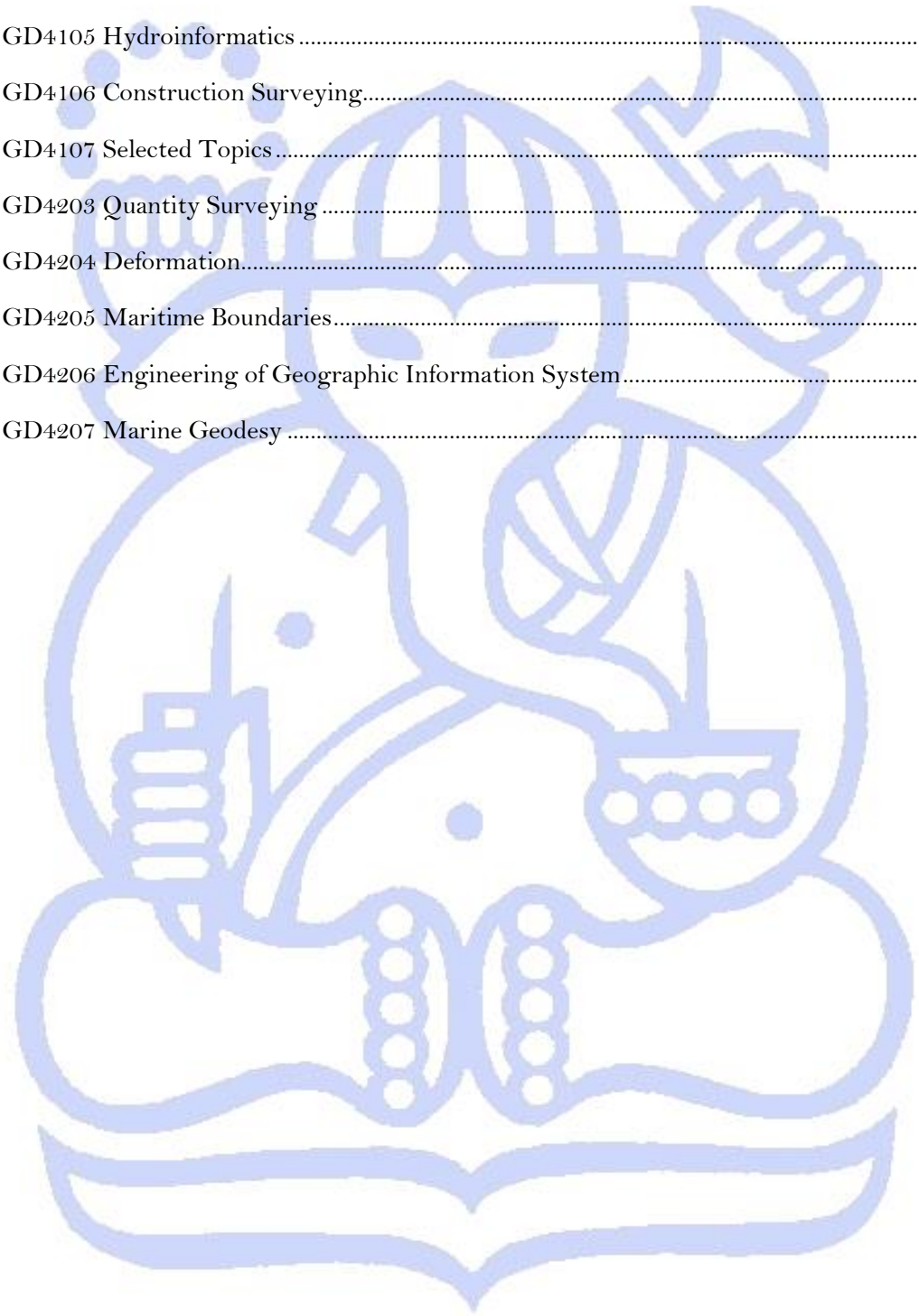
Module Handbook

2013 – 2018 Curriculum

Undergraduate Programme in
Geodesy and Geomatics Engineering
Faculty of Earth Sciences and Technology
Institut Teknologi Bandung

Contents



2. GD2101 Positioning I

Module Name	**Positioning I**
Module level, if applicable	Beginner
Code, if applicable	GD2101
Subtitle, if applicable	-
Courses, if applicable	GD2101 Positioning I
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Kosasih Prijatna, Agoes Soewandito Soedomo, Dwi Wisayantono
Lecturer	Agoes Soewandito Soedomo; Andri Hernandi; Dwi Wisayantono; Asep Yusup Saptari; Kosasih Prijatna; Rizqi Abdulharis
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics Engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Able to describe, applied concept, and applied surveying concept include distance measurement, angle measurement and levelling.

	Psychomotor**:** Students are able to perform positioning, determining the position, angle, distance and levelling ***Affective*****:** Following the rules of the courses
Content	This course deals with concept and determination methods of direction, angle, distance and position. Concept of 2D dan 3D position, application concept and determination methods of direction, angle, distance, and positioning (horizontal and vertical).
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Cormack, 1997, Surveying 2. Deumlich, 1997, Surveying Instrument 3. Abidin Z A, 2002, Survey dengan GPS, Penerbit Pradnya Paramita 4. Wilson, 1971, Land Surveying 5. Umaryono, Ilmu Ukur Tanah Seri A 6. Umaryono, Ilmu Ukur Tanah Seri B 7. Ghilani DG and Wolf PR, *Elementary Surveying: An Introduction to Geomatics* (latest edition)

3. GD2102 Geometric Geodesy

Module Name	**Geometric Geodesy**
Module level, if applicable	Beginner
Code, if applicable	GD2102
Subtitle, if applicable	-
Courses, if applicable	GD2102 Geometric Geodesy
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Dina Anggreni Sarsito, Kosasih Prijatna, Wedyanto
Lecturer	Dina Anggreni Sarsito; Vera Sadarviana; Kosasih Prijatna; Teguh Purnama Sidiq; Wedyanto; Heri Andreas
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 4 hours x 16 weeks per semester Tutorial
Workload	Class: 4 hours x 14 weeks = 56 hours Structured activities : 4 hours x 14 weeks = 56 hours Independent Study: 4 hours x 14 weeks = 56 hours Exam: 2 hours x 2 time = 4 hours Total = 172 hours
Credit points	4 sks ~ 5.32 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended	***Cognitive:*** Able to understand and applied geometric geodesy concept.

learning outcomes	***Psychomotor:*** Students are able to perform Geometric Geodesy Calculation ***Affective:*** Following the rules of the courses
Content	This course provides the students basic knowledge on geometry of ellipsoid, geodetic datum, geodetic positioning computation and map projection. In addition, this course emphasizes the use of computer programming (i.e. MATLAB) to accelerate the student's understanding Introduction to geometric geodesy, geometry of ellipsoid, geodetic datum, direction, angle/azimuth, distance above ellipsoid surface, geodetic computation and map projection.
Study and examination requirements and forms of examination	***Cognitif:*** Written test (Mid Test, Final Test, Assignment, Quiz ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely :(a) Contributions (attendance, active, role, initiative, language) , (b) Being on time , (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Borre K: *Ellipsoidal Geometry and Conformal Mapping*, Lecture Notes, Aalborg University, 2003 2. Jekely C: *Geometric Reference Systems in Geodesy*, Division of Geodesy and Geospatial Science, School of Earth Sciences, Ohio State University,2006 3. Krakiwsky EJ: *Conformal Map Projection in Geodesy*, Lecture Notes 37, University of New Brunswick, 1973. 4. Krakiwsky EJ & Thompson DB: *Geodetic Position Computations*, Lecture Notes 39, University of New Brunswick, 1978.

4. GD2103 Statistics Geodesy

Module Name	**Statistics in Geodesy and Geomatics Engineering**
Module level, if applicable	Beginner
Code, if applicable	GD2103
Subtitle, if applicable	-
Courses, if applicable	GD2103 Statistics Geodesy
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Agustinus Bambang SETYADJI, Dudy Darmawan Wijaya, Irwan Meilano
Lecturer	Agustinus Bambang SETYADJI; Zamzam Akhmad Jamaluddin T.; Dudy Darmawan Wijaya; Irwan Gumilar; Irwan Meilano; Vera Sadarviana
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics Engineering
Type of teaching, contact hours	Class Lecture: 4 hours x 16 weeks per semester Computation Tutorial.
Workload	Class: 4 hours x 14 weeks = 56 hours Structured activities : 4 hours x 14 weeks = 56 hours Independent Study: 4 hours x 14 weeks = 56 hours Exam: 2 hours x 2 time = 4 hours Total = 172 hours
Credit points	4 sks ~ 5.32 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Able to understand and analize basic statistics in geodesy and geomatics applications

	Psychomotoric: Students are able to apply basic statistic for geodesy and geomatics applications ***Affective:*** Following the rules of the courses
Content	Review/recall of basic concept of Statistics, Introductory statistic (idealization, simplification), Introduction to Geodesy and Geomatics data characteristic, descriptive and inferential statistic, probability concept and data distribution, estimation (mean, median, modus, range, standard deviation, variance, outlier), statistical test (Null Hypothesis, rejection criteria), statistical application to Geodesy & Geomatics Problems for estimation and quality control.
Study and examination requirements and forms of examination	***Cognitive:*** Written test (Mid Test, Final Test, Assignment, Quiz) ***Psychomotoric:*** Tutorial Practice ***Affective:*** Assessed from the element /variables achievement, namely: (a) Contributions (attendance, active, role, initiative, language) , (b) Being on time , (c) Effort
Media employed	Classical teaching tools with white board and visual presentation material
Reading list	1. Probability & statistics for engineers & scientists/Ronald E. Walpole [et al.] 9th ed., 2012, Prentice Hall. 2. Adjustment computations: spatial data analysis / Charles D. Ghilani. 5th ed. 2010, John Wiley & Sons, Inc.

5. GD2104 Geodetic Computation I

Module Name	**Geodetic Computation I**
Module level, if applicable	Beginner
Code, if applicable	GD 2104
Subtitle, if applicable	-
Courses, if applicable	GD 2104 Geodetic Computation I
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Dudy Darmawan Wijaya , Dina Anggreni Sarsito, Wedyanto
Lecturer	Dudy Darmawan Wijaya; Heri Andreas; Irwan Meilano; Irwan Gumilar; Wedyanto; Dina Anggreni Sarsito;
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Type of teaching: Face to face lecture, literature review, exercise/tutorial Contact hour: 12 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-

Module objectives/intended learning outcomes	***Cognitive:*** Students are able to apply principles of elementary linear algebra to solve linearized problems in geodesy and geomatics ***Psychomotor:*** Students are able to develop a system of linear equations, which relates the observations and parameters, and solve it using an elementary linear algebra ***Affective:*** Students are able to obey the rules of the courses
Content	This course provides an elementary linear algebra (i.e. a system of linear equations, Gaussian elimination, determinant, eigenvector/eigenvalue) and a concept of linearization as well as their applications to solve problems in geodetic positioning and coordinate transformations.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practice ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. H. Anton and C. Rorres (2014) Elementary linear algebra, 11th eds., John Willey and Sons, Inc. ISBN: 978-1-118-43441-3. 2. S.C. Chapra andR.P. Canale, (1998) Numerical Methods for Engineers, McGraw-Hill Book Co. 3. G. Strang and K. Borre (1997) Linear Algebra, Geodesy & GPS, Cambridge-Wellesley.

6. GD2105 Introduction to Spatial System

Module Name	**Introduction to Spatial System**
Module level, if applicable	Beginner
Code, if applicable	GD2105
Subtitle, if applicable	-
Courses, if applicable	GD2105 Introduction to Spatial System
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Prof. Widyo Nugroho S, Poerbandono, Akhmad Riqqi
Lecturer	Widyo Nugroho; Eka Djunarsjah; Akhmad Riqqi; Dwi Wisayantono; Poerbandono
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics Engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 16 weeks per semester Tutorial
Workload	Lecture (class): 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 86 hours
Credit points	2 SKS ~ 2.66 ECTS
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	1. Students can explain how to understand a phenomenon through a systems approach

	2. Students can explain that a complex system can be simplified in the model 3. Students can demonstrate that the idea of a system is an original scholarly perspective that is not a procedure or rule that has been there or seen 4. Students are able to explain the definition of space and issues in the realm of spatial problems in development (spatial, economic, maritime) and environmental protection (global change, adaptation strategies, sustainability) 5. Students are able to explain that the problems in the economy and national defense strategy may occur due to the low spatial intelligence in the planning and implementation of development
Content	Structure, behavior, boundaries, and levels in the system. Comparison between the various systems. The type and characteristics of the system. Typology and elements of the system. Behavior of a system. Approach and the stages of modeling. The use of a model system for problem resolution. Location, movement, spatial relationships, and spatial transformation as spatial elements. Spatial problems in development (spatial, economic, maritime) and environmental protection (global change, adaptation strategies, sustainability). Domain problem and problem identification using system approach. Transformation and analogy of problems into spatial systems. Spatial technology and the spatio-temporal process. The use of spatial technologies in simulation and spatial modeling. Spatial analyses on various aspects of national development.

Study and examination requirements and forms of examination	***Cognitive:*** Written test (Mid Test, Final Test, Assignment, Quiz ***Psychomotor:*** Practice ***Affective:*** assessed from the element /variables achievement, namely :(a) Contributions (attendance, active, role, initiative, language) , (b) Being on time , (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Bertalanffy, L.V.(1968). General System Theory. George Brazillier. New York. 2. Skyttner, L. (2001). General Systems Theory. World Scientific Publishing, Singapore. 3. Odum, H.T.(1983). System Ecology: An Introduction. John Wiley & Sons. 4. Odum, H.T.(1983). Ekologi Sistem : Suatu Pengantar. Gajah Mada University Press. Jogja (Edisi Indonesia).

7. GD2106 Geospatial Expedition (Field Work)

Module Name	**Geospatial Expedition (Field Work)**
Module level, if applicable	Beginner
Code, if applicable	GD2106
Subtitle, if applicable	-
Courses, if applicable	GD 2106 Geospatial Expedition
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Irwan Gumilar, Rizqi Abdulharis
Lecturer	Rizqi Abdulharis; Riantini Virtriana; Sella Lestari Nurmaulia; Irwan Gumilar; Mipi Ananta Kusuma; Teguh Purnama Sidiq
Language	Indonesian
Relation to curriculum	Compulsory module for undergraduate program in Geodesy and Geomatics Engineering
Type of teaching, contact hours	Type of teaching: Face to face lecture, pratical work at campus, and fieldwork on field Contact hours: 6 hours x 16 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended	***Cognitive***: Students are able to demonstrate understanding on concepts on fieldwork activity

learning outcomes	planning, map reading, orienteering, survival, team building, first aid and emergency response, and Health, Safety, and Environment (HSE) ***Psychomotor***: Students are able to fieldwork activity planning, perform map utilisation, orienteering, survival, team building, first aid and emergency response, and HSE, as well as to develop reports for every activity ***Affective***: Students are able to: - Understand the purpose of activity - Understand the role and authority on every activity - Build trust between team members and establish an atmosphere of honesty and openness, and equal loyalty - Develop open communication between fellow team members - Resolve personal and team problems, show appreciation, open to criticism, and have positive attitude - Collaborate with fellow team members and other teams - Develop good fieldwork activity plan - Develop determination to achieve activity's objectives - Innovate to solve problems on field - Develop good activity report
Content	Fieldwork activity planning, map reading, , orienteering, survival, team building, first aid and emergency response, and Health, Safety, and Environment (HSE)
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, final exam, quizzes, assignments, activity reports ***Psychomotor***: Rubric for every activity ***Affective:*** Rubric for every activity

Media employed	- Visual media namely white board and projector, references such as books, papers, and other types of online publications - Props - Fieldwork site
Reading list	1. Steven Boga (1997). Orienteering: The Sport of Navigating with Map & Compass. Stackpole Books. 2. "Download Clue". Delaware Valley Orienteering Association. Retrieved 2009-09-01.

8. GD2201 Positioning II

Module Name	**Positioning II**
Module level, if applicable	Beginner
Code, if applicable	GD 2201
Subtitle, if applicable	-
Courses, if applicable	GD 2201 Positioning II
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Kosasih Prijatna, Dwi Wisayantono, Andri Hernandi, Agoes Soewandito Soedomo
Lecturer	Dwi Wisayantono, Sudarman, Andri Hernandi, Asep Yusup Saptari, Agoes Soewandito Soedomo; Budhy Soeksmantono; Kosasih Prijatna, Teguh Purnama Sidik.
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD 2101 Positioning I

Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain and implement systems and positioning applications ***Psychomotor:*** Students are able to perform positioning ***Affective:*** Following the rules of the lecture courses
Content	This course is about positioning and application in cadaster, hydrography, and photogrammetry, including Positioning procedure, positioning methods: terrestrial, astronomic, satellite, acoustic, photogrammetry (aero triangulation).
Study and examination requirements and forms of examination	***Cognitive:*** Written test (Mid Test, Final Test, Assignment, Quiz ***Psychomotor:*** Practice ***Affective:*** assessed from the element /variables achievement, namely :(a) Contributions (attendance, active, role, initiative, language) , (b) Being on time , (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Wilson, 1971,Land Surveying 2. Wolf, p.R, and B A Dewitt, 2000,. Element of Photogrammetry: with Application in GIS, 3rd ed. McGraw Hill, New York, 608 p. 3. Deumlich, 1997, Surveying Instrument 4. de Jong, Lachapelle G, Skone S, Elema IA (2002), Hydrography Delft University Press. 5. George Vosselman and Hans-Gerd Maas (2010), Airborne and Terrestrial Laser Scanning 6. Abidin Z A, Geodesi Satelit (2001), PT Pradnya Paramita 7. Petunjuk Teknis PMA/KBPN Nomor 3 Tahun 1997 Materi Pengukuran dan Pemetaan Pendaftaran Tanah 8. US Army Corps of Engineers, 2002, Engineering and Design : Structural Deformation Surveying

	(engineer Manual EM 1110-2-1009) [paperback] 9. Umaryono, Statistik untuk Surveying 10. Walter G Robillard and Lane J Bouman, 1998, Clarck on Surveying and Boundaries.

9. GD2202 Geometric Reference System

Module Name	**Geometric Reference System**
Module level, if applicable	Beginner
Code, if applicable	GD 2202
Subtitle, if applicable	-
Courses, if applicable	GD 2202 Geometric Reference System
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Kosasih Prijatna, Dina Anggreni Sarsito, Irwan Meilano
Lecturer	Dina Anggreni Sarsito, Heri Andreas, Kosasih Prijatna, Vera Sadarviana, Irwan Meilano, Teguh Purnama Sidik.
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 4 hours x 16 weeks per semester
Workload	Class: 4 hours x 14 weeks = 56 hours Structured activities : 4 hours x 14 weeks = 56 hours Independent Study: 4 hours x 14 weeks = 56 hours Exam: 2 hours x 2 time = 4 hours Total = 172 hours
Credit points	4 SKS ~ 5.32 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2102 Geometric Geodesy

Module objectives/intended learning outcomes	***Cognitive:*** Able to understand and explain the concept of Geospatial Reference System in the field of geodesy and geomatics ***Psychomotor:*** Able to design the basic geodetic framework for mapping purposes ***Affective:*** Following the rules of the lecture courses
Content	In this course, the students will be taught a comprehensive knowledge on concept of geospatial reference system and its applications for positioning. Introduction, geospatial reference system, review of coordinate system, basics of terrestrial reference system, global reference system and frame, terrestrial reference system, realization of reference frame (1D, 2D, 3D), coordinate transformation, and datum transformation.
Study and examination requirements and forms of examination	***Cognitive:*** Written test (Mid Test, Final Test, Assignment, Quiz ***Psychomotor:*** Practice ***Affective:*** assessed from the element /variables achievement, namely :(a) Contributions (attendance, active, role, initiative, language) , (b) Being on time , (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Jekely, C : Geometric Reference Systems in Geodesy, Division of Geodesy and Geospatial Science, School of Earth Sciences, Ohio State University.2006 2. Torge, W and Muller, J: Geodesy, Walter De Gruyter. 2012.

10. GD2203 Estimation and Approximation

Module Name	Estimation and Approximation
Module level, if applicable	Beginner
Code, if applicable	GD2203
Subtitle, if applicable	-
Courses, if applicable	GD2203 Estimation and Approximation
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Agustinus Bambang Setyadji, Wiwin Windupranata, Irwan Meilano
Lecturer	Agustinus Bambang Setyadji; Vera Sadarviana; Wiwin Windupranata; Zamzam Akhmad Jamaluddin T.; Irwan Meilano; Kosasih Prijatna
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester.
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2103 Statistics Geodesy
Module objectives/intended learning outcomes	***Cognitive:*** Able to apply basic concept of statistic and estimation theory in Geodesy and Geomatics

	Psychomotor: Able to analyze the problems and solving practical computation in Geodesy ***Affective:*** Following the rules of course
Content	This course deals with applications of estimation theory for solving common problems in Geodesy. This course provides methods to solve various geodetic problems related to parameter estimation, spatiotemporal interpolation, and data analysis in time/spatial and spectral domains.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from mid-test, final-test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of affective performance: (a) contribution (attendance, being active, role, initiative, and language), (b) time appreciating, (c) effort.
Media employed	Classical teaching tools with white board and power point presentation.
Reading list	1. Teunissen, P.J.G: Adjustment Theory: An Introduction, MGP TU-Delft, 1999 2. Blais, J.A.R: Estimation and Spectral Analysis, the Univ. of Calgary Press, 1988 3. Kamen, E.W., and Heck, B.S.: Fundamentals of Signals and Systems, Prentice Hall, New Jersey, 1997 4. Teunissen, P.J.G., Dynamic Data Processing, MGP TU-Delft, 2001 5. Chapra, S.C., and Canale, R.P., Numerical Methods for Engineers, Sixth Edition, McGraw-Hill Education, 2010

11. GD2204 Geodetic Computation II

Module Name	**Geodetic Computation II**
Module level, if applicable	Beginner
Code, if applicable	GD2204
Subtitle, if applicable	-
Courses, if applicable	GD2204 Geodetic Computation II
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Kosasih Prijatna, Irwan Meilano, Dudy Darmawan Wijaya, Dina Anggreni Sarsito
Lecturer	Kosasih Prijatna, Bambang Setyadjie, Dudy Darmawan Wijaya; Heri Andreas; Irwan Meilano; Irwan Gumilar; Dina Anggreni Sarsito; Zamzam A.J. Tanuwijaya
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Type of teaching: Face to face lecture, literature review, exercise/tutorial Contact hour: 12 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2104 Geodetic Computation I GD2103 Statistics Geodesy

Module objectives/intended learning outcomes	***Cognitive:*** Students are able to apply principles of least square adjustment to solve linearized problems in geodesy and geomatics ***Psychomotor:*** Students are able to represent non-linear geodetic problems into linear ones and then to estimate geodetic parameters along with their error analyses. ***Affective:*** Students are able to obey the rules of the courses
Content	This course provides a basic concept of least square adjustment for geodetic data analysis, including three types of adjustment methods (parametric, conditional and mixed adjustments). This course also provides a basic concept of error analyses for the observations and estimated parameters, including propagation of the errors, outlier detection and quality control. In this course, students learn how to apply the least square adjustments for some typical geodetic cases (terrestrial and space-based positioning and coordinate transformations)
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from responses and practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Ghilani, C.D., and Wolf P.R., (2006), Adjusment Computation: Spatial Data Analysis, John Wiley and Sons, Inc. ISBN:978-0-471-6972802.

2. Mikhail EM., and Gracie G., (1981), Analysis and adjustment of survey measurements, Van Nostrand Reinhold, ISBN-13:978-0442253691.

12. GD2205 Satellite Geodesy

Module Name	**Satellite Geodesy**
Module level, if applicable	Beginner
Code, if applicable	GD2205
Subtitle, if applicable	-
Courses, if applicable	GD2205 Satellite Geodesy
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Dudy Darmawan Wijaya, Heri Andreas, Irwan Gumilar
Lecturer	Dudy Darmawan Wijaya; Teguh Purnama Sidiq; Heri Andreas; Mipi Ananta Kusuma; Irwan Gumilar; Wedyanto
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 16 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2103 Statistics Geodesy
Module objectives/intended learning outcomes	***Cognitive:*** Able to understand and explain satellite using in solving geodesy problems

	Psychomotor: Able to do computations related to the basic of satellite geodesy ***Affective:*** Following the rules of course
Content	This course provides the students basic knowledge on the use of satellite in Geodesy. Introduction, Coordinate System, Time System, Orbit System, Signal Propagation, SLR System, LLR System, VLBI System, Satellite Altimetry, GNSS
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from assignments ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Seeber, Gunter: Satellite Geodesy, Foundation, Methods, and Applications, Walter de Gruyter Berlin. New York. 1993 2. Abidin. Z. H: Geodesi Satelit, PT. Pradnya Paramita. 2001

13. GD2206 Geospatial Law and Regulations

Module Name	**Geospatial Law and Regulations**
Module level, if applicable	Beginner
Code, if applicable	GD2206
Subtitle, if applicable	-
Courses, if applicable	GD2206 Law and Regulation Geospatial
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Prof. Dr.Ir. Widyo Nugroho SULASDI
Lecturer	Prof. Dr.Ir. Widyo Nugroho SULASDI Dr. Ir. Dwi Wisayantono Dr. Akhmad Riqqi, ST, MS
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 16 weeks per semester
Workload	Lecture (class): 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain law products related to geospatial information

	Psychomotor: Students are able to interpret law products related to geospatial information ***Affective:*** Following the rules of the course
Content	This course discusses about basic knowledge in law and regulation that aplly in national constitution, especially in data spatial arrangement. The course also discussion about logic and legal hierarchy, scope of arrangement, legal structure and interpretation of legal products, and some legal products (Geospatial Information Act, Agrarian Act, Spatial Planning Act, Local Goverment Act, Territory Boundary Act).
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from interpretation of law products ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Djunarsjah, E., Aspek Teknis Hukum Laut, Penerbit ITB Bandung, 2007 2. Djunarsjah, E., Kumpulan Peraturan Perundangan Geospasial, 2013 3. Hasim, P., Pengantar Ilmu Hukum Indonesia, Fakultas Hukum USU, Medan, 2007 4. IHO, S-57 Technical Aspects of the Law of the Sea, 2006 5. United Nations, The Convention of the Law of the Sea, 1983

14. GD3101 Terrestrial Mapping

Module Name	Terrestrial Mapping
Module level, if applicable	Intermediate
Code, if applicable	GD3101
Subtitle, if applicable	-
Courses, if applicable	GD3101 Terrestrial Mapping
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Prof. Dr. Ir. S. Hendriatiningsih. MS
Lecturer	Prof. Dr. Ir. S. Hendriatiningsih. MS Dr. Ir. Dwi Wisayantono, MT Ir. Agoes Suwandito S., MT Dr. Ir. Asep Yusup Septari. Ir. Sudarman, MT
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Lecture (class): 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2201 Positioning II GD2202 Geospatial Reference System

	GD2102 Geometric Geodesy
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain and apply terrestrial mapping correctly ***Psychomotor:*** Students are able to do terrestrial mapping ***Affective:*** Following the rules of course
Content	- The meaning of map (kind of maps, component of map, map geometry (map projection, coordinate system and reference) - Map principle, methods and technology of mapping (terrestrial, photogrammetry, remote sensing, and hydrography) - Process, procedure, methods, and visualization of terrestrial mapping (horizontal & vertical reference frame) - Detail situation mapping: offset, tachymetri, and graphic methods. - Data visualization: numerical and grapichal - Map accuracy quantitatively and qualitatively - Define area with coordinate and graphical methods - Longitudinal and transverse profiles - Earthwork - Solar azimuth - Setting out
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Cormack, 1997,Surveying

	2. Deumlich, 1997, Surveying Instrument 3. Kavanach, 1997, Surveying with Construction Application 4. Wilson, 1971,Land Surveying 5. Umaryono, Ilmu Ukur Tanah Seri C

15. GD3102 Hydrography I

Module Name	**Hydrography I**
Module level, if applicable	Intermediate
Code, if applicable	GD3102
Subtitle, if applicable	-
Courses, if applicable	GD3102 Hydrography I
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Poerbandono, Eka Djunarsjah, Irdam Adil
Lecturer	Irdam Adil, Samsul Bachri, Eka Djunarsjah, Poerbandono, Wiwin Windupranata
Language	Indonesian/English
Relation to curriculum	Compulsory courses for undergraduate program in geodesy and geomatics engineering
Type of teaching, contact hours	Lecture (face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2101 Positioning I GD2201 Positioning II GD2202 Geospatial Reference System
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the concept, performance, and limitation of underwater acoustics

	use and SONAR system for bathymetric mapping and seabed study. Students are able to explain depth sounding procedure and bathymetric mapping. - Student is able to explain the concept of sound underwater, SONAR system, depth sounding, and bathymetric mapping; - Student is able to describe the technical sequences of depth sounding and bathymetric mapping, as well as to rationalize the scientific concept of each of such sequences; - Student is able to prepare bathymetric survey plan according to a given term of reference; - Student is able to present bathymetric map from depth sounding data, involve tidal correction, and apply nautical cartography; - Student is able to describe the concept of Multi Beam Echo Sounder, Side Scan SONAR, and Sub-Bottom Profiler. ***Psychomotor:*** Students are able to do bathymetric data processing and bathymetric mapping ***Affective:*** Following the general provisions which is set by course
Content	This course contains underwater acoustics, SONAR system, depth sounding, and seabed study. Acoustics, its generation and physical properties. Propagation and sound speed. Refraction, reflection, and backscattering. Noise, refraction index, acoustic reception, and performance of underwater acoustics instruments. Selection of system and data recording. Transducer and hydro-acoustics. Hydro-acoustics imaging. Sounder calibration and sounding reduction and accuracy. Depth sounding (in river, coastal and offshore) and sounding data processing. Bathymetric mapping. Seabed geometry and properties

	(sediment, feature). Sounding survey and acoustics swath. Seabed survey: hydro-acoustics method, direct inspection, sampling (grab, core). Interpretation and detection of seabed features.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Focus, (b) Respect, (c) Literacy, and (d) Contribution.
Media employed	Classical teaching tools with white board and power point presentation. Blendedlearning page.
Reading list	1. de Jong CD, Lachapelle G, Skone S, Elema IA (2002). Hydrography. Delft University Press. 2. Lurton X (2003). An Introduction to Underwater Acoustics: Principles and Applications. Springer Verlag. 3. Poerbandono, Djunarsjah, E. (2005). SurveiHidrografi. Penerbit PT. RefikaAditama. 4. IHO (2005). Manual on Hydrography. C-13.

16. GD3103 Photogrammetry I

Module Name	**Photogrammetry I**
Module level, if applicable	Intermediate
Code, if applicable	GD3103
Subtitle, if applicable	-
Courses, if applicable	GD3103 Photogrammetry I
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Saptomo Handoro Mertotaruno, Deni Suwardhi, Irawan Soemarto;
Lecturer	Deni Suwardhi; Agung Budi Harto; Irawan Soemarto; Budhy Soeksmantono; Saptomo Handoro Mertotaroeno; Andri Hernandi
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2202 Geospatial Reference System
Module objectives/intended	***Cognitive:*** Students are able to explain principles and image processing in photogrammetry

learning outcomes	***Psychomotor:*** Students are able to do positioning in photogrammetry ***Affective:*** Following the rules of course
Content	This course contain Elements of Aerial Photogrammetry, Image Geo-referencing, Point Positioning by Photogrammetry. Introductory Concepts, Elementary Photogrammetry, Photogrammetric Sensing System, Mathematical Concepts in Photogrammetry, Image Measurements and Refinements, Photogrammetric Orientation, Aero-Triangulation / AT.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Mikhail, E.M., J.S. Bethel, and J.C. McGlone, 2001. Introduction to Modern Photogrammetry, John Wiley & Sons, Inc., New York, 479 p. 2. Wolf, P.R., and B.A. Dewitt, 2000. Elements of Photogrammetry: with Application in GIS, 3rd ed., McGraw-Hill, New York, 608 p. 3. McGlone, J.C., ed., 2004. Manual of Photogrammetry, 5th ed., American Society of Photogrammetry and Remote Sensing, Maryland 20814, USA, 1151 p.

17. GD3104 Spatial Database

Module Name	**Spatial Database**
Module level, if applicable	Intermediate
Code, if applicable	GD3104
Subtitle, if applicable	-
Courses, if applicable	GD3104 Spatial Data Base
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Albertus Deliar, Akhmad Riqqi, Deni Suwardhi
Lecturer	Akhmad Riqqi; Budhy Soeksmantono; Albertus Deliar; Riantini Virtriana; Deni Suwardhi; Agung Budi Harto
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students understand and able to explain the theories of database design

	Psychomotor: Students are able to design and implement database for GIS ***Affective:*** Following the rules of the course
Content	This study deals with designing a conceptual model of Geographic Information Systems database. Database definition, repeating groups, duplication and redundant, determinant and identifier, fully normalized table, entity relationship concept, degree and class of relationship, skeleton table, conceptual model, spatial database structure
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Howe, D.R, 1982. Data Analysis for Data Base Design, Edward Arnold, Leicester, 293 pp. 2. Atre, Shaku, 1988, Data Base, Structured Techniques for Design, Performance and Management, 2nd Edition, John Wiley & Sons, New York. 3. Halpin, Terry, 1995. Conceptual Schema & Relational Database Design, Second Edition, Prentice Hall Australia, Sydney. 4. Bernhardsen, T., 1996, Geographic Information Systems, John Wiley & Sons.

18. GD3105 Surveying by GNSS

Module Name	**Surveying by GNSS**
Module level, if applicable	Intermediate
Code, if applicable	GD3105
Subtitle, if applicable	-
Courses, if applicable	GD3105 Surveying by GNSS
Semester(s) in which the module is taught	3rd Semester
Person responsible for the module	Hasanuddin Z. Abidin, Heri Andreas, Irwan Gumilar
Lecturer	Hasanuddin Z. Abidin; Heri Andreas; Mipi Ananta Kusuma; Irwan Gumilar; Teguh Purnama Sidiq
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2205 Satellite Geodesy
Module objectives/intended learning outcomes	***Cognitive:*** Students know and understand various aspects related to GNSS technology and their characteristics, the principles of positioning using GPS and its problems, planning and doing a GPS

	survey, as well as the applications of GPS technology for engineering and research. ***Psychomotor:*** Doing the assigments and are able to do a GPS survey ***Affective:*** Following the rules of the course.
Content	This course deals with applications of Global Navigation Satellite System, especially GPS (Global Positioning System) for solving geodetic problems, e.g. positioning and its temporal variation as applied to engineering and scientific applications. GPS In General; GPS Signal and Observables; Positioning with GPS; Differencing and Data Combinations; Errors and Biases; Applications, Introduction to GPS Surveying; GPS Survey Planning and Preparation.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Abidin, Z.A, : Penentuan Posisi dengan GPS dan Aplikasinya, Pradnya Paramita, Jakarta (2000) 2. Abidin, Z.A, : Survei dengan GPS, Pradnya Paramita, Jakarta (2002) 3. B. Hoffman-Wellenhof et.al. (1994). GPS, Theory and Practice. Springer Verlag, Berlin

19. GD3201 Cartography

Module Name	**Cartography**
Module level, if applicable	Intermediate
Code, if applicable	GD3201
Subtitle, if applicable	-
Courses, if applicable	GD3201 Cartography
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Akhmad Riqqi, Agung Budi Harto, Albertus Deliar
Lecturer	Akhmad Riqqi; Alfita Puspa Handayani; Agung Budi Harto; Riantini Virtriana; Albertus Deliar; Sella Lestari Nurmaulia
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3101 Terrestrial Mapping GD3102 Hidrography I
Module objectives/intended	***Cognitive***: Students are able to explain the design and production process of maps

learning outcomes	***Psychomotor:*** Students are able to design and create maps ***Affective:*** Following the rules of the course
Content	This course contain map design and process of map production. Concept and cartography principle, geometry aspect, map design, data classification, topography map, thematic map, digital cartography, quality of spatial data, process of map production, cartography for chart
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, and language), (b) Appreciating time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Hadwi Soendjojo & Akhmad Riqqi, Kartografi, Penerbit ITB, 2012 (Pustaka utama) 2. Author(s), Element of Carthography. 6th Edition., John Wiley & Sons, Inc., Year.

20. GD3202 Hydrography II

Module Name	**Hydrography II**
Module level, if applicable	Intermediate
Code, if applicable	GD3202
Subtitle, if applicable	-
Courses, if applicable	GD3202 Hydrography II
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	Poerbandono, Eka Djunarsjah, Wiwin Windupranata
Lecturer	Irdam Adil, Samsul Bachri, Eka Djunarsjah, Poerbandono, Wiwin Windupranata, Dudy Darmawan Wijaya
Language	Indonesian/English
Relation to curriculum	Compulsory courses for undergraduate program in geodesy and geomatics engineering
Type of teaching, contact hours	Lecture (face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3102 Hydrography I
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the theory of tide, measurement methods and analyses; physical characteristics of sea water; mechanism and

	propagation of waves; oceanographic survey method and its data analysis; and introduction to hydrodynamics modeling for ocean tide simulation. - Explain the theory of tide and describe its characteristics. - Explain and execute water level observation, and assess water level observation data. - Explain tidal current, describe its measurement, and analyze such data. - Perform tidal data analysis, define tidal levels, and identify tidal regimes. - Establish tidal datums and execute tidal prediction. - Describe non-tidal effects on water level and identify their variations. - Explain the physical properties of sea water. - Explain the physical process of ocean and coastal current. - Explain the generation of ocean waves and their interaction with coastal bathymetry. - Explain principles of oceanographic observation and perform oceanographic data processing and visualization. ***Psychomotor:*** Students are able to do work with water level observation data, carry out tidal analysis and prediction, as well as wave statistics. ***Affective:*** Following the general provisions which is set by course
Content	This course contains study about tide and oceanography for hydrography. Tides (theory, observation, tidal stream, tidal analysis, tidal information), non-tidal sea surface variations, oceanographic parameters (physical water properties, currents, waves), and oceanographic survey (sampling, processing, presentation and analysis).

Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Focus, (b) Respect, (c) Literacy, and (d) Contribution.
Media employed	Classical teaching tools with white board and power point presentation. Blendedlearning page.
Reading list	1. Garrison T (2008). Essentials of Oceanography. 5th international ed, Brooks Cole, 464 pp. 2. de Jong CD, Lachapelle G, Skone S, Elema IA (2002). Hydrography. Delft University Press. 3. Poerbandono, Djunarsjah E (1995). Survei Hidrografi. Refika Aditama. 4. IHO (2005). Manual on Hydrography. C-13. 5. Open University (1999). Waves, Tides, and Shallow Water Processes.

21. GD3203 Photogrammetry II

Module Name	**Photogrammetry II**
Module level, if applicable	Intermediate
Code, if applicable	GD3203
Subtitle, if applicable	-
Courses, if applicable	GD3203 Photogrammetry II
Semester(s) in which the module is taught	5th Semester
Person responsible for the module	Irawan Soemarto, Saptomo Handoro Mertotaruno, Deni Suwardhi
Lecturer	Irawan Soemarto; Andri Hernandi; Deni Suwardhi; Agung Budi Harto; Saptomo Handoro Mertotaroeno; Budhy Soeksmantono
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 16 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3101 Photogrammetry I
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the mapping principles and processes using photogrammetry

	Psychomotor: Students are able to do photogrammetric mapping ***Affective:*** Following the rules of the course
Content	This course contain Topographic Mapping and Spatial Data Extraction, Photogrammetric Project Planning, Quality Assurance (QA) and Quality Control (QC) of Photogrammetric Mapping. Digital Photogrammetry, Softcopy Photogrammetric Workstation, Elementary Methods of Planimetric Mapping for GIS, Topographic Mapping and Spatial Data Extraction, Photogrammetric Project Planning.
Study and examination requirements and forms of examination	***Cognitive:*** Assessed from midterm test, end of term test, assignments, and quiz ***Psychomotor:*** Assessed from practices ***Affective:*** Assessed from variables of performance, namely: (a) Contribution (attendance, being active, role, initiative, language), (b) Appreciating time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Mikhail, E.M., J.S. Bethel, and J.C. McGlone, 2001. Introduction to Modern Photogrammetry, John Wiley & Sons, Inc., New York, 479 p. 2. Wolf, P.R., and B.A. Dewitt, 2000. Elements of Photogrammetry: with Application in GIS, 3rd ed., McGraw-Hill, New York, 608 p. 3. McGlone, J.C., ed., 2004. Manual of Photogrammetry, 5th ed., American Society of Photogrammetry and Remote Sensing, Maryland 20814, USA, 1151 p.

22. GD3204 Thematic Mapping

Module Name	Thematic Mapping
Module level, if applicable	Intermediate
Code, if applicable	GD3204
Subtitle, if applicable	-
Courses, if applicable	GD3204 Thematic Mapping
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Akhmad Riqqi, Agung Budi Harto, Wiwin Windupranata.
Lecturer	Akhmad Riqqi; Poerbandono; Agung Budi Harto; Riantini Virtriana; Wiwin Windupranata; Sella Lestari Nurmaulia
Language	Indonesia
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the purpose of thematic mapping; nature, grouping, and

	presenting spatial distribution of thematic data; determine representative value of quantitative thematic data. ***Psychomotor:*** Students are able to perform modeling using GIS software. ***Affective:*** Following the rules of the courses
Content	This course deals with basic of mapping Students can explain: 1. Methodology of thematic mapping 2. Purpose of mapping are the tools for geographic analysis 3. Some of technique procurement atribut data or thematic data, especially of quantitative (interval and rasio) 4. Procedure presentation of thematic information at map Students can present thematic information in map with theme of earth or marine and theme of legal.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Omelink, 199x, Introduction Tematic Mapping 2. Laksono, B. E., 1992, Standar Pemetaan Tematik untuk Program Pengembangan Prasarana Kota Terpadu (P3KT) 3. de Blij, H.J., 1996, Physical Geography of the Global Environment, John Wiley and Sons

23. GD3205 Remote Sensing

Module Name	**Remote Sensing**
Module level, if applicable	Intermediate
Code, if applicable	GD3205
Subtitle, if applicable	-
Courses, if applicable	GD3205 Remote Sensing
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Ketut Wikantika, Bambang Edhi Leksono S, Irawan Soemarto
Lecturer	Ketut Wikantika; Agung Budi Harto; Bambang Edhi Leksono S.; Samsul Bachri; Irawan Soemarto; Asep Yusup Saptari
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 4 hours x 14 weeks per semester Practice
Workload	Class: 4 hours x 14 weeks = 56 hours Structured activities : 4 hours x 14 weeks = 56 hours Independent Study: 4 hours x 14 weeks = 56 hours Exam: 2 hours x 2 time = 4 hours Total = 172 hours
Credit points	4 SKS x 1.33 ~ 5.32 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2202 Sistem Referensi Geospasial

Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the principles and digital image processing ***Psychomotor:*** Students are able to extract information from remote sensing data. ***Affective:*** Following the rules of the courses
Content	Radiometric and geometric correction, image spectral transformation, digital image processing technique, image information extraction from various sensor data. Remote sensing principle, radiometric correction, geometric correction, digital image processing technique, LiDAR mapping, micro wave remote sensing, information extraction from remote sensing data.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Jensen, John R., 1996, Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall; 318 p. 2. Sabins, Floyd F., 1997, Remote Sensing: Principles and Interpretation, Freeman, 494 p. 3. Gonzalez, Rafael C., 1987, Digital Image Processing, Prentice Hall; 793 p. 4. Floyd F. SABINS, Jr, Remote Sensing, Principles and Interpretation.W. H. FREEMAN and Company, San Francisco.

24. GD3206 Field Camp

Module Name	Field Camp
Module level, if applicable	Intermediate
Code, if applicable	GD3206
Subtitle, if applicable	-
Courses, if applicable	GD3206 Field Camp
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Irwan Gumilar; Rizqi Abdulharis
Lecturer	Irwan Gumilar, Rizqi Abdulharis, Teguh P. Sidiq, Sella Nurmaulia, Alfita Handayani, Didik Wihardi
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2101 Positioning I GD2201 Positioning II GD2202 Geometric Reference System GD3101 Terrestrial Mapping GD3105 GNSS Survey

Module objectives/intended learning outcomes	***Cognitive***: Students are able to explain the process of field preparation, field operations planning, team building, introduction of system operation surveying and mapping equipment, Induction of Health Safety and Environment (HSE), mobilization, demobilization, guided field practice, data acquisition, data processing, data visualization technical report writing, and presentation ***Psychomotor***: Students are able to implement all phases of survey and mapping works including report writing and presentation ***Affective***: Students are able to follow the procedures and rules of the field activities
Content	Field operations planning, team building, introduction of system operation surveying and mapping equipment, Induction of Health Safety and Environment (HSE), mobilization, demobilization, guided field practice, processing and presentation of data, technical report writing. 1. Field operations planning, team building, introduction of system operation surveying and mapping equipment 2. Project Proposal Writing: Background, Scope of work, Methods, Induction of Health Safety and Environment (HSE), mobilization, demobilization, Timeline Schedule and Bill of Quantity 3. Guided field practice: Survey Planning, Reconnaissance, Measurement of Horizontal and Vertical Network, Measurement of detailed topographic and land boundaries 4. Data processing and data visualization 5. Quality control of data observation and data processing 6. Technical report writing

Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Field Work Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative and language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation, Field work at campus and on field
Reading list	1. Cormack, 1997, Surveying 2. Deumlich, 1997, Surveying Instrument 3. Abidin Z A, 2002, Survey dengan GPS, Penerbit Pradnya Paramita 4. Wilson, 1971, Land Surveying 5. Jekely, C, 2006, Geometric Reference Systems in Geodesy, Division of Geodesy and Geospatial Science, School of Earth Sciences, Ohio State University 6. Wolf dan Ghilani, 1987, Adjusment Computation. 7. Soetomo Wongsotjitro, 1986. Ilmu Ukur Tanah

25. GD4101 Geographic Information System

Module Name	**Geographic Information System**
Module level, if applicable	Advanced
Code, if applicable	GD4101
Subtitle, if applicable	-
Courses, if applicable	*GD4101 Geographic Information System*
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Albertus Deliar; Agung Budi Harto; Akhmad Riqqi
Lecturer	Agung Budi Harto; Alfita Puspa Handayani; Akhmad Riqqi; Rizqi Abdulharis; Albertus Deliar; Riantini Virtriana
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester Practice
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS x 1.33 ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3205 Spatial Data Base GD3201 Cartography

Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain the principles of Geographic Information System ***Psychomotor :*** Students are able to manage spatial data by using Geography Information System Technology ***Affective:*** Following the rules of the courses
Content	This course provides insight and knowledge to the students about GIS, development, and application. Basic concept of geospastial data, GIS Concepts, data structure, spatial analysis, GIS modelling
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Gorr, W. L. dan K. S. Kurland, GIS Tutorial Basic Workbook, ESRI Press, 2008 [Main Reference] 2. Bernhardsen, T., Geographic Information Systems, John Wiley & Sons, 1996 [Main Reference] 3. Rolf, A. (editor), Principles of Geographic Information Systems, ITC Educational Textbook Series, ITC Enschede, The Netherlands, 2001 4. Korte, G. B. A practioner's Guide: The GIS Book, edisi 4, Onward Press, USA, 2001 5. Antenucci, J. C., K. Brown, P. L. Croswell, M. J. Kevany dan H. Archer, Geographic Information Systems: A Guide to the Technology, Van Nostrand Reinhold, New York, 1991

26. GD4102 Cadastre System

Module Name	Cadastre System
Module level, if applicable	Advanced
Code, if applicable	GD4102
Subtitle, if applicable	-
Courses, if applicable	GD4102 Cadastre System
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Andri Hernandi
Lecturer	Alfita Puspa Handayani, Andri Hernandi, Bambang Edhi Leksono, Irawan Soemarto, Rizqi Abdulharis, Sella Lestari Nurmaulia
Language	Indonesian
Relation to curriculum	Compulsory module for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Type of teaching: Face to face lecture, literature review, workshop Contact hour: 12 hours x 14 weeks per semester
Workload	Class: 4 hours x 14 weeks = 56 hours Structured activities : 4 hours x 14 weeks = 56 hours Independent Study: 4 hours x 14 weeks = 56 hours Exam: 2 hours x 2 time = 4 hours Total = 172 hours
Credit points	4 SKS x 1.33 ~ 5.32 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	Pre-requisite(s): GD3105 *Hukum dan Perundangan Geospasial* (Geospatial Law and Regulation)

	Co-requisite(s): GD4101 *Sistem Informasi Geografis* (Geographic Information System)
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to demonstrate basic understanding on the concepts on spatial unit management, administration, and cadastre system; as well as its application throughout the world and in Indonesia ***Psychomotor:*** Students are able to apply her/his knowledge on the above mentioned concepts to recommend solution(s) to open problem(s) ***Affective:*** Students are actively developing comprehension on the above mentioned concept and its application, contributing to activities during implementation of module, and following the rules of the module
Content	This course deals with spatial unit management, administration, and cadastre system; as well as its application. This comprises of the fundamentals of the above mentioned concept mainly human-land relationship and evolution of cadastral system; spatial unit management system; spatial unit tenure, use, and value system; legal, regulatory, fiscal, and multipurpose cadastre; cadastral mapping; and future vision of cadastre.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, final exam, quizzes, assignments, workshop presentation ***Psychomotor:*** Workshop presentation ***Affective:*** Assignments, workshop presentation, contributions (activeness, initiative, language), being on time, and effort.
Media employed	Visual media namely white board and projector, references such as books, papers, regulations, and other types of online publications

Reading list	1. Williamson, I, Enemark, S., Rajabifard, A., Wallace, J., Land Administration for Suistanable Development, ESRI, 2010 2. PeraturanPemerintah no. 24 tahun 1997 tentangPendaftaran Tanah 3. PetunjukTeknis PMNA/ KBPN Nomor 3 Tahun 1997 MateriPengukuran Dan PemetaanPendaftaran Tanah. 4. Prawoto, A., TeoridanPraktekPenilaianProperti, FE UGM

27. GD4103 Environmental Geography

Module Name	**Environmental Geography**
Module level, if applicable	Advanced
Code, if applicable	GD4103
Subtitle, if applicable	-
Courses, if applicable	GD4103 Environmental Geography
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Wiwin Windupranata
Lecturer	Agung Budi Harto; Samsul Bachri; Wiwin Windupranata
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3205 Spatial Data Base GD3201 Cartography
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain and model the human interaction with the environment spatially.

	Psychomotor: Students are able to perform modeling using Geography Information System Technology ***Affective:*** Following the rules of the courses
Content	Students can understand the human impact on the environment (pollution, flood, erosion, danlainnya), the dynamics of spatial changes and trends and global change, environmental risk analysis Homeland (threat, exposure, vulnerability, adaptive capacity) and utilization of geospatial data for process modeling environment SIG. Process modeling environment with GIS: water balance, erosion, climate change, eco-regional planning, land use, and adaptation strategies and sustainability.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. de Blij, H.J., 1996, Physical Geography of the Global Environment, John Wiley and Sons 2. Strahler, Alan H. , 1992, Modern Physical Geography, John Wiley and Sons 3. Press, Frank, 1994, Understanding Earth, W. H. Freeman and Company.

28. GD4001 Internship

Module Name	Internship
Module level, if applicable	Advanced
Code, if applicable	GD4001
Subtitle, if applicable	-
Courses, if applicable	GD4001 Internship
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Budhy Soeksmantono, Rizqi Abdulharis
Lecturer	Budhy Soeksmantono
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Face to face lecture: 3 times x 2 hours Practical work on site: minimum 8 hours/day x 22 days Reporting = maximum 8 hours/day x 2 days Presentation = maximum 4 hours
Workload	Face to face lecture: 3 times x 2 hours = 6 hours Practical work on site: minimum 8 hours/day x 22 days = 176 hours Reporting = maximum 8 hours/day x 2 days = 16 hours Presentation = maximum 4 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-

Module objectives/intended learning outcomes	***Cognitive**:* Students can explain the preparation of professional profiles, ordinances communicate and report preparation techniques. Students has ability to adapt based on their knowledge when they are introduced to new technology, methods or tools in geodesy and geomatics engineering ***Psychomotor**:* Students can draw up professional profiles, communicate well, and compiling reports. ***Affective**:* Following established guidelines
Content	- Minimum 1 month full-time internship - CV composition - Verbal and written communication - Reporting
Study and examination requirements and forms of examination	***Cognitive:*** Assignments, Report ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Desk Intership / Field work Intership / Desk and Field Work Intership
Reading list	-

29. GD4002 Undergraduate Thesis

Module Name	Undergraduate Thesis
Module level, if applicable	Advanced
Code, if applicable	GD4002
Subtitle, if applicable	-
Courses, if applicable	GD4002 Undergraduate Thesis
Semester(s) in which the module is taught	8th semester
Person responsible for the module	Agustinus Bambang Setyadji; Andri Hernandi
Lecturer	Agustinus Bambang Setyadji; Andri Hernandi
Language	Indonesian/English
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	4 Times classroom Lecture. A minimum 2 (two) hours discussion with the supervisors until the final examination.
Workload	2 Semesters of supervised research and scientific writing. Product of this course will be a scientific report book, 1 (one) published/presented scientific paper, and 1 (one) presentation poster.
Credit points	6 SKS x 1.33 ~ 7.98 ECTS
Requirements according to the examination regulations	The Student have to choose topics on Geodesy and/or Geomatics as their subject of research and scientific writing. Final examination can be done after the thesis book is approved by the supervisor(s).
Recommended prerequisites	-

Module objectives/intended learning outcomes	**Affective**: Indicates the behavior, layout and appearance speak polite and educated, and able to convey ideas and knowledge honestly, based, structured, effective and accurate in a scope of selected application of geospatial engineering. **Cognitive Psychomotor**: Ability to communicate ideas and knowledge formally in writing and orally as well as demonstrate the ability to use the approach, methods and/or spatial engineering technology for the completion of an open problem at an geospatial application fields. **Affective-Psychomotor**: Understanding the definition and role of their potential and be able to search, find and select facts and information related to geospatial engineering applications in a structured and independent basis.
Content	Survey literature citations, and literature, writing (including layout), test read (proof reading), and presentations, research methods (literature study, experiment / measurement / observation / field surveys, experiments scaled / laboratory, modeling / simulation), processing, analysis, presentation and interpretation of data The presentation of maps in the report, supervised work (evaluation of progress, process, and outcome) Thesis Seminar, exam (final and comprehensive topic) 1. Surveying the literature, citation and bibliography 2. Writing (including layout), test read (proof reading), and the presentation 3. Research methods: literature review, experiment / measurement / observation / field surveys, experiments scaled / laboratory, modeling / simulation

	4. Processing, analysis, presentation and interpretation of data 5. The presentation of maps in the report 6. Work guided (an evaluation of progress, process, and outcome) 7. Final Seminar 8. exam (final and comprehensive topic)
Study and examination requirements and forms of examination	***Cognitive:*** Writing, Comprehensive Exam, Seminar, Poster, Paper, Thesis Book, Presentation ***Psychomotor:*** Writing Skill, Analysis Skill, Programming Skill, Presentation Skill ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and slide presentation material.
Reading list	1. Kamus Besar Bahasa Indonesia (KBBI), 2. Pedoman Ejaan Bahasa Indonesia yang Disempurnakan, English Thesaurus Guides, English Grammar Guides.

30. GD4201 Geospatial Information Industry

Module Name	**Geospatial Information Industry**
Module level, if applicable	Advanced
Code, if applicable	GD4201
Subtitle, if applicable	-
Courses, if applicable	GD4201 Geospatial Information Industry
Semester(s) in which the module is taught	8th Semester
Person responsible for the module	Poerbandono, Irwan Gumilar
Lecturer	Poerbandono; Dwi Wisayantono; Irwan Gumilar; Agustinus Bambang Setyadji
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3205 Spatial Data Base GD3201 Cartography
Module objectives/intended learning outcomes	***Cognitive:*** Students can explain the meaning, scope and role of geospatial information industry as intellectual capital, which can be used to ensure the accuracy of

	decision-making, both for planning and operations. Students can analyze the general structure and business processes in an industry, and explains the system elements in a business entity. ***Psychomotor***: Students indicate readiness in attitude and thinking to pass as a scholar, as well as having the readiness to completeness as a professional. ***Affective:*** Following the rules of the courses
Content	Information industry, geospatial information, industrial and business management, system theory and approach, project management, and case studies. Industry and economy, supply-demand, price equilibrium, competitive forces. Management process, organizational objective, and problem identification and decision making. Marketing strategy and business growth. Time value of money and return on investment. Cost behaviour and break-even point analysis. Human resources. Definition of system, problem definition, and system approach for problem solving. Cost-Quality-Time constraints in project management, work breakdown structure, resources estimation, and scheduling. Case studies: survey and mapping projects and industries, geospatial information business and any relevant business innovation, legal, taxation, banking, business practices, workforces, and start-up. The spirit of this course is to allow students to build analogy to think in understanding the meaning, scope and role of geospatial information industry as a value creator for improving the quality of life, and to build knowledge-based technological entrepreneurship (Technopreneurship).
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice

	Affective: Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, and language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Churchill NC, Lewis VL. (1983). The five stages of small business growth. Harvard Business Review, May-June, 11pp. 2. Fornefeld M, Oefinger P, Rausch U (2003). The market for geospatial information: Potentials for employment, innovation, and value added. MICUS Management Consulting GmbH, 12pp. 3. Gaudet CH, Annulis HM, Carr JC (2003). Bulding the geospatial workforce. URISA Journal 15(1), pp. 21-30. 4. Porter ME (1979). How competitive forces shape strategy, Harvard Business Review, March-April. 5. UN-GGIM (2013). Future trends in geospatial information management: The five to ten year vision, 40pp. 6. Tennet J (2008). Guide to financial management. Profile Book Ltd. London, 333pp. 7. Hardin LE (2002), Problem solving concepts and theories, JVME 30(3), 227-230. 8. Laszlo A, Krippner S (1998). System theories: Their origins, foundation, and development. In Jordan JS (Ed.). System theories and a priori aspects of perceptions. Elsevier Science, Ch 3 pp. 47-74. 9. Baars W (2006) Project management handbook. DANS, The Hague, 83pp.

31. GD4202 Quality Management System

Module Name	**Quality Management System**
Module level, if applicable	Advance
Code, if applicable	GD4202
Subtitle, if applicable	-
Courses, if applicable	GD4202 Quality Management *System*
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Poerbandono, Agustinus Bambang SETYADJI
Lecturer	Irawan Soemarto, Mipi Ananta Kusuma, Poerbandono, Agustinus Bambang SETYADJI
Language	Indonesian
Relation to curriculum	Compulsory Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3206 Field Camp GD4001 Internship
Module objectives/intended learning outcomes	***Cognitive:*** Students can explain: 1. Purpose and quality assurance plan mapping in managing the risk of mistakes (errors) in the

	data, the process of acquisition, processing, and presentation. 2. The quality control procedures to ensure that the data (obtained through the acquisition, processing, and later served) meet the applicable standards or set. 3. Importance of records or documentation of data and activities on each work step in the process of acquisition, processing, and presentation of data to the benefit of the reconstruction of the production of geospatial information. ***Psychomotor:*** Student can develop and present (in written) procedure primarily for controlling quality, and secondarily for assuring quality of data in specific (or selected) cases related to geospatial information. ***Affective:*** Following the general provisions, which is set by course.
Content	Risk assessment: Definition of risk, risk formulation, quantification of risk. Quality management: planning, control, assurance, quality improvement, PDCA cycle. Documents and publications related to standards in surveying, mapping, and geographic information. Elements of production process of geospatial information and identification of risks of errors in and between elements. Assessment of quality of data and information with selected examples mapping, e.g. bathymetry, topography, photogrammetry. Designing quality management plan. Designing quality control plan. The role of human resources and technology in maintaining and improving quality.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice

	Affective: Assessed from variables of performance, namely: (a) Focus, (b) Respect, (c) Literacy, and (d) Contribution.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Schlickman JJ (2003). ISO 9001: 2000 Quality Management System Design. 2. Goetsch DL, Davis S (2014). Introduction to Total Quality (Management). 3. Al-Hakim L (2003). Information Quality Management: Theory and Applications.

32. GD3106 Introduction to Physical Geodesy

Module Name	**Introduction to Physical Geodesy**
Module level, if applicable	Intermediate
Code, if applicable	GD3106
Subtitle, if applicable	-
Courses, if applicable	GD3106 Introduction to Physical Geodesy
Semester(s) in which the module is taught	For students in 6th or 7th or 8th semester
Person responsible for the module	Dina Anggreni Sarsito, Kosasih Prijatna
Lecturer	Dina Anggreni Sarsito; Teguh Purnama Sidiq; Kosasih Prijatna; Vera Sadarviana
Language	Indonesian
Relation to curriculum	Elective Courses for Undergraduate Program in Geodesy and Geomatics Engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2 SKS x 1.33 ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD2102 Geometrics Geodesy GD2202 Geometric Reference System
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to comprehend and explain the earth's shape and dimension, and its temporal variation by employing earth's gravity information.

	Psychomotor: Students are able to employ earth's gravity information in the shape of geoid surface. ***Affective:*** Following the rules of the courses
Content	In this course, the students will be taught a comprehensive knowledge on the earth's shape and dimension, and its temporal variation by employing earth's gravity information.
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, Final exam, Quizzes, Assignments ***Psychomotor:*** Practice ***Affective:*** Assessed from the element /variables achievement, namely (a) Contributions (attendance, active, role, initiative, and language), (b) Being on time, (c) Effort.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Moritz, H., and B.H. Wellenhof, Physical Geodesy, Springer Wien, New York, 2006 2. Torge, W., Gravimetry, Walter de Gruyter, Berlin and New York, 1989 3. Rummel, R., Physical Geodesy 1, Collegediktaat Faculteit der Geodesie, TU Delft, 1992 4. Heiskanen W & Moritz H: Physical Geodesy, WH Freeman, 1967

33. GD4104 Environmental Remote Sensing

Module Name	**Environmental Remote Sensing**
Module level, if applicable	Advanced
Code, if applicable	GD4104
Subtitle, if applicable	-
Courses, if applicable	GD4104 Environmental Remote Sensing
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Ketut Wikantika, Bambang Edhi Leksono S
Lecturer	Ketut Wikantika ; Agung Budi Harto ; Bambang Edhi Leksono S.; Samsul Bachri;
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2SKS ~ 2.66ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3104 Remote Sensing GD4101 Geospatial Information System
Module objectives/intended learning outcomes	***Cognitive:*** Students will be able to explain digital image processing techniques for environment application.

	Psychomotor: Students will be able to apply digital image processing techniques for environmental information extraction. ***Affective:*** Following the study program lecture rules
Content	This course contain introduction, fundamental concepts of remote sensing, digital image processing techniques and its application in remote sensing data to extract environmental information. Introduction to the concept of remote sensing fundamentals, basic knowledge of the principles and applications of remote sensing, digital image interpretation techniques, and applications of remote sensing in the extraction of environmental information.
Study and examination requirements and forms of examination	***Cognitive:*** assessed from midterms, final exam, assignments, quizzes ***Psychomotor:*** assessed from practical process ***Affective:*** assessed from prestige note elements/variables, which are: (a) Contributions (attendance, activeness, roles, inisiative, language), (b) Appreciation of time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Barrett, E.C. & Curtis, L.F., 2007, Introduction to Environmental Remote Sensing, Routledge Publisher. 2. Jensen, John R., 1996, Introductory Digital Image Processing: A Remote Sensing Perspective, Prentice Hall; 318 p. 3. Sabins, Floyd F., 1997, Remote Sensing: Principles and Interpretation, Freeman, 494 p. 4. Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, 3rd Edition, Prentice Hall, 2002.

34. GD4105 Hydroinformatics

Module Name	**Hydroinformatics**
Module level, if applicable	Advanced
Code, if applicable	GD4105
Subtitle, if applicable	-
Courses, if applicable	GD4105 Hydroinformatics
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Poerbandono, Wiwin Windupranata
Lecturer	Poerbandono, Wiwin Windupranata
Language	Indonesian/English
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3102 Hydrography I GD3202 Hydrography II
Module objectives/intended learning outcomes	***Cognitive:*** Students will be able to explain the process and factors that could affect ocean and coastal dynamic, water quality in coastal area, and interaction between ocean, coastal, and atmosphere dynamic parameter; to

	understand the design criteria for met ocean study and to do calculation on metocean study for engineering in coastal and offshore area purposes; and to apply numerical approach for modeling hydrodynamics. 1. Student is able to explain parameters involved in coastal hydrodynamics; 2. Student is able to describe the process of transport of sediment; 3. Student is able to perform a single metocean parameter for the purpose of Front End Engineering Design (FEED); 4. Student is able to define properties of water and elements of water quality; 5. Student is able to depict factors of regional oceanography, emphasizing Indonesian water; 6. Student is able to apply numerical tool for simulation of coastal hydrodynamics. ***Psychomotor:*** Students are able to do work with and generate information and knowledge from meteorological and oceanographic dataset for the purpose of ocean prediction and design criteria. ***Affective:*** Following the general provisions, which is set by course.
Content	This course contains ocean and coastal dynamics, metocean study, and numerical modelling. Details of the content include the process of generation of gravity wave and its propagation across nearshore zone; the relation between tide and tidal current, as well as their observation and analytical description; the characteristics of hydrodynamics across wave- and tide-dominated coasts and estuary; the process of erosion, transport, and deposition of sediment; the approach for prediction of sediment transport, its observation and impact on changes of seabed elevation; mean regime analysis by carrying out descriptive statistical approach for occurrence analysis; extreme value analysis of a

	single metocean parameter using Weibull distribution and plot on Gumbel paper; physical, chemical, and biological properties of seawater, and their processes throughout tidal cycle and season; regional, steric, and synodic effects on Indonesian ocean and its adjacent region, particularly ENSO and Through Flow; partial differential equation (PDE) for carrying out modelling of advection and diffusion of fluids on 2D; construction of 1D calculation using PDE for simulation of changes of water elevation with time due to tide; construction of computational domain for simulation of 2D current of a simple coastal region and perform senstivity analysis; calibration of tide and current simulation using observation data and report the result of performance of 2D numerical simulation; and analytical report on tide and tidal current based on result from calibrated 2D numerical simulation.
Study and examination requirements and forms of examination	***Cognitive:*** assessed from midterms, final exam, assignments, quizzes ***Psychomotor:*** assessed from practical process ***Affective:*** Assessed from variables of performance, namely: (a) Focus, (b) Respect, (c) Literacy, and (d) Contribution.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Garrison T (2008). Essentials of Oceanography. 5th international ed, Brooks Cole, 464 pp. 2. Masselink G, Hughes MG (2003), Introduction to Coastal Processes and Geomorphology, Hodder Arnold Publication, pp. 354 3. Chapra SC (2012) Applied Numerical Methods with MATLAB for Engineers and Scientists, Third Edition, Mc GrawHill, 2012 4. Reiss RD, Thomas M (2007) Statistical analysis of extreme values.

	Reiß RD, Thomas M (2007) Statistical Analysis of Extreme Values: with Applications to Insurance, Finance, Hydrology and Other Fields.

35. GD4106 Construction Surveying

Module Name	Construction Surveying
Module level, if applicable	Advanced
Code, if applicable	GD4106
Subtitle, if applicable	-
Courses, if applicable	GD4106 Construction Surveying
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Prof. Dr. Ir. S. Hendriatiningsih, MS.
Lecturer	Prof. Dr. Ir. S. Hendriatiningsih, MS. Dr. Ir. Dwi Wisayantono, MT Dr. Ir. Asep Yusuf Septari Ir. Sudarman, MT
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester
Workload	Lecture (class): 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD3201 Cartography GD3101 Terestrial Mapping GD3202 Hydrographic II

	GD3203 Photogrametry II
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain about setting out points in engineering survey. ***Psychomotor:*** Students are able to do and implement setting out in the field. ***Affective***: Students are able to follow the rules of courses.
Content	- Route surveying, horizontal & vertical curvature, grade/slope - Setting out horizontal points - Setting out circle from TC/CT - Setting out circle from CC, PI, and O - Spiral and transition Curve - Setting out spiral - Symmetric and asymmetric vertical curve - Setting out vertical points - Define area in the field - Earthwork
Study and examination requirements and forms of examination	***Cognitive:*** assessed from midterms, final exam, assignments, quizzes ***Psychomotor:*** assessed from practical process ***Affective:*** assessed from prestige note elements/variables, which are: (a) Contributions (attendance, activeness, roles, inisiative, language), (b) Appreciation of time, (c) Effort
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Barry F Kavanagh,1997, Surveying with Construction Applications, Prentice Hal,Inc 2. W.Schofield, 1998, Engineering Surveying, Butterworth-Heinemann. 3. William Irvine,1995, Surveying For Construction, McGraw-Hill Book Company.

36. GD4107 Selected Topics

Module Name	Selected Topics
Module level, if applicable	Advanced
Code, if applicable	GD4107
Subtitle, if applicable	Spatial Data Infrastructure
Courses, if applicable	GD4107 Selected Topics
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Agustinus Bambang Setyadji, Rizqi Abdulharis
Lecturer	Agustinus Bambang Setyadji, Rizqi Abdulharis
Language	Indonesian
Relation to curriculum	Directed elective modul for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Type of teaching: Face to face lecture, literature review, workshop Contact hours: 9 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to demonstrate advanced understanding on Spatial Data Infrastructure; as well as its application throughout the world and in Indonesia

	Psychomotor : Students are able to apply her/his knowledge on the above mentioned concept to recommend solution(s) to geospatial-related complex problem(s) ***Affective:*** Students are actively developing comprehension on the above mentioned concept and its application, contributing to activities during implementation of module, and following the rules of the module
Content	Concept, policy, standard, technology, institutional aspect, and application of Spatial Data Infrastructure
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, final exam, quizzes, assignments, workshop presentation ***Psychomotor:*** Workshop presentation ***Affective:*** Assignments, workshop presentation, contributions (activeness, initiative, language), being on time, and effort.
Media employed	Classic Visual media namely white board and projector, references such as books, papers, regulations, and other types of online publications al teaching tools with white board and power point presentation
Reading list	1. Nebert, D. Douglas (2012). Developing Spatial Data Infrastructure: The SDI Cookbook version 2.0. Retrieved on 1 August 2013 from 2. http://gsdiassociation.org/images/publications/cookbooks/SDI_Cookbook_from_Wiki_2012_update.pdf

37. GD4203 Quantity Surveying

Module Name	**Quantity Surveying**
Module level, if applicable	Advanced
Code, if applicable	GD4203
Subtitle, if applicable	-
Courses, if applicable	GD4203 Quantity Surveying
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	Bambang Edhi Leksono S; ; Irawan Soemarto
Lecturer	Bambang Edhi Leksono S.; Asep Yusup Saptari; Irawan Soemarto; Sella Lestari Nurmaulia
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Type of teaching: In-class lecture, literature review, and workshop Contact hour: 9 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD4102 Cadastre System
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to demonstrate analytical thinking on land and building surveying and valuation

	and real estate management; as well as their procurement process and legal aspect ***Psychomotor:*** Students are able to perform procurement process and simulate land and building surveying and valuation and real estate management ***Affective:*** Students are actively developing comprehension on the above mentioned concept and its application, contributing to activities during implementation of module, and following the rules of the module
Content	- Land and building surveying - Land and building valuation - Real estate management - Legal aspect of land and building surveying and valuation and real estate management - Procurement process on land and building surveying and valuation
Study and examination requirements and forms of examination	***Cognitive:*** Midterm exam, final exam, quizzes, assignments, workshop presentation ***Psychomotor:*** Workshop presentation ***Affective:*** Assignments, workshop presentation, contributions (activeness, initiative, language), being on time, and effort.
Media employed	Visual media namely white board and projector, references such as books, papers, regulations, and other types of online publications
Reading list	1. Seeley IH. (1997). Quantity Surveying Practice, 2nd Revised Macmillan; ISBN 978-0-333-68907-3 2. Seeley IH. (1998). Building Quantities Explained 5th Revised edition, Macmillan ISBN 978-0-333-71972-5 3. Lee S. Trench W. Willis A. (2005) Elements of Quantity Surveying. 10th Edition WileyBlackwell; ISBN 978-1-4051-2563-5

	4. Ashworth A. Hogg K. (2007). Willis's Elements of Quantity Surveying 12 Rev Ed edition Blackwell Publishing. ISBN 978-1-4051-4578-7.

38. GD4204 Deformation

Module Name	Deformation
Module level, if applicable	Advanced
Code, if applicable	GD4204
Subtitle, if applicable	-
Courses, if applicable	GD4204 Deformation
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Dina Anggreni Sarsito; Irwan Meilano
Lecturer	Dina Anggreni Sarsito; Heri Andreas; Irwan Meilano; Irwan Gumilar
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students will have the knowledge and ability to monitor the dynamics of the earth, especially deformation phenomena using geodetic methods

	Psychomotor: After attending this course, students are able to explain how to monitor and analyze the phenomenon of earth dynamics and deformation using geodetic methods and understand the basic idea in deformation models. ***Affective:*** Following the rules of the lecture courses.
Content	This course provides the students comprehensive knowledge on application of geodesy for studying the Earth dynamic and deformation including its design and geodetic measurements as well as deformation analysis. Including Introduction, Basic deformation theory, Deformation monitoring technology, Deformation phenomena.
Study and examination requirements and forms of examination	***Cognitive:*** assessed from mid test, final exam, Tasks, Quiz ***Psychomotor:*** assessed from the laboratory ***Affective:*** assessed from the elements / achievement ***variables:*** (a) Contributions (attendance, active, role, initiative, and language), (b) Respect for the time, (c) Business.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Turcotte D.L., Schubert G., :Geodynamics, 3rd edition, 2014 2. Caspary, W.F.,: Concepts of Network and Deformation analysis, monograph 11, School of Surveying UNSW, Kensington, NSW, Australia 1987. 3. Fowler, C.M.,: The Solid Earth: Introduction to Global Geophysics, Cambridge University Press, 1993. 4. Kuang, S: Geodetic Network Analysis and Optimal Design: Concepts and Applications, Ann Arbor Press, Inc, 1996. 5. Lambeck, K: Geophysical Geodesy: The Slow Deformation of The Earth, Claredon Press, Oxford, 1998.

	6. Dzurisin, D: Volcano Deformation: Geodetic Monitoring techniques, Springer , 2007.

39. GD4205 Maritime Boundaries

Module Name	Maritime Boundaries
Module level, if applicable	Advanced
Code, if applicable	GD4205
Subtitle, if applicable	-
Courses, if applicable	GD4205 Maritime Boundaries
Semester(s) in which the module is taught	4th Semester
Person responsible for the module	Eka Djunarsjah; Heri Andreas
Lecturer	Eka Djunarsjah; Heri Andreas
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities: 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD 2206 Geospatial Law and Regulations
Module objectives/intended learning outcomes	Students are able to understand the concept of maritime delimitation both nationally and internationally, to understand and analyze the problems, and to

	understand the marine cadaster current issue in Indonesia
Content	This course content maritime boundaries and related to marine cadaster, including definition and concept of baseline, international and national maritime zone characteristics, national and international maritime boundaries delimitation, marine cadaster, case study for maritime boundaries and marine cadaster.
Study and examination requirements and forms of examination	***Cognitive:*** assessed from mid test, final exam, Tasks, Quiz ***Psychomotor:*** assessed from the laboratory ***Affective:*** assessed from the elements / achievement variables: (a) Contributions (attendance, active, role, initiative, language), (b) Respect for the time, (c) Business.
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. BPN-RI, Prosedur Pengukuran Ruang Perairan, 2011 2. Djunarsjah, E., Aspek Teknis Hukum Laut, Penerbit ITB Bandung, 2007 3. IHO, S-51 Technical Aspects of the Law of the Sea, 2006 4. Kemendagri-RI, Pedoman Penegasan Batas Daerah, 2012 5. United Nations, The Convention of the Law of the Sea, 1983

40. GD4206 Engineering of Geographic Information System

Module Name	**Engineering of Geographic Information System**
Module level, if applicable	Advanced
Code, if applicable	GD4206
Subtitle, if applicable	-
Courses, if applicable	GD4206 Engineering of Geographic Information System
Semester(s) in which the module is taught	8th Semester
Person responsible for the module	Albertus Deliar; Deni Suwardhi
Lecturer	Albertus Deliar; Riantini Virtriana; Deni Suwardhi; Alfita Puspa Handayani
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 3 hours x 14 weeks per semester
Workload	Class: 3 hours x 14 weeks = 42 hours Structured activities : 3 hours x 14 weeks = 42 hours Independent Study: 3 hours x 14 weeks = 42 hours Exam: 2 hours x 2 time = 4 hours Total = 130 hours
Credit points	3 SKS ~ 3.99 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	GD 4101 Geospatial Information System
Module objectives/intended learning outcomes	***Cognitive:*** Students understand and able to explain the methods of spatial analysis in GIS model development. ***Psychomotor:*** Students are able to perform spatial modeling with GIS.

	Affective: Following the rules of the lecture courses.
Content	This course will give the knowledge about basic principle of GIS modelling, integrated GIS by using statistics methods, and the future of GIS. GIS review, surface analysis, advanced analysis, non-spatial database analysis, procedure analysis, site selection analysis, trend analysis, GIS model, GIS design, Spatial decision support system, Web GIS and pilot project.
Study and examination requirements and forms of examination	***Cognitive***: assessed from mid test, final exam, Tasks, Quiz ***Psychomotor:*** assessed from the laboratory ***Affective:*** assessed from the elements / achievement variables, : (a) Contributions (attendance, active, role, initiative, language), (b) Respect for the time, (c) Business
Media employed	Classical teaching tools with white board and power point presentation
Reading list	1. Michael Zeiler (1999). Modeling Our World, ESRI Press. 2. Chou, T.H. (1997), Exploring Spatial Analysis in Geographic Information Systems, Onword Press, Santa Fe. 3. Christman, N. (1997), Exploring Geographic Information Systems, John Wiley and Sons, New York.

41. GD4207 Marine Geodesy

Module Name	**Marine Geodesy**
Module level, if applicable	Advanced
Code, if applicable	GD4207
Subtitle, if applicable	-
Courses, if applicable	GD4207 Marine Geodesy
Semester(s) in which the module is taught	8th Semester
Person responsible for the module	Dina Anggreni Sarsito; Dudy Darmawan Wijaya
Lecturer	Dina Anggreni Sarsito; Vera Sadarviana; Dudy Darmawan Wijaya; Zamzam Akhmad Jamaluddin T.
Language	Indonesian
Relation to curriculum	Supervised Elective Courses for undergraduate program in Geodesy and Geomatics engineering
Type of teaching, contact hours	Lecture (Face to face lecture): 2 hours x 14 weeks per semester
Workload	Class: 2 hours x 14 weeks = 28 hours Structured activities : 2 hours x 14 weeks = 28 hours Independent Study: 2 hours x 14 weeks = 28 hours Exam: 2 hours x 2 time = 4 hours Total = 88 hours
Credit points	2SKS ~ 2.66 ECTS
Requirements according to the examination regulations	1. Registered in this course 2. Minimum 80% attendance in this course
Recommended prerequisites	-
Module objectives/intended learning outcomes	***Cognitive:*** Students are able to explain how to do a positioning, bathymetry profile determination and gravity of the earth in the sea area using geodetic technologies (including satellite technology)

	Psychomotor: Students are able to calculate the position detailing and make bathymetry profiles also calculate gravity in the sea area. ***Affective:*** Following the rules of the lecture courses
Content	This course deals with the role of geodesy in marine environment. The course subjects includes precise positioning, seabed mapping, and earth's gravity field determination by using the most recent technology. Including, Introduction; Geodetic frame and reference system review, Observables; Precise positioning techniques; Satellite geodesy in marine environment; Sea surface topography determination; Thematic Map and Marine geodesy application status.
Study and examination requirements and forms of examination	***Cognitive:*** assessed from mid test, final exam, Tasks, Quiz ***Psychomotor:*** assessed from the laboratory ***Affective:*** assessed from the elements / achievement variables, : (a) Contributions (attendance, active, role, initiative, language), (b) Respect for the time, (c) Business
Media employed	Classical teaching tools with white board and power point presentation.
Reading list	1. Jekely, C : Geometric Reference Systems in Geodesy, Division of Geodesy and Geospatial Science, School of Earth Sciences, Ohio State University.2006 2. Torge, W and Muller, J: Geodesy, Walter De Gruyter. 2012 3. Seeber, Gunter : Satellite Geodesy, Foundation, Methods, and Applications, Walter de Gruyter Berlin. New York. 1993 4. Fu, L.L and A Cazenave : Satellite altimetri and earth science, Academic Press, 2001.