Module Handbook

UNDERGRADUATE PROGRAM OF GEOLOGICAL ENGINEERING
FACULTY OF EARTH SCIENCE AND TECHNOLOGY
INSTITUT TEKNOLOGI BANDUNG

2017

Contents

1. Curriculum Structure

Table 1 Stages of Course in Undergraduate Program Geological Engineering per Semester

Semester I				Semester II			
	Code	Courses Name	CU		Code	Courses Name	CU
1	MA1101	Math I A	4	1	MA1201	Math II A	4
2	FI1101	Basic Physic I A	4	2	FI1201	Basic Physic II A	4
3	KI1101	Basic Chemistry I A	3	3	KI1201	Basic Chemistry II A	3
4	KU1101	Introduction into Engineering and Design 1	2	4	KU201	Introduction into Engineering and Design 2	2
5	KU1011	Scientific Writing	2	5	KU102X	English	2
6	KU1163	Introduction into Earth Science	2	6	KU1071	Introduction into Information Science A	2
				7	KU1001	Sports	2
		Total	17			Total	19

Semester III				Semester IV			
	Code	Courses Name	CU		Code	Courses Name	CU
1	GL2111	Physic Geology	3	1	GL2012	Structural Geology	3
2	GL2141	Crystallography and Mineralogy	3	2	GL2242	Petrology	3
3	GL2151	Sedimentology	3	3	TG2211	General Geophysics	2
4	GL2171	Paleontology	3	4	GL2261	Micropaleontology	3
5	GL2131	General Geochemistry	2	5	GL2213	Tectonophysics	2
6	GL2101	Math and Statistic for Geology	2	6	GL2252	Principle of Stratigraphy	2
				7	GL2281	Geo-fluids	2
		Total	16			Total	17

Semester V				Semester VI			
	Code	Courses Name	CU		Code	Courses Name	CU
1	GL3141	Optical Mineralogy and Petrography	3	1	GL3203	Geology of Indonesia	2
2	GL3101	Computational Geology	3	2	GL3204	Field Geology	4
3	GL3142	Volcanology and Geothermal	2	3	GL3051	Petroleum Geology	3
4	GL3181	General Hydrogeology	3	4	GL3221	Engineering Geology	3
5	GL3191	Reference Study	2	5	GL3205	Geology Information System	3
6	GL3111	Geomorphology	3	6	GL3271	Historical Geology	2
7	GL3002	Marine Geology	2	7	GL3243	Mineral Deposits	3
		Total	18			Total	20

Semester VII				Semester VIII			
	Code	Course Name	CU		Code	Course Name	CU
1	GL4101	Methods in Geological Exploration	3	1	GL4098	Final Project A	5
2	GL4151	Coal Geology	2				
3	GL4103	Law and Regulation on Earth Management	2			Total	5
				Semester VIII			
				1	GL4099	Final Project B	3
		Total	7			Total	3

Table 2 ITB Compulsory Courses

	Code	Course Name	CU
1	KU206X	Religion & Ethics	2
2	KU2071	Civic Education	2
3	GL4102	Management and Mineral Economics*	3
4	GL4121	Environmental Geology*	3
		Total	10

* ITB Compulsory Courses: 10 CU

*They are alternative courses on management courses set up by ITB. Students must take any one of them;

2. Common Preparatory Level Courses

Module name:	**Mathematics IA**				
Module level, if applicable	1st year				
Code, if applicable	MA1101				
Semester(s) in which the module is taught	First Semester				
Person responsible for the module	Faculty of Mathematics and Natural Science, Analysis and Geometry Research Group				
Lecturer	Faculty of Mathematics and Natural Science, Analysis and Geometry Research Group				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	4	Lecture	Lecture	56
				Preparation and Follow up	56
Tutorial	80	2	Tutorial	Tutorial	28
				Preparation and Follow up	28
Total Workload	168 hours				
Credit points	4 CU				
Requirements according to the examination regulations	Mid semester exam, Semester exam, Project, Homework, Quizzes				
Recommended prerequisites	High school mathematics				
Module objectives/intended learning outcomes	After following this lecture, students are expected to have: 1. Standard technical skills supported by appropriate concepts, formulas, methods and reasoning; 2. A critical, logical and systematic mindset; As well as creativity in problem-solving related to calculus; 3. The ability to communicate the results of thought and work, both in oral or writing; 4. Readiness to study other subjects, which require calculus as a prerequisite, independently.				
Content	This course gives rigorous understanding of some topics in calculus as one of the fundamental courses in mathematics to prepare the students in learning advanced topics. It covers functions and limit, derivatives and its applications, integrations and its applications, transcendental functions, and technique of integrations.				
Study and examination requirements and forms of examination	Assessment of student's competency achievement using assignment (project, homework and quiz), Middle Semester Exam and Semester Exam.				
Media employed	Chalkboard, power point, tutorial				
Reading list	Thomas, Calculus, Pearson Education, 2010, 12th ed. (Main Reference)				
	James Stewart, Calculus, Brooks/Cole Publishing Company, 1999, 4th ed.				
	Dale Varberg, Edwin Purcel and Steve Rigdon, Calculus, Prentice Hall, 2007, 9th ed.				

Module name:		**Mathematics IIA**			
Module level, if applicable		1st year			
Code, if applicable		MA1201			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		Faculty of Mathematics and Natural Science, Analysis and Geometry Research Group			
Lecturer		Faculty of Mathematics and Natural Science, Analysis and Geometry Research Group			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	4	Lecture	Lecture	56
				Preparation and Follow up	56
Tutorial	80	2	Tutorial	Tutorial	28
				Preparation and Follow up	28
Total Workload		168 hours			
Credit points		4 CU			
Requirements according to the examination regulations		Mid semester exam, Semester exam, Project, Homework, Quizzes			
Recommended prerequisites		Mathematics IA			
Module objectives/intended learning outcomes		After following this lecture, students are expected to have: 1. Standard technical skills supported by appropriate concepts, formulas, methods and reasoning; 2. A critical, logical and systematic mindset; As well as creativity in problem-solving related to calculus; 3. The ability to communicate the results of thought and work, both in oral or writing; 4. Readiness to study other subjects, which require calculus as a prerequisite, independently.			
Content		This course gives rigorous understanding of some topics in calculus as one of the fundamental courses in mathematics to prepare the students in learning advanced topics. It covers techniques of integration, infinite series, parametric equations, vectors and geometry in space, derivatives in R^n , multiple integrals, first and second order differential equations.			
Study and examination requirements and forms of examination		Assessment of student's competency achievement using assignment (project, homework and quiz), Middle Semester Exam and Semester Exam.			
Media employed		Chalkboard, power point, tutorial			
Reading list		Thomas, Calculus, Pearson Education, 2010, 12th ed. (Main Reference)			
		James Stewart, Calculus, Brooks/Cole Publishing Company, 1999, 4th ed.			
		Dale Varberg, Edwin Purcel and Steve Rigdon, Calculus, Prentice Hall, 2007, 9th ed.			

Module name:		**Elementary Physics IA**			
Module level, if applicable		1st year			
Code, if applicable		FI1101			
Semester(s) in which the module is taught		1st Semester			
Person responsible for the module		Faculty of Mathematics and Natural Science			
Lecturer		Faculty of Mathematics and Natural Science			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	4	Lecture	Lecture	56
				Preparation and Follow Up	56
Laboratory Work	80	2	Laboratory report	Laboratory	28
				Preparation and Follow Up	28
Total Workload		168 hours			
Credit points		4 CU			
Requirements according to the examination regulations		Mid semester exam, Semester exam, Laboratory test			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Understanding physical phenomena involving the movement of point objects, rigid bodies objects, elastic objects and fluids, due to various influences and able to formulate also solving the problems associated with it.			
Content		The topics on the subject are focused to the following subtopics: Kinematics variables, 1D, 2D and 3D Motions, Newton's Laws, Free-Body Diagrams, Work-Energy Theorem, Impuls and Linear Momentum, Conservation of Linear Momentum, Torque, Moment of Inertia, Angular Momentum, Conservation of Angular Momentum, Rotational Motion, Oscillating motion, Elasticity, Mechanical Waves, Hydrostatic Pressure, Surface Tension, Continuity Principle, Bernoulli Principle, Heat and Temperature, Heat Transfer, Gas Kinetic Theory, Thermodynamics Laws (0, 1, 2).			
Study and examination requirements and forms of examination		Paper test, laboratory report			
Media employed		Power point, chalkboard, laboratory			
Reading list		1. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, 8th ed. John Wiley & Sons, 2007, Asia 2. Alonso, M. & Finn, E.J. (1992). Physics. Addison-Wesley 3. Fishbane, P.M., et al (1996). Physics for Scientists and Engineers. Prentice Hall 4. Resnick, R, et al (1991, 1992). Physics, vol. I & II. John Wiley & Sons 5. Serway, R.A. (2002). Principles of Physics. Sanders College 6. Thomas A. Moore (2003). Six Idea That Shape Physics, 2nd			

	edition, Mcgraw-Hill College 7. Young, H.D. & Freedman, R.A. (1996, 2001). University Physics. Addison-Wesley Cutnell, J.D. & Johnson, K.W. Physics. John Wiley & Sons, 2001.

Module name:		**Elementary Physics II**			
Module level, if applicable		1st year			
Code, if applicable		FI1201			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		Faculty of Mathematics and Natural Science			
Lecturer		Faculty of Mathematics and Natural Science			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	4	Lecture	Lecture	56
				Preparation and Follow Up	56
Laboratory Work	80	2	Laboratory report	Laboratory	28
				Preparation and Follow Up	28
Total Workload		168 hours			
Credit points		4 CU			
Requirements according to the examination regulations		Mid semester exam, Semester exam, Laboratory test			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Understanding physical phenomena involving the movement of point objects, rigid bodies objects, elastic objects and fluids, due to various influences and able to formulate also solving the problems associated with it.			
Content		The topics on the subject are focused to the following subtopics: Electric Fields and Electric Forces, Gauss Law, Electric Potential Energy, Electric Potential Difference, Capacitors and Dielectrics, Magnetic Fields and Magnetic Forces, Faraday's Law, Lenz's Law, Reactance and Impedance, RLC Series Circuits and Resonance, Maxwell equation, EM Waves, Young's Slits Interference, Fraunhaufer Diffraction, Interference-diffraction, Polarization, Modern Physics, Atomic Physics & Material Physics.			
Study and examination requirements and forms of examination		Paper test, laboratory report			
Media employed		Power point, chalkboard, laboratory			
Reading list		1. David Halliday, Robert Resnick and Jearl Walker, Fundamentals of Physics, 8th ed. John Wiley & Sons, 2007, Asia 2. Alonso, M. & Finn, E.J. (1992). Physics. Addison-Wesley 3. Fishbane, P.M., et al (1996). Physics for Scientists and Engineers. Prentice Hall 4. Resnick, R, et al (1991, 1992). Physics, vol. I & II. John Wiley & Sons 5. Serway, R.A. (2002). Principles of Physics. Sanders College 6. Thomas A. Moore (2003). Six Idea That Shape Physics, 2nd edition, Mcgraw-Hill College 7. Young, H.D. & Freedman, R.A. (1996, 2001). University Physics. Addison-Wesley Cutnell, J.D. & Johnson, K.W. Physics. John Wiley			

	& Sons, 2001.

Module name:		**General Chemistry IA**			
Module level, if applicable		1st year			
Code, if applicable		KI1101			
Semester(s) in which the module is taught		1st Semester			
Person responsible for the module		Faculty of Math and Natural Science			
Lecturer		Faculty of Math and Natural Science			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and follow up	56
Laboratory Practice		1	Laboratory report	Laboratory Work	14
				Preparation and Follow Up	28
Total Workload		126 hours			
Credit points		3 CU			
Requirements according to the examination regulations		45% Mid semester exam + 45% Semester exam +10% Laboratory test. Passing the laboratory test is mandatory			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Providing knowledge as well as exploring basic concepts of chemistry, to be more familiar with it and understand the natural phenomena also their processes and changes, as a basic in studying the processes and mechanisms of nature at a further level, using these concepts to solve simple problems in daily life, science, and technology. Students are able to explain the chemical principles underlying the phenomena that occur in the natural environment.			
Content		Elements, compounds and periodic tables, mole concepts, empirical formulas, molecular formulas, limiting reagents, rendement and stoichiometry, chemical reactions (acid-base and redox) in solution, molecular structure, atoms and quantum mechanics, chemical bonds, structures and bond theory , The form of matter, the phase diagram, the nature of the gas, the force between molecules, thermochemistry, and chemical thermodynamics. This lectures give an overview of the following topics: 1. Elements, Compounds, and Periodic Table 2. Mol and Stoichiometry 3. Molecular Reactions in Solution 4. Molecular Structure 5. Oxidation and Reduction Reactions 6. Atoms and Quantum Mechanics 7. Chemical Bonds 8. Structure and Bond Theory 9. Thermochemicals 10. Gas Properties			

	11. Force between molecules and physical properties of liquids and solids 12. Thermodynamics
Study and examination requirements and forms of examination	Paper Test and Laboratory Report
Media employed	Power Point, Laboratory Tools
Reading list	J. E. Brady, F. A. Senese and N D Jespersen, Chemistry, 6th edition, John Wiley and Sons Inc., 2010.

Module name:		**General Chemistry IIA**			
Module level, if applicable		1st year			
Code, if applicable		KI1201			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		Faculty of Math and Natural Science			
Lecturer		Faculty of Math and Natural Science			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and follow up	56
Laboratory Practice		1	Laboratory report	Laboratory Work	14
				Preparation and Follow Up	28
Total Workload		126 hours			
Credit points		3 CU			
Requirements according to the examination regulations		45% Mid semester exam + 45% Semester exam +10% Laboratory test. Passing the laboratory test is mandatory			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Providing knowledge as well as exploring basic concepts of chemistry, to be more familiar with it and understand the natural phenomena also their processes and changes, as a basic in studying the processes and mechanisms of nature at a further level, using these concepts to solve simple problems in daily life, science, and technology. Students are able to explain the chemical principles underlying the phenomena that occur in the natural environment.			
Content		Ideal solution, colligative properties, electrolyte and non-electrolyte solutions, reaction quotients, equilibrium constant, Le Chatelier principle, factors affecting equilibrium, Gibbs free energy in equilibrium, rate law, reaction order, half-life, factors affecting reaction rate, reaction mechanism, collision theory and transition state, acid-base theory, pH, buffer solution, hydrolysis, acid-base reaction, Ksp, Volta cell, standard reduction potential, cell notation, Nernst equation, electrolysis cell, Faraday's law, , The law of decay rate, the half-life, the decay rate constant, the fission and fusion nuclear reactions, mass defects, radionuclide applications, organic chemical functional groups, nomenclature, simple organic chemical reactions, polymers, and the introduction of the structure and function of biomolecules (proteins, Enzymes, carbohydrates, fats, and nucleic acids) This lectures give an overview of the following topics: 1. Characteristic of the liquids 2. Kinetics in chemistry 3. Chemical Equilibrium 4. Acid Base Equilibrium in Solution			

	5. Solubility and Equilibrium of Solutions 6. Electrochemistry 7. Nuclear Reaction 8. Organic Compounds, Polymer, and Biochemistry
Study and examination requirements and forms of examination	Paper Test and Laboratory Report
Media employed	Power Point, Laboratory Tools
Reading list	J. E. Brady, F. A. Senese and N D Jespersen, Chemistry, 6th edition, John Wiley and Sons Inc., 2010.

Module name:		**Introduction to Engineering and Design I**			
Module level, if applicable		1st year			
Code, if applicable		KU1101			
Semester(s) in which the module is taught		1st Semester			
Person responsible for the module		LTPB ITB			
Lecturer		LTPB ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Discussion	Lecture	28
				Preparation and follow up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Homework, Group project, Mid Semester Exam, Final Exam			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		1. Students have motivation to studying engineering 2. Students understand what engineering and engineer profession, including responsibility in various related aspects 3. Students understand that engineering issues are multi-faceted and require multidisciplinary solutions 4. Students recognize and understand some engineering disciplines and their interrelationships 5. Students recognize contemporary issues related to engineering disciplines 6. Students understand the principles of science and mathematics applied in solving engineering problems 7. Students are able to propose an alternative solution to engineering problems in their environment by considering various related aspects			
Content		This course covers engineering and design in society, engineer as a profession, aspects in engineering, key elements of engineering analysis, steps in solving problems, concept of energy, conversion and conservation, and some examples of engineering discipline as well as ethics in engineering.			
Study and examination requirements and forms of examination		Homework, Group project, paper test			
Media employed		Power point			
Reading list		Philip Kosky et al., Exploring Engineering : An Introduction to Engineering and Design, Academic Press, 2010 (Main Reference)			
		Saeed Moaveni, Engineering Fundamentals : An Introduction to Engineering, Cengage Learning, 2011 (Supporter Reference)			
		Holtzapple & Reece, Foundations of Engineering, McGraw-Hill, 2003 (Supporter Reference)			

Additional Information	The teaching method used is team teaching. One lecturer is responsible for the class. Engineering discipline materials are given in rotation by other lecturers with appropriate background.

Module name:		**Introduction to Engineering and Design II**			
Module level, if applicable		1st year			
Code, if applicable		KU1201			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		LTPB ITB			
Lecturer		LTPB ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Discussion	Lecture	28
				Preparation and follow up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Homework, Group project			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		1. Students have motivation to study engineering 2. Students understand the principles of science and mathematics applied in solving engineering problems. 3. Students experience and engage in simple engineering design problems are following correct process rules Students have basic skills in teamwork			
Content		This lecture is offering a deeper understanding on engineering and design by means of teamwork student projects.			
Study and examination requirements and forms of examination		Individual and group assessments by lecturers and assessment by group members.			
Media employed		Power Point			
Reading list		Philip Kosky et al., Exploring Engineering : An Introduction to Engineering and Design, Academic Press, 2010 (Main reference)			
		Saeed Moaveni, Engineering Fundamentals : An Introduction to Engineering, Cengage Learning, 2011 (Supported Reference)			
		Holtzapple & Reece, Foundations of Engineering, McGraw-Hill, 2003 (Supported Reference)			
Additional Information		Projects in groups are carried out in F / S coordination or combined F / S			

Module name:		**Indonesian Language: Scientific Writing**			
Code, if applicable		KU1011			
Module level, if applicable		1st year			
Semester(s) in which the module is taught		1st semester			
Person responsible for the module		LTPB ITB			
Lecturer		LTPB ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Presence Mid semester exam Semester exam Paper Home work			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students able to communicate both oral and written using the correct Indonesian language and uphold the principle of originality (honesty) in accordance with their respective professions in the working world.			
Content		Students get materials on variety of language of scientific writing and their characteristics; spelling, capitalization, loan translation, and use of punctuation; word formation and use of word formation in sentences; basic sentence patterns, effective sentences, and sentence variation; terminologies, definitions, and syllogisms; conditions, kinds, developments of paragraphs; selection of topics, themes, titles, and outlining; introductory chapter, issues, analysis, and conclusions; initial complementation and final complementation; typing, citations, and references.			
Study and examination requirements and forms of examination		Paper test, Paper			
Media employed		Power point			
Reading list		1. Alwi Hasan.et.al. Tata Bahasa Baku Bahasa Indonesia. Jakarta : Balai Pustaka, 1998.			
		2. Depdikbud. RI. Kamus Umum Bahasa Indonesia Jakarta ; Balai Pustaka. 2000			
		3. Keraf, Gorys, Komposisi . Ende Flores : Nusa Indah 1998			
		4. Sosio Komunikasi, KK Ilmu Kemanusiaan, FSRD-ITB 2006 Metode Penulisan Ipteks. Bandung Penerbit ITB.			
		5. Depdikbud RI. Pedoman Umum Ejaan yang Disempurnakan.			

	Jakarta:Balai Pustaka 1997
	6. Depdikbud RI. Pedoman Pembentukan Istilah. Jakarta:Balai Pustaka 1997

Module name:		**Introduction to Earth Sciences**			
Module level, if applicable		1st year			
Code, if applicable		KU1163			
Semester(s) in which the module is taught		1st semester			
Person responsible for the module		Faculty of Earth Science and Technology			
Lecturer		Team from Faculty of Earth Science and Technology			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lecture	28
				Preparation and Follow up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Mid semester exam 40% Final semester exam or group presentation 40% (minimum presence 80% to join) Other (quiz, presence, etc.) 20%			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students get an overall picture of the earth as a whole, and understand Earth as a living resource that can be exploited through exploratory technology and how it impacts when exploited. Students understand how the nature and dynamics of the Earth, so that at least able to analyze the problems associated with the earth, especially when done exploration of earth resources, and later able to approach to solve the problem by following the rules of environmental and sustainable.			
Content		Earth science and technology is a lecture explaining the Earth system, the dynamic relationship between the atmosphere (climate, air), the hydrosphere (ocean, water), the lithosphere (the Earth's shell) and the row (interior of the Earth); And how its role and influence on life on Earth, especially human. This lecture discusses the beginnings of the birth and development of earth science, the formation and evolution of the Earth, the material of the Earth (solid, gas, liquid) and its processes (including those that cause disaster), and the uniqueness of Indonesia's earth, including the richness of its Earth resources. Also introduced a way of exploration in the field of earth including measuring and monitoring the dynamics of earth.			
Study and examination requirements and forms of examination		Paper test, Mid semester exam, and group presentation as Final semester exam.			
Media employed		Power Point			

Reading list	1. Pengantar Ilmu dan Teknologi Kebumian, B. Brahmantyo, D.K. Mihardja, B. Santoso, dan B. Tjasjono; FITB, 2009 (*in press*) 2. Earth Science, 11/E, Tarbuck, E.J., Lutgens, F.K. dan Tasa, D., Prentice Hall. 2006. 3. The Blue Planet: An Introduction to Earth System Science, 2nd Ed., Brian J. Skinner, Steven C. Porter, & Daniel B. Botkin, John Wiley & Sons, 1999. 4. Geodesy the Concept, Petr Vanicek and E.J. Krakiwsky, North Holland Publishing, Amsterdam 1986.

Module name:		**English – Critical Reading Skills**			
Module level, if applicable		1st year			
Code, if applicable		KU1021			
Semester(s) in which the module is taught		2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		English			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lecture	28
				Preparation and Follow up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		(Attendance < 85%, students are not allowed to sit for the Final Test.) Final assignment (750-word summary response essay) due.			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		(A) Can understand the function of each section of the textbook, (B) Can judge a good paragraph, (C) Can write different types of paragraphs correctly and properly, (D) May annotate relevant ideas as reading needs of the students, (E) Can creating outline ideas that have been annotated by the students (F) Can write a summary with different sentence structure and word choice (paraphrasing), (G) Can write summary-response essays according to the format, and (I) Can write the correct quotations for ideas that students quoted on the essay they wrote.			
Content		Train the students' critical thinking skills in reading activities that include (a) before the reading is done, (b) at the time of reading is in progress, and (c) after the reading is over. The critical thinking skills are trained before the reading activity is conducted include (1) the ability to check the book parts in order to determine whether or not a book is relevant to the students' reading needs. While (2) the reading activity is in progress, the students are trained to critically identify the ideas that are relevant to their reading needs by means of annotations. In addition, the students are also trained to identify various ideas, such as the main ideas, supporting ideas, counter arguments, and refutations. At the same time, students are also trained to make the best use of their linguistic knowledge and world knowledge as well as the contexts in the reading text to know the meaning of an unfamiliar word by guessing. Finally, (3) when the reading is over, the students are trained to be able to critically summarize in their own words (paraphrasing) the article before they respond the article in a summary-response essay while applying the correct citation in their			

	essay.
Study and examination requirements and forms of examination	Main assessment aspect: (Assessment Components) 1. Assignment, quiz, etc. (30%) 2. Mid-semester exam (30%) 3. Semester exam (40%)
Media employed	Power point, reading assignment
Notes:	Students are placed in accordance with placement test results
Reading list	1. Amaudet, M.L. and barret, M. E. 1984. Approaches to Academic Reading and writing. Prentice Hall: Englewood Cliff, NJ.
	2. Axelrod, R. B. And Cooper, C.R. 1990. Reading Critically, Writing Well. St. Martin's Press: New York
	3. Bartram, m. And Perry, A. 1989. Reading Skills. Penguin Books: Great Britain
	4. Blake, K.A. 1989. College Reading skills. Prentice hall: New Jersey
	5. Floris, Flora Debora, et al. 2007. Success in Academic English: English for General Academic Purpose. Graha Ilmu: Jakarta.
	6. Folse,Keith.S. 2001. Great paragraph. Houghton Mifflin Company: USA
	7. Lyons, L and Heasley, B. 1987. Study Writing. Cambridge University Press: Cambridge
	8. Mikulecky, B.S. and Jeifries, L. 1998. Reading Power. Addison Wesley Longman, Inc: New York
	9. Mosback, G. and Mosback, V. 1986. Practical Faster Reading. Cambridge university Press: Cambridge
	10. Reid, Joy. M. 2000. The process of Composition. 3rd Edition. Longman: New York
	11. Rogers, Bruce. 2007. The Complete Guide to the TOEFL Test (ibt edition). Thomson: USA.
	12. KK Ilmu Kemanusiaan, FSRD-ITB. Critical Reading. Bandung: Penerbit ITB. 2013 [Main Reference]

Module name:		**English – Academic Writing**			
Module level, if applicable		1st year			
Code, if applicable		KU1022			
Semester(s) in which the module is taught		2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		English			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lecture	28
				Preparation and Follow Up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		(Attendance < 85%, students are not allowed to sit for the Final Test.) (Final assignment (2000-argumentative essay) due.)			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students are able to produce correct scientific essays in English properly by using various types of paragraphs consisting of compact and systematic sentences (2000 words) as well as clear systematic ideas.			
Content		Students will learn materials on academic writing that cover the following: vocabulary, spelling, punctuation; sentences: dependent clause and independent clause; kinds of sentences: simple sentence, compound sentence, and complex sentence; paragraphs that comprise topic selection, topic sentence/main idea, supporting sentences, concluding sentence; unity and coherence. They will also learn how to write a 2000-word argumentative essay that consists of introductory paragraph, body paragraphs and concluding paragraph. The introductory paragraph discusses thesis statement, hook, and transition. Students also learn skills that are very important in avoiding plagiarism in writing, i.e. paraphrasing, citation, referencing.			
Study and examination requirements and forms of examination		Mid semester exam (30%) Semester exam (40%) Assignment, quiz, etc. (30%) (The final task is a 2000 word essay, collected before Final Assignment (a 2000-word essay))			
Media employed		Visualizer, power point			
Notes:		Students are placed in accordance with placement test results			
Reading list		1. Bander, R.. From Sentence to Paragraph. Canada: CBS College Publishing 1981 [Supporting Reference]			
		2. English, K.A. Northstar: Reading and Writing. New York: Longman. 2004. [Supporting Reference]			
		3. Frank, M. Sentences and Complex Sentences. New Jersey: Prentice Hall. 1972. [Supporting Reference]			
		4. Oshima, A. and Ann Hague. Writing Academic English. New York: Longman. 1999. [Supporting Reference]			

	5. KK Ilmu Kemanusiaan, FSRD-ITB. Academic Writing. Bandung: Penerbit ITB. 2013 [Main Reference]
	6. Strauch, O.A. Writers at Work: The Short Composition. Cambridge: Cambridge University Press. 2005. [Supporting Reference]
	7. Williams, A. Writing for IELTS. London: Harper Collins. 2011. [Supporting Reference]
	8. Wingersky, J. Et al. Writing Paragraphs and Essays. California: Wardsworth Publishing Company. 1995. [Supporting Reference]
	9. Zemach, E.D. Writers at Work: The Essay. Cambridge: Cambridge University Press. 2008. [Supporting Reference]

Module name:		**English – Presentation Skills**			
Module level, if applicable		1st year			
Code, if applicable		KU1023			
Semester(s) in which the module is taught		2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		English			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture (5 meetings)	80	2	Lecture and discussion	Lecture	10
				Preparation and Follow Up	20
Presentation (9 meetings)	80	2	Presentation and discussion	Presentation	18
				Preparation and Follow Up	36
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Presence less than or equal to 85% should not follow UAS (E)			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		After completing the course, students can make formal academic presentations in English, in accordance with existing rules by paying attention to aspects of communication such as body language, voice and others.			
Content		Provide students with basic theory of Presentation in English for academic purposes such as presenting scientific paper and train them to perform scientific presentation for their academic needs. This course emphasizes on Theory and Practice with composition 30% and 70%. The basic theory is how to prepare and perform a presentation in English. In preparation, it focuses on presentation's objective, structure, and time which is embodied in Why, Who, What, How, When and Where. In performing, it discusses six points: Beginning, Language, Visual Aids and Body Language, Voice, Ending, and Question. For practice, students have three times performances: 5, 10, and 15 minutes for Practice, Mid, and Final test.			
Study and examination requirements and forms of examination		Mid semester exam 30% Semester exam 40% Assignment/class attendance 30% (Final Assignment: 1000 words essay, collected 1 week before last the presentation)			
		Assessment in this course using the process assessment and appearance method. Assessment is carried out continuously from one performance to the next, given not only by lecturers but also by classmates as audiences and presenters. Audience should fill out the assessment sheets for each presenter by including feedback and suggestions for further performance improvements. Lecturers provide			

	feedback on every appearance.
Media employed	Watching video of scientific presentations Attend national and international conferences
Notes:	Students are placed in accordance with placement test results
Reading list	1. Goodale, Malcom. Professional Presentations: A video-based course. Cambridge University Press. 2006 (Main reference)
	2. KK Ilmu Kemanusiaan, FSRD-ITB. Academic Writing. Bandung: Penerbit ITB. 2013 [Main reference]
	3. Meriwether, Nell.w. Successful Research Paper in 12 Easy Steps. McGraw-Hill. 2000 (Supporting reference)
	4. Oshima, Alice. Writing Academic English. Longman. 2000 (Supporting reference)
	5. Powell, Mark. Presenting in English: How to give successful presentations. Thomson Heinle. 2002 (Supporting reference)
	6. Williams,Erica J. Presentations in English Macmillan. 2008 (Supporting reference)

Module name:		**Introduction to Information Technology B**			
Module level, if applicable		1st year			
Code, if applicable		KU1072			
Semester(s) in which the module is taught		2nd semester			
Person responsible for the module		LTPB ITB			
Lecturer		LTPB ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	28
Practicum	40	1	Quizzes, homework	Practicum	14
				Preparation and Follow Up	14
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Mid semester exam Semester exam Quiz Assignment Laboratory Assignment			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		After attending this lecture, students are expected to: • Describing basic concepts in computer systems and organizations; knowing the various types of hardware and software and their utilization; also knowing the basic concepts in communication networks, including the internet. • Describing the use of the computers and communication networks ethically in various aspects of human life, especially related to student life in general and specific to faculty / school. • Implementing ethics in the utilization and dissemination of information through computers and communication networks. • Demonstrate the ability of computational thinking through the skill of composing algorithm. Produce simple programs in selected procedural programming languages and ready to develop independently in later stages.			
Content		This course introduces information technology as a part of ethical development of creativity. The course materials include the introduction to computer system and organization (hardware and software), communication network (including the internet), the implications of the use of information technology in the aspects of human's life (especially the ones related to the life in the faculty/school), as well as computational thinking through the basics of procedural programming in a chosen programming language.			
Study and examination requirements and forms of examination		Paper test, case study			

Media employed	Power point and practicum
Reading list	1. G. Beekman and B. Beekman, Digital Planet: Tomorrow's Techology and You, Complete Tenth Edition, Prentice Hall, 2012 (or newest edition) (Main Reference)
	2. C++ : Walter Savitch, Problem Solving with C++ (8th Edition)
	3. Pascal : Walter Savitch, Pascal: An Introduction to the Art and Science of Programming (4th Edition)
	4. Fortran : Michael Metcalf, John Reid, and Malcolm Cohen; Modern Fortran Explained (Numerical Mathematics and Scientific Computation)
	5. B. K. Williams and S. C. Sawyer, Using Information Technology: A Practical Introduction to Computers and Communications, Ninth Edition Complete Version, Mc Graw Hill, 2011 (Alternative Reference)
	6. D. Morley and C. S. Parker, Understanding Computers: Today and Tomorrow, 14th Edition Comprehensive, Course Technology, 2013 (Supporting Reference)

Module name:		**Sports**			
Module level, if applicable		1st year			
Code, if applicable		KU1001			
Semester(s) in which the module is taught		1st Semester			
Person responsible for the module		LTPB ITB – Samsul Bahri, Drs., M.Kes.			
Lecturer		LTPB ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	1	discussion	Lecture	14
Sports Activity	80	1	Fitness progress	Coordinated Activity	14
				Independent Activity	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		-			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		After attending this lecture students are expected to be able to maintain and improve the degree of physical fitness and able to understand the positive values of sports and can apply it in life on campus or general public.			
Content		The course including theory and practice. The theory involves the importance of sports, the body fitness, nutrition, sports and the principles of training, and various games of sport. The Practice includes the physical exercise.			
Study and examination requirements and forms of examination		Physical fitness progress (run test)			
Media employed		Power point, gymnasium and sports hall			
Reading list		1. Bompa, T.O., 1994, Theory and Methodology of Training, Iowa: Kendal/Hunt Publishing Company			
		2. Daniel Goleman, 1977, Emotional Intellegence, Jakarta: terjemahan PT. Gramedia.Pustaka			
		3. Giriwijoyo, S., Y.S. dkk., 2005, Manusia dan Olahraga, Kerja sama ITB FPOK UPI Bandung, Penerbit ITB.			
		4 Harsono, 1988, Coaching dan Aspek-asapek Psikologis dalam Coaching, CV. Tambak Kusuma.Pustaka			
		5. Snow Harrison, 1992, The Power of Team Building, San Diego, California: Pfeiffer & Company			
		6. Willmore, H., Jack & Costill, L., David., 1999, Physiology of Sport and Health Exercise			

3. Geology Compulsory Courses

Module name:	**Tectonophysics**				
Module level, if applicable	2nd year				
Code, if applicable	GL 2012				
Semester(s) in which the module is taught	3rd semester				
Person responsible for the module	Agus Handoyo Harsolumakso, Chalid Idham Abdullah, Benyamin Sapiie				
Lecturer	Agus Handoyo Harsolumakso, Chalid Idham Abdullah, Benyamin Sapiie, Indra Gunawan, Alfend Rudyawan				
Language	Indonesian				
Relation to curriculum	Compulsory				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion and presentation	45	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (25%), and end semester exam (35%))				
Recommended prerequisites	Physical geology, Principle of Stratigraphy, Geomorphology, Petrology				
Related Course	Structural Geology				
Module objectives/intended learning outcomes	Students understand the processes and mechanisms of dynamic earth, and the important concept of plate tectonics as basic in geology and earth science in general.				
Content	Understanding of basic knowledge of geodynamics known as plate tectonics is very important not only their history but also their mechanism and geometry. The general knowledge of earth internal structures, geodynamics, earth quakes distribution, volcanism, and basin distribution including their economic importance and hazard mitigation will be the main target of this course. The lectures give an overview of the following topics: 1. The history of Plate Tectonic 2. Continental Drift 3. Crust, Mantle, Lithosphere, and Asthenosphere 4. Sea Floor and Sediment 5. Volcanism and Plate Tectonic 6. Tectonic and Oceanic Lithosphere 7. Tectonic and Subduction 8. Collision Tectonic and Continental Accretion 9. Continental Spreading 10. Intracontinental Sedimentary Basin 11. Tectonic and Geomorphology				

Study and examination requirements and forms of examination	Paper test for theory
Media employed	Power Point presentation
Reading list	1. Keary, P., and Vine, F. J., 2009, Global Tectonics; 3rd ed., Willey-Blackwell Scientific Pub, 482p. 2. Strahler, A., (1998), Plate Tectonics, Geo-Books Publishing, 554p. 3. Frisch, W., Meschede, M. and Blakey, R., 2011, Plate Tectonics, Springer, 212p.

Module name:	**Mathematics and Statistics for Geology**				
Module level, if applicable	2nd year				
Code, if applicable	GL-2101				
Semester(s) in which the module is taught	3rd semester				
Person responsible for the module	Dr.Eng. Suryantini, S.T., Dipl Geothermal EnTech., M.Sc. Agus Muhammad Ramdhan S.T., M.T., Ph.D.				
Lecturer	Dr.Eng. Suryantini, S.T., Dipl Geothermal EnTech., M.Sc. Agus Muhammad Ramdhan S.T., M.T., Ph.D.				
Language	Indonesian Language				
Relation to curriculum	Compulsory				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	**Forms of active participation**	Workload	
lecture, lesson, practical,	80-90	2	Lecture, discussion, practical	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% Final score is average of 50% Maths plus 50% Statistics Math score is evaluated based on assignment (25%) and mid semester exam (75%), Statistics score is evaluated based on class discussion and activity (5%), daily quiz (10%), assignment and (10%) and end semester exam (75%)				
Recommended prerequisites	No pre-requisites course is necessary because this course is basic course				
Related Course	GL2111 GEOLOGI FISIK GL2131 GEOKIMIA UMUM TG211 GEOFISIKA UMUM GL2151 SEDIMENTOLOGI GL 2281 GEOFLUIDA etc.				
Module objectives/intended learning outcomes	**<u>Knowledge and Analytical skills</u>** 1.Able to carry out geological data analysis with univariate and bivariate statistics and simple spatial statistics 2.Able to model and predict simple geological process with common mathematical equations 3. Able to use Excel software and its statistical tool **<u>Skill</u>** 1. Have basic skill to utilize Excel Software properly 2. Have ability to calculate basic statistic and common mathematical equation for geology 3. Have communication and writing skill in explaining the statistics and mathematical modeling results in the form of simple essays.				

	<u>The character to be developed</u> 1 confidence 2 independent 3 appreciate the difference analysis and opinions according to the data 4 hard worker in calculating and analyzing plenty data No **Competencies outcomes because this is a basic course**
Content	This lecture is designed to improve basic knowledge and skills in applying mathematics and statistics which is commonly used to resolve geological. Mathematics and statistics have generally been studied and used in everyday life, but its use to solve geological problems, will be the main objective in this study. Examples of applications will be given for geological cases such as petrology, stratigraphy, structural geology, geochemistry, geophysics, calculation of earth resources, determining the probability of drilling success and so forth. Some concepts or mathematical functions and statistics that will be discussed, such as regression analysis (best fit) linear and quadratic using the method of least-squares, the analytic solution (Gaussian elimination) and numerical solution (Jacobi method), Marcov Chain, univariate statistics, bivariate statistics, time series analysis and introduction to spatial statistical.
Study and examination requirements and forms of examination	Paper Test
Media employed	Power Point slide, Projector, Black Board, spread sheet software
Reading list	1. ARH Swand and Sandilands, 1995, Introduction to Geological Data Analysis 2. David Waltham, 2000, Mathematics - A Simple Tool for Geologist, John Willey and Sons Inc 3. Davis, J.C.,1970, Statistics and data Analysis in Geology, John Willey and Sons Inc.

Module name:		**Physical Geology**			
Module level, if applicable		2^{nd} year			
Code, if applicable		GL 2111			
Semester(s) in which the module is taught		Every Semester			
Person responsible for the module		Agus Handoyo Harsolumakso, Chalid Idham Abdullah, Benyamin Sapiie			
Lecturer		Agus Handoyo Harsolumakso, Chalid Idham Abdullah, Benyamin Sapiie, Indra Gunawan, Alfend Rudyawan			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	45	2	Lecture and discussion	Lectures: (2 x 14)	28
				Preparation and Follow up (4 x 14)	56
Practical	30	1	Practical homework	Practical: 1 x 12	12
				Preparation and Follow up 2 x 12	24
Total Workload		120 hours			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (25%), and end semester exam (35%))			
Recommended prerequisites		Introduction to Earth Science and Technology			
Module objectives/intended learning outcomes		Students are able to know the main geological objects and have the ability to describe and explain the geologic phenomena and processes occurred. In addition it is expected that they can understand basic knowledge which includes the mechanical and chemical process occurred inside and outside earth including those relating to mineral and energy resources			
Content		Physical geology is a science which study earth processes, planetary science and internal structure of the earth, rocks and minerals, surficial processes such erosion and disintegration, sedimentation, transport mechanism such as rivers, beaches as well as eolian. Earth quakes and tectonics processes, volcanism and internal deformation of the earth covers in this course. Study of energy and mineral resources as well as nature hazard include and describe in this course. The lectures give an overview of the following topics: 1. Introduction 2. Rocks and Minerals 3. Igneous Rocks and Intrusive Activity 4. Volcanism 5. Weathering, Erosion, and Soil 6. Sedimentation and Sedimentary Rock 7. Metamorphism and Metamorphic Rock 8. Earthquake and Earth Below Surface Structure			

	9. Deformation and Mountain Formation 10. Mass Movement and Land Slide 11. Hydrology Cycle and Groundwater 12. Environment and Geological Hazard 13. Energy and Geological Resources
Study and examination requirements and forms of examination	Paper test
Media employed	Power Point, Studio Material for practical
Reading list	1. Smith and Pun, 2006, Earthworks, Prentice Hall (Main reference) 2. Tarbuck and Lutgens, 2000, Earth Science, Prentice Hall (Additional reference) 3. Hamblin, 1989, The Earth Dynamic System, McMilan (Additional reference)

Module name:		**General Geochemistry**			
Module level, if applicable		2^{nd} year			
Code, if applicable		GL 2131			
Semester(s) in which the module is taught		Every Semester			
Person responsible for the module		Dr. Ir. Bambang Priadi			
Lecturer		Dr. Ir. Bambang Priadi; Ir. Niniek Rina Herdianita M.Sc.,Ph.D.; and Prof. Dr. Ir. Eddy A. Subroto			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture, discussion, and group projects	Lectures	28
				Preparation and Follow up	56
Total Workload		84 Hours			
Credit points		2 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Mid semester exam (40%), and end semester exam (40%), Other incl. presence, homework, quiz (20%).			
Recommended prerequisites		Physical Geology (Corequisite)			
Module objectives/intended learning outcomes		Lectures are given with the aim of providing knowledge about the chemical properties, accumulation and distribution of elements in a variety of rocks and geological environment, as well as the roles of the chemical properties of elements, minerals and rocks for geological field. Students know and have the ability to explain the relevance / role of chemistry and its principles in geological processes and use them to explore further and use it in geological field.			
Content		Lecture describes the relative and absolute amounts in the occurrence and the abundance of elements and isotopes. It explains the formation and distribution of elements in space, methods of absolute-age dating, the occurrence of elements and isotopes in different chemical stability in tiny crystals to the rocks in various parts of the earth. Lectures will especially examine the chemical equilibria in forming mineral association in igneous, sedimentary and metamorphic rocks, as well as the roles of organics in sedimentations. The lectures give an overview of the following topics: 1. Introduction 2. Basic Principle of Chemistry 3. Element Abundance in the Universe 4. Isotope and Geochronology 5. Thermodynamic and Crystal Chemistry 6. Magma Geochemistry and Igneous Rocks			

	7. Fluids Geochemistry 8. Sedimentation and Sedimentary Rocks 9. Geochemistry of Metamorphic Rocks 10. Geochemistry of Organic Matter
Study and examination requirements and forms of examination	Paper test for theory
Media employed	Power Point presentation
Reading list	1. Bronlow A.R., 1996, Geochemistry, 2nd Edition, Prentice Hall, New Jersey USA. 2. Dickin A.P., 1995, Radiogenic Isotope Geology, Cambridge Univ Press, UK. 3. Campbell A.N. & Smith N.O., 1951, The Phase Rule and its application, Dover Publ Inc., USA 4. Faure G., 1982, Principles of Isotope Geology, John Wiley & Sons, New York, USA. 5. Gill R., 1989, Chemical Fundamentals of Geology, Chapsman and Hall, London, UK 6. Hunt J.M., 1993, Petroleum Geochemistry and Geology, W.H. Freeman & Company, San Fransisco, USA. 7. Krauskopf KB. & Bird DK, 1995, Introduction to Geochemistry, McGraw-Hill Inc, New York, USA 8. Mason B. & Moore C.B., 1982, Principle of Geochemistry, John Wiley & Sons, New York, USA. 9. Siegel F.R., 1995, Review of Research on Modern Problems in Geochemistry, Earth Sciences, Association for Geochemistry and Cosmochemistry, Unesco. 10. Rose A.W., Hawkes H.E & Webb J.S., 1979, Geochemistry in Mineral Exploration, Academic Press, London, UK 11. Waples D.W., 1985, Geochemistry in Petroleum Exploration, Geological Science Series, International Human Resources Development Corporation, Boston, USA

Module name:	**Crystallography and Mineralogy**				
Module level, if applicable	2nd year				
Code, if applicable	GL2141				
Semester(s) in which the module is taught	3rd semester				
Person responsible for the module	Dr. I Gusti Bagus Eddy Sucipta, ST., MT.				
Lecturer	Dr. I Gusti Bagus Eddy Sucipta, ST., MT. and Dr. Eng. Mirzam Abdurrahman, ST., MT.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and Follow up : 56 hours	56
Practical	15	1	Report	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on course score (60%) and practical report score (40%). Course score consist of mid semester exam (40%), end semester exam (50%), and assignment/quiz (10%)				
Recommended prerequisites	KU1163 Introduction into Geoscience (pre-requisite) and GL2111 Physical Geology (co-requisite)				
Related Course	GL3141 Optical Mineral and Petrography (compulsory) and GL3045 Rock Forming Minerals (elective)				
Module objectives/intended learning outcomes	1. Students having basic knowledge about the relationship of crystals, minerals, and rocks. 2. Students have the ability to identify a group of minerals and their genetic process for use to describe the rocks and economic mineral deposits.				
Content	The lecture examines the crystal axes and its projection to know the crystal system on the ideal minerals, included the symmetry elements of crystal, repetition, growth-twinning pattern, physical and chemical properties for minerals identification. The lecture also explains mineral association to form igneous, pyroclastic, sedimentary and metamorphic rocks, as well as mineral association in economic deposits and gemstones. The lectures give an overview of following topics: 1. Introduction 2. Crystal structure and their regularity 3. Crystal system and symmetry elements 4. Crystal projection and crystal classes 5. Repetition pattern in crystallography 6. Crystal chemistry 7. Mineral chemistry				

	8. Physical properties of minerals and their identification 9. Mineral classification 10. Mineral association in igneous and pyroclastic rocks 11. Mineral association in sedimentary rocks 12. Mineral association in metamorphic rocks 13. Alteration mineral and gemstones
Study and examination requirements and forms of examination	Paper Test and Practical Test
Media employed	White board, computer, projector, wood crystals model, minerals or rocks specimens
Reading list	1. Klein, C. and Hulburt, C. S., 1993, Manual of Mineralogy, John Willey and Sons, Inc., New York USA, 681p. 2. Mottana, A., Crespi, R., and Liborio, G., 1978, Guide to rocks and minerals, Simon & Schuster, Inc., 607p. 3. Read, P. G., 2005, Gemology, Elsevier Ltd., London, 324p. 4. Chang, R., 1998, Chemistry, Sixth editions, WCB McGraw Hill, New York USA, 993p 5. Klein, C., 1989, Minerals and Rocks: Exercises in Crystallography, Mineralogy and Hand-Specimen Petrology, John Willey and Sons, Inc., New York USA, 402p. 6. Philips, W. J. and Philips, N., 1980, An Introduction to Mineralogy for Geologists, John Willey and Sons, Inc., New York USA, 352p.

Module name:	**Sedimentology**				
Module level, if applicable	2nd year				
Code, if applicable	GL 2151				
Semester(s) in which the module is taught	Every Semester				
Person responsible for the module	Dr. Ir. Dardji Noeradi				
Lecturer	Dr. Ir. Dardji Noeradi and Dr. Dwiharso Nugroho, S.T., M.T.				
Language	Indonesian				
Relation to curriculum	Compulsory Course and Minor Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures: (2 x 14)	28
				Preparation and Follow up (4 x 14)	56
Practical	20	1	Practical homework	Practical: 1 x 12	12
				Preparation and Follow up 2 x 12	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (20%), mid semester exam (40%), and end semester exam (40%).				
Recommended prerequisites	1. Crystallography and Mineralogy (Prerequisite) 2. Petrology (Prerequisite)				
Module objectives/intended learning outcomes	By following this course, students are expected to understand concepts, theories and basic laws that apply in the formation of sedimentary rock particles and in the transportation/sedimentation of the particles. Students are able to understand the process of sedimentation either mechanical, chemical, or organic. In addition, students are also expected to be able to master the methods and procedures for laboratory and/or field analysis to produce data and data synthesis that can be used to understand the process of sedimentation of sedimentary rocks which then can be a clue in assessing the geometry, distribution and sedimentary rocks depositional environment. After following this course the student is expected to understand: 1. Sedimentary texture and structure as an indicator of sedimentary process 2. Process that occurs in carbonate rocks formation 3. How to analyze sedimentary rock environmental deposition based on its character				
Content	The course explaining about sedimentary particles how it formed, transported and deposited in term of mechanical, chemical and biological processes. Explaining about where and how sedimentary				

	rocks were deposited and its characteristic. To understand all about sedimentary rocks the course started with sedimentary texture analysis comprising of grain size, grain shape and grain packing. Based on sedimentary texture the sedimentary processes are elaborated; starting with mechanical process of traction and gravity mass flow, in this topic sedimentary structure and its relation to sedimentary processes are discussed. Continue with carbonate sedimentation in which biological process is predominant beside mechanical and chemical, following by the chemical process of evaporitic sediments The course continue with sedimentary rocks classification and depositional analysis. Depositional analysis comprise of continental, transitional, shallow marine and deep marine. The course ended with the economic potential of sedimentary rocks. The lectures give an overview of the following topics: 1. Introduction 2. Sedimentary Rock Forming Particle 3. Sedimentary Process 4. Sedimentary Rocks Classification 5. Depositional Environment and Sedimentology Characteristics and its Stratigraphic Pattern 6. Methods of Environmental Deposition Analysis 7. Sedimentology Role and Sedimentary Rock as Geological Resources
Study and examination requirements and forms of examination	Paper Test and Practical Test
Media employed	Laboratory Activity, Power Point Slide, Excursion is tentative
Reading list	1. Friedman, GM., Sanders, JE, 1978, Principles of Sedimentology, John Wiley & Sons Inc. 2. Collinson, JD., Thompson, DB. 1982, Sedimentary Structures 2nd Ed., London Unwin Hyman, 207 pages. 3. Mc Lane, M., 1995, Sedimentology, Oxford University Press Inc., 423 pages. 4. Pettijohn, FJ., Potter, PE., 1964, Atlas and Glossary of Primary Sedimentary Structure, Springer-Verlag, Berlin, 370 pages.

Module name:		**Paleontology**			
Module level, if applicable		2nd year			
Code, if applicable		GL 2171			
Semester(s) in which the module is taught		1st semester			
Person responsible for the module		Dr. Ir. Yan Rizal R., Dipl. Geol. and Dr. Aswan ST., MT.			
Lecturer		Prof. Dr. Ir. Jahdi Zaim, Dr. Ir. Yan Rizal R., Dipl. Geol., Dr. Aswan ST., MT., Mika Rizki Puspaningrum, S.Si., MT.			
Language		Indonesian			
Relation to curriculum		compulsory course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	90 (2 x 45)	2	quiz, discussion, assignment	Lectures: 28 hours (2 hours x 14 weeks)	28
				Preparation and Follow up: 56 hours (4 hours x 14 weeks)	56
practical, presentation	90 (8 x 11/12)	1	quiz, report, presentation	Practical: 12 hours (1 hours x 12 weeks)	12
				Preparation and Follow up 24 hours (2 hours x 12 weeks)	24
Total Workload		120 hours/semester			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (30%), mid semester exam (35%), and end semester exam (35%)			
Recommended prerequisites		-			
Related Course		1. Micropaleontology (prohibition) 2. Sedimentology (prohibition) 3. Principle of Stratigraphy (prohibition) 4. Historical Geology (prohibition) 5. Tectonophysics (prohibition)			
Module objectives/intended learning outcomes		Students be able to understand the basic and application of evolution and paleontology and its role to stratigraphy, sedimentology, and its application to geology in general.			
Content		The lecture is about basic principles of paleontology, fossils and fossilization process, the sense of space and time in evolution and paleontology, paleontology/fossil role in geology. Quantitative and qualitative methods in paleontology, and also fossil meaning in the geologic time scale formulation will be discussed in this module. The systematic of macrofossils will also be elaborated and introduced. The module also explains the methods used for fossil identification, particularly discussed the key taxa for each of geological periods recorded in Indonesia.			

	The lectures give an overview of the following topics: 1. Introduction 2. Fossilization Process 3. Rocks and Fossils 4. Bathymetry Zone 5. Evolution 6. Taxonomy 7. Methods in Taxonomy 8. Arthropod and Coelenterate 9. Bryozoan and Porifera 10. Brachiopods 11. Mollusk 12. Ichnofossil and Vertebrata 13. Biostratigraphy and Depositional Environment
Study and examination requirements and forms of examination	Paper Test and individual presentation
Media employed	Presentation slides, movie
Reading list	1. Basic Paleontology, Benton & Harper ; Longman, 1997 2. Invertebrate Paleontology, Clarkson; Charman & Hall, 1993 3. The Practical Paleontologist, Parker & Bernor, Fireside Book, 1990 4. Paleontology, Romer, The Univ. Chicago Press, 1966 5. Bringing Fossils to Life, Prothero, McGraw Hill, 1998 6. Invertebrate Paleontology and Evolution, 2nd ed., Clarkson; Allen & Unwin, 1986. 7. Introduction to Paleobiology and the fossil record, Benton and Harper; Wiley-Blackwell, 2009

Module name:		**Structural Geology**			
Module level, if applicable		2nd year			
Code, if applicable		GL 2212			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		Dr. Ir. Agus Handoyo Harsolumakso; Dr. Ir. Chalid Idham Abdullah; Ir. Benyamin Sapiie Ph.D.			
Lecturer		Dr. Ir. Agus Handoyo Harsolumakso, Dr. Ir. Chalid Idham Abdullah; Ir. Benyamin Sapiie Ph.D.; Indra Gunawan S.T., M.Sc. Ph.D; Alfend Rudyawan S.T., M.T., Ph.D.; Dr. Meli Hadiana, S.T., M.T.			
Language		Indonesian			
Relation to curriculum		Compulsory			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	45	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Practical	45	1	Practical homework	Practical: 1 x 12	12
				Preparation and Follow up 2 x 12	24
Total Workload		120 hours			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (25%), and end semester exam (35%))			
Recommended prerequisites		Physical geology, Principle of Stratigraphy, Geomorphology, Petrology			
Related Course		Tectonophysics			
Module objectives/intended learning outcomes		Students are able to recognize elements of geological structures, perform a geometric description, kinematic and dynamic analysis and can explain the process occurred. Students are also expected to carry out the synthesis in relation to tectonic processes associated with the formation of these structures.			
Content		Structural geology is a study of deformed rocks including shape, geometry and architecture of the crust as well as their deformation mechanism. Structural geology includes understanding tectonic deformation such as force, stress and strain. Identifying, mapping and analyzing various different structures such as fractures, folds, faults, foliation, cleavages and lineation and their relationship among them in the context of plate tectonic. Applying structural geology techniques in analyzing geological natural disaster in active tectonic regions including earthquakes and landslides, hydrocarbon migration and trap, economic minerals and engineering geology. The lectures give an overview of the following topics: 1. Introduction into structural geology 2. Kinematic Analysis 3. Dynamic Analysis			

	4. Fracture Mechanic 5. Structure Element and Deformation Mechanism 6. Fractures, Joints, and Fault 7. Fold 8. Fault and Fold Interaction 9. Foliation, Cleavage, and Lineage 10. Shear Zones and Progressive Deformation 11. Active Tectonics 12. Structural Geology Application in hydrocarbon and mineral prospects, and engineering geology.
Study and examination requirements and forms of examination	Paper test for theory and practical, field trips will be organised
Media employed	Power Point, Studio Material for practical
Reading list	1. Davis, G. H., Reynolds, S. J., and Kluth, C. F., 2012, Structural Geology of Rock and Regions: 3rd edition, John and Wiley and Sons, Inc., 835 p. 2. Fossen, H., 2010, Structural Geology, Cambrige University Press, 463 p. 3. Twiss, R. J. and Moore, E. M., 1992, Structural Geology: W. H. Freeman and Company, 532 p. 4. Marshak and Mitra, (1988), Basic Methods of Structural Geology, Prentice-Hall, 441.

Module name:	**Petrology**				
Module level, if applicable	2nd year				
Code, if applicable	GL2242				
Semester(s) in which the module is taught	4th semester				
Person responsible for the module	Prof. Dr. Ir. Emmy Suparka				
Lecturer	Prof. Dr. Ir. Emmy Suparka; Dr. I Gusti Bagus Eddy Sucipta; Ir. Nurcahyo Indro Basuki, Ph.D.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and Follow up : 56 hours	56
Practicals	15	1	Report	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours/semester				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on practical course report (30%), mid semester exam (30%), and end semester exam (30%), and assignment/quiz (10%)				
Recommended prerequisites	GL2141 Crystallography and Mineralogy (pre-requisites)				
Related Course	GL3141 Optical Mineral and Petrography (compulsory) and GL3044 Petrogenesis (elective)				
Module objectives/intended learning outcomes	1. Students having basic knowledge about the rocks as a part of lithosphere and understanding about rocks type, mineralogy, texture, structure, and their genesis in general. 2. Students have the ability to identify and describe the rocks in the megascopic scale included their classification and relationship in the fields				
Content	The lecture examines the igneous rocks, pyroclastic rocks, sedimentary rocks, and metamorphic rocks in the megascopic scale, included their mineralogy, texture, and structure. The lecture also explains how to identify the rocks and how to understand the rock formation, included their classification and relationship in the fields The lectures give an overview of following topics: 1. Introduction 2. Igneous rocks 3. Pyroclastic rocks 4. Sedimentary rocks (non carbonate rocks) 5. Sedimentary rocks (carbonate rocks) 6. Metamorphic rocks				
Study and examination requirements and forms of examination	Paper Test and Practical Test				
Media employed	White board, computer, projector, minerals or rocks specimens				

Reading list	1. Ehlers,E., Harvey Blatt , 1982. Petrology. Igneous, Sedimentary, and Metamorphic, Freeman, 732p. 2. Fischer, R.V. and Schmincke, H.U., 1984, Pyroclastic Rocks, Springer-Verlag, San Francisco, 472p. 3. Tucker, Maurice E., 2001. Sedimentary Petrology, An Introduction to the Origin of Sedimentary Rocks. Blackwell Science Ltd., 286p.

Module name:		**Principle of Stratigraphy**			
Module level, if applicable		2nd year			
Code, if applicable		GL 2252			
Semester(s) in which the module is taught		2nd Semester			
Person responsible for the module		Dr. Djuhaeni			
Lecturer		Dr. Djuhaeni			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture, discussion, and group projects	Lectures	28
				Preparation and Follow up	56
Total Workload		84 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based exams			
Recommended prerequisites		Sedimentology (Prerequisite)			
Module objectives/intended learning outcomes		Students are able to understand the basic principles of stratigraphy.			
Content		In geology, it is required an understanding of sedimentary rocks and their relation in space and time. The basic concept of stratigraphy, stratigraphic process and rock layers reconstruction process is the main topic of this course. Furthermore, the division into stratigraphic units: lithostratigraphy, biostratigraphy and chronostratigraphy will be discussed in the Standard of Indonesian Stratigraphy. Understanding the concept of time and space correlations will be the main objective in the course Principles of Stratigraphy. Geological history and the economic value will be discussed by a cross section-correlation. The lectures give an overview of the following topics: 1. Introduction into Principles of Stratigraphy 2. Basic Law in Stratigraphy 3. Process in Stratigraphy 4. Concept of Facies 5. Concept of Unconformity 6. Stratigraphic Unit 7. Correlation			
Study and examination requirements and forms of examination		Paper Test			
Media employed		Presentation slides			

Reading list	1. Dunbar,C.O and Rodgers,J (157), Principal of Stratigraphy 2. Schoch, R.M, (1989), Stratigraphy: Principal and Methods 3. Martodjojo, S dan Djuhaeni, (1996), Sandi Stratigrafi Indonesia

Module name:	**Micropaleontology**				
Module level, if applicable	2nd year				
Code, if applicable	GL-2261				
Semester(s) in which the module is taught	4th Semester				
Person responsible for the module	Dr. Rubiyanto Kapid				
Lecturer	Dr. Rubiyanto Kapid				
Language	Indonesian				
Relation to curriculum	Compulsory				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture, Presentation	80	2	Lecture and discussion	Lectures: 2(hrs) x 14 (sessions)	28
				Preparation and Follow up 4(hrs) x 14 (sessions)	56
Practical	15	1	Report, Observation	Practical: 1(hr) x 12 (practicals)	12
				Preparation and Follow up 2(hrs) x 12 (practicals)	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (30%), mid semester exam (30%), and end semester exam (40%)				
Recommended prerequisites	Paleontology				
Related Course	Principe Stratigraphy; Micropaleontology & Biostratigraphy; Biostratigraphy Quantitative; Nannoplankton; Palynology.				
Module objectives/intended learning outcomes	The students can understand the type of microfossils, how to evaluate microfossils data, the identification of microfossils, biostratigraphy analysis and the application in industry and geology research.				
Content	Micropaleontology gives the knowledge about microfossil and the application of microfossils in Industry and research. This lecture provides how to identify of microfossil, how to take the samples, the relationship with sedimentology and stratigraphy, biostratigraphy analysis and the application in Industry and research. Some aspects that will be discussed in this course: 1. Fossil and sedimentology analysis 2. Biostratigraphy 3. Small foraminifera (geology aspect and identification) 4. Large foraminifera (geology aspect and identification) 5. Nannoplankton (introduction) 6. Palynology (introduction) 7. Radiolarian (introduction) 8. The application of microfossils in industry and research				
Study and examination	Paper Test and Group Presentation				

requirements and forms of examination	
Media employed	Presentation of lecture slides, watching video, and practice at the laboratory using microscope
Reading list	1. BouDagher-Fadel, M.K., 2008: Evolution and Geological Significance of Larger Benthic Foraminifera 2. Bolli, H.M., J.B. Saunders, and K., Perch - Nielsen, 1985: Plankton Stratigraphy 3. Aubry, M.P., 1984: Handbook of Cenozoic Calcareous Nannoplankton 4. Blow, W.H., 1969: The Cenozoic Globigerinida. 5. Glaessner, M.F., 1945 : Principles of Micropaleontology

Module name:	**Geofluids**				
Module level, if applicable	2nd year				
Code, if applicable	GL2281				
Semester(s) in which the module is taught	4th Semester				
Person responsible for the module	Prof. Ir .Lambok M. Hutasoit, M.Sc., Ph.D.				
Lecturer	Agus M. Ramdhan, S.T., M.T., Ph.D. and Irwan Iskandar, S.T.,M.T., Ph.D.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
lecture and homework	80	2	Lecture and discussion	Lectures: 2 hours x 14 times	28
				Preparation and Follow up: 4 hours x 14 times	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on weekly assignment and presence (20%), mid semester exam (40%), and end semester exam (40%)				
Recommended prerequisites	1. Math (Prerequisite) 2. Physic (Prerequisite)				
Related Course	Physical Geology				
Module objectives/intended learning outcomes	Students be able to understand the science of fluid mechanics to complete the basic science of fluid and basic science of earth that has been studied in First Year Preparation Program. This science is expected to help students understand the role of fluids in geological processes on the surface and underground.				
Content	Fluids have important roles to geological processes, at the surface and sub-surface. This course covers basic principles of fluid mechanics and its role to various geological processes. Some aspects that will be discussed in this course: 1. The genetic and evolution of fluids 2. Physical, chemical, and isotopically properties of geo-fluids 3. Tectonic, stress, pore pressure 4. Fracturing in fluid system 5. Fluid flow and heat transport in geothermal system 6. Fluids in diagenesis and mineralization 7. Geofluids in sedimentary basin 8. Interaction and influence of magmatic and metamorphic fluids				
Study and examination requirements and forms of examination	Midterm, final term, and homework				
Media employed	Slide projector				

Reading list	• Chapman, R.E., 1981, Geology and Water: An Introduction to Fluid Mechanics for Geologists. • Drever, J.I., 1988, The Geochemistry of Natural Waters. Ingebritsen, S., Sanford, W., and Neuzil, C., 2006, Groundwater in Geologic Processes.
Additional Information	This course is introduction into fluids mechanic for geology

Module name:	**Marine Geology**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3001				
Semester(s) in which the module is taught	Every semester				
Person responsible for the module	Dr. Ir. Andri Slamet Subandrio, Dipl. Geol.				
Lecturer	Dr. Ir. Andri Slamet Subandrio, Dipl. Geol.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture, discussion, and group projects	Lectures	28
				Preparation and Follow up	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based exams				
Recommended prerequisites	1. Physical Geology (prerequisite) 2. Sedimentology (corequisite)				
Module objectives/intended learning outcomes	Students know and understand the character and the physical properties of the ocean and sea water, as well as the role of the sea in geological processes, and are able to use it to help reconstruct the geological phenomena, climatology, and oceanographic history.				
Content	The lecture explains the influence of oceans to the deposition system in littoral, shelf, slope to deep-sea environments, with the role of continent and ocean components, as well as of biological interaction. It is also describes the controls on seawater circulation, waves, and it correlations with paleoclimate and paleo-oceanography. The lecture then explains the economic aspects of seabeds (minerals, hydrocarbon, etc.) and environmental aspects in exploit them. Lecture is given to explain the characters and physical-chemical properties of seawater, and its role in underwater geological processes such as development of oceanic basins, oceanic sedimentation in different depths, and its correlation with paleoclimate and paleo-oceanography. Some aspects that will be discussed in this course: 1. Introduction into marine geology 2. Plate tectonic and oceanic basin characteristic 3. Geology and geophysics method on marine geology 4. Physical process in the ocean 5. Sea level changes 6. Coastal system 7. Continental margin				

	8. Marine sedimentation 9. Coral reef 10. Ocean chemistry and deep ocean sediment 11. Ocean circulation 12. Paleoclimate and Paleo-oceanography 13. Marine resources and environmental awareness
Study and examination requirements and forms of examination	Paper Test
Media employed	Presentation slides
Reading list	1. Anderson RN, (1986), Marine Geology, A planet earth perspective, John Wiley, USA 2. Bhatt, JJ., (1978), Oceanography, Exploring the planet ocean, Van Nostrand, NY, USA 3. Cronan DS, (1992), Marine Minerals in Exclusive Economic Zones, Chapman & Hall, London, UK 4. Doyle LJ & Pilkey OH., (1979), Geology of Continental Slope, Soc. Of Econ. Paleon. And Min., Spec Pub. No. 27., Tusla Okla. USA 5. Rona PA, Bostrom K, Laubier L, and Smith KL, (1983), Hydrothermal Processes at Seafloor Spreading Centers, NATO Sci. Affair Div., Plenum, NY 6. Ross DA., 1977, Introduction to Oceanography, 2nd edition, Prentice Hall Inc., Eaglewood Cliffs, New jersey 07632, 429p. 7. Weisberg J & Parish H., 1974, ..., McGraw Hill Book Company, New York, 315p

Module name:		**Geocomputation**			
Module level, if applicable		3rd year			
Code, if applicable		GL3101			
Semester(s) in which the module is taught		5th Semester			
Person responsible for the module		Prof. Ir .Lambok M. Hutasoit, M.Sc, Ph.D.			
Lecturer		Dr. Ir. Asep Heri Patria Kesumanjana, M.T. and Agus M. Ramdhan, S.T., M.T., Ph.D.			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
lecture, practical, and homework	90	3	Lecture and discussion	Lectures: 3 hours x 14 times	42
				Preparation and Follow up: 4 hours x 14 times	56
Practicals	90	1	Report	Practical: 1 hour x 12 practical	12
				Preparation and Follow up: 2 hours x 12 individual practical	24
Total Workload		134 hours			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment, practical course report, and presence (20%), mid semester exam (40%), and end semester exam (40%)			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students understand application of deterministic and statistic method for solving geological problem e.g. groundwater level decline due to water extraction.			
Content		This lecture focuses on the understanding of problem solving in geology by applying deterministic mathematical method with the aid of computer (computer programming)			
Study and examination requirements and forms of examination		Mid-term, final term, practical, and homework			
Media employed		Slide projector and computer			
Reading list		• Wang, H.F., dan Anderson, M.P., 1982, Introduction to Groundwater Modeling Finite Difference and Finite Element Methods, Academic Press, Inc. • Chapra, S.C., dan Canale, R.P., 2002, Numerical Methods for Engineers Fourth Edition, McGraw-Hill Companies, Inc. • Raharjo, B., 2007, Pemrograman C++, mudah dan cepat menjadi master C++, Penerbit Informatika, 442 halaman (dari Kuliah PTI-B) • www.cplusplus.com • User manual Codeblock			

Module name:		**Geomorphology**			
Module level, if applicable		3rd year			
Code, if applicable		GL 3111			
Semester(s) in which the module is taught		6th Semester			
Person responsible for the module		Dr. Ir. Agus Handoyo Harsolumakso			
Lecturer		Dr. Ir. Agus Handoyo Harsolumakso, Alfend Rudyawan S.T., M.T., Ph.D.			
Language		Indonesian			
Relation to curriculum		Compulsory			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion and presentation	80	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Practical	80	1	Discussion and reporting	Lectures/discussion 1 x 14	14
				Individual reporting 2 x 14	28
Total Workload		126 hours			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (25%), and end semester exam (35%))			
Recommended prerequisites		1. Petrology (prerequisite) 2. Principles of Stratigraphy (prerequisite) 3. Structural Geology (prerequisite) 4. Geomorphology (prerequisite)			
Module objectives/intended learning outcomes		Being able to understand the meaning of geomorphology, identify the type and shape of the landscape as well as the processes that take place. Capable and skilled in the analysis and interpretation of the geomorphology of the media topographic maps, aerial photographs, satellite images, with a variety of equipment.			
Content		Geomorphology is the study of landforms, processes that occur and formation, both inside (endogenous) and on the surface (exogenous) of the earth. Geomorphology is a reflection of the condition of lithology and geological structures, associated with the stage of the surface such as weathering, erosion and sedimentation, which gives an overview of landscape characteristics. In studying geomorphology, beside of field observations, another analysis is used such as topographic maps, aerial photographs and a variety of remotely sensed imagery. This analysis includes the technique of using aerial photographs and imagery from aircraft or satellites, processing and interpretation of visual or digital way.			

	Some aspects that will be discussed in this course: 1. Introduction into geomorphology 2. Exogenous geomorphic process 3. Endogenous geomorphic process 4. Geomorphic element and identification to geomorphological object 5. Folded mountain and plateau 6. Volcanoes and dome 7. Fluvial plain 8. Coastal, swamp, and deltas 9. Karst morphology 10. Complex, block, and structural mountains 11. Geomorphology mapping 12. Modern geomorphology 13. Applied geomorphology
Study and examination requirements and forms of examination	Paper examination for both theories and practical
Media employed	Paper and presentation
Reading list	1. Thornburry, 1989, Principles of Geomorphology 2. van Zuidam, 1985, Guide to Geomorphologic Aerial Photo 3. Floyd F. Sabins, Remote Sensing, Principles and Interpretation, Freeman 3rd Edition, 1997. 4. Geomorphology and Photo Interpretation, USGS.

Module name:	**Optical Mineralogy and Petrography**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3141				
Semester(s) in which the module is taught	5th semester				
Person responsible for the module	Ir. Nurcahyo Indro Basuki, M.T., Ph.D.				
Lecturer	Ir. Nurcahyo Indro Basuki, M.T., Ph.D.				
Language	Indonesian				
Relation to curriculum	Compulsory				
Types of teaching and learning	Compulsory Course	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and Follow up	56
Practical	12	1	Microscopic observation and Report	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance in class is 80% (according to ITB regulation). Final score is evaluated based on course score (70%) and practical report score (30%). Course score consist of mid exam (25%), final exam (40%), quiz (10%) and assignments (25%)				
Recommended prerequisites	GL2141 Crystallography and Mineralogy (pre-requisites), GL2242 Petrology (pre-requisites)				
Related course	GL3045 Rock Forming Minerals (elective), GL3044 Petrogenesis (elective)				
Module objectives/intended learning outcomes	1. Students will be able to explain optical phenomena when light wave goes through non-opaque minerals and how these phenomena can be characteristics of various rock-forming minerals. 2. Students will be able to carry out petrographic observation techniques using polarized microscope. 3. Students will be able to identify various rock-forming minerals, and classify various and common igneous, sedimentary and metamorphic rocks based on their mineralogy and textures. 4. Students will be able to generate mineralogy and textural interpretation to determine rock-forming processes.				
Content	This course will discuss optical phenomena when light wave goes through non-opaque minerals and how these phenomena can be characteristics of various rock-forming minerals. Techniques to observe and identify rock-forming minerals and various rock types using polarized microscope will be comprehensively discussed. Furthermore, mineralogy and textures of various rock types (i.e. igneous, sedimentary, metamorphic rocks) and how to classify them will be covered. Mineralogy and textural interpretation to determine rock-forming processes will also be briefly discussed. This course includes weekly laboratory work				

	that will give students the opportunity to learn about optical characteristics of rock-forming minerals as well as mineralogy and texture characteristics of different rock types based on thin section observation using polarized microscope. The lectures give an overview of following topics: 1. Theory of light and Polarizing microscope 2. Isotropic and Anisotropic Optical Indicatrix 3. Orthoscopic observation, plane polarized light: shape, habit, refraction index, relief, color, pleochroic 4. Orthoscopic observation, crossed-polarizers: birefringence, interference color, sign of elongation, extinction 5. Conoscopic observation: uniaxial and biaxial optics 6. Identification of Minerals 7. Petrography of Igneous Rocks: Ultramafic, Mafic, Intermediate, Acid and Pyroclastic Rocks 8. Petrography of Sedimentary Rocks: Siliciclastic and Carbonate Rocks 9. Petrography of Metamorphic Rocks
Study and examination requirements and forms of examination	Paper-based exams (mid semester and final), quiz, assignments and Practical Test
Media employed	Writing on board, power point, movie (limited), articles/papers, thin sections
Reading list	1. Kerr. P.F. 1977. Optical Mineralogy, 4th ed. Mc Graw Hill Book Coy. 492 p. 2. Nesse, W.D., 2004. Introduction to Optical Mineralogy. 3rd ed. Oxford University Press, New York, 348 p. 3. Deer et al. 1979 (Second Impression). An Introduction to the Rock-Forming Minerals. E L B S and Longman. 528 p. 4. Williams, H., Turner, F.J., and Gilbert, C.M., 1982. Petrography, an introduction to the study of rocks in thin sections. 2nd ed. W.H. Freeman and Co., New York, 626 p 5. Ehlers, G.E., dan Blat, H., 1982, Petrology, W.H. Freeman and Co., San Francisco, 732 p. 6. Fischer, R.V. and Schmincke, H.U., 1984, Pyroclastic rocks, Springer-Verlag, San Francisco, 472 p.

<table>
<tr><td colspan="2">Module name:</td><td colspan="5">Volcanology and Geothermal</td></tr>
<tr><td colspan="2">Module level, if applicable</td><td colspan="5">3rd year</td></tr>
<tr><td colspan="2">Code, if applicable</td><td colspan="5">GL3142</td></tr>
<tr><td colspan="2">Semester(s) in which the module is taught</td><td colspan="5">5th semester</td></tr>
<tr><td colspan="2">Person responsible for the module</td><td colspan="5">Dr. I Gusti Bagus Eddy Sucipta, ST., MT.</td></tr>
<tr><td colspan="2">Lecturer</td><td colspan="5">Dr. I Gusti Bagus Eddy Sucipta, ST., MT.; Dr. Eng. Mirzam Abdurrahman, ST., MT.; and Dr. Eng. Asep Saepuloh, ST., M.Sc.</td></tr>
<tr><td colspan="2">Language</td><td colspan="5">Indonesian</td></tr>
<tr><td colspan="2">Relation to curriculum</td><td colspan="5">Compulsory Course</td></tr>
<tr><td>Types of teaching and learning</td><td>Class Size</td><td>Attendance time (hours per week per semester)</td><td>Forms of active participation</td><td colspan="3">Workload</td></tr>
<tr><td rowspan="2">Lecture</td><td rowspan="2">80</td><td rowspan="2">2</td><td rowspan="2">Lecture, discussion, and group projects</td><td>Lectures</td><td colspan="2">28</td></tr>
<tr><td>Preparation and Follow up</td><td colspan="2">56</td></tr>
<tr><td colspan="2">Total Workload</td><td colspan="5">84 hours</td></tr>
<tr><td colspan="2">Credit points</td><td colspan="5">2 CU</td></tr>
<tr><td colspan="2">Requirements according to the examination regulations</td><td colspan="5">Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on mid semester exam (30%), end semester exam (40%), group assignment (20%), and quiz (10%),</td></tr>
<tr><td colspan="2">Recommended prerequisites</td><td colspan="5">GL2111 Physical Geology (pre-requisite), GL2213 Tectonophysics (pre-requisite), and GL2242 Petrology (pre-requisite)</td></tr>
<tr><td colspan="2">Related Course</td><td colspan="5">GL4042 Geology Geothermal (elective)</td></tr>
<tr><td colspan="2">Module objectives/intended learning outcomes</td><td colspan="5">1. Students understand the volcanological science and geothermal systems.
2. Students understand the volcanological aspects especially in Indonesia and the world at large scale.
3. Students understand the conceptual model of geothermal systems and get to know some methods of exploration.</td></tr>
<tr><td colspan="2">Content</td><td colspan="5">The lecture examines the tectonic position of volcanoes, their eruption, classification, magmatic formation, chemical and physical aspects, heat flow, hazards mitigation, volcano stratigraphic, and survey methods in the fields. The lecture also explains the relationship of volcanoes with geothermal, mineralization, and the aspects of human life included agriculture, tourisms.
The lectures give an overview of following topics:
1. Introduction
2. Tectonic setting of volcanoes and magma formation
3. Classification, shape, and structure of volcanoes
4. Volcanoclastic deposits and lava flows
5. Mechanism of pyroclastic deposits, lahar, tephra, and pyroclastic flows
6. Geology of volcanoes
7. Field investigation methods of volcanoes
8. Mitigation on volcanic hazard
9. Magmatism and geothermal system
10. Exploration and benefits of geothermal energy</td></tr>
</table>

	11. Geothermal system of caldera 12. Geochemistry survey in geothermal 13. Geothermal geophysics 14. Relationship of volcanoes and geothermal
Study and examination requirements and forms of examination	Paper Test and Group Presentation
Media employed	White board, computer, projector, reference paper, maps
Reading list	1. Wohletz, K. and Heiken, G., 1992, Volcanology and geothermal energy, University of California Press, Berkeley - Los Angeles, 432 p. 2. Fisher, R. V., Heiken, G., and Hullen, J. B., 1998, Volcanoes: Crucibles of change, Princeton Univ. Press, New Jersey, 317 p. 3. Kusumadinata, K., 1979, Data dasar gunungapi di Indonesia, Direktorat Volkanologi, Bandung, 820 p 4. Schmincke, H-U., 2005, Volcanism, Springer, Verlag Berlin, 324 p. 5. Fischer, R.V. and Schmincke, H.U., 1984, Pyroclastic rocks, Springer-Verlag, San Francisco, 472 p. 6. Cas, R .A. F. And Wright, J. V., 1988, Volcanic successions; : Modern and ancient, Unwin Hyman, London, 528 p 7. Yuwono,Y.S., 2004, Pemetaan daerah volkanik: Panduan untuk pemetaan lapangan, Penerbit ITB, Bandung, 77 p. 8. Bignami C., Bosi V., Costantivi L., Lavigne F., and Thierry P., 2012, Handbook for Volcanic Risk Management, Prevention, Crisis Management, and Resilience, Miavita – Library of Congress Cataloging, Orlean-France, 197 p. 9. van der Meer F. , Hecker C., van Ruitenbeek F., van der Werff H., de Wijkerslooth C., Wechsler C., 2014, Geologic remote sensing for geothermal exploration: A review, International Journal of Applied Earth Observation and Geoinformation, Elsevier, 15 p. 10. Lowrie, W., 2007, Fundamentals of Geophysics, Cambridge University Press, Cambridge - London, 381 p.

Module name:	**General Hydrogeology**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3181				
Semester(s) in which the module is taught	Every Semester				
Person responsible for the module	Dr. Dasapta Erwin Irawan, S.T., M.T.				
Lecturer	Dr. Dasapta Erwin Irawan, S.T., M.T. and Prof. Dr. Ir. Deny Juanda Puradimaja, DEA				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and Follow up	56
Practical	12	1	Report	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based exams				
Recommended prerequisites	1. Physical Geology 2. Geofluids				
Module objectives/intended learning outcomes	Produce students who understand: 1. Principles of hydrogeology, 2. The role of the geological conditions in the presence of groundwater control and flow patterns. Students are able to apply: 1. Principles of hydrogeology, 2. The role of the geological conditions in the presence of groundwater control and flow patterns. 3. Basic analysis in hydrogeological mapping in the field.				
Content	This course covers the principles of hydrogeology, including hydrological cycle, rain and surface water as source of groundwater, geological control to aquifer system, exploration techniques, hydrodynamic behavior of groundwater, numerical simulation, hydrochemistry, hydrogeological basin, groundwater law. Some aspects that will be discussed in this course: 1. Introduction into principles of hydrogeology 2. Hydrologic cycle, precipitation and surface water as main source of groundwater 3. Aquifer system and groundwater potential 4. Aquifer system and groundwater potential in sedimentary rocks system 5. Aquifer system and groundwater potential in alluvial system 6. Aquifer system and groundwater potential in volcanic deposits system 7. Aquifer system and groundwater potential in igneous and				

	metamorphic rock system 8. Groundwater and aquifer properties 9. Exploration in hydrogeology 10. Drilling techniques and well construction 11. Groundwater hydrodynamics and aquifer test 12. Math equation in hydrogeology 13. Groundwater modelling 14. Dispersion phenomena in groundwater 15. Hydrogeological basin analysis
Study and examination requirements and forms of examination	Paper Test
Media employed	Presentation Slides, field activity
Reading list	1. Mandel, S., Shiftan, Z.L., 1981, Groundwater resources: investigation and development, Academic Press, Inc. 2. Freeze, RA dan Cherry, JA., 1979, Groundwater, Prentice Hall 3. Fetter, CW, 1994, Applied hydrogeology, 2nd ed, Prentice Hall 4. Todd, DK, 1980, Groundwater hydrology, John Wiley and Sons 5. Erdelyi, M. dan Galfi,J., 1989, Surface and subsurface mapping in hydrogeology, John Wiley & Sons

Module name:	**Reference Study**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3191				
Semester(s) in which the module is taught	First semester				
Person responsible for the module	Dr. Ir. Budi Brahmantyo, M.Sc				
Lecturer	Dr. Ir. Budi Brahmantyo, M.Sc				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture (5 meetings)	80	2	Lecture and discussion	Lecture	10
				Preparation and Follow Up	20
Presentation (9 meetings)	80	2	Presentation and discussion	Presentation	18
				Preparation and Follow Up	36
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation).				
Recommended prerequisites	1. Tectonophysics 2. Petrology 3. Structural Geology 4. Principles of Stratigraphy				
Module objectives/intended learning outcomes	In this lecture, students will be given lectures with the aim to: 1. Understand aspects of the study of literature / references; searching the literature, write a resume. 2. Understand the rules and ways of writing scientific papers about geology in Bahasa in good and right way, such as: abstract, introduction, analysis, discussion, conclusions. How to cite and reference, footnotes or end, tables, picture, maps, etc. 3. Being able to write a paper based on the study of literature. 4. Being able to present a good presentation with limited time management; and understand geological problems presented Students understand how to make geological papers, preparing presentation materials and have the experience and skills to present it with a good display, including a discussion and answer questions.				
Content	Reference Study I is a student seminar by presenting scientific geological paper with references from published papers within the last 10 years' journals/proceedings. In the beginning of the program, the students will be have a lecture how to look for and to collect references, how to make resume and how to re-write as scientific paper and make a presentation. The lectures also give presentation technics and skills and how to earn successful presentation. There will be only several lectures, in the end students will present their paper in front of their friends and lecturer. Some aspects that will be discussed in this course:				

	1. Introduction 2. Presentation planning 3. Presentation preparation and techniques 4. Evaluation of students presentation
Study and examination requirements and forms of examination	Paper and Presentation
Media employed	Power point slides
Reading list	1. Berko, R.M., A.D. Wolvin, dan D.R. Wolvin, 1989, communicating (4th Ed.), Houghton Mifflin Co., Boston. 2. Adler, R.B., L.B. Tosenfeld, dan N. Towne, 1992, Interplay The Process of Interpersonal Communication (5th ed.), Harcourt Brace Jovanovich Coll. Publ., Fort Worth. 3. Ong, H.L., 1999, Cara Memberikan Presentasi Yang Efektif Dengan Contoh-contoh di Bidang Geologi dan Pertambangan, Jur. Teknik Geologi, ITB. 4. Seksi Bahasa Indonesia, 1988, Bahasa Indonesia dan Tata Tulisan Karangan Ilmiah, Jur. MKDU ITB.

Module name:	**Geology of Indonesia**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3203				
Semester(s) in which the module is taught	6th Semester				
Person responsible for the module	Dr. Ir. Chalid Idham Abdullah				
Lecturer	Dr. Ir. Chalid Idham Abdullah				
Language	Indonesian				
Relation to curriculum	Compulsory				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion and presentation	80	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (25%), and end semester exam (35%))				
Recommended prerequisites	1. Petrology (prerequisite) 2. Principles of Stratigraphy (prerequisite) 3. Structural Geology (prerequisite) 4. Geomorphology (prerequisite)				
Module objectives/intended learning outcomes	Lectures are given to refresh student's knowledge of tectonics with a view of its application in the geology of Indonesia. Students are able to make a connection between important geological information across Indonesia in order to make a sound review about geology around Indonesia.				
Content	Regional knowledge about tectonics, structure and, effect on sedimentation processes in the area of Indonesia. The concept of micro-continental zone which amalgamated become Sundaland. Configuration of terranes with its megasheares and the sutures. The discussion includes the tectonic-structures framework and stratigraphy, tectonic influenced basins framework, main stress patterns, geological features, tectonic and stratigraphic setting that different within islands in Indonesia. Some aspects that will be discussed in this course: 1. Introduction into geology of Indonesia 2. Geology of Western Indonesia 3. Geology of Sunda Shelf 4. Geology of Sumatera Islands 5. Geology of Java and Madura 6. Geology of Borneo 7. Geology of Eastern Indonesia 8. Geology of Sulawesi				

	9. Geology of Bali and West Nusa Tenggara 10. Geology of East Nusa Tenggara 11. Geology of Sumba 12. Geology of Timor 13. Geology of Papua 14. Geology of Banda Sea and Sahul Shelf
Study and examination requirements and forms of examination	Paper examination and presentation
Media employed	Paper and presentation
Reading list	1. Campton, 2004, Field Geology 2. Geologi ITB, 2002, Buku Pedoman Geologi Lapangan, Teknik-Geologi FIKTM-ITB 3. Hamblin, 1990, The Earth Dynamic System, McMilan Publ Co, 4. Maley, T, 1994, Field Geology Illustrated, MineralLand Publications, Idaho, USA, 316p

Module name:		**Field Geology (Karangsambung Field Camp)**			
Module level, if applicable		3rd year			
Code, if applicable		GL 3204			
Semester(s) in which the module is taught		6th Semester			
Person responsible for the module		Chalid Idham Abdullah, Agus Handoyo Harsolumakso			
Lecturer		A team of lecturers			
Language		Indonesian			
Relation to curriculum		Compulsory			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion	80	2	Lecture and discussion	Lectures: 2 x 14	28
				Coordinated Fieldwork 3 x 14	42
Individual mapping	80		Briefing and preparation Mapping	Preparation and Follow up 4 x 14	56
				Mapping program 3 x 12	36
Total Workload		168 hours			
Credit points		4 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation).			
Recommended prerequisites		1. Petrology (prerequisite) 2. Principles of Stratigraphy (prerequisite) 3. Structural Geology (prerequisite) 4. Geomorphology (prerequisite)			
Module objectives/intended learning outcomes		Lectures given with the aim of students understand the application of geology in the field, so as to carry out geological field work standard, as well as being able to make a geological map of an area and its report mapping results. Students are able do standard geological fieldwork and be able to make a geological map of an area and its report mapping result.			
Content		This lecture presents field-lecture to implement the obtained geological knowledge by doing direct observation on geological data at field. The field-lecture consists of standard field geological method such as morphological analysis, outcrop observation, sampling, make some geological section, stratigraphic measurement, analysis on structural geology, and geological mapping including report. Until now, the lecture is realized in LIPI Field Geological Campus in Karangsambung (Central Java). Some aspects that will be discussed in this course: 1. Introduction into field geology 2. Geomorphology analysis 3. Basic petrology for describing rocks 4. Principles of stratigraphy and sedimentology for measuring section 5. Basic of structural analysis 6. Basic of geological mapping 7. Fieldwork report techniques			

	8. Outcrops observation 9. Geological fieldwork 10. Geological mapping practical
Study and examination requirements and forms of examination	Geological, Geomorphological, Traverse Maps, Stratigraphic Column, Cross Section and sound geological interpretation
Media employed	Paper and presentation
Reading list	1. Campton, 2004, Field Geology 2. Geologi ITB, 2002, Buku Pedoman Geologi Lapangan, Teknik-Geologi FIKTM-ITB 3. Hamblin, 1990, The Earth Dynamic System, McMilan Publ Co, 4. Maley, T, 1994, Field Geology Illustrated, MineralLand Publications, Idaho, USA, 316p

Module name:		**Geological Information System**			
Module level, if applicable		3rd year			
Code, if applicable		GL 3205			
Semester(s) in which the module is taught		First semester			
Person responsible for the module		Dr. Ir. Asep Heri Patria Kesumajana, M.T.			
Lecturer		Dr. Ir. Asep Heri Patria Kesumajana, M.T.			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
lecture, practical,	85	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up: 4 x 14	56
Practical, group projects	25	2	Report	Practical: 2 x 12	12
				Preparation and Follow up: 1 x 12	24
Total Workload		120 hours			
Credit points		2 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (40%), mid semester exam (30%), and end semester exam (30%)			
Recommended prerequisites		1. Physical Geology (prerequisites) 2. Tectonophysics (prerequisites) 3. Structural Geology (prerequisites)			
Module objectives/intended learning outcomes		By following this course students are expected to understand the basic concepts of geographic information system (GIS) and can apply these concepts into geology problem. After attending this course students are expected to understand more about the process of data collection, manipulation and analysis, and display the geology and geoscience information in the form of Geological Information System			
Content		These lectures provide an introduction to geographic information system (GIS) and application of geographic concepts in the field of geology and earth science. To achieve such understanding requires knowledge about the elements contained in geographic information system (GIS), various types of data in the field of geology and earth science, the process of digitizing the data, and the data structure management, retrieval, processing and manipulation and data analysis. Some aspects that will be discussed in this course: 1. Introduction into GIS 2. Data structure 3. Data retrieval and data processing 4. Data management 5. Data manipulation and analysis			

	6. GIS product 7. GIS and remote sensing 8. Applied GIS for geology and earth science
Study and examination requirements and forms of examination	Minimum attendance at lectures is 80% (according to ITB Regulation) Paper test, Laboratory Final Project
Media employed	Computer laboratory, power point slides
Reading list	1. Star, J & Estes, John, 1990, Geographic Information System: an Introduction, Prentice Hall Inc. 2. Richard L. Bedell Jr., 1995, Continuing Education Manual on GIS for The Geosciences, Geological Society of America, New Orleans, Louisiana, 193 hal. 3. Fazal, Shahab., 2008, GIS Basics, New Age International (P) Ltd., Publishers, New Delhi, 339 hal. 4. Prahasta, Eddy. 2001. Konsep-konsep dasar Sistem Informasi Geografis. Penerbit Informatika Bandung. 5. Softwares Manual : Arc Info, Arc View, Map Info, Ilwis 6. Publikasi dan Laporan SIG

Module name:		**Engineering Geology**			
Module level, if applicable		3rd year			
Code, if applicable		GL 3221			
Semester(s) in which the module is taught		2nd semester			
Person responsible for the module		Dr. Eng. Imam Achmad Sadisun, S.T., M.T.			
Lecturer		Dr. Eng. Imam Achmad Sadisun, S.T., M.T.			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture		2	Discussion, Quiz, Assignment	Attendance time	28
				Preparation and follow up	56
Pratical Course		1	Laboratory Test Report	Attendance time	12
				Preparation and follow up	24
Total Workload		126 hours			
Credit points		3 CU			
Requirements according to the examination regulations		Minimum attendance at lectures is 80% (according to ITB Regulation) Final score is evaluated based on quiz (5%), assignment (10%), laboratory test report (25%), mid semester exam (25%) and final semester exam (30%).			
Recommended prerequisites		1. Physical Geology (prerequisite) 2. Geomorphology (prerequisite) 3. Petrology (prerequisite) 4. Structural Geology (prerequisite)			
Module objectives/intended learning outcomes		Students are able to get: • A knowledge and understanding on the geological principles which will be put to practical use for engineering activities, • An understanding on the nature of geological materials (mainly rocks, soils, and water) in both the mechanics fundamentals and the applied engineering, • A knowledge on geological processes that potentially bother engineering activities or even result in natural disasters, • An understanding on the instrumentation techniques wheter for field (in-situ) or laboratory, investigation methods and engineering geological mapping methods. With a good geological knowledge and understanding, students will gain an ability to use geological data and information in a various engineering activities, as well as having the ability to provide solutions to the geological problems that may arise in engineering work.			
Content		This course gives a knowledge and understanding on the geological principles which will be put to practical use for engineering activities in relation to whether civil, mining, petroleum or environmental engineering. Emphasis will be placed on the importance of understanding on the nature of geological materials (mainly rocks, soils and water) in both the mechanics fundamentals and the applied			

	engineering. Some cases of geological processes that potentially bother engineering activities or even result in natural disasters will be also discussed. Moreover, the course will also cover the instrumentation techniques whether for field (in-situ) or laboratory, investigation methods and engineering geological mapping methods. Some aspects that will be discussed in this course: 1. Fundamental mechanics 2. Engineering aspect in rock, weathered rock and soil 3. Engineering aspect in sub-surface water 4. Engineering works on rock and soil 5. Geological process and hazard 6. Engineering geological investigation 7. Engineering geological mapping
Study and examination requirements and forms of examination	Paper test
Media employed	Slide presentation, animation, movie, laboratory test guideline
Reading list	1. Hencher, S.R., 2012. Practical Engineering Geology, CRC Press, 464 pp. 2. Price, D.G., 2009. Engineering Geology: Principle and Practice. Edited and Compiled by M. H. De Freitas, Springer, 450 pp. 3. Tony Waltham, 2009. Foundations of Engineering Geology, 3rd edition. New York: Spon Press. 4. Bell, F. G., 2007. Engineering Geology, 2nd Edition. Butterworth-Heinemann, Amsterdam, 581 pp.

Module name:	**Mineral Deposits**				
Module level, if applicable	3rd year				
Code, if applicable	GL3243				
Semester(s) in which the module is taught	6th semester				
Person responsible for the module	Ir. Nurcahyo Indro Basuki, M.T., Ph.D.				
Lecturer	Ir. Nurcahyo Indro Basuki, M.T., Ph.D.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture and discussion	Lectures	28
				Preparation and Follow up	56
Practicals	12	1	Microscopic observation and Report	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance in class is 80% (according to ITB regulation). Final score is evaluated based on course score (70%) and practical report score (30%). Course score consist of mid exam (25%), final exam (40%), quiz (10%) and assignments (25%)				
Recommended prerequisites	GL2141 Crystallography and Mineralogy (pre-requisites), GL2242 Petrology (pre-requisites)				
Related Course	GL2012 Structural Geology (compulsory), GL4032 Geochemical Exploration (elective), GL4045 Mineral Deposits and Ore Minerals (elective)				
Module objectives/intended learning outcomes	1. Students will be able to distinguish various types of mineral deposits based on their characteristics. 2. Students will be able to carry out samples/outcrops observation and make description and interpretation based on their mineralogy and textures/structures. 3. Students will be able to explain the relationships between various mineral deposits and their tectonic setting. 4. Students will be able to describe how characteristics of different mineral deposits will affect their exploration concepts and methods				
Content	This course is to give basic understanding of various economic metal commodities related to different ore deposits that are sought and mined. Therefore, the course will discuss various types/models of ore deposits associated with igneous, sedimentary and metamorphic rocks, as well as surficial weathering-erosion processes. Geological, geochemical and geophysical characteristics of various types of ore deposits will also be covered. Topics on ore formation and general exploration concept will also be briefly discussed. This course includes weekly laboratory work that will give students the opportunity to learn about mineralogy and texture characteristics to different ore deposits based on hand-specimen sample observation.				

	The lectures give an overview of following topics: 1. Orthomagmatic deposits 2. Felsic rock-associated deposits (incl. pegmatite, greisen, porphyry types) 3. Epithermal, orogenic and exhalative deposits (incl. VHMS and Sedex) 4. Surficial-supergene-placer deposits 5. Mineral exploration
Study and examination requirements and forms of examination	Paper-based exams (mid semester and final), quiz, assignments and Practical Test
Media employed	Writing on board, power point, movie (limited), articles/papers, hand specimens
Reading list	1. Bateman AM & Jensen ML., (1981) Economic Mineral Deposits, Jhon Wiley & Sons, Singapore 2. Evans, AM, (1992) Ore Geology and Industrial Minerals, An Introduction, , Blackwel Sci. Pub., London 3. Guilbert, JM & Park, Jr. CF., (1986) The Geology of Ore Deposits, Freeman, NY. 4. Kirkham, RV, Sinclair, WD, Thorpe, RI, and Duke, JM, (1997), Mineral Deposit Modeling, Geological Association of Canada Special Paper 40. 5. Roberts, RG & Sheahan, PA, (1988), Ore Deposit Models, Geological Association of Canada. 6. Hedenquist JF, (1990), Epithermal Gold Mineralization of the Circum Pacific Vol I & II, Elsevier 7. Hedenquist, JW, Thompson, JFH, Goldfarb, RJ, & Richards, JP, (2005), Economic Geology 100th Anniversary Volume, Society of Economic Geologists, Inc. 8. Pirajno, F, 2009. Hydrothermal Processes and Mineral Systems. Springer Verlag, 1250 p.

Module name:	**Petroleum Geology**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3251				
Semester(s) in which the module is taught	2nd semester				
Person responsible for the module	Dr. Ir. Dardji Noeradi				
Lecturer	Dr. Ir. Dardji Noeradi				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Discussion	Lectures	28
				Preparation and Follow up	56
Practicum	20	1	Report Assignment Presentation	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (20%), mid semester exam (40%), and end semester exam (40%).				
Recommended prerequisites	1. Sedimentology (prerequisite) 2. Principles of Stratigraphy (prerequisite) 3. Structural Geology (prerequisite)				
Module objectives/intended learning outcomes	Provide a basic understanding of petroleum existence in the earth's crust as well as the principles of the exploration. After following this course, the student is expected to know about: 1. Formation of oil and gas 2. Concept of oil and gas formation and accumulation 3. How geologist find oil and gas				
Content	The course discuss about Petroleum system which consists of elements and process within the system. Three sub-system which are; Generative sub-system, Migration sub-system and Entrapment sub-system will be discussed in detail. The Generative sub-system comprises of; source rocks identification and its condition, source rocks types and its relation to hydrocarbon potential and source rock maturities as well as the methods of maturity identification and modeling including kitchen definition. The Migration sub system discuss two aspects which are primary migration where hydrocarbon out from source rocks to carrier beds in the kitchen area and secondary migration within carrier bed from the kitchen to the available traps. The Entrapment sub system discuss about entrapment mechanism related to secondary migration, component of traps; geological condition, reservoir rock and seal rock, type of traps including; structural, stratigraphic and combination of both. Some aspects that will be discussed in this course:				

	1. Introduction into petroleum geology 2. Hydrocarbon definition 3. Human history of hydrocarbon 4. Hydrocarbon source rocks 5. Hydrocarbon migration 6. Reservoir 7. Hydrocarbon entrapment 8. Hydrocarbon system analysis inside the basin 9. Lead, prospect, and drilling prognosis 10. Measuring resource and geological risk 11. Structural and isopach mapping 12. Resources Measuring
Study and examination requirements and forms of examination	Paper Test and Studio Activity
Media employed	Presentation slides, studio activity
Reading list	1. North F.K (1985), Petroleum Geology Allen & Unwin, London, Sydney 2. Magoon B.and Dow G. AAPG memoir no. 60 1994; The Petroleum System from Source to Trap. 3. Diana Morton-Thompson, 1992. Development Geology Reference Manual, AAPG Methods in Exploration Series, N0 10

Module name:	**Historical Geology**				
Module level, if applicable	3rd year				
Code, if applicable	GL 3271				
Semester(s) in which the module is taught	2nd semester				
Person responsible for the module	Dr. Ir. Yan Rizal R., Dipl. Geol. and Dr. Aswan ST., MT.				
Lecturer	Prof. Dr. Ir. Yahdi Zaim; Dr. Ir. Yan Rizal R., Dipl. Geol.; Dr. Aswan ST., MT.; Mika Rizki Puspaningrum, S.Si., M.T.				
Language	Indonesian				
Relation to curriculum	compulsory course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
lecture and group presentation	2 x 45	2	quiz, discussion, assignment, group presentation	Lectures: 28 hours (2 hours x 14 weeks)	28
				Preparation and Follow up: 56 hours (4 hours x 14 weeks)	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and group presentation (30%), mid semester exam (35%), and end semester exam (35%)				
Recommended prerequisites	1. Physical Geology 2. Structural Geology 3. Petrology 4. Sedimentology 5. Principles of Stratigraphy 6. Paleontology				
Module objectives/intended learning outcomes	Students be able to understand the establishment, evolution and dynamics process of the earth within time and space, the sedimentation/climatic history, the evolution of organisms and the implication for resource/economic/hazard potential yielded by the Earth.				
Content	This module explains the basic / philosophy of the earth formation in the solar system, as well as of the basic concepts of the theories in geology (geosyncline, continental drift and plate tectonics). The module also includes the basic understanding of the earth composition and it distribution by geological processes and aspects of life / evolution in space and time, including the meaning of geological processes on the development of life and evolution. This module also explains the tectonic development, fauna and flora and their environment of all time (Paleozoic - Quaternary), important events during the Earth history, as well as its significance for the exploration of resources/economic/geohazard, especially in Indonesia. Discuss the existence of hominid Homo erectus and vertebrates in Indonesia as well as the reconstruction of the paleo-environment during the Quaternary Period in Indonesia and Asia.				

	Some aspects that will be discussed in this course: 1. Earth formation concept 2. The development of theories of geological processes 3. Methods in geological dating 4. Basin history 5. Geological time scale 6. The evolution of flora and fauna, and the correlation with geodynamics and climate 7. Earth during between the Precambrian and Early Paleozoic 8. Earth during the Late Paleozoic 9. Earth during Cenozoic 10. Earth during Neogene 11. Earth during Quaternary
Study and examination requirements and forms of examination	Paper Test and Group Presentation
Media employed	presentation slides, movie
Reading list	1. Kummel, B., History of the Earth, Freeman & Co, 1961 (main) 2. Read and Watson , Introduction to Geology: Earth History, Vol 1 & 2, McMillan, 1978 (main) 3. Stanley S.M., Historische Geologie, Spektrum Akademischer Verlag, Heidelberg. Berlin, 2001 (main) 4. Nichol G., Sedimentology and Stratigraphy, second ed., Wiley-Blackwell, 2009 (additional) 5. Van Bemmelen R.W., The Geology of Indonesia, Martinus Nijhoff,The Hague, 1949 (additional) 6. Watanabe N., Kadar D., Quaternary Geology of the Hominid Fossil Bearing Formation in Java, GRDC, 1985 (additional)

Module name:	**Methods on Geological Exploration**				
Module level, if applicable	3rd year				
Code, if applicable	GL 4101				
Semester(s) in which the module is taught	1st Semester				
Person responsible for the module	Dr. Ir. Prihadi Sumintadireja				
Lecturer	Dr. Ir. Prihadi Sumintadireja				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Discussion	Lectures	28
				Preparation and Follow up	56
Practicum	40	1	Report Assignment Presentation	Practical	12
				Preparation and Follow up	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Attendance at lectures is 80% Assignment and Presentation 20% Mid Semester Exam 30% End Semester Exam 30% Practical Laboratory 20%				
Recommended prerequisites	Petrology, Stratigraphy and Sedimentology, Structural Geology				
Module objectives/intended learning outcomes	Student are able to understand the basic understanding of the exploration activities covering concepts, principles, planning and exploration stages as well as the implementation of the exploration methods. Students are able to perform these steps in an integrated geological exploration to the estimation of reserves				
Content	Discussion the course outline includes concepts exploration, followed by planning and technical exploration. In the technical section exploration discussed models and stages exploration and models exploration. Model exploration taught include geological models and geophysical models following methods geology and geophysical common used. survey methods geology, geological investigation local, exploration drilling, seismic, gravity, geoelectric (IP), geomagnetic				
Study and examination requirements and forms of examination	Type of test is given in this course is a group presentation and paper test				
Media employed	Slides and LCD Projectors, White/Blackboards				
Reading list	Relevant reading for this course uses literature from: 1. Applied Mining Geology, Springer, 2016 2. Reynolds, J.M., An Introduction to Applied an Environmental Geophysics, John Wiley & Sons, 1997 3. Telford, W.M., L.P. Geldart, R.E, Sheriff, Applied Geophysics, Cambridge University, 1990				

Module name:	**Management and Economy of Minerals**				
Module level, if applicable	4th Year				
Code, if applicable	GL-4102				
Semester(s) in which the module is taught	First Semester				
Person responsible for the module	Prof. Dr. Ir. Eddy A. Subroto				
Lecturer	Prof. Dr. Ir. Eddy A. Subroto				
Language	Indonesian				
Relation to curriculum	Compulsory course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and seminars	150	2	Lecture and discussion	Lectures: 2(hour) x 14 (meeting)	28
				Preparation and Follow up 4(hour) x 14 (self-learning)	56
Group projects	150	1	Case studies and report writing	Practical: 1(hour) x 12 (meeting)	12
				Preparation and Follow up: 2(hour) x 12 (self-preparation)	24
Total Workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and group case study reports (20%), mid semester exam (40%), and end semester exam (40%))				
Recommended prerequisites	-				
Related Course	-				
Module objectives/intended learning outcomes	Program learning outcome(s): Knowledge and skill. Students are hoped to have knowledge and skill in creating a self-business idea and have basic intuition about entrepreneurship.				
Content	This course is designed for discussing the principle and basic concept of management and economy of mineral and oil and gas business. Discussion in management will cover knowledge about the development in management theory. For economics, discussion will be directed to the industrial mineral (plus) in Indonesia including oil and gas business, coals, metal and non-metal minerals. Discussion will also cover bank interest concept, cash flow, investment rate of return, depreciation, taxation, inflation and deflation, and estimation.				
Study and examination requirements and forms of examination	Paper test, group paper (proposal) writings, and presentation				
Media employed	Text books, slides (power points), and films				

Reading list	Newman, D.G. (1988) Engineering Economic Analysis. Edisi ketiga, Binarupa Aksara, Jakarta. Gitman, L.J. (2006) Principles of Managerial Finance. Robertson Scientific Edisi kesebelas, Pearson International Edition, Boston, USA.

Module name:	**Geological Law and Regulation**				
Module level, if applicable	4th year				
Code, if applicable	GL4103				
Semester(s) in which the module is taught	7th Semester				
Person responsible for the module	Prof. Ir. Lambok M. Hutasoit, M.Sc., Ph.D.				
Lecturer	Dr. Rendy Dwi Kartiko, S.T., M.T.; Dr. R. Sukhyar; Dr. Andang Bachtiar; and Zardi Dahlius, M.T.				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Teaching, Discussion, Debate	80	2	Discussion, Debate, Exercise	Lectures: 2 hours x 14 times	28
				Preparation and Follow up 4 hours x 14 times	56
Total Workload	84 Hours				
Credit points	2 Credits				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and presence (20%), mid semester exam (40%), and end semester exam (40%))				
Recommended prerequisites	1. General Hydrogeology (prerequisite) 2. Petroleum Geology (prerequisite) 3. Mineral Deposits (prerequisite)				
Related Course	1. Coal Geology (Co-requisite) 2. Environmental Geology (Co-requisite)				
Module objectives/intended learning outcomes	Students have basic knowledge on laws and regulation related with geology in Indonesia, which will be useful for career development in the country				
Content	Concept of managements systems based on the Constitution which regulates natural resources. This is the basis for regulations on geological natural resources such as mineral deposits, energy, water, and land. Some aspects discussed in this course are: 1. Introduction to Law 2. State controlling rights mandated by The Constitution 3. Natural resources management system 4. Law and Regulation related with ground water resources 5. Hydrocarbon (petroleum) Law and Regulation 6. Debate related with law and geological issue in Oil and Gas 7. Law related with spatial planning and land ownership 8. Debate related with land law and spatial planning 9. Government perspective on natural resources law 11. Mineral industry law and regulation 11. Debate related with industry law and regulation 12. Renewable energy law and regulation (hydro power, geothermal) 13. Environmental law and regulation				

	14. Natural hazard law and regulation
Study and examination requirements and forms of examination	Mid-term, Final term, and Oral test
Media employed	Slide Projector
Reading list	Indonesian regulation and books, such as: 1. The Indonesian Constitution 2. Oil and Gas Law (Law No. 22 Year 2001) 3. Conservation and environment management Law (Law No. 32 Year 2009) 4. Disaster management Law (Law No. 24 Year 2007) 5. Spatial planning Law (Law No. 26 Year 2007) 6. Mineral and coal mining Law (Law No. 4 Year 2009) 7. Indonesian mineral committee code (Year 2011) 8. Local government Law (Law No. 23 Year 2014) 9. Geothermal Resources Law (Law No. 21 Year 2014) 10. WH Rodgers, Energy and Natural Resources Law, 1983 11. ADB, Environmental Consideration in Energy Development, 1991 12. Daud Silalahi, Regulations on Water Resources and Environment Management, 2002

Module name:	**Environmental Geology**				
Module level, if applicable	4th year				
Code, if applicable	GL 4121				
Semester(s) in which the module is taught	Semester 7				
Person responsible for the module	Dr. Ir. Budi Brahmantyo, M.Sc				
Lecturer	Dr. Ir. Budi Brahmantyo, M.Sc				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Discussion	Attendance time	28
				Preparation and follow up	56
Practical Course	80	1	Report	Attendance time	12
				Preparation and follow up	24
Total workload	120 hours				
Credit points	3 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (20%), mid semester exam (40%), and end semester exam (40%).				
Recommended prerequisites	-				
Module objectives/intended learning outcomes	Students are able to: 1. Understand the role of geology in the ecosystem and how its role in structuring the built environment and the natural environment. 2. Understand geology as the carrying capacity, constraints and limitations of environmental regulation. 3. Understanding the impact of development and workflow impact analysis. 4. Understand environmental problems derived from aspects of geological resources (rocks, minerals, soil, land, water, energy resources, morphology, geological structure, processes and geological phenomena) and how to handle of the problem.				
Content	Environmental Geology gives geological knowledge to learn interaction between Earth with its geological aspects (rocks, minerals, soils, waters, energy resources, morphology, geological structures, geological processes and phenomena) and living creature, especially man. It gives how the role of geological resources as potency, constraint and limitation in environmental planning, spatial arrangement and regional development which change our resources. It gives also the impact of geological processes to human live such as geological hazards and disasters, disposal waste and pollution, environmental law and assessment, and ended up by study cases including spatial analyses by using scoring and weighting criteria. Some aspects that will be discussed in this course: 1. Earth as an ecosystem				

	2. Geological elements ((landscape, rock, mineral, soil, water resources) in life system 3. Energy use 4. Water resources problems 5. Geological hazards 6. Geological assessment on area with high pollution and disposal area 7. Environmental law and geological role for environmental assessment
Study and examination requirements and forms of examination	Paper Test
Media employed	Papers, maps, white board, computers, projector.
Reading list	1. Montgomery, C., 1992, Environmental Geology (3rd Ed.), Wm.C. Brown Publ., Dubuque, USA. 2. Howard, A.D., dan I. Remson, 1978, Geology in Environmental Planning, McGraw-Hill Inc., New York. 3. Raharjo, M., 2007, Memahami Amdal, Graha Ilmu, Yogyakarta.

Module name:	**Coal Geology**				
Module level, if applicable	4th year				
Code, if applicable	GL 4151				
Semester(s) in which the module is taught	First semester				
Person responsible for the module	Dr. Ir. Dardji Noeradi				
Lecturer	Dr. Ir. Dardji Noeradi				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion and presentation	80	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Total Workload	84 hours				
Credit points	2 CU				
Requirements according to the examination regulations	Minimum attendance at lectures is 80% (according to ITB regulation). Final score is evaluated based on assignment and practical course report (20%), mid semester exam (40%), and end semester exam (40%).				
Recommended prerequisites	1. Sedimentology (prerequisites) 2. Principle of Stratigraphy 3. General Geochemistry 4. Structural Geology 5. Subsurface Geology				
Module objectives/intended learning outcomes	Students are able to understand what is meant by coal. Include the process of occurrence, the environment of precipitation, quality, until processing of coal				
Content	This lecture will discussed about factors that contribute to the occurrence of coal deposits, coal formation, the process from plants to peat until become coal, parameters of coal quality and its qualification, coal exploration methods and its geological model, the classification of coal resource and reserve, coal preparation, and possibilities of coal utilization and its environmental impact. Some aspects that will be discussed in this course: 1. Coal formation 2. Coal depositional environment 3. Coal quality 4. Coal classification 5. Coal exploration 6. Coal preparation and utilization 7. Coal and environmental impact				
Study and examination requirements and forms of examination	Paper Test				
Media employed	Presentation Slides				

Reading list	1. Speight, J.G., 1994, The Chemistry And Technology Of Coal, Marcel Dekker. 2. Peters, W.C., 1978, Exploration Mining and Geology, John Wiley &Sons 3. Stach, E., et al., 1975, Coal Petrology, Gebruder Borntraeger. 4. Diessel, C.F.K., 1992, Coal-Bearing Depositional Systems, Springer-Verlag

Module name:		**Final Project A**			
Module level, if applicable		4^{th} year			
Code, if applicable		GL 4098			
Semester(s) in which the module is taught		Every semester			
Person responsible for the module		Head of Study Program			
Lecturer		-			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Independent project	-	15 hours	**Consultation and colloquium**	15 x 14	210
Total Workload		210			
Credit points		5 CU			
Requirements according to the examination regulations		Passing minimum 139 CU prior to defense			
Recommended prerequisites		1. Field Geology (Prerequisite)			
Module objectives/intended learning outcomes		Students are able to conduct geological mapping of an area and research topics in accordance with the proposal, prepare a report and present it final project defense.			
Content		Final Project Type A is an activity of writing his thesis on the results of geological mapping of an area with base map scale between 1: 10,000 and 1: 25,000 with minimum map area (50 X 50) cm^2. The resulting map contains a minimum of three (3) lithologies mapped, excluding alluvial. Besides the discussion about the general geology (geomorphology, stratigraphy, structural geology), students can also suggest topics, especially from the region, for example, stratigraphy/ biostratigraphy, structural analysis, geochemical, petrogenesys, mineralization or any other that may be considered as a scientific contribution. The field research is generally supported by laboratory analysis, such as petrography, micro-paleontology, sedimentology and geochemistry. Final A project must apply field geology methodologies, resulting in a product such as a map of the track, geomorphological map, geological map, a geological cross section along with the stratigraphic column, in the same attachment lab analysis. The final project must be worthy of publication, so that no confidential matters. The final project is complemented by a presentation of the results of his research in a colloquium forum, after the data processing, laboratory, and sectional maps and other diagrams required has been completed. The final project is presented at trial undergraduate exam after the thesis has been completed, after administrative and academic requirements are met.			
Study and examination		Comprehensive test			

requirements and forms of examination	Colloquium Defense
Media employed	Presentation slides, maps, manuscript
Reading list	All related references

Module name:	**Final Project B**				
Module level, if applicable	4th year				
Code, if applicable	GL 4099				
Semester(s) in which the module is taught	Every semester				
Person responsible for the module	Head of Study Program				
Lecturer	-				
Language	Indonesian				
Relation to curriculum	Compulsory Course				
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Independent project	-	9 hours	**Consultation and colloquium**	9 x 14	126
Total Workload	126				
Credit points	3 CU				
Requirements according to the examination regulations	Passing minimum 141 CU prior to defense				
Recommended prerequisites	1. Field Geology (prerequisites)				
Module objectives/intended learning outcomes	Students are able to conduct geological mapping of an area and research topics in accordance with the proposal, prepare a report and present it final project defense.				
Content	Final Project B is an activity of writing a thesis from the primary data, which can be taken from the field or from a specific activity of an agency that is not confidential. These activities may be related to the field of oil and gas, mining, engineering and the environment. This final project should discuss the geological connection with specific topics that are taken according to the data used. The final project is complemented by a presentation of the results of his research in a colloquium forum, after the data processing, laboratory, and sectional maps and other diagrams required has been completed. Final Project B must implement geological synthesis, resulting in a product in the form of a map of GL. The data used are primary data or raw data that has not been interpreted. The final project must be worthy of publication, so that no confidential matters . The final project was presented in the trial exam after the undergraduate thesis completed, with administrative and academic requirements are met.				
Study and examination requirements and forms of examination	Comprehensive test Colloquium Defense				
Media employed	Presentation slides, maps, manuscript				

Reading list	All related references

4. Compulsory Courses Organized by Other Faculty or Units

Module name:		**General Geophysics**			
Module level, if applicable		2^{nd} year			
Code, if applicable		TG 2211			
Semester(s) in which the module is taught		Every Semester			
Person responsible for the module		Geophysical Engineering Study Program			
Lecturer		Geophysical Engineering Study Program			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture and group discussion and presentation	80	2	Lecture and discussion	Lectures: 2 x 14	28
				Preparation and Follow up 4 x 14	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Practical 20% Mid Semester Exam 35% Final Semester Exam 45%			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students able to understand the basic theory and the application of geophysics			
Content		Students are expected to know how to obtain physical parameter and earth interior structures based on geophysical methods.			
Study and examination requirements and forms of examination		Paper test			
Media employed		Power point presentation			
Reading list		Butler, R.F., *Paleomagnetism: Magnetic Domains to Geologic Terranes*, Blackwell Scientific, 1992. Fowler, C.M.R., *The Solid Earth*. Cambridge University Press (2nd edition), 2005. Kearey, P., dan F.J. Vine, *Global Tectonics*. Blackwell Scientific Publications, 1990. Ludman, A., dan N.K. Coch, *Physical Geology*, McGraw-Hill, Inc., 1982. Plummer, C.C., D. McGeary, dan D.H. Carlson, *Physical Geology*, McGraw-Hill, Inc., 2001. Skinner, B.J., dan S.C. Porter, *The Dynamic Earth : an Introduction to Physical Geology*, John Willey & Sons, Inc., 2000. Tachyudin Taib, MI, Diktata Kuliah Geofisika Umum, 2000. Widiyantoro, S., Fisika dan Struktur Interior Bumi, ISBN : 978-979-1241-06-9. Penerbit: Badan Meteorologi dan Geofisika, Jakarta, 2007.			

Module name:		**Islamic Religion and Ethics**			
Module level, if applicable		2nd year			
Code, if applicable		KU2061			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Minimum attendance 80% (10% of final score) Mid semester exam (30%) Semester exam (30%) Soft skill training (30%)			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students believe the truth of Islamic teachings as stated in the holy book of the Qur'an and the Sunnah of the Prophet Muhammad. Having a strong tawhid to Allah. Diligently perform worship, especially the five-time prayer that serves to prevent immorality and can give birth to praiseworthy behaviors such as honest, trustworthy, and responsible. Appearing Islamic noble character, to Allah, to humans and to the environment. Able to maintain the harmony of life among religious people and able to cooperate in the midst of a pluralist society. Able to use Islamic values in the life of society, nation and state. Able to show performance as a khalifah on earth whose activities are beneficial for the people. Able to use Islamic values in the development of science, technology and art.			
Content		(1). The relationship between the natural laws dan religion laws (2). The standing position and the function of human being (3). The holistic of Islam (4). Alqur'an as the first reference of Islam (5). Al-Sunnah as the second of Islam references (6). Ijtihad : the metodology of Islamic justice laws (7).The ethics toword Allah and his misinger (8). The function of ritual (9). The ethics of human relationship (10). The ethic of science, technology and art development (11). The Ethics of politic activities (12). Madany Society/ Civil Society			

	(13). The principles of Islamic banking.
Study and examination requirements and forms of examination	Paper test, Mentoring
Media employed	Power point, student mentoring. (mentoring Is field monitoring by religious assistants to know the students' ability to attend religious lectures in reading Alqur'an, Salat and other amaliyah)
Notes	Student must choose according to their religion
Reading list	• Quraisy Shihab, Tafsir Al-Misbah: Pesan, Kesan dan Keserasian Alqur'an, Lentera Hati, Ciputat Tangerang, 2002.
	• Miftah Faridl, Pokok-pokok Ajaran Islam, Pustaka Salman ITB, Bandung, 2000.
	• Asep Zaenal Ausop, Quranic Character Building: Mewujudkan Muslim yang Berkarakter Qur'ani, Grafindo, Bandung, 2013.
	• Hamdan Manshur, dkk, Material Instruksional Pendidikan Agama Islam untuk Perguruan Tinggi Umum, Direktorat Pendidikan Tinggi Islam, Depag, 2006.
	• Munawar Khalil, Kembali kepada Alqur'an dan Sunnah, Bulan Bintang, Jakarta, 1973.
	• Cecep Alba, Tasawuf dan Tarekat : Dimensi Esoteris Ajaran Islam, Rosda Karya, Bandung, 2012.

Module name:		**Protestant and Protestant Ethics**			
Module level, if applicable		2nd year			
Code, if applicable		KU2062			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Attendance minimum 80 % (Assessment requirements) Mid semester exam: 25 % Semester exam: 25 % Retreat : 25 % Assignment : 25 %			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students understand and able to realize the basic values of Christian doctrine based on the authority of the truth of God's Word written in the Bible. The students have awareness of nation and state in applying science, technology and art that he master. This is reflected in ethics, good morality, noble and noble and high integrity. Students as alumni can later show their identity based on the teachings of religion that have been studied. They make the noble values of Christianity as the views and lifestyle of their profession. They make the teachings of religion as the foundation of life in behaving in the context of Indonesian society is very diverse in the tribe, language, culture and mindset. Thus they have a spirit of togetherness, keeping the harmony and mentality of builders in the pluralistic Indonesian society.			
Content		Lordship of Christ, The Doctrine of Salvation, Worship and the authority of the Word God, Growing in Christ (Colossians 2:6-7), Faith, God's will and leadership, Trials, Suffering and Victory in Christ, Occult, Character, Ethics, Relationships Pre Marriage, Pornography , Love, Life Purpose.			
Study and examination requirements and forms of examination		Paper test, mentoring, retreat			
Media employed		Mentoring, Retreat, Quite time (Personal worship)			
Notes		Student must choose according to their religion			
Reading list		1. Dr.Dorothy Irene Marx,' Agama dan Etika Protestan, 2000.			
		2. Dr. J. Verkuyl, 'Etika Kristen, Ras, Bangsa, Gereja dan Negara.			

	3. Billy Graham' Roh Kudus' Kuasa Allah dalam Hidup Anda.
	4. Dr. Charles C. Ryrie, "Teologi Dasar 1, 2010 dan Teologi Dasar 2, 2010.
	5. Les Parrott Ph.D, High-Maintenance, Relationships, 2000.

Module name:		**Catholicism and Catholic Ethics**			
Module level, if applicable		2nd year			
Code, if applicable		KU2063			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Assignment (15%), Mentoring/Seminar (25%), Mid Semester Exam (25%) and Semester Exam (35%)			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		Students become religious Indonesian human (Homo Religiosus) who can realize the basic values of Religion and Catholic Ethics in everyday life in a pluralistic society, by applying science, technology, and art mastered, in order to increase human dignity in the spirit of love And truth. Guiding and delivering students to: Mastering the religion and able to make it as a source of values and guidelines for life and the foundation of thinking and behaving in applying the knowledge and profession mastered Be intellectual capital who believe and cautious and noble character. Be 100% Indonesians and 100% Catholics.			
Content		Students get materials on twelve universal values, religion and belief - religiosity, revelation and faith, the ten commandments – guides to human life, Christian morality, safety of the actualization of God's kingdom, the church challenges, the social doctrine of the Catholic Church, important themes in the church social teachings, dialectics of faith and its practices, pluralism and dialogs.			
Study and examination requirements and forms of examination		Paper test, mentoring, seminar presence			
Media employed		Power point, mentoring			
Notes		Student must choose according to their religion			
Reading list		Konferensi Wali Gereja Indonesia, Iman Katolik, Buku Informasi dan Referensi, Yogyakarta:Kanisius, 1996.			
		Hardiwardoyo, Purwa, Al. Dr., Moral dan Masalahnya, Yogyakarta: Kanisius, 1990.			
		Konferensi Wali Gereja Indonesia, Kompendium Katekismus Gereja Katolik,			

	Ypgyalarta:Kaniusius, 2010

Module name:	**Hindu Ethics and Religion**

Module level, if applicable		2nd year			
Code, if applicable		KU2064			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Presence, mid exam, final exam			
Recommended prerequisites		-			
Module objectives/intended learning outcomes		The desired outcome after the student completing this course is: So that they can make themselves as fully human immoral and not be the object of technology, but as subjects. Because the technology products that contain values, culture, morality, work patterns, behavior and production patterns. In order for them to be able to transform the technology by considering many factors, especially the impact that will arise from the product of the technology.			
Content		Students learn materials on socio-technology, Hindu theology, the nature of human beings, Hindu ethics, science, technology and art in the Hindu perspective, religious harmony, the Hindu laws, society, culture as an expression, experiences of Hindu religion, Hindu in political life.			
Study and examination requirements and forms of examination		Paper test, Pura visitation			
Media employed		Field Practicum in Pura and discussion			
Notes		Student must choose according to their religion			
Reading list		• Pudja, G., Sudharta, Tjokorda Rai. (1977). Manawadharma Sastra (Manu Dharma Sastra). Jakarta: Dirjen Bimas Hindu dan Budha Departemen Agama RI.			
		• Pudja, G., Sudharta, Tjokorda Rai. (1977). Manawadharma Sastra (Manu Dharma Sastra). Jakarta: Dirjen Bimas Hindu dan Budha Departemen Agama RI.			
		• Drs. Punyatmadja, Ida Bagus Oka. (1984). Pancha Sraddha. Jakarta: Dirjen Bimas Hindu dan Budha, Yayasan Dharma Sarathi			
		• Prof. Moehadi. (1986). Materi Pekat Sejarah Indonesia. Jakarta: Tarumika			
		• Prof. Mantra, Ida Bagus. (1989). Tata Susila Hindu Dharma. Jakarta: Dharma Sarathi			

	• Drs. Pendit, Nyoman S. M.Ag (1989). Bhagawadgita. Jakarta: Daya Proza Press
	• Drs.Punyatmadja, I B. Oka. (1989). Panchasradha. Jakarta: Yayasan Dharma Sarati
	• Mantik, Agus S. (1992). Upanisad Utama. Jakarta: Yayasan Dharma Sarathi
	• DR. Wiana, I Ketut. (1995). Yajna dan Bhakti Dari Sudut Pandang Hindu. Denpasar: Pustaka Manikgeni
	• DR. Titib, I Made. (1998). Veda Sabda Suci Pedoman Praktis Kehidupan. Surabaya: Paramita
	• Krisna, Tjokorde Raka. (2004). Esensi Nilai Agama Hindu dalam Kebudayaan

Module name:		**Buddhist Ethics and Religion**			
Module level, if applicable		2nd year			
Code, if applicable		KU206			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture	Lecture	28
				Preparation and Follow Up	56
Total Workload		84			
Credit points		2 CU			
Requirements according to the examination regulations		Attendance 10%, Mid Semester Exam 30%, Semester Exam 35% and Tutorial 25%			
Recommended prerequisites					
Module objectives/intended learning outcomes		After following this course students have: belief in One God, the noble qualities of deity. - Values of morality and humanity. - Loyalty to the nation and state and to support world peace - Tolerance towards others in social and academic relationships - Logical thinking, critical and creative. - Honesty and internalization of positive attitudes - Active communication - Entrepreneurial spirit			
Content		Life of Buddha, historical development of Buddhism in Indonesia, God the Almighty, Nibbana, the sublime nature of deity (Brahma Vihara) and the nature of Evil (Catur Mara), Tipitaka holly book, Truth, Ehipassiko, Kalama Sutta, Saddha Tri Ratna, Buddhist Pancasila , Four Noble Truths, Meditation and Levels of Purity, Sigalovada Sutta, Dasa Raja Dharma, Tilakkhana, Pancakhanda, paticca Samuppada, Punarbhava, Natural Life, Law of Karma			
Study and examination requirements and forms of examination		Paper test			
Media employed		Power point, tutorial			
Notes		Student must choose according to their religion			
Reading list		• Sumedha Widyadharma (Maha Pandita Sasanacariya). Agama Buddha dan Perkembangannya di Indonesia. Tangerang : P.C. Mapanbudhi. 1995. • Utomo, B. B. Buddha di Nusantara. Jakarta : Buddhist Education Centre. 2010. • Tipitakadhara Mingun Sayadaw. Riwayat Agung Para Buddha, buku 1. Terjemahan : Anggara, I. Jakarta : GiriMangala publications			

	dan ehiPassiko foundation. 2009.
	• Tipitakadhara Mingun Sayadaw. Riwayat Agung Para Buddha, buku 2. Terjemahan : Anggara, I. Jakarta : GiriMangala publications dan ehiPassiko foundation. 2009.
	• Tipitakadhara Mingun Sayadaw. Riwayat Agung Para Buddha, buku 3. Terjemahan : Anggara, I. Jakarta : GiriMangala publications dan ehiPassiko foundation. 2009 : 2407 – 2500.
	• Abhidhamma 45 jam. Panjika, Jakarta : Tri Sattva Buddhist Centre. 2001.
	• Samyutta Nikaya (Buku 5). Terjemahan : Anggara, I. Jakarta : DhammaCitta Press. 2010.
	• Digha Nikaya. Terjemahan : Team Giri Mangala Publication, Team DhammaCitta Press. Jakarta : DhammaCitta Press. 2009.
	• Upa. Sasanasena Seng Hansen. Ikhtisar Ajaran Buddha. Yogyakarta : Vidyasena Production. 2008.
	• Sri Dhammananda. Keyakinan Umat Buddha. Terjemahan : Kurniati, I. Jakarta : Yayasan Penerbit Karaniya. 2005.
	• Ashin Janakabhivamsa. Abhidhamma Sehari-hari. Terjemahan : Jinorasa, A. Jakarta : Yayasan Penerbit Karaniya. 2005.
	• Cunda J. Supandi. Dhammapada Phali (edisi khusus) : Vidyavardhana Samuha. 2004.
	• Samyutta Nikaya (Buku 2). Terjemahan : Anggara, I. Jakarta : DhammaCitta Press. 2010.
	• Digha Nikaya (Khotbah-khotbah panjang Sang Buddha). Terjemahan : Anggara, I. Jakarta : DhammaCita Press. 2009.
	• Samyutta Nikaya (Buku 1). Terjemahan : Anggara, I. Jakarta : DhammaCitta Press. 2010.
Additional Information	Open discussions and case studies are conducted every week to improve knowledge and understanding. Mentoring activities led by 4 Assistants are also conducted every week to help the understanding of the students.

Module name:		**Pancasila and Civic Education**			
Module level, if applicable		2nd year			
Code, if applicable		KU 2071			
Semester(s) in which the module is taught		1st and 2nd semester			
Person responsible for the module		Lembaga MKU ITB			
Lecturer		Lembaga MKU ITB			
Language		Indonesian			
Relation to curriculum		Compulsory Course			
Types of teaching and learning	Class Size	Attendance time (hours per week per semester)	Forms of active participation	Workload	
Lecture	80	2	Lecture, presentation and discussion	Lecture	28
				Preparation and Follow Up	56
Total Workload		84 hour			
Credit points		2 CU			
Requirements according to the examination regulations		Assignment: 10% Mid semester exam : 30% Semester exam : 30% Group presentation : 20 %			
Recommended prerequisites					
Module objectives/intended learning outcomes		Students have the ideal of becoming good citizens. Committed on the values of Pancasila in the life of society, nation and state. Has a high sense of nationalism and patriotism. Understand the archipelago in realizing socio-cultural and socio-political order. Motivated to participate in improving law and human rights enforcement. Motivated to contribute to a good, compact and dignified government. Support the creation of a democratic culture. Maintaining the harmony of inter-religious life and being able to work together in a pluralist society.			
Content		(1). Pancasila as the philosophy and basis of the state (2). National identity (3) Politics and strategies (4). Local Region Autonomy (5). Good and clean governance (6). Rights and obligations of citizens (7). Democratic culture (8) Civil Society (9). Rules of law (10). Human rights enforcement (11). Geopolitics (12). Geostrategic			
Study and examination requirements and forms of examination		Paper test, group presentation			
Media employed		Power point			
Reading list		• Tim Nasional Dosen Pendidikan Kewarganegaraan, Pendidikan Kewarga negaraan : Paradigma Terbaru untuk Mahasiswa, Alfabeta, Bandung, 2010.			
		• Ubaidillah dan Abdul Razaq, Pancasila, Demokrasi, HAM dan Masyarakat Madani, Prenada Media Group, Jakarta, 2012.			
		• Affan Gaffar, Politik Indonesia: Transisi Menuju Demokrasi, Pustaka Pelajar Offset, Yogjakarta, 2000.			

	• Kaelan, Pendidikan Kewarganegaraan Untuk Mahasiswa, Pustaka Pelajar, 2011.
Additional Information	Pedagogical Strategies and Messages for Teachers: Pedagogical Strategies and Messages for Teachers: KU 2071 Course is a Compulsory Course to be taken by all ITB students. In order for the lecture to draw and run smoothly, lectures should be in the form of discussion, raising the latest issues related to the topic being discussed, so that students are actively involved in understanding the current state of affairs with the state.