Module Handbook Curriculum Documents 2017

Chemistry Study Program (CSP)



Chemistry Study Program Faculty of Science and Mathematics UNIVERSITAS ISLAM INDONESIA

3.2 Distribution of Courses

SEMESTER I

	Kode/					Prasyarat/Prero	equiste
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
1	UNI-101	Bahasa Inggris Untuk Kimia	English for Chemistry	2	-	-	-
2	UNI-102	Pendidikan Agama Islam	Islamic Education	2	-	-	-
3	UNI-103	Pancasila	Philosophy State	2	-	-	-
4	CGB-104	Biologi	Biology	2	-	-	-
5	CGB-105	Fisika Dasar	General Physics	2	-	-	-
6	CGB-106	Kimia Dasar	General Chemistry	4	-	-	-
7	CGB-107	Manajemen dan Teknik Laboratorium	Laboratory Management and Techniques	2	-	-	-
8	CGB-108	Matematika Dasar	General Mathematics	2	-	-	-
9	CGB-109	Prak. Fisika Dasar	Practical Course of Physics	1	-	-	-
10	CGB-110	Prak. Kimia Dasar	Practical Course of General Chemistry	1	-	-	-
11	XXX-000	ONDI	ONDI	0	-	-	-
12	XXX-000	BTAQ	BTAQ	0	-	-	-
13	XXX-000	Studi Industri	Industrial Study	0	-	-	-
Total				20			

Module Name		English for Chemistry					
Module level, if app	licable	1 st year					
Code, if applicable		UNI-101					
Semester (s) in whi module is taught	ch the	First semester	r				
Person responsible module	for the	Dr. Dwiarso R	ubiyanto				
Lecturer(s)		Kurniyati, S.Po	d., M.Hum.				
Language		English					
Relation to curriculu	ım	Compulsory	course				
Types of teaching and learning	Class size	Attendance time (hours per week per semester)	Forms of active participation	Workload			
Teaching	50	1.67 (hours) x 16	Collaborative discussion	Lecture: 2 (hours) x 16 (meeting)	32 hour s		
Discussion and Presentation		(meeting) = 27 hours	Presentation	Preparation and follow up 2 (hours) x 16 (self-learning)	32 hour s		
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements acco examination regulat	rding to tions	Minimum attendance at lectures is 75% (according to UII regulation). Final score is evaluated based on assignment and reports (40%) and exam (60%)					
Recommended pre	requisites	-					
Related course	·	-					
Module objectives/i	ntended	By the end of this course students should be able to:					
learning		1. Speaking and writing with the correct structure.					
		2. Communicate fluently in English, specifically used in					
		chemistry and technology term.					
		 Delivered the research paper in English and can deliver the idea in English. 					
Content		English lecture will cover materials as follow:					
		1. Language Development, which involves grammar and					
		extensive vocabulary learning, writing skills, which have					
		a specific focus on literacy and short essays,					
		memoranda, notes.					
		2. Reading, which involves chemistry references topics relevance.					
		3. Listening, which includes comprehension of academic					
		presentation in chemistry activities.					

	 Communication skills, which cover communication situations (within the framework of Breakthrough level).
Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion
Media employed	Textbooks, international journal, slides (power points), and video/movie.
Reading lists	 Robert Schoenfeld, 2010, The Chemist's English, American Chemical Society Another chemistry references

Module Name		Islamic Education					
Module level, if appli	cable	1 st year					
Code, if applicable		UNI-102					
Semester (s) in which	the module is	First semester					
taught							
Person responsible for	or the module	Prof. Dr. Is Fatir	nah				
Lecturer(s)		Drs. Sularno, M	A				
		Shubhi Mahma	shony Harimurti,	S.S., M.A.			
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	1	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion	16 (meeting)	hours		
Discussion and		16 meeting =	Presentation	Preparation and	32		
Presentation		27 hours		tollow up 2 (nours) x	nours		
Tatal wanklaad		01 hours		16 (self-learning)			
Cradit points							
Poquiromonts accord	ling to	3.4 EUI3 Minimum attandance at lastures is 75% (according to 111)					
evamination regulation	nng to	regulation) Final score is evaluated based on assignment and					
examination regulation	0113	reports (40%) and exam (60%).					
		Each student must achieve a minimum grade/predicate of C for					
		the overall grade point average. If it does not meet then the					
		student is required to take a test/ repair assignment.					
Recommended prere	quisites	-					
Related course	-	-					
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:			
learning		1. Have consistency and enthusiasm in realizing positive and					
		Islamic attitudes and behaviors					
		2. Endeavor to continue to study (lifelong learning) at a higher					
		level in the relevant field with the chemistry of essential oil					
		development, materials for energy and the environment. and					
		natural products for food and health					
		3. Have capability and proficiency in the association of the					
		chemistry global community and social awareness that					
		supports chemistry science					
		4. Have scientific digital and computer proficiency internet					
		literacy, and mastery of international language skills to					
		support research and development in chemistry					
Content		The course will	cover:				

	The definition of religion and human natural tendency (<i>Fitrah</i>) towards religion, kinds of religion, mankind's need of hidayah from Allah and types of hidayah, the true religion of Islam and its meaning, sources of Islamic teachings, aspects of Islamic teachings, sharia, discussion about Islamic aqidah (belief), the five pillars of Islam (Rukun Islam), the six pillars of Imaan (<i>Rukun Iman</i>). The focus will be given more on the character building of Muslim professional.
Study and examination requirements and forms of examination	Mid-term, Final term, individual and group presentation
Media employed	Blended (lecture and students' presentation)
Reading lists	 Ilyas, Yunahar. 2009. Kuliah Aqidah. Yogyakarta: LPPI UMY. Referensi Utama. Zuhdi, Masjfuk. 1988. Studi Islam (Jilid 1: Akidah). Jakarta: Rajawali. Tim Penyusun. 1984. Dasar -dasar Agama Islam (Buku Teks Pendidikan Agama Islam pada Perguruan Tinggi Umum. Jakarta: Bulan Bintang. Al Maududi, Abul A'la. 1991. Prinsip-prinsip Islam. Bandung: Al Ma' arif. Sabiq, Sayid. 1992. Aqidah Islam; Pola Hidup Manusia Beriman. Bandung: Diponegoro. Miftah Farid. 1980. Pokok-pokok Ajaran Islam. Bandung: Pustaka Salman. Ahmad Azhar Basyir, 1990. Pendidikan Agama Islam I (Aqidah), Perpustakaan FH UII.

Module Name		Pancasila					
Module level, if appli	cable	1 st year					
Code, if applicable		UNI-102					
Semester (s) in which	the module is	First semester					
taught							
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si				
Lecturer(s)		Edny Wulandar	i, SH., MH.				
		Alif Lukmanul H	lakim, S.Fil., M.Ph	nil.			
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	1			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Class	Lecture: 2 (hour) x 16	32 h		
	50	Class	attendance	week (meeting)			
Discussion and		attendance:	Self-directed	Preparation and	32 h		
Presentation		16 week x 2 x	studies	follow up 2 (hour) x			
		0,83 = 27 h	Presentation	16 (self-learning)			
Total workload		01					
Credit points		31					
Requirements accord	ling to	Minimum attendance at lectures is 75%					
examination regulation	ons						
Recommended prere	quisites	-					
Related course	•	-					
Module objectives/in	tended	By the end of this course students should be able to:					
learning		1. Have consistency and enthusiasm in realizing positive					
		attitude and	Islamic behavior				
		2. Have the abi	lity to continue o	of knowledge (long life lea	arning)		
		at a higher level in the relevant field.					
		3. Have skills and leadership attitudes in collaborating or					
		interacting with others.					
Content		The course will cover:					
		Introduction to Pancasila education, Pancasila in the flow of					
		the nation's history, Pancasila as a National principle of					
		Indonesia, Pancasila as country ideology, Pancasila is a					
		philosophical system, Pancasila as asystem of ethics and islam,					
Study and avamination	20	Pancasila is a basic science development.					
requirements and for	ms of	ויווע-נכווו, רווומו נכוווו מווע מסטובוווופוונ					
evamination							
Media employed		Blended mix					
Media employed		Blended mix					

Reading lists	1.	Dirjen Pembelajaran dan Kemahasiswaan Kementrian riset, Teknologi dan pendidikan tinggi RI, <i>Pendidikan Pancasila</i> <i>untuk Pergurugan Tinggi</i> , Buku Bahan Ajar wajib Umum.
		cetakan L 2016
	2	Kaelan 2003 <i>Pendidikan Pancasila</i> Vogyakarta: Paradigma
	2.	Musthafa Kamal Pasha dkk 2003 Pancasila dalam Tiniguan
	5.	Historis, Vuridis dan Eilosofis, Vogyakarta: Citra Karsa
		Mandiri.
	4.	Syahrial Syarbaini. 2003. Pendidikan Pancasila di Perguruan
		Tinggi. Jakarta: Ghalia Indonesia.
	5.	Subandi Al Marsudi. 2001. Pancasila dan UUD '45 dalam
		Paradigms Reformasi. Jakarta: RajaGrafindo Persada.
	6.	Noor MS Bakry. 1997. PancasilaYuridis Kenegaraan.
		Yogyakarta: Liberty:
	7.	Heru Santosa dkk. 2002. Sari Pendidikan Pancasila 'dan
		Undang-undang Dasar 1945: Beserta Perubahannya.
		Yogyakarta: Tiara Wacana.
	8.	Darji Darmodiharjo dan Shidarta. 1996. Penjabaran Nilai-
		nilal Pancasila dalam Sistem Hukum Indonesia. Jakarta: Raja
		Grafindo Persada.
	9.	Soejadi.1999. Pancasila Sebagai Sumber "Kitab Hukum
		Indonesia. Yogyakarta: Lukman Offset.
	10.	Dahlan Thaib. 1988. Pancasila Yuridis
		Nasional,Yogyakarta: PH U11.
	11.	Dahlan Thaib. 1991. Pancasila Yuridis
		Ketatanegaraan: Yogyakarta: UPP AMP YKPN.
	12.	Notonagoro. 1997. Pancasila Secara Ilmiah Populer. Jakarta:
		Bumi Aksara.
	13.	P.J. Suwarno. 1993. Pancasila Budaya Bangsa Indonesia.
		Yogyakarta: Kanisius.
	14.	Endang S. Anshari. 1981. Piagam Jakarta 22 Juni 1945.
		Jakarta: CV. Rajawali.
	15.	Ali As'ad Said, 2009, Negara Pancasila Jalan Kemaslahatan
		Berbangsa, Pustaka LP3ES, Jakarta.
	16.	Dodo, Surono dan Endah (ed.), 2010, Konsistensi Nilai-Nilai
		Pancasila dalam UUD 1945 dan Implementasinya, PSP-
		Press, Yogyakarta

Module Name		Biology					
Module level, if appli	cable	1 st year					
Code, if applicable		CGB-104					
Semester (s) in which	the module is	First semester					
taught							
Person responsible for	or the module	Dr. Tatang Shat	our Juliato, M.Si				
Lecturer(s)		Dr. Tatang Shat	our Juliato, M.Si				
		Dr. Habibi Hida	yat, M.Si				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	I			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)			221		
reaching	50	Class	Class	Lecture: 2 (nour) x 16	32 N		
Discussion and	50	attendance:	Solf directed	Week (meeting)	22 h		
Discussion and Procontation		$10 \text{ week } x \ge x$ 0.82 - 27 h	sell-ulrected	follow up 2 (bour) y	32 11		
Fresentation		0,85 - 27 11	Presentation	1010W up 2 (110ur) x 16 (self-learning)			
			rresentation				
Total workload		91 h					
Credit points		3.4 FCTS x 16 week = 54.4 FCTS					
Requirements accord	ling to	Minimum attendance at lectures is 75%.					
examination regulation	ons						
Recommended prere	quisites	-					
Related course	•	-					
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:			
learning		1. Have the ability to continue of knowledge (long life learning)					
		at a higher le	evel in the releva	nt field.			
		2. Have the ski	lls to work indep	endently or occupy a dec	ent		
		job with opp	ortunity oriente	d.			
Content		The course will	cover:				
		Biology as science, Parts and cycle cell, cell respiration, genetics					
		of life, Structure and function of plant (plant growth), Different					
		type of gases and nutrients of plant, structureand function of					
		animal (digestion of food), respiratory system in animals,					
Study and ovaminatio	20	Mid torm Final torm guiz and assignment					
requirements and for	ms of	ivila-term, Final term, quiz, and assignment					
examination							
Media employed		Text books, slides (power points), cooperative learning					
			(points	,,			
Reading lists		1. Campbell, N.A., Reece, J.B., Urry, L.A., and Cain, M.L.					
_	0		2008, <i>Biology</i> , 8 th ed., Benyamin Cumming Publ., New York				
		2. Campbell, N.A., Reece, J.B., Urry, L.A., and Cain, M.L.,					
		2009, <i>Biology, 9th ed.</i> , Benyamin Cumming Publ., New York					
		, <u>9</u> ,, , - , <u>2</u> ,					

Module Name		Physic				
Module level, if appli	cable	1 st year				
Code, if applicable		UNI-105				
Semester (s) in which taught	the module is	First semester				
Person responsible for	or the module	Dr. Dwiarso Rul	piyanto, M.Si.			
Lecturer(s)		Dr.Eng. Hendra	Setiawan, S.T., N	1.Т.		
		R Yosi Aprian Sa	ari, S.Si., M.Si.			
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse	T	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
Tooching		semester)	Collaborativo	Lacture: 100	1600	
reaching	50	340 minutes v	discussion	(minutes) v 16	1000	
	50	16 meeting	01300331011	(meeting)		
Discussion and		20 11 10 11 10	Self-learning	Preparation and	3840	
Presentation				follow up 240		
				(minute) x 16 (self-		
				learning)		
Total workload		5440 minutes = 90.67 h				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Final score is evaluated based on assignment and				
		reports (40%) and exam (60%)				
Recommended prere	quisites	-				
Related course		-				
Module objectives/in	itended	By the end of this course students should be able to:				
learning		1. S (Student of tomorrow)				
		Have the ability to continue to learn (long life learning) at a				
		nigner level in relevant fields				
		2. E (Enterpreneursnip and employability)				
		Have the skills to work independently or occupy a decent				
		Job with opportunity-oriented				
Content		Fundamental concepts of physics, unit system, vector algebra,				
		kinematics, dynamics, Newton's law, force and work, linear				
		momentum, torque and angular momentum, dynamics of				
		moving bodies, relativity movement, pendulum, vibrational				
		mechanics, gravitational field and its implementation, statistics				
		and fluids, mechanics wave, basic thermo physics, state				
		equation, properties of ideal gas, electrostatic and magneto				
		static in vacuum and in medium, electromagnetic induction,				
		direct current and alternating current, electromagnetic wave,				

	geometric optics: mirror, lenses, physical optics: interference and diffraction, polarization: specific reactivity, atomic structure: electron, nuclei of complex atom, atomic spectrum, atomic and nuclear processes.			
Study and examination	Test Based:			
requirements and forms of	Mid-term, final examination, quiz.			
examination				
Media employed	Text books, slides (power points), and journal			
Reading lists	 Cutnell, J.D., and Johnson, K.W., 2012, <i>Physics</i>, John Welly and Sons Inc., New York. Fedric, J.B., 2006, <i>Fisika untuk Universitas, schaum</i> <i>Outlines</i>, Erlangga, Jakarta 			
	 Giancoli, C, Douglass, 1998, Fisika I diterjemahan : Cuk Imawan dkk, Erlangga, Jakarta. 			
	 Halliday, D., Resnik R., 1997, <i>Fisika</i> Jilid I, Alih Bahasa : Pantur Silaban & Erwin Sucipto, Erlangga Jakarta. 			
	 Miller, Jr., M., 1997, College Physic, 4th ed., Horcour Brace Jovanovich, New York. 			
	 Sears, Z., 1994, Fisika untuk Universitas I, diterjemahkan : Soedarjana, Amir Achmad, Binacipta, Bandung. 			

Module Name		General Chemistry					
Module level, if appli	cable	1 st year					
Code, if applicable		CGB-106					
Semester (s) in which	the module is	First semester					
taught							
Person responsible for	or the module	Prof. Is Fatimah					
Lecturer(s)		Prof. Is Fatimah					
		Prof. Riyanto					
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 4 (hour) x 16	64		
	50	3.34 (hours) x	discussion	(meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	64		
Presentation		= 53.44 hours		follow up 4 (hour) x	hours		
				16 (self-learning)			
Total workload		181 hours					
Credit points		6.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Each student must achieve a minimum					
		grade/predicate of C for the overall grade point average. If it					
		does not meet then the student is required to take a test/					
		repair assignment. Final score is evaluated based on					
		assignment and	l reports (40%) ar	nd exam (60%).			
Recommended prere	quisites	-					
Related course		-					
Module objectives/in	tended	By the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
Contont							
Content		The course will cover:					
		The basic concepts in chemistry including atomic theory,					
		atomic structure and periodicity, elements, compounds and					
		stoicniometry, chemical reactions, gas state equations, acid-					
		base concepts, oxidation-reduction concepts, thermodynamics,					
		reaction Kinetics, equilibrium, the basics of organic chemistry					
		and the latest chemical development concepts.					
Study and examination		collaborative discussion					
equirements and for			500551011				
examination							

Media employed	Text books, slides (power points), and video
Reading lists	1. Ebbing, D., and Gammon, S.D., 2009, General Chemistry,
	Enhanced 9 th ed., Houghton Mifflin Company.
	2. McQuarrie, D.A., Rock, P.A., and Gallogly, E.B., 2010,
	General Chemistry, Royal Society of Chemistry.
	3. Chang, R., and Overby, J., 2010, General Chemistry: The
	Essential Concepts, McGraw-Hill Companies.
	4. Hill, J.W., Petrucci, R.H., McCreary, T.W., and Perry, S.S.,
	General Chemistry, 4 th ed., 2004, John Welly and Sons
	Inc., New York.
	5. Brady, J.E., 1990, General Chemistry, Principles &
	<i>Structure</i> , 5 th ed., John Willy & Sons, New York.
	6. Petrucci, H.R., 1997, General Chemistry Principle and
	Modern Apliccations, Prentice Hall International, New
	Jersey.
	7. James Speight, 2005, Lange's Handbook of Chemistry,
	Sixteenth Edition, Mc Graw Hill Book Company, New York.
	 Donald A McQuarrie, Peter A Rock, Ethan B Gallogly, 2011, General Chemistry,

Module Name Management and Laboratory Technique								
Module level, if app	olicable	1 th Year						
Code, if applicable		CGB-107	CGB-107					
Semester (s) in which the		l (one)						
module is taught								
Person responsible	for the	Prof. Riyanto, F	Ph.D.					
module								
Lecturer(s)		Prof. Riyanto, F	Ph.D					
		Dr. Noor Fitri.,	MI.SI					
		Final Anugratiw						
Pelation to curricul	um	Compulsory co						
Types of teaching		Attendance	Forms of	Workload				
and learning		time (hours	active	WORKIOUU				
unu leuring		per week per	participation					
		semester)	pare element					
Teaching		,	Collaborative	Lecture: 2 (hours)	32 hours			
Ū	50	1.67 (hours) x	discussion	x 16 (meeting)				
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours			
Presentation		= 27 hours		follow up 2 (hours)				
				x 16 (self-learning)				
Total Workload		91 hours						
Poquiromonts acco	rding to	3.4 EUIS						
examination regula	tions	regulation) Minimum attendance at lectures is 75% (according to UI						
cxamination regula	tions	Ill regulation). Final score is evaluated based on Assignment and						
		Reports (40%), Mid and Final Examination (60%)						
Recommended pre	requisites			· · ·				
Related course	·							
Module objectives/	'intended	By the end of this course students should be able to:						
learning		1. Have the ability to gain knowledge (long life learning) at a higher						
		level in relevant field						
		2. Have the skills to work independently or occupy a decent job						
		with opportunity-oriented						
		3. Have consistency and enthusiasm in realizing Islamic Attitudes						
Contont		an behaviours						
content		Students und	and understand	eory of laboratory	management,			
		know and under	erstand the organ	nizational structure of	the laboratory			
		and staff. Stud	ents know and	understand the scope	of laboratory			
		education. res	earch, testing a	nd calibration. Stude	nts know and			
		understand lab	oratory equipme	ent and laboratory safe	ty equipment,			
		Students know and understand the handling of tools and chemicals,						
		Students know and understand the handling of laboratory waste,						

	students know and understand the techniques of use, handling tools and calibration tools and instruments in the laboratory.					
Study and examination	Mid-term, Final term, assignment, collaborative learning and					
requirements and forms of	project-based learning.					
examination						
Media employed	Text books, slides (power points), and video					
Reading lists	 Milner, O.I., 1991, Successful Management of the Analytical Laboratory, Publisher Lewis. Standar Internasional ISO/IEC 17025, Persyaratan Umum Kompetensi Laboratorium Pengujian dan Kalibrasi, Edisi Kedua, Versi Bahasa Indonesia. JA. Beran.2011.Laboratory Manual for Principles General Chemistry. 9th. John Wiley and Son. Jerry R. Mohrig, Cristina Noring Hammond, Paul F. Schatz. 2010. 					
	Techniques in Organic Chemistry. W. H. Freeman					

Module Name Mathematics							
Module level, if app	olicable	1 th Year					
Code, if applicable		CGB-108	CGB-108				
Semester (s) in which the		l (One)					
module is taught							
Person responsible	for the	Prof. Riyanto, F	Ph.D.				
module							
Lecturer(s)		Prof.Dr. Jaka N	ugraha, M.Si				
		Mujiati Dwi Ka	rtikasari, S.Si., M	.Sc			
Language		English - Indon	esia				
Relation to curricul	um	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (nours	active				
		per week per	participation				
Tooching		semester	Collaborativo	Locture: 2 (hours)	22 hours		
Teaching	50	1 67 (bours) x	discussion	x = 16 (meeting)	52 110015		
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours		
Presentation		= 27 hours	resentation	follow up 2 (hours)	52 110015		
				x 16 (self-learning)			
Total workload	·	91 hours					
Credit points		3.4 ECTS					
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII					
examination regula	tions	regulation). Minimum attendance at lectures is 75% (according to					
		UII regulation). Final score is evaluated based on Assignment and					
		Reports (40%),	Mid and Final Ex	camination (60%)			
Recommended pre	requisites						
Related course	(By the and of this course students should be able to:					
Nodule objectives/	intended	By the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a higher					
		2 Have the skills to work independently or occupy a decent job					
		with opportunity-oriented					
Content		Real number sy	stem the proper	ties of real numbers. I	Equations and		
		Inequalities, Sy	stem of Linear E	quations, Relationship	s and		
		functions, Limit function, Derivative, Derivative application					
		Geometry meaning and physical meaning, Derivative application,					
		Matrix, Taylor/Maclaurin					
Study and examina	tion	Mid-term, Fin	al term, assign	ment, collaborative	learning and		
requirements and f	orms of	project-based l	earning.				
examination							
Media employed		Text books, slic	les (power point	s), and video			
Reading lists		• Pickover, C.A., 2012, The Math Book: From Pythagoras to					
		the 57 th Dimension, 250 Milestones in the History of					
		Mathe	matics (Sterling l	<i>Villestones),</i> Sterling P	'ublising.		

Gowers, T., 2002, <i>Mathematics: A Very Short Introduction</i> , Oxford University Press, UK.
• Purcelle, E., 1985, <i>Kalkulus dan Geometri Analisis</i> , Erlangga, Jakarta.

Module Name		Practical Course of Physics					
Module level, if appli	cable	1 st year					
Code, if applicable		CGB-109					
Semester (s) in which	the module is	First semester					
taught							
Person responsible for	or the module	Prof. Is Fatimah					
Lecturer(s)		Imam Sahroni, I	M.Sc.				
		Dr. Habibi Hiday	yat				
Language		Indonesia					
Relation to curriculun	n Class sins	Compulsory co	urse		[
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (nours	active				
		per week per	participation				
Teaching		Semestery	Laboratory	Laboratory practice	16		
reaching	50	0.83 (hours) x	practice and	1(hour) x 16	hours		
		16 (meeting)	experiments	meeting)			
Discussion and		= 13.28 hours		Examination and	16		
Presentation				preparation 1 (hours)	hours		
				x 16 meeting			
Total workload		45 hours					
Credit points		1.7 ECTS					
Requirements accord	ing to	Minimum attendance at lectures is 100% Final score is					
examination regulation	ons	evaluated based on:					
		pre-test (10%), Practice (50%)					
		Practice (50%),					
		assessment (20%)					
Recommended prere	auisites	-					
Related course	4	Physics					
Module objectives/in	tended	By the end of this course students should be able to:					
learning		1. Have consistency and enthusiasm in realizing Islamic					
-		attitudes and behaviours					
		2. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		3. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		4. Have leadership skills and attitudes in collaborating or					
			vitin otners	u digital computer inter	rnot		
		and internat	ional languages	y, digital, computer, inte	inet		
Content			cover.				
		Students of the	Physics Lab will f	follow safety laboratory			
		workshop before the activity in Laboratory. The physics lab					
		practice will support Physics lectures with sharpening of skills					
Recommended prere Related course Module objectives/in learning	quisites tended	 Practice (50%), report (20%), assessment (20 - Physics By the end of th 1. Have consist attitudes and 2. Have the abi higher level if 3. Have the skill job with opp 4. Have leaders interacting w 5. Have skills in and internat The course will Students of the workshop befor practice will sup 	%) his course studen rency and enthus d behaviours lity to gain know in relevant field lls to work indepe ortunity-oriented ship skills and att vith others a scientific literact ional languages cover: Physics Lab will for the activity in l oport Physics lect	ts should be able to: iasm in realizing Islamic ledge (long life learning) endently or occupy a dec d itudes in collaborating or y, digital, computer, inter follow safety laboratory aboratory. The physics la	at a ent rnet ab skills		

	aspects related to the measurement of physical properties such as thermal properties, electrical properties, properties of solutions and light.
Study and examination requirements and forms of examination	Pre-test (10%), Practice (50%), report (20%), assessment (20%)
Media employed	Text books, slides (power points), and video
Reading lists	 Physics Lab Book for first year's students, 2020 University Physics Volume 1, Jeff Sanny, Loyola Marymount University, Samuel Ling, Truman State University (2016)

Module Name		Practical Cours	e of Basic Chem	istry			
Module level, if app	olicable	1 st year					
Code, if applicable		CGB-110					
Semester (s) in which	ch the	First Semester					
module is taught							
Person responsible	for the	Prof. Is Fatimal	า				
module							
Lecturer(s)							
Language		English- Indone	esia				
Relation to curricul	um	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Laboratory	Laboratory	16 hours		
	50	0.83 (hours) x	practice and	Practice			
		16 (meeting)	experiments	1 (hour) x 16			
		= 13 hours		(meeting)			
Discussion and				Exams and	16 hours		
Presentation				preparations 1			
				(hour) x 16			
				(meeting)			
Total workload		45 hours					
Credit points		1.7 ECTS					
Requirements acco	rding to	Minimum attendance at practical work is 100%. Final score is					
examination regula	tions	evaluated based on:					
		Pretest	t (20%)				
		 Experir 	ment (30%)				
		Report	(30%)				
		Final ex	xamination (20%)			
Recommended pre	requisites	-					
Related course		-					
Module objectives/	intended	By the end of t	his course stude	ents should be able to	:		
learning		1. Have consistency and enthusiasm in realizing Islamic					
		attitudes and behaviours					
		2. Have t	he ability to gain	knowledge (long life l	earning) at a		
		higher level in relevant field					
		3. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		4. Have le	eadership skills a	nd attitudes in collabo	orating or		
		interac	ting with others				
		5. Have s	kills in scientific l	iteracy, digital, compu	uter, internet		
		and int	ernational langu	ages			
Content		The course wil	I cover:				
		Basic chemistry	y practicum subje	ects train students in p	practice:		
		Introduction to	Laboratory Too	is and Techniques, Pre	eparation of		

	Solutions, Colligative Properties of Solutions: Determination of Molecular Weights Based on Boiling Point Increase and Freezing Point Depression, Chemical Reactions, Acids, Bases, Buffers and pH, Oxidation Reduction Reactions, Stoichiometry Reaction, Acid- Base Reaction, Chemical Analysis of Industrial Materials, Reaction				
	Kinetics, Determination of Concentration by Conductometry,				
	Classification of Elements				
Study and examination	Pretest				
requirements and forms of	Report				
examination	Presentation				
Media employed	Text books (module) and video				
Reading lists	 Ebbing, D., and Gammon, S.D., 2009, General Chemistry, Enhanced 9th ed., Houghton Mifflin Company. McQuarrie, D.A., Rock, P.A., and Gallogly, E.B., 2010, General Chemistry, University Science Books. Chang, R., and Overby, J., 2010, General Chemistry: The Essential Concepts, McGraw-Hill Companies. Hill, J.W., Petrucci, R.H., McCreary, T.W., and Perry, S.S., General Chemistry, 4th ed., 2004, John Welly and Sons Inc., New York. Brady, J.E., 1990, General Chemistry, Principles & Structure, 5th ed., John Willy & Sons, New York. Petrucci, H.R., 1997, General Chemistry Principle and Modern Apliccations, Prentice Hall International, New 				
	Jersey.				

SEMESTER II

	Kode/				Prasyarat/Prerequiste		
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
1	UNI-201	Kewirausahaan Syariah	Sharia Entrepreneurship	2	-	-	-
2	UNI-202	Islam Ulil Albab	Islam for Scholar	3	UNI-102	Pendidikan Agama Islam	Islamic Education
3	UNI-203	Kewarganegaraan	Civic Education	2	-	-	-
4	CGB-204	Kapita Selekta	Capita Selecta	2	-	-	-
5	CAB-205	Kimia Analitik I	Analytical Chemistry I	2	CGB-106	Kimia Dasar	General Chemistry
6	CIB-206	Kimia Anorganik I	Inorganic Chemistry I	2	CGB-106	Kimia Dasar	General Chemistry
7	COB-207	Kimia Organik I	Organic Chemistry I	2	CGB-106	Kimia Dasar	General Chemistry
8	CPB-208	Kimia Fisika I	Physical Chemistry I	2	CGB-106	Kimia Dasar	General Chemistry
9	CPB-209	Matematika Untuk Kimia	Mathematics for Chemistry	2	CGB-108	Matematika Dasar	General Mathematics
10	CAB-210	Prak. Kimia Analitik I	Practical Course of Analytical Chemistry I	1	CGB-110	Prak. Kimia Dasar	Practical Course of General Chemistry
11	XXX-000	LKID	LKID	0	-	-	-
Total				20			

Module Name		Sharia Entrepreneurship					
Module level, if appli	cable	1 st year					
Code, if applicable		UNI-201					
Semester (s) in which	the module is	Second semester					
taught							
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si.				
Lecturer(s)		apt. Hady Ansh	ory T, S.Si., M.Sc.				
		Gani Purwiando	ono, M.Sc., Ph.D				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	I			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Terebier		semester)			22		
Teaching	50	1 C7 (h a	Collaborative	Lecture: 2 (nours) x	32		
Discussion and	50	1.67 (nours) x	discussion	16 (meeting)	nours		
Discussion and Procentation		27 hours	Presentation	follow up 2 (bours) x	3Z		
Presentation		27 110013		10100 up 2 (10013) x 16 (self-learning)	nours		
Total workload		91 hours					
Credit points		2 A ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to 111)					
examination regulation	ons	regulation). Fin	al score is evalu	ated based on assignme	ent and		
		reports (40%) and exam (60%).					
		Each student must achieve a minimum grade/predicate of C for					
		the overall grade point average. If it does not meet then the					
		student is requi	ired to take a test	t/ repair assignment.			
Recommended prere	quisites	-					
Related course		-					
Module objectives/in	itended	By the end of th	nis course studen	ts should be able to:			
learning		1. Capable to d	evelop and mark	et themselves sustainab	ly to be		
		able to wor	rk and contribut	e in the area of esser	ntial oil		
		developmen	t, material for	energy and environmer	nt, and		
		natural prod	uct for food and	health			
		2. Endeavor to continue to study (lifelong learning) at a higher					
		level in the relevant field with the chemistry of essential oil					
		development, materials for energy and the environment, and					
		natural products for food and health					
		3. Have the skills to work independently or gain a decent,					
		opportunity-	oriented job i	n the area of essent	tial oil		
		development, materials for energy and the environment, and					
		natural products for food and health					
Contont							
Content		i ne course will	cover:				

	Sharia principles in business and entrepreneurship, basic principles of entrepreneurship, business action and plan.					
Study and examination requirements and forms of examination	Mid-term, final term, individual and group presentation.					
Media employed	Blended (lecture and students' presentation)					
Reading lists	 Certo, Samuell, 1985, Management of Organization and Human Resources, IOWA, WMC Brown Company Publisher. Drucker dan Peter F., 1991, Inovasi dan Kewirausahaan, Praktek dan Dasar-dasar, diterjemahkan oleh Rusjdi Naib,, Erlangga, Jakarta. Hisrich Robet D. and Michael P. Peter, 1989, Entrepreneurship, Starting, Developing and Managing a New Enterprise, Rochard D Twin, Inc., Boston. 					

Module Name		Islam Ulil Albab						
Module level, if app	licable	1 st year						
Code, if applicable		UNI-202						
Semester (s) in whi module is taught	ch the	Second semester						
Person responsible for the module		Dr. Dwiarso R	ubiyanto					
Lecturer(s)		Shubhi Mahma Sofwan Hadik	ashony Harimur usuma, Lc., M.E	ti, S.S., M.A.				
Language		English- Indon	iesia					
Relation to curriculu	ım	Compulsory	course					
Types of teaching and learning	Class size	Attendance time (hours per week per semester)	Forms of active participation	Workload				
Teaching	50	1.67 (hours) x 16	Collaborative discussion	Lecture: 2 (hours) x 16 (meeting)	32 hour s			
Discussion and Presentation		(meeting) = 27 hours	Presentation	Preparation and follow up 2 (hours) x 16 (self-learning)	32 hour s			
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements acco examination regulat	rding to tions	Minimum attendance at lectures is 75% (according to UII regulation). Final score is evaluated based on assignment and reports (40%) and exam (60%)						
Recommended pre	requisites	-						
Related course		-						
Module objectives/in learning	ntended	 By the end of this course students should be able to: 1. Have consistency and enthusiasm in realizing Islamic attitudes and behaviours 2. Have the ability to gain knowledge (long life learning) at a 						
		higher level in relevant field 3. Have ability and skills in global community as well as social						
		awareness that supports the development of science 4. Have skills in scientific literacy, digital, computer, internet						
		and international languages						
Content		The course will cover:						
		I. Islamic mought and Civilization The founding character of Lill						
		2. The fouriary character of Off						
		5. ISIdIIIIC	Leavership study					

	 The view of life is inclusive and sociable in the global community while maintaining the Islamic identity of Indonesian The integration of Islamic values in the field of science The founding fouther of UII
Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion
Media employed	Text books, slides (power points), and video
Reading lists	 Antonio, Syafii Muhammad. 2007. Muhammad SAW: The Super Leader Super Manager. Jakarta: ProLM Centre & Tazkia Multimedia. Karim, M. Abdul. 2012. Sejarah Pemikiran Peradaban Islam. Bagaskara: Yogyakarta. Universitas Islam Indonesia. (2015). 9 Windu Universitas Islam Indonesia. Yogyakarta.

Module Name		Civic Education				
Module level, if applicable		1 st year				
Code, if applicable		UNI-203				
Semester (s) in which the module is taught		Second semester				
Person responsible fo	or the module	Dr. Dwiarso Rul	biyanto, M.Si.			
Lecturer(s)		Edny Wulandar	i, S.H., M.H.			
		Fuadi Isnawan,	S.H., M.H.			
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours) x	32	
	50	1.67 (hours) x	discussion	16 (meeting)	hours	
Discussion and		16 (meeting)	Presentation	Preparation and	32	
Presentation		= 27 hours		tollow up 2 (nours) x	nours	
				TO (Sell-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Eve	ery student must	achieve a minimum scor	e/	
		predicate C. Th	e scoring system	used in the Benchmark		
		Reference Assessment (BRA) with the following rating ranges: A				
		: 3.65 A- : 3.50 A/B : 3.35 B+ : 3.20 B : 3.05 B- : 2.90 B/C : 2.75				
		C+ : 2.60 C : 2.45 C- : 2.30 C/D : 2.15 D : 2.00				
Recommended prerequisites		-				
Related course		-				
Nodule objectives/in	itended	By the end of this course students should be able to:				
learning		1. паче consistencyand entrusiasm in realizing islamic				
		2 Have the ability to gain knowledge/long life learning) at a				
		2. nave the ability to gain knowledge(long life learning) at a				
		nigher level	in relevant neiu			
Content		The course will cover:				
		Civic Education course will cover the materials as follow:				
1.		1. The essence of citizenship in developing professional				
bachelor's ability						
		2. National Identity as the determinant of nation character				
		3. National integration as one of the Parameters of Unity and				
		Unity of the nation				
		4. Constitutional values and Norms in the life of the nation				
		5. Harmonizatio	on of Rights and L	outies of States and Citize	ens	

	6. Indonesian Democracy based on Pancasila and the 1945 Constitution			
	7. Justice Law Enforcement			
Study and examination	Mid-term, Final term, presentation, assignment, and			
requirements and forms of	collaborative discussion			
examination				
Media employed	Text books, and slides (power points)			
Reading lists	1. Dirjen Pembelajaran dan Kemahasiswaan Kementrian			
	riset, Teknologi dan pendidikan tinggi RI, Pendidikan			
	Kewarganegaraan untuk Perguruan Tinggi, Buku Bahan			
	Ajar wajib Umum, cetakan I, 2016			
	2. Kaelan, Pendidikan Kewarganegaraan, Yogyakarta:			
	Penerbit Paradigma, 2007			
	3. LEMHANNAS, Pendidikan Kewarganegaraan, Jakarta:			
	LEMHANNAS, 2002.			
	4. Sumarsono, et.al., Pendidikan Kewarganegaraan, Jakarta:			
	PT. Gramedia Pustaka , 2005 Utama.			
	5. Tim Dosen IAIN Syarif Hidayatullah, Pendidikan Kewargaan			
	(Civic Education), Demokrasi, HAM dan Masyarakat			
	Madani, Jakarta: IAIN Syarif Hidayatullah Press.2000			
	6. Tim Sosialisasi Wawasan Kebangsaan, Himpunan Modul			
	Sosialisasi Wawasan Kebangsaan, Jakarta: Kantor			
	Sekretariat Wakil Presiden RI.2005			
	7. Sobirin dan Suparman (Penyunting), Pendidikan			
	Kewarganegaraan dan Hak asasi Manusia UII Press, 2003			
	8 Dwi Winarno, Paradigma Baru Pendidikan			
	Kewarganegaraan PT Rumi Aksara 2006			
	0 Musthafa Kamal Dandidikan Kawarganagaraan (Civia			
	5. Iviusulala Kallial, Pelluluikali Kewalgallegaldali (CIVIC			
	Education), Citra Karsawandiri, 2002.			

Module Name		Capita Selecta				
Module level, if applicable		1st year				
Code, if applicable		CGB-204				
Semester (s) in which the module is		2 nd semester				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, S.Si., M.S	i.		
Lecturer(s)		Dr. Dwiarso Rul	piyanto, S.Si., M.S	i.		
		Prof. Dr. Is Fatir	nah			
		Rudy Syahputra	a, Ph.D.			
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse	Ι		
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
leaching	50		Collaborative	Lecture: 2 (hours) x	32	
	50	1.67 (nours) x	discussion and	16 (meeting)	nours	
Discussion and		16 (meeting)	Presentation	following 2 (hours) v	32 haura	
Presentation		- 27 Hours		10110W up 2 (flours) x	nours	
				TO (Sell-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulations		regulation). Final score is evaluated based on assignment and				
		reports (25%), exam (50%), and presentation (25%)				
Recommended prerequisites		-				
Related course		-				
Module objectives/in	tended	By the end of this course students should be able to:				
learning		1. Have the ability to gain knowledge (long life learning) at a				
		higher level in relevant field				
		2. Have the skills to work independently or occupy a decent				
		Job with opportunity-oriented				
		3. Have skills in collecting, analysing and organizing				
		information from various sources using the latest				
		A Have skills in scientific literacy digital computer internet				
		4. nave skills in scientific interacy, digital, computer, internet				
Content		The course will cover:				
		discuss the basic concent of scientific thinking the				
		development of chemistry as part of the basic sciences, the				
		development of chemistry in the Middle Ages include the				
		contribution of Islamic civilization to chemistry, various topics				
		in the field of analytical chemistry, organic chemistry,				
		chemistry inorganic, biochemical, physical chemistry, current				

	chemical concepts including green chemistry with sustainability principles.			
Study and examination	Mid-term, Final term, presentation, assignment, and			
requirements and forms of	collaborative discussion			
	Dian da du Taut la a lua managenda managen a l'idan (manuna mainte)			
Media employed	Blended: Text books, research papers, slides (power points), and video			
Reading lists	1. Journal: Sustainable and Green Chemistry			
	2. Journal: Recent Trend in Analytical Chemistry			
	3. Malik, W.U., et al., 2014, Selected Topics in Inorganic			
	Chemistry, S. Chand & Company Ltd,			
	4. S. P. Bhutani, 2007, Organic Chemistry: Selected Topic, Ane Books India			
	5. Shawahy, A., 20014, Selected Topics in Physical			
	Chemistry, Protea Publisher, US			
	6. Donald M. Borchert, 2006, <i>Encyclopedia of Philosophy</i> , Second Edition, Macmillan, New York.			
	7. Bhushan, Nalini, and Rosenfeld, Stuart, 2000, <i>Of Minds</i> and Molecules. New Philosophical Perspectives on Chemistry, New York: Oxford University Press			
	 Slosson, E.E., 2009, Creative Chemistry: Descriptive of Recent Achievements in the Chemical Industries, BiblioBazaar. 			
	9. Schaub, G., and Turek, T., 2010, Energy Flows, Material Cycles and Global Development: A Process Engineering Approach to the Earth System (Environmental Science and Engineering / Environmental Engineering), Springer: 1st Edition.			
	10. Delanghe, H., Muldur, U., and Soete, L., 2010, European Science and Technology Policy: Towards Integration or Fragmentation? Edward Elgar Pub.			
	 Van Brakel, Jaap, 2000, Philosophy of Chemistry. Between the Manifest and the Scientific Image, Leuven: Leuven University Press. 			

Content	The role of analytical chemistry and complete analysis process, explain concentration units, stoichiometric calculations; reaction type: precipitation, acid-base, complex, redox, calculation with reagents, the basic equipment used in the Analytical Chemistry Lab, the definition of analysis, determination, measurement techniques, methods, procedures, and protocols, the classification of analytic techniques; selection of an analytic method; development procedures, chemical reactions in solution solvent in analytical chemistry, the acid-base equilibrium, the equilibrium of complex, the solubility equilibrium, Equilibrium of buffer solution, the equilibrium of the hydrolyzed salt solution, the equilibrium of redox reactions, Solvent in analytical chemistry, qualitative analysis of cations and anions
Study and examination requirements and forms of examination	Mid-term, Final Examination quiz, and exercises
Media employed	Textbooks, slides (power points), and video
Reading lists	 Harvey, D., Modern Analytical Chemistry, McGraw-Hill Higher Education Pubs., 2000 Mitra, S., Sample preparation techniques in analytical chemistry, Wiley, Canada, 2003 Skoog, D.A., et al, Fundamentals of Analytical Chemistry 8th ed., Saunder College Pubs., 2004

Module Name		Inorganic Chemistry 1				
Module level, if app	olicable	1 st year	1 st year			
Code, if applicable		CIB-206				
Semester (s) in which the		Second semest	er			
module is taught						
Person responsible	for the	Drs. Allwar, M.	Sc., Ph.D.			
module						
Lecturer(s)		Drs. Allwar, M.	Sc., Ph.D.			
		Argo Khoirul Ar	nas, M.Sc.			
		M. Miqdam Mu	usawwa, S.Si., M.	.Sc.		
Language		English- Indone	esia			
Relation to curricul	um	Compulsory co	urse	1	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching		1.67 (hours) x	Collaborative	Lecture: 2 (hours)	32 hours	
	50	16 (meeting)	discussion	x 16 (meeting)		
Discussion and		= 27 hours	Presentation	Preparation and	32 hours	
Presentation				follow up 2 (hours)		
				x 16 (self-learning)		
Taral a dila a d		01 1				
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements acco	raing to	Minimum attendance at lectures is 75% (according to UII				
examination regula	tions	regulation). Each student must achieve a minimum grade/predicate				
		student is requ	ired to take a ter	st/renair assignment	meet then the	
Recommended pre	roquisitos	General Chemi	stry			
Related course	requisites		3CT y			
Module objectives	intended	- By the end of t	his course stude	ats should be able to:		
By the end of this course students sho			wledge (long life learn	ing) at a		
learning		higher level in relevant field				
		2. Have the skills to work independently or occupy a decent job				
		with opportunity-oriented				
Content		Introduction to inorganic chemistry lectures: relation between				
content		inorganic chemistry and other fields of chemistry				
		Atomic theory and structure: introduction to atomic theory:				
		Dalton, Thomson, Rutherford, Bohr, and quantum mechanical				
		model: orbital and quantum number. electron configuration				
		Elements periodic system: table organization in modern periodic				
		system; availability of elements: elements stability and their			ility and their	
		isotopes; e	element classific	ation; properties and	d reactions of	
		elements.				
		• Periodic properties of the elements: atomic radius; ionization				
		energy; electron affinity; electronegativity.				

	 Covalent bonding: introduction to molecular orbital theory; Diatomic Molecular Orbital (OM); heteronuclear diatomic molecular orbital; Lewis theory; partial reaction order; formal charge; VSEPR theory: Linear geometry, trigonal planar, tetrahedral, trigonal bipyramid, octahedral; Valence bonding theory: hybridization orbital; intermolecular force. Metallic bonding and Crystal structure: introduction to metallic bonding; bonding model; metal structure; unit cell. Ionic bonding: characteristic of ionic substances; Ionic model and ionic size: trend of ionic radii, trend of melting point;
Study and examination	Mid-exam, Final exam, quiz, assignment, and collaborative
requirements and forms of	discussion
examination	
Media employed	Text books, slides (power points), and video
Reading lists	 Atkins, P., 2010. Shriver and Atkins' inorganic chemistry. Oxford University Press, USA. Canham, G.R., 2000, Descriptive Inorganic Chemistry. Second Edition, W.H. Cotton, F.A., Wilkinson, G., Murillo, C.A., Bochmann, M. and Grimes, R., 1988. Advanced inorganic chemistry (Vol. 5). New York: Wiley. Douglas, B., 1993, Concept and Model of Inorganic Chemistry, John Wiley, New York. Housecroft, 2007, Inorganic Chemistry, 3rd edition, Pretince Hall. Huheey, J.E., Keiter, E.A. and Keiter, R.L., 1993. Principles and applications of inorganic chemistry. Harper Collins, New York. Scerri, E.R., 2007. The periodic table: its story and its significance. Oxford University Press, USA.

Module Name		Organic Chemistry I				
Module level, if applicable		1 st year	1 st year			
Code, if applicable		COB-207				
Semester (s) in which the		Second semest	er			
module is taught						
Person responsible	for the	Dr. Dwiarso Ru	biyanto			
module						
Lecturer(s)		Dr. Dwiarso Ru	biyanto			
		Amri Setyawat	i, M.Sc.			
Language		English- Indone	esia			
Relation to curricul	um	Compulsory co	ourse			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours)	32 hours	
	50	1.67 (hours) x	discussion	x 16 (meeting)		
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours	
Presentation		= 27 hours		follow up 2 (hours)		
				x 16 (self-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII				
examination regula	tions	regulation). Final score is evaluated based on assignment and				
		reports (40%) and exam (60%) Each student must achieve a minimum grade /prodicate of C for the				
		Each student must achieve a minimum grade/predicate of C for the				
		overall grade point average. If it does not meet, then the student is				
required to take a test/ repair assignment.						
Recommended pre	mended prerequisites General Chemistry					
Kelated course - Madula abjectives/intended Duths and af this assume at duths the laboration of the second						
loarning	Intended	by the end of this course students should be able to:				
learning		relevant field				
Price Valit Helu.		inv a decent				
	2. Have the skins to work independently of occupy a de			ipy a decent		
Content		The course will cover:				
1 Definition and concent of organic compounds						
2. Struct		Structure of organic compounds and their deniction				
molecular modelling, compound formulas (molecu			s (molecules			
structures, compounds, polygons, etc.)			(
3. Isomerism and stereochemistry of organic compounds			mpounds.			
4. Categorization and nomen		penclature of alkane compounds				
		5. Reactions and properties of alkane compounds.				
		6. Classification and nomenclature of alkene compounds.				
		7. The reaction and properties of the alkene compound.				
	8. Classification and nomenclature, reactions, and properties					
---------------------------	---	--	--	--	--	
	of alkaline compounds.					
	9. Classification and nomenclature of alkyl halide compounds.					
	10. The reaction and properties of alkyl halide compounds.					
	11. Classification and nomenclature of alcohols, ether, thiols,					
	sulfides, disulfides.					
	12. Benzene compounds and their properties.					
	Reactions of benzene compounds.					
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and					
requirements and forms of	collaborative discussion					
examination						
Media employed	Molecular model, Textbooks, slides (power points), and video					
Reading lists	1. Klein, D.R., 2011, Organic Chemistry, John Willey, and Sons. Inc., New					
	York.					
	2. Smith, J., 2010, Organic Chemistry, Thomson Learning Inc.					
	3. Carey, F., and Giuliano, R., 2010, Organic Chemistry, John Willey and Sons					
	Inc., New York.					
	4. Klein, D.R., 2011, Organic Chemistry I As a Second Language: First					
	Semester Topics, John Willey, and Sons Inc. New York.					
	5. Mc. Murry, J., 2011, Organic Chemistry, John Willey and Sons Inc., New					
	York.					

Module Name		Physical Chemistry I					
Module level, if applicable		1 st year					
Code, if applicable		CPB-208					
Semester (s) in which the module is		Second semest	er				
taught							
Person responsible for	or the module	Prof. Is Fatimah	I				
Lecturer(s)		Prof. Is Fatimah	1				
		Imam Sahroni,	M.Sc.				
		-					
Language	-	English-Indone	sia				
Types of teaching		Attendance	Lorms of	Morkland			
and loarning		time (hours		WORKIDAU			
and learning		ner week per	narticination				
		semester)	participation				
Teaching			Collaborative	Lecture: 2 (hours) x	32		
0	50	1.67 (hours) x	discussion	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 hours		follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours					
Credit points							
Requirements accord	ling to	regulation) Each student must achieve a minimum					
examination regulati	ons	regulation). Eac	ch student must a	roll grade paint average	IE :+		
		grade/predicate	then the student	is required to take a test	-/		
		repair assignment. Final score is evaluated based on					
		assignment and	reports (40%) a	nd exam (60%).			
Recommended prere	auisites	General Chemis	strv				
Related course		-					
Module objectives/ir	itended	By the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will	cover:	The ideal case state a sur	ation		
		The concepts of	i Equality of State	e, The lueal gas state equ	lation,		
		The non-ideal state equation, The first law of Thermodynamics,					
		Entrony Entrony phase of change Relationship the first law					
		and second law of thermodynamic. Function of Helmholtz and					
		Gibbs, work and concept					
Semester (s) in which taught Person responsible for Lecturer(s) Language Relation to curriculur Types of teaching and learning Teaching Discussion and Presentation Total workload Credit points Requirements accord examination regulati Recommended prere Related course Module objectives/in learning Content	n the module is or the module m Class size 50 ling to ons equisites atended	Second semester Prof. Is Fatimah Prof. Is Fatimah Imam Sahroni, I English- Indone Compulsory co Attendance time (hours per week per semester) 1.67 (hours) x 16 (meeting) = 27 hours 3.4 ECTS Minimum atter regulation). Eac grade/predicate does not meet repair assignment assignment and General Chemis - By the end of th 1. Have the abi higher level 2. Have the abi higher level 2. Have the abi solving as we technology of The course will The concepts of The ron-ideal s Thermochemist Entropy, Entrop and second law Gibbs, work and	er M.Sc. sia urse Forms of active participation Collaborative discussion Presentation Presentation Presentation Presentation Andance at lecture ch student must a e of C for the ove then the student ent. Final score is a reports (40%) and stry mis course student dity to gain know in relevant field lls to work independent fequality of State tate equation, The cover: f Equality of State f Equality of	Workload Lecture: 2 (hours) x 16 (meeting) Preparation and follow up 2 (hours) x 16 (self-learning) es is 75% (according to U achieve a minimum rall grade point average. is required to take a test evaluated based on nd exam (60%). ts should be able to: ledge (long life learning) endently or occupy a dec d ritical thinking and proble ideas in science and e, The ideal gas state equi- te first law of Thermodyr enthalpy, Adiabatic condi- ige, Relationship the first finit, Function of Helmholt	32 hour 32 hour 11 If it at a em at a em		

Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1. Fatimah, I., 2016, Kimia Fisika, Deepublish, Yogyakarta, Indonesia.
	2. Moore & Moore, 1989, Kinetics Chemistry, McGraw- Hill Publisher, New York

Module Name		Mathematics for Chemistry					
Module level, if applicable		1 st year					
Code, if applicable		CPB-209					
Semester (s) in which the module is		Second semest	er				
taught							
Person responsible for	or the module	Prof. Is Fatimah	1				
Lecturer(s)		Prof. Is Fatimah	1				
		Imam Sahroni,	M.Sc.				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 hours		follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		01 hours					
Credit points							
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to 100					
examination regulation	nng to	regulation). Final score is evaluated based on assignment and					
examination regulations		reports (40%) a	nd exam (60%)		e unu		
Recommended prere	auisites	General Mathem	atics				
Related course	-	-					
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:			
learning		1. Have the ability to gain knowledge (long life learning) at a					
_		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
Content		The course will cover:					
		The concepts of Definitions of functions and variables,					
		examples of functions of two variables, partial derivatives and					
		total derivatives in the chemical field, Level one differential					
		equations with variables, Single-level differential equations					
		with homogeneous function coefficients, Exact and non-exact					
		level equations	, Linear differenti	ai linear equations,			
			linear differential	equations of two or mo	re		
		levels with constant coefficients, Non-homogeneous linear					
		differential equations more than two levels, Applied linear					
		differential linear equations in chemical field, Definition of					
		Laplace Transfo	inition, the use	or Laplace transform in s	solving		
		inear different	ial equations coef	mcient constant, Definiti	on ot		

	Symmetry Group, symmetry group properties, application of chemical symmetry group.		
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and		
requirements and forms of examination	collaborative discussion		
Media employed	Text books, slides (power points), and video		
Reading lists	1. Bronson ,R, 1994, Differential Equations, 2nd Ed., Megraw Hill.Inc, New York		
	2. Golberg, J and Potter, MC. 1998. Differential Equations A system approach. Prentice-Hall International. Inc. New York		
	 George Turrell, Mathematics for Chemistry and Physics, Academics Press, 2002. 		
	4. McQuarrie, D.A., and Hansen, M., 2008, <i>Mathematics for</i> <i>Physical Chemistry</i> , University Science Books.		
	5. Turrell, G., 2002, <u>Mathematics for Chemistry & Physics</u> , Academic Press; 1 edition.		
	 Steiner, E., 2008, <u>The Chemistry Maths Book</u>, Oxford University Press, USA; 2 edition. 		
	 Barrante, J.R., 2003, <u>Applied Mathematics for Physical</u> <u>Chemistry</u>, Prentice Hall; 3 edition. 		

Module Name		Practical Course of Analytical Chemistry I					
Module level, if applicable		1 nd year					
Code, if applicable		CAB-210					
Semester (s) in which the module is		II (Two)					
taught							
Person responsible for	or the module	Prof. Riyanto, P	h.D.				
Lecturer(s)		Mai Anugrahwa	ati, S.Si., M.Sc.				
		Febi Indah Faja	rwati, S.Si., M.Sc.				
Language		Bahasa Indones	sia				
Relation to curriculur	n	Compulsory cou	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Laboratory	Laboratory Practice	16		
	50	0.83 (hours) x	practice and	1 (hour) x 16	hours		
		16 (meeting)	experiments	(meeting)			
Discussion and		= 13.28 hours		Exams and	16		
Presentation				preparations 1 (nour)	nours		
				x 10 (meeting)			
Total workload		45 hours					
Credit points							
Requirements accord	ling to	Minimum attendance at practical work is 100% Final score is					
examination regulation	ons	evaluated based on:					
examination regulations		Pretest (20%)					
		 Experiment (30%) 					
		 Report (30%) 					
			(30%)				
Pacammandad prora	quicitos	Final ex Practical Course	amination (20%)	nictry			
Related course	quisites			ilisti y			
Module objectives /in	tended	1 Have the ability to gain knowledge (long life learning) at a					
learning	ltended	higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		Preparation of reagent solution. Determination of					
		Concentration	of Standard Solut	ions by Titrimetry, Prep	aration		
		and determina	tion of pH of b	uffer solution with pH	meter,		
		Determination	of pH of soluti	ion with pH meter. Th	iron		
			equilibrium reaction (III) thiocyanate. Determination of product				
		vield (Ksn) Qualitative analysis of cations Qualitative anion					
		analysis. Determination of monoprotic acid dissociation					
		constant using	pH meter, Observ	vation of equilibrium bala	ance of		

	acid / base indicator, weak acid and base, and precipitation reaction
Study and examination	Pretest
requirements and forms of	Report
examination	Presentation
Media employed	Text books, slides (power points), and video
Reading lists	 Eubanks, L.P., Midddlecamp, C.H., Heltzel, C.E., dan Keller, S.W., 2006, <i>Chemistry incontext: Applying chemistry to society</i>, 6th ed., McGraw-Hill Higher Educ, Boston. Fernando, Q and Ryan M.D., 1982, <i>Calculations in Analytical</i> <i>Chemistry</i>, Harcourt Brace Jovanovich, Inc. Fifield, F.W., dan Kealey, D., 2000, <i>Principles and practice of</i> <i>analytical chemistry</i>, 5th ed., Blackwell Science Ltd., USA. Garcia-Domenech, R., et al, 1996, <i>Determination of the</i> <i>dissociation constant for a monoprotic acid by simple pH</i> <i>measurement</i>, J. Chem. Edu. Vol.73, No.8.p.792. Green, D.B., Rechtsteiner, G. Dan Honodel, A., 1996, <i>Determination of the Thermodynamic solubility of Pbl2</i> <i>assuming nonideal behavior</i>, J.Chem.Educ., vol.73 NO.8 Tim dosen FMIPA UII, Petunjuk Praktikum Kimia Analitik I, FMIPA-UII. Jogiakarta

SEMESTER III

	Kode/				Prasyarat/Prerequiste		
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
1	CGB-301	Kimia Polimer	Polymer Chemistry	2	COB-207	Kimia Organik I	Organic Chemistry I
2	CGB-302	Metodologi Penelitian Dan Bahasa Indonesia	Research Methodology and Bahasa	2	-	-	-
3	CAB-303	Kimia Analitik II	Analytical Chemistry II	2	CAB-205	Kimia Analitik I	Analytical Chemistry I
4	CIB-304	Kimia Anorganik II	Inorganic Chemistry II	2	CIB-206	Kimia Anorganik I	Inorganic Chemistry I
5	COB-305	Kimia Organik II	Organic Chemistry II	2	COB-207	Kimia Organik I	Organic Chemistry I
6	CPB-306	Kimia Fisika II	Physical Chemistry II	2	CPB-208	Kimia Fisika I	Physical Chemistry I
7	CPB-307	Kimia Kuantum	Quantum Chemistry	2	CPB-208	Kimia Fisika I	Physical Chemistry I
8	CBB-308	Biokimia	Biochemistry	3	CGB-104	Biologi	Biology
9	CAB-309	Prak. Kimia Analitik II	Practical Course of Analytical Chemistry II	1	CAB-210	Prak. Kimia Analitik I	Analytical Chemistry Labwork I
10	COB-310	Prak. Kimia Organik	Practical Course of Organic Chemistry	1	CGB-110	Prak. Kimia Dasar	Practical Course of General Chemistry
11	CPB-311	Prak. Kimia Fisika	Practical Course of Physical	1	CGB-110	Prak. Kimia Dasar	Practical Course of General
			Chemistry				Chemistry
Total				20			

Module Name		Polymer Chemistry					
Module level, if applicable		2 nd year	2 nd year				
Code, if applicable		CGB-301	CGB-301				
Semester (s) in whi	ch the	Third semester	Third semester				
module is taught							
Person responsible	for the	Dr. Dwiarso Ru	biyanto, S.Si., M.	Si.			
module							
Lecturer(s)		Dr. Dwiarso Ru	biyanto, S.Si., M.	Si.			
		Amri Setyawat	i, S.Si., M.Sc.				
Language		English-Indone	esia				
Relation to curricul	um Class size	Compulsory co	urse	Markland			
Types of teaching	Class size	Attendance	Forms of	WORKIOAD			
anu learning		ner week per	active				
		semester)	participation				
Teaching		1 67 (hours) x	Collaborative	Lecture: 2 (hours)	32 hours		
	50	16 (meeting)	discussion	x 16 (meeting)	52 110015		
Discussion and		= 27 hours	Presentation	Preparation and	32 hours		
Presentation				follow up 2 (hours)			
				x 16 (self-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII					
examination regula	tions	regulation).					
Recommended pre	requisites						
Related course	intended	By the end of this course students should be able to:					
learning	Intended	1. Have the ability to gain knowledge (long life learning) at a					
learning		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent job					
		with opportunity-oriented					
		3. Have the al	bility and skills in	critical thinking and p	roblem		
		solving as v	vell as finding ne	w ideas in science and	l technology		
		developme	nt				
Content		Polymer types	, nomenclature,	commercial name, li	inear polymer		
		type, branches	s, cross branch a	ind physical chemical	properties of		
		polymer, condensed polymer, addition and step-growth					
		polymerization, chain-growth polymerization, copolymer, stereo					
		definition of n	alymor products	and chomical mothor	ther concept,		
			orymer products		is for polymer		
			didiysis.				
Study and examination	tion	Mid-term. Fina	l term. quiz. assi	gnment, and collabora	itive		
requirements and f	orms of	discussion					
examination							

Media employed	Text books, slides (power points), and video
Reading lists	1. Paul, C., Hiemenz, Timothy, P., Lodge, 2007, Polymer Chemistry,
	Second Edition , Marcel Dekker, New York.
	2. Robert, J., Young, Peter, A., and Lovell, 2011, Introduction to
	Polymers, Third Edition, Taylor & Francis Group, LLC,
	United States of America.
	3. Charles, E., and Carraher, Jr., 2010, Carraher's Polymer
	Chemistry, Eighth Edition, Marcel Dekker, New York.
	4. Cowie, J.M.G., and Arrighi, V., 2007, Polymers: Chemistry and
	Physics of Modern Materials, Third Edition, Nelson Thomas Ltd.,
	United Kingdom.
	5. Kroschwitz, J.I. 1990, Polymers Characterization and Analysis,
	John Wiley & amp; Sons, New York.

Module Name		Research Methodology and Bahasa					
Module level, if applicable		2 nd year					
Code, if applicable		CGB-302					
Semester (s) in which the module is		3 rd semester					
taught							
Person responsible for	or the module	Dr. Dwiarso Ruk	oiyanto, S.Si., M.S	i.			
Lecturer(s)		Prof. Dr. Is Fatir	nah				
		Rudy Syahputra	ı, Ph.D.				
		Dr. Dwiarso Ruk	oiyanto, S.Si., M.S	i.			
Language		English-Indone	sia				
Relation to curriculur	n	Compulsory co	urse		n		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion and	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 nours		tollow up 2 (nours) x	nours		
				16 (sen-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulations		regulation). Fin	al score is evalua	ted based on assignmen	t and		
		reports (25%), e	exam (50%), and p	presentation (25%)			
Recommended prere	quisites	-					
Related course	-	-					
Module objectives/in	tended	By the end of th	nis course student	ts should be able to:			
learning		1. Have consist	ency and enthusi	asm in realizing Islamic			
		attitudes and behaviours					
		2. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		3. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		4. Have skills in scientific literacy, digital, computer, internet					
		and international languages					
Content	Content		I ne course will cover:				
		study the types of research, the basics and scientific concepts					
		literature evolo	ration the prepar	ration of research hypot	hases		
		the preparation	of research met	nods identification of re	search		
		results and taking conclusions from research data correctly					
		Students will be introduced to scientific writings and types of					
		scientific papers and learn the use of Indonesian grammar is					
		good and true in scientific writing and delivery of Indonesian					

	language in written and spoken language in scientific
Study and examination requirements and forms of examination	Mid-term, Final term, presentation, assignment, and collaborative discussion
Media employed	Blended: Text books, research papers, slides (power points), and video
Reading lists	 Geoffrey Marczyk, David DeMatteo, David Festinger, 2005, Essentials of Research Design and Methodology, John Wiley & Sons, NY. Creswell J.W., 2014, Research Design: Qualitative, Quantitative, and mixed methods approaches 4th edition, Sage Publisher Kothari, C.R., 2004, Research Methodology, New Age International Publisher Press. Journal: Recent Trend in Analytical Chemistry Journal: Green and Sustainable Chemistry

Module Name		Analytical Chemistry II					
Module level, if a	pplicable	-					
Code, if applicabl	e	CAB-303					
Semester (s) in wh	nich the	Third semeste	er				
module is taught							
Person responsible	e for the	Prof. Rivanto	. S.Pd., M.Si., P	h.D			
module			, ~ , , ,				
Lecturer(s)		Dr. Noor Fitri	. S.Si., M.Si.				
		Mai Anugrah	wati. S.Si., M.So	C.			
Language		English - Indo	onesia				
Relation to curricu	ılum	Compulsory of	course				
Types of	Class size	Attendance	Forms of	Workload			
teaching and		time (hours	active	,, onligud			
learning		per week	participation				
louining		per	puriorpution				
		semester)					
Teaching		semester)	Collaborative	Lecture: 2	32 hours		
reaching	50	1 67 (hours)	discussion	(hours) x 16	52 nouis		
	50	x 16	discussion	(meeting)			
Discussion and		(meeting) =	Presentation	Preparation and	32 hours		
Presentation		(11100000) = 27 hours	riesentation	follow up 2	52 110015		
Tresentation		27 110013		(hours) x 16			
				(self_learning)			
				(sen-learning)			
Total workload		91 hours					
Credit points		34 ECTS (1)	3.4 ECTS (1 sks makul praktikum dan non praktikum = 1.7				
crean points		ECTS)					
Requirements acc	ording to	Minimum attendance at lectures is 75% (according to UII					
examination regul	ations	regulation).					
examination regul	ations	regulation).					
		Each student must achieve a minimum grade/predicate of C					
		for the overall grade point average. If it does not meet this					
		then the student is required to take a remedial assignment					
Recommended pr	erequisites	Analytical chemistry 1					
Related course							
Module objectives	s/intended	By the end of this course students should be able to:					
learning	s/ intended	1 Have the	ability to study (lifelong learning) at	a higher		
learning		1. Have the a	e relevant field y	with the chemistry of	of essential		
		oil develo	nment material	s for energy and the			
		environm	ent and natural	products for food an	d health		
		2 Have the	skills to work in	dependently or gain	a decent		
		2. Have the s	ty_oriented job i	n essential oil devolu	a uccelli,		
		materials for energy and the environment and natural					
		products f	for food and head	lie environnent, and	natural		
		products f	or tood and hea	lth			

Content	sampling technique, principle of gravimetry, the method of gravimetric precipitation, the evaporative gravimetric method the particulate gravimetric method, the method of volumetric principle, the method of acid-base titration, the complexation titration method, the method of precipitate titration, redox titration method, redox iodo / iodimetry titration method the DSC method, the TGA method				
Study and examination requirements and forms of examination	Mid-term, Final Examination quiz, and excercises				
Media employed	Text books slides (power points) and video				
Reading lists	1 Harvey D Modern Analytical Chemistry McGraw-				
Reading insta	Hill Higher Education Pubs, 2000				
	2. Mitra. S., Sample preparation techniques in analytical				
	chemistry, Wiley, Canada, 2003				
	3. Skoog, D.A., et al, Fundamentals of Analytical				
	Chemistry 8 th ed., Saunder College Pubs., 2004				
	4. Christian, G.D., Analytical Chemistry 7 th ed, John				
	Wiley & Sons, 2011				
	5. Harris, D.C., Quantitative Analytical Chemistry 8 th ed, Freeman Co., 2010				
	 Vyazovkin, S., Thermogravimetric Analysis, John Wiley, 2012 				
	7. Hoehne, G., et al., Differential Scanning Calorimetry, Springer, 2003.				
	8. Peter McPherson, <i>Practical Volumetric Analysis</i> , RSC Publisher, UK, 2014.				

Module Name		Inorganic Chemistry 2						
Module level, if app	olicable	2 nd year						
Code, if applicable		CIB-304	CIB-304					
Semester (s) in whi	ch the	Third semester						
module is taught								
Person responsible	for the	Drs. Allwar, M.	Sc. <i>,</i> Ph.D.					
module								
Lecturer(s)		Drs. Allwar, M.	Sc., Ph.D.					
		Argo Knoirul Ai	nas, IVI.SC.					
		English Indone						
Relation to curricul	um							
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active	Workload				
		per week per	participation					
		semester)						
Teaching		1.67 (hours) x	Collaborative	Lecture: 2 (hours)	32 hours			
	50	16 (meeting)	discussion	x 16 (meeting)				
Discussion and		= 27 hours	Presentation	Preparation and	32 hours			
Presentation				follow up 2 (hours)				
				x 16 (self-learning)				
Total workload 91 hours								
Credit points		3.4 ECTS						
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII						
examination regula	tions	regulation). Each student must achieve a minimum grade/predicate						
		of C for the overall grade point average. If it does not meet then the						
		student is required to take a test/ repair assignment						
Recommended pre	requisites	Inorganic Chemistry 1						
Related course	· · · ·							
logrning	Intended	By the end of this course students should be able to:						
learning		1. Have the ability to gain knowledge (long life learning) at a higher level in relevant field						
		2 Have the skills to work independently or occupy a decent ich						
		with opportunity-oriented						
Content		The role of	medium in inor	ganic reaction: solvat	ion process of			
		inorganic c	inorganic compounds in water; the effect of temperature and					
		other factors in the solubility of inorganic compounds in water;						
		solvation mechanism of inorganic compounds in water.						
		Inorganic reaction in water: acid-base reaction system; redox reaction system						
		 Inorganic r 	Inorganic reaction in non-water medium: properties of non-					
		water solvent as a medium of inorganic reaction, example of						
		inorganic reaction in dilute ammonia, dilute HF, dilute SO2,						
		acetic acid.						

	• Chemical elements: Group 1; Group 2; Group 13, Group 14; Group 15, Group 16; Group 17, Group 18, d and f-block				
	alements				
	elements.				
Study and examination	Mid-term, Final term, quiz, assignment, and collaborative				
requirements and forms of	discussion				
examination					
Media employed	Text books, slides (power points), and video				
Reading lists	 Canham, G.R., 2000, Descriptive Inorganic Chemistry, Second edition, W.H. Scerri, E.R., 2006. The Periodic Table: Its Story and Its Significance, Oxford University Press, USA. Housecroft, 2007, <u>Inorganic Chemistry, 3rd Edition</u>, Prentice Hall. Douglas, B., 1993, Concept and Models of Inorganik 				
	 <i>Chemistry</i>, John Willey, New York. 5. Huheey, J.E., Keiter, E.A., and Keiter, R.L., 1993, <i>Inorganic Chemistry: Principles of Structure and Reactivity, 4th ed.</i>, Harper Collin College Publisher, New York. 6. Jack Barrett, 2003, <i>Inorganic Chemistry in Aqueous Solution</i>, RSC Publisher, UK. 				

Module Name	Module Name Organic Chemistry II							
Module level, if app	olicable	2 nd year						
Code, if applicable		COB-305						
Semester (s) in whi	ch the	Third semester						
module is taught								
Person responsible	for the	Dr. Dwiarso Ru	biyanto					
module								
Lecturer(s)		Dr. Dwiarso Ru	biyanto					
		Amri Setyawat	i, M.Sc.					
Language		English- Indone	esia					
Relation to curricul	um	Compulsory co	ourse					
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching			Collaborative	Lecture: 2 (hours)	32 hours			
	50	1.67 (hours) x	discussion	x 16 (meeting)				
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours			
Presentation		= 27 hours		follow up 2 (hours)				
				x 16 (self-learning)				
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII						
examination regula	tions	regulation). Final score is evaluated based on assignment and						
		reports (40%) and exam (60%)						
		Each student must achieve a minimum grade/predicate of C for the						
		overall grade point average. If it does not meet, then the student is						
		required to tak	e a test/ repair a	ssignment.				
Recommended pre	requisites	Organic Chemi						
Related course								
Module objectives/	intended	By the end of this course students should be able to:						
learning		1. Can gain knowledge (long life learning) at a higher level in						
		relevant field.						
		2. Have the skills to work independently or occupy a decent						
		job wit	h opportunity-or	iented				
Content		The course will	cover:	· · · · · · /				
		1. The introduction of carbon functional group (carbonyl,						
		carboxyl, amine, amide)						
		2. Physica	2. Physical and chemical properties of hetero-carbon double					
		bondin	ig functional grou	ups Internet to the t				
		3. The properties of aldehyde and ketone compounds						
		4. Reactivity of aldehyde and ketone compounds						
		5. The properties of carboxylic acid and ester compounds						
		6. Reactivity of carboxylic acid compounds and esters						
1		/. The pro	operties of amine	7. The properties of amines, nitriles, and amides				

	8. Reactivity of amines, nitriles, and amides				
	9. Organic life compounds: carbohydrates, proteins, and fats				
Study and examination	Task 1, 2, 3 15 %				
requirements and forms of	Independent task 15 %				
examination	Mid-term Examination 35 %				
	Final Examination 35 %				
Media employed	Textbooks, Journals, slides (power points), and video				
	(sesuai di RPS)				
Reading lists	1. Klein, D.R., 2011, Organic Chemistry, John Willey and Sons. Inc., New				
	York.				
	2. Smith, J., 2010, Organic Chemistry, Thomson Learning Inc.				
	3. Carey, F., and Giuliano, R., 2010, Organic Chemistry, John Willey and				
	Sons Inc., New York.				
	4. Hoffman, R.F, Organic Chemistry: An intermediet Text, 2nd edition,				
	John Willey and Sons Inc., New York.				
	5. Mc. Murry, J., 2011, Organic Chemistry, John Willey and Sons Inc., New				
	York.				

Module Name		Physical Chemistry II					
Module level, if applicable		2 nd year					
Code, if applicable		CLOB-306					
Semester (s) in which the module is		third semester					
taught							
Person responsible for	or the module	Prof. Is Fatimah	1				
Lecturer(s)		Prof. Is Fatimah	1				
		Imam Sahroni,	M.Sc.				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse		r		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Tooching		semester)	Collaborativo	Lactura: 2 (hours) y	22		
reaching	50	1 67 (bours) y	discussion	16 (meeting)	bours		
Discussion and	50	16 (meeting)	Presentation	Prenaration and	32		
Presentation		= 27 hours	Tresentation	follow up 2 (hours) x	hours		
				16 (self-learning)	nours		
Total workload	·	91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Eac	ch student must a	achieve a minimum			
		grade/predicate	e of C for the ove	rall grade point average.	lf it		
		does not meet	then the student	is required to take a test	:/		
		repair assignme	ent. Final score is	evaluated based on			
		assignment and	reports (40%) ar	nd exam (60%)			
Recommended prere	quisites	Physical Chemist	ry I				
Related course		By the end of this course students should be able to:					
loorning	itended	By the end of this course students should be able to:					
learning		 паче the ability to gain knowledge (long life learning) at a higher level in relevant field 					
		2 Have the skills to work independently or occupy a decent					
		iob with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will	cover:				
		The concepts o	f The second law	of Thermodynamics, Gib	bs		
		function and chemical potential, Gibbs function and chemical					
		potential of pure substance mixture, The Changes of					
		thermodynamics of pure substances, Simple Mixed					
		Thermodynami	c Changes.				

Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion				
Media employed	Text books, slides (power points), and video				
Reading lists	 Fatimah, I., 2016, Kimia Fisika, Deepublish, Yogyakarta, Indonesia . Moore & Moore, 1989, Kinetics Chemistry, McGraw-Hill Publisher, New York 				

Module Name		Quantum Chemistry						
Module level, if applicable		2 nd year						
Code, if applicable		CPB-307						
Semester (s) in which the module is		Third semester	Third semester					
taught								
Person responsible for	or the module	Prof. Dr. Is Fatir	nah					
Lecturer(s)		Prof. Dr. Is Fatir	nah					
		Gani Purwiando	ono, M.Sc., Ph.D					
Language		English- Indone	sia					
Relation to curriculur	n	Compulsory co	urse		Γ			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
Taaabina		semester)	Callabarativa	Leature 2 (heure) v	22			
reaching	50	1.67 (bours) y	discussion	Lecture: 2 (nours) x	32 bours			
Discussion and	50	1.07 (nours) x	Drocontation	Droparation and	22			
Discussion and Presentation		27 hours	Fresentation	follow up 2 (bours) y	bours			
riesentation		27 110013		16 (self-learning)	nours			
Total workload		91 hours		10 (3011 100111116)				
Credit points		3.4 ECTS						
Bequirements according to		Minimum attendance at lectures is 75% (according to UII						
examination regulations		regulation). Final score is evaluated based on assignment and						
		reports (40%) and exam (60%)						
Recommended prere	quisites	Physical Chemistry I						
Related course		-						
Module objectives/in	itended	By the end of this course students should be able to:						
learning		1. Endeavor to continue to study (lifelong learning) at a higher						
		level in the	relevant field wit	h the chemistry of esser	ntial oil			
		development, materials for energy and the environment,						
		and natural	products for food	and health				
		2. nave the skills to work independently or gain a decent,						
		development materials for energy and the environment						
		and natural products for food and health						
Content		The course will	cover:					
content		The definition of atom and atomic orbital valence bond theory						
		and covalent bond (atomic orbital and molecular orbital) and						
		their implication towards spectroscopy, wave theory, Born-						
		Oppenheimer theory, and Schrödinger equation of atomic						
		orbital						
Study and examination	on	Mid-term, final	term, and quiz					
requirements and for	rms of							
examination								
Media employed		Blended (lectur	e and students' p	resentation)				
Reading lists		1. Engel, T., and Reid, P., 2012, Physical Chemistry, 3 rd ed,						
		Prentice Ha	all.					

2. Atkins, P., and Paula, J.D., 2010, Physical Chemistry
Volume 1: Thermodynamics and Kinetics 9 th ed, W.H.
Freeman.
3. Lewis, W .C.M., 2011, Physical Chemistry, University of
Toronto Libraries.

Module Name		Biochemistry					
Module level, if applicable		2 nd year					
Code, if applicable		CBB-308					
Semester (s) in which	the module is	third semester					
taught							
Person responsible for	or the module	Dr. Tatang Shat	our Julianto, M.Si				
Lecturer(s)		Dr. Tatang Shat	our Julianto, M.Si				
		Dr. Habibi Hida	yat, M.Si				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse/elected cou	rse (dipilih salah satu)	T		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Class	Lecture: 3 (hour) x 16	48 h		
	50	Class	attendance	week (meeting)			
		attendance:					
		16 week x 3 x	Collaborative				
		0,83 = 40 h	discussion		_		
Discussion and			Self-directed	Preparation and	48 h		
Presentation			studies	follow up 3 (hour) x			
				16 (self-learning)			
Total workload		136					
Credit points		5.1 ECTS X 16 WEEK =81.6 ECTS					
Requirements accord	ling to	Minimum attei	ndance at lecture	es is 75%			
examination regulation		Organia Chami					
Recommended prere	quisites	Organic Chemis	Stry II				
Nedule objectives (in	tondod	- Dy the end of th	ais courso studon	ts should be able to:			
loorning	lenueu	By the end of the	his course studen	ts should be able to:			
learning		1 Have the ab	ility to continue c	ts should be able to.	arning)		
		1. Have the ab	avel in the releva	nt field	arning)		
		2. Have the skills to work independently or occupy a decent					
		job with opportunity oriented.					
Content		The course will cover:					
content		Biochemistry philosophy. Introduction to biomolecules water					
		amino acids and protein, properties and function enzyme					
		carbohydrates, lipids, nucleic acid, cell energy, metabolism.					
		protein biosynthesis, photosynthesis.					
Study and examination	on	Mid-term, Final term, presentation, guiz, assignment, and					
requirements and for	ms of	collaborative di	scussion				
examination							
Media employed		Text books, slid	es (power points)			
Reading lists		1. David	S. Page, 19	97, Prinsip-prinsip B	iokimia		
		diterjemahkan oleh R. Soendoro dari Principles of					
		Biological Chemistry, Penerbit Erlangga, Jakarta					
		2. Lehning	ger, 2004, Princip	les of Biochemistry, 4th	Edition		

3.	Wirahadikusumah,	1982,	Biokimia,	Penerbit	ITB,
	Bandung				
4.	Tatang S Julianto,	2013, B	iokimia: Bi	omolekul d	alam
	perspektif Al-Qur'ar	n, Deepu	blish, Yogy	akarta	

Module Name		Practical Course of Analytical Chemistry II						
Module level, if appli	cable	2 nd year						
Code, if applicable		CAB-309						
Semester (s) in which	the module is	III (Three)						
taught								
Person responsible for the module		Prof. Riyanto, P	h.D.					
Lecturer(s)		Mai Anugrahwa	ati, S.Si., M.Sc.					
		Febi Indah Faja	rwati, S.Si., M.Sc.					
Language		Bahasa Indones	sia					
Relation to curriculur	n	Compulsory cou	urse					
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching			Laboratorv	Laboratory Practice	16			
	50	0.83 (hours) x	practice and	1 (hour) x 16	hours			
		16 (meeting)	experiments	(meeting)				
Discussion and		= 13.28 hours		Exams and	16			
Presentation				preparations 1 (hour)	hours			
				x 16 (meeting)				
Total workload		45 hours						
Credit points		1.7 ECTS						
Requirements accord	ing to	Minimum attendance at practical work is 100%. Final score is						
examination regulation	ons	evaluated based on:						
		 Pretest 	(20%)					
		• Experiment (30%)						
		• Report (30%)						
		 Final ex 	amination (20%)					
Recommended prere	quisites	Practical Course	e of Analytical Ch	emistry I				
Related course		-						
Module objectives/in	tended	1. Have the ability to gain knowledge (long life learning) at a						
learning		higher level in relevant field						
		2. Have the skills to work independently or occupy a decent						
		job with opportunity-oriented						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and						
		technology development						
Content		Determination	of sulfate conte	nt in seawater by grav	imetric			
		method, Dete	rmination of N	aCI content in seawa	ter by			
		argentometric	nethod, Determi	nation of acidity and alka	linity in			
		water sample by aside and alkalimetry method, Determination						
		of calcium content in river water by method of complexometri,						
		Determination of vitamin C in drugs with redox titration,						
		Potentiometric titration, Determination of sodium benzoate in						
		tood, Acid B	ase litration v	vith Potentiometric N	iethod,			

	Determination of Acetic Acid in Commercial Vinegar Samples by			
	Titrimetry, Phosphoric Acid Potentiometric Titration			
Study and examination	Pretest			
requirements and forms of	Report			
examination	Presentation			
Media employed	Text books, slides (power points), and video			
Reading lists				
	1. Harvey, D., 2000, Modern Analytical Chemistry,			
	McGraw-Hill Higher Education Pubs.			
	2. Skoog, D.A., et al., 2004, Fundamental of Analytical Chemistry 8 th ed., Saunder College Pubs.			
	3. Fernando, Q and Ryan M.D., 1982, <i>Calculations in Analytical Chemistry</i> . Harcourt Brace Jovanovich. Inc.			
	4. Fifield, F.W., dan Kealey, D., 2000, <i>Principles and practice of analytical chemistry</i> , 5 th ed.,Blackwell Science Ltd., USA.			
	 Garcia-Domenech, R., et al, 1996, Determination of the dissociation constant for a monoprotic acid by simple pH measurement, J. Chem. Edu. Vol.73, No.8.p.792. 			
	6. Green, D.B., Rechtsteiner, G. Dan Honodel, A., 1996, Determination of the Thermodynamic solubility of PbI2 assuming nonideal behavior, J.Chem.Educ., vol.73 N0.8			
	 Tim dosen FMIPA UII, Petunjuk Praktikum Kimia Analitik II, FMIPA-UII, Jogjakarta 			

Module Name		Practical Course of Organic Chemistry						
Module level, if applicable		2 nd year	2 nd year					
Code, if applicable		COB-310	COB-310					
Semester (s) in which the		Third semester						
module is taught								
Person responsible	for the	Dr. Dwiarso Ru	biyanto					
module								
Lecturer(s)		Amri Setyawat	i, M.Sc.					
		Dhina Fitriastu	ti, M.Sc					
Language		English-Indone	sia					
Relation to curricul	um	Compulsory co	ourse	1	1			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching			Laboratory	Laboratory	16 hours			
	50	0.83 (hours) x	practice and	Practice				
		16 (meeting)	experiments	1 (hour) x 16				
Discussion and	-	= 13.28 nours		(meeting)	10 h a una			
Discussion and				Exams and	16 nours			
Presentation				preparations 1				
				(nour) x 10 (mooting)				
				(meeting)				
Total workload		45 hours						
Credit points		1.7 ECTS						
Requirements acco	rding to	Minimum attendance at practical work is 100%. Final score is						
examination regula	tions	evaluated based on:						
		Pretest (20%)						
		• Experiment (30%)						
		• Report (30%)						
		• Final examination (20%)						
Recommended pre	requisites	Practical Course of General Chemistry						
Related course		-						
Module objectives/	intended	By the end of this course students should be able to:						
learning		1. Have consistency and enthusiasm in realizing Islamic						
		attitudes and behaviours.						
		2. Can gain knowledge (long life learning) at a higher level in						
		relevant field.						
		3. Have t	he skills to work	independently or occu	ipy a decent			
		job wit	n opportunity or	iented.				
		4. Have leadership skills and attitudes in collaborating or						
		Interac	Interacting with others.					
		 nave skins in sciencific interacy, digital, computer, internet, and international languages 						
Contont		and international languages.						
Content		I The course will	COVEL.					

	In this Organic chemistry lab students are trained to master
	laboratory skills and increase students' understanding of the
	theories related to organic chemistry. In practicum students are
	expected to know and master the technique of separation of
	organic compound mixture and synthesis of some chemical
	compounds such as formiat, acetyl salicylic acid/aspirin, ethyl
	acetate, iodoform, phenol from aniline, butyralaldehyde,
	anthraquinone, iodoform, acetamide and hex methylene tetra
	amine. In addition, after completing the Organic Chemistry Lab
	Course, students are expected to recognize and master laboratory
	techniques related to the synthesis of such compounds such as
	reflux, distillation, fractional distillation, and various purification
	techniques such as crystallization, recrystallization, sublimation,
	and other. In the implementation, students are divided into small
	groups and accompanied by an assistant.
Study and examination	Pretest (20%)
requirements and forms of	Experiment (30%)
examination	Report (35%)
	Final Assessment (15%)
Media employed	Laboratory experiment, Instrumentation related to chemistry,
	Practical Guide books, virtual class for FGD, slides (power points),
	and video.
Reading lists	1. Tim dosen , 2012, Panduan Praktikum Kimia Organik, FMIPA UII
	2. Anwar, C., Purwono, B., Pranowo, H.D. dan Wahyuningsih, T.D.,
	1994, Pengantar Praktikum Kimia Organik, editor Saadijah Achmad,
	FMIPA UGM, Jogjakarta
	3. Armarego, W.L.F., and Perrin, D.D., 2000, Purification of
	Laboratory Chemicals, 4th edition, Butter worth-Heinemann
	Publisher, Oxford
	4. Miller, J.A. and Neuzel, E.F., 1980, Modern Experimental Organic
	Chemistry, Western Washington
	5. Pecsok, R.L., 1968, Modern Methods of Chemical Analysis, 2nd
	ed., John Wiley and Sons Publishers, New York
	6. Vogel, A.I., 1956, A Text-book of Practical Organic Chemistry, 3rd
	edition, Longman, London

Module Name		Practical Course of Physical Chemistry						
Module level, if appli	cable	2 nd year						
Code, if applicable		CPB-311						
Semester (s) in which	the module is	3 rd semester						
taught								
Person responsible for	or the module	Prof. Is Fatimah	, M.Si.					
Lecturer(s)		Prof. Is Fatimah	, M.Si.					
1		Gani Purwiando	ono, M.Sc., Ph.D.					
Language		English-Indone	sia					
Relation to curriculur		Attendance	Lise	Markland				
and learning		time (bours		WUIKIUdu				
anu leanning		ner week ner	narticination					
		semester)	participation					
Teaching		0.83 (hours) x	Laboratory	Laboratory Practice:	16			
	50	16 (meeting)	practice and	1 (hours)	hours			
		= 13 hours	experiments	x 16 (meeting)				
Discussion and				Exams and	16			
Presentation				preparation 1	hours			
				(hours)				
				x 16 (self-learning)				
Total workload		45 hours						
Credit points		1.7 ECTS						
Requirements accord	ling to	Minimum attendance at lectures is 100% (according to UII						
examination regulation	ons	regulation). Final score is evaluated based on Pretest (20%),						
December of a december of		Experiment (30%), Report (30%), and Final examination (20%) Practical Course of General Chemistry						
Recommended prere	quisites							
Modulo objectives (in	tandad	By the end of this course students should be able to:						
learning	itenueu	1. Have consistency and enthusiasm in realizing Islamic						
learning		attitudes and behaviours						
		2. Have the ability to gain knowledge (long life learning) at a						
		higher level in relevant field						
		3 Have the skills to work independently or occupy a decent						
		ioh with onportunity-oriented						
		A Have leadership skills and attitudes in collaborating or						
		interacting with others						
		5 Have skills in scientific literacy digital computer internet						
		and international languages						
Content		The course will	cover:					
		Thermochemist	rv: isotherm ads	orption: viscosity and				
		streaming activation energy, solubility as a temperature						
		function; kineti	cs decomposition	of phenolphthalein in a	alkali			
		solutions; steam-liquid equilibrium in binary solutions; surface						
		tension; determ	nination of spectr	ophotometric reaction	order			

Study and examination requirements and forms of	Pretest, report, and review
examination	
Media employed	Practical work
Reading lists	 Tim Dosen Penyusun, Buku Panduan Praktikum Kimia Fisika, Lab. Ilmu Kimia FMIPA-UII, Jogjakarta Levine, I.N., 2008, <u>Physical Chemistry</u>, 6th ed, McGraw-Hill Science/Engineering/Math Kavanah, P., 2008, <u>Chemistry: The Physical Setting</u>, Pearson Prentice Hall

SEMESTER IV

Kode/				Prasyarat/Prerequiste			
No Code	Code	Matakuliah	Matakuliah Subject SK		Kode/ Code	Matakuliah	Subject
1	CAB-401	Kimia Instrumental I	Instrumental Chemistry I	2	CAB-303	Kimia Analitik II	Analytical Chemistry II
2	CAB-402	Kimia Pemisahan & Pemurnian	Chemical Separation and Purification	2	CAB-303	Kimia Analitik II	Analytical Chemistry II
3	CAB-403	Kemometri	Chemometrics	2	CGB-108	Matematika Dasar	General Mathematics
4	CIB-404	Kimia Koordinasi	Coordination Chemistry	2	CIB-304	Kimia Anorganik II	Inorganic Chemistry II
5	COB-405	Kimia Organik III	Organic Chemistry III	2	COB-305	Kimia Organik II	Organic Chemistry II
6	CPB-406	Elektrokimia	Electrochemistry	2	CPB-208	Kimia Fisika I	Physical Chemistry I
7	CPB-407	Komputasi kimia	Computational Chemistry	2	CPB-208	Kimia Fisika I	Physical Chemistry I
8	CPB-408	Kinetika Kimia dan Dinamika molekul	Chemical Kinetics and Molecular Dynamics	2	CPB-306	Kimia Fisika II	Physical Chemistry II
9	CBB-409	Mikrobiologi	Microbiology	2	CGB-104	Biologi	Biology
10	CAB-410	Prak. Kimia Instrumental I	Practical Course of Instrumental Chemistry I	1	CAB-309	Prak. Kimia Analitik II	Practical Course of Analytical Chemistry II
11	CIB-411	Prak. Kimia Anorganik	Practical Course of Inorganic Chemistry	1	CGB-110	Prak. Kimia Dasar	Practical Course of General Chemistry
12	CBB-412	Prak. Biokimia	Practical Course of Biochemistry	1	COB-310	Prak. Kimia Organik	Practical Course of Organic Chemistry
Total				21			

Module Name		Instrumental Chemistry I					
Module level, if a	pplicable	-					
Code, if applicabl	e	CAB-401					
Semester (s) in wl	nich the	Fourth semes	ter				
module is taught							
Person responsible	e for the	Prof. Riyanto	, S.Pd., M.Si., P	h.D.			
module							
Lecturer(s)		Prof. Riyanto	, S.Pd., M.Si., P	h.D.			
Language		English - Inde	onesia				
Relation to currice	ulum	Compulsory of	course		-		
Types of	Class size	Attendance	Forms of	Workload			
teaching and		time (hours	active				
learning		per week	participation				
		per					
		semester)					
Teaching			Collaborative	Lecture: 2	32 hours		
	50	1.67 (hours)	discussion	(hours) x 16			
	-	x 16		(meeting)			
Discussion and		(meeting) =	Presentation	Preparation and	32 hours		
Presentation		27 hours		follow up 2			
				(hours) x 16			
				(self-learning)			
Total workload		91 hours					
Credit points		3 4 FCTS					
Requirements acc	ording to	Minimum attendance at lectures is 75% (according to LUL					
examination regul	ations	regulation).					
examination regul	unons	1-5ului(01).					
Recommended pr	erequisites	Analytical chemistry 2					
Related course	•	-					
Module objectives	s/intended	By the end of	By the end of this course students should be able to:				
learning		1. Have the ability to study (lifelong learning) at a higher					
		level in the relevant field with the chemistry of essential					
		oil development, materials for energy and the					
		environment, and natural products for food and health					
		2. Have the skills to work independently or gain a decent,					
		opportunity-oriented job in essential oil development,					
		materials for energy and the environment, and natural					
		products f	or food and hea	lth			
		3. Have capa	ability and profic	ciency in critical thin	nking and		
		problem s	olving and deve	lop new ideas in the	tield of		
		essential oil development, materials for energy and the					
Contorí		environment, and natural products for food and health					
Content		The basic principle of spectroscopy, Wavelength relationship					
		with energy, Sample preparation techniques, The basic					

	principle of UV-Vis spectrophotometer, Components of the tool and how it works in the UV-Vis spectrophotometer, Method of qualitative and quantitative analysis with UV-Vis spectrophotometer, The basic principle of AAS, Tool components, atomization, HCL lamps and how they work in AAS, Method of qualitative and quantitative analysis with					
	AAS, CVAAS analysis technique, HGAAS analysis					
	technique, The basic principles, tool components, atomization,					
	and workings of ICP-MS, Basic principles, tool components,					
	and now FTIK works, The basic principles, tool components, and workings of NMR					
Study and examination	Mid-term, Final Examination guiz, and essay about chemical					
requirements and forms of	instruments, exercises					
examination						
Media employed	Textbooks, slides (power points), and video					
Reading lists	 Duckett, S., and Gilbert, B., 2000, Foundation of Spectroscopy, Oxford University Press, Oxford, UK. Chen, W.Y., Wang, Y.C., and Kuo, M.S., 2002, Determination of total mercury and methylmercury in Human hair by GFAAS using 2,3 dimercaptopropane- 1-sulfonat as a complexing agent, Anal. Scie. 18:255- 260. Christian, G.D. and O'Reilly, I.E., 1986, Instrumental Analysis, 2nd ed., Allyn and Bacon, Inc., Boston. Ong, E.S., Yong, Y.L., Woo, S.O., and Kee, L.K., 2000, Determination of mercury in Chinese-prepared medicine using closed vessel microwave digestion with cold vapor atomic absorption spectrometry, Anal. Scie. 16:391-395. Pecsok, R.L., Shields, L.D., Cairns, T., and WcWilliam, I., 1976. Modern methods of Chemical Analysis, second edition, John Wiley and Sons, Inc. New York. G.A., Webb, 2006, Nuclear Magnetic Resonance: Volume 35, RSC Publisher, UK. 					

Module Name		Chemical Separation and Purification					
Module level, if app	olicable	2 th Year					
Code, if applicable		CAB-402					
Semester (s) in whi	ch the	IV (four)					
module is taught							
Person responsible	for the	Prof. Riyanto, F	Ph.D.				
module							
Lecturer(s)		Dr. Noor Fitri.,	M.Si				
		Febi Indah Faja	irwati, S.Si., M.Sc				
		Mai Anugrahw	ati, S.Si., M.Sc				
Language		English - Indon	esia				
Relation to curricul	um	Compulsory co	urse		1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (nours	active				
		per week per	participation				
Tooching		semester)	Collaborativo	Locture: 2 (hours)	22 hours		
Teaching	50	1.67 (bours) y	discussion	x 16 (meeting)	52 110015		
Discussion and	50	$1.07 (10013) \times$ 16 (meeting)	Presentation	Prenaration and	32 hours		
Presentation		= 27 hours	rescritation	follow up 2 (hours)	52 110013		
Tresentation		27 110 01 0		x 16 (self-learning)			
Total workload		91 hours	91 hours				
Credit points		3.4 ECTS					
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII					
examination regula	tions	regulation). Minimum attendance at lectures is 75% (according to					
		UII regulation). Final score is evaluated based on Assignment and					
		Reports (40%), Mid and Final Examination (60%)					
Recommended pre	requisites	Analytical Chemistry II					
Related course		-	-				
Module objectives/	intended	By the end of t	By the end of this course students should be able to:				
learning		1. Have the al	1. Have the ability to gain knowledge (long life learning) at a higher				
		level in relevant field					
		2. Have the skills to work independently or occupy a decent job					
		with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem solving					
		as well as finding new ideas in science and technology					
Contont			noral th	oon of	constation		
Content		Classification	of Separation Te	chniques Senaration	by size Field		
		Flow Fractiona	tion Separation	hy mass and density a	nd complexing		
		reactions Sena	aration hased on	changing circumstance	es Senaration		
		by two-phase Interception Partition Separation by two-phase					
		Interception Partition, Chromatographic Separation. Gel					
Electrophoresis (GE), Capillary Electrophoresis (CE			lectrophoresis (CE)	,			

Study and examination N requirements and forms of p examination	Mid-term, Final term, assignment, collaborative learning and project-based learning.
Media employed T	Text books, slides (power points), and video
Media employed I Reading lists I I I	 Lext books, slides (power points), and video Ackley, K.L. dan Caruso, J.A. 2003. Separation Techniques- Liquid Chromatography, p.147-162 <i>dalam</i> Cornelis, R., Caruso, J., Crews, H., dan Heumann, K., Eds, <i>Handbook of Elemental</i> <i>Speciation: techniques and Methodology</i>, Wiley, England. Harvey, D., Modern Analytical Chemistry, McGraw-Hill Higher Education Pubs., 2000 Mitra, S., Sample preparation techniques in analytical chemistry, Wiley, Canada, 2003 Akter, K. F., G. Owens, D. E. Davey, and R. Naidu. 2005. Arsenic speciation and toxicity in biological systems. <i>Reviews of</i> <i>Environmental Contamination and Toxicology, Vol 184</i> 184:97- 149. B'Hymer, C. dan Caruso, J.A. 2004 Arsenic and its speciation analysis using high-performance liquid chromatography and inductively coupled plasma mass spectrometry. <i>Journal of</i> <i>Chromatography A</i> 1045, no. 1-2, 1-13. Bowell, R dan Parshley J. 2003. Arsenic cycling in the Mining environment. <i>Summit</i> House, 9 Windsor Place, Cardiff CF10 3RS. Wales, UK. Cullen, William R; Reimer, Kenneth J. 1989. Arsenic speciation in the environment. <i>Chemical Reviews</i> 89 (4): 713–764 Fitri N, Buchari, Amran M.B, Warganegara FM , dan Setiawan B. 2009. Speciation of phosphorus in phloem sap of castor bean: <i>A</i> <i>differentiation and distribution study of molecular size using</i> <i>SEC-UV-ICPQMS. Proceedings of</i> Taibah International Chemistry Conference, Al-Madinah Al-Munawwarah, Kingdom of Saudi Arabia Fitri N. 2008. Diferensiasi dan distribusi spesi Mg, Ca, Mn, Zn, Mo dan Cd dalam cairan floem tanaman iarak. Disertasi S3. ITB

Module Name		Chemometrics					
Module level, if applicable		-					
Code, if applicabl	e	CAB-403					
Semester (s) in which the		Fourth semest	ter				
module is taught							
Person responsible	e for the	Prof. Riyanto	, S.Pd., M.Si., P	h.D			
module							
Lecturer(s)		Mai Anugrah	wati, S.Si., M.So	с.			
		Febi Indah Fa	jarwati, S.Si., M	I.Sc.			
Language		English - Indo	onesia				
Relation to curricu	ulum	Compulsory c	course				
Types of	Class size	Attendance	Forms of	Workload			
teaching and		time (hours	active				
learning		per week	participation				
		per					
		semester)					
Teaching			Collaborative	Lecture: 2	32 hours		
	50	1.67 (hours)	discussion	(hours) x 16			
	-	x 16		(meeting)			
Discussion and		(meeting) =	Presentation	Preparation and	32 hours		
Presentation		27 hours		follow up			
				exercise 2			
				(hours) x 16			
				(self-learning)			
Total workload		01 hours					
Cradit points		3.4 FCTS					
Paquiromente eco	ording to	5.4 EU15 Minimum attendance at lectures is 75% (according to LUI					
avamination ragul	ording to	ivinimum attendance at lectures is /5% (according to Ull					
examination regul	auons						
Recommended pr	erecuisites	General Mathematics					
Related course	erequisites						
Module objectives	vintended	- By the end of this course students should be able to:					
learning	s/ intended	by the child of this course students should be able to: 1 Have the ability to study (lifelong learning) at a higher					
learning		1. nave the admity to study (inclong learning) at a night					
		oil development materials for energy and the					
		environment and natural products for food and health					
		2 Have the skills to work independently or gain a decent					
		opportuni	tv-oriented iob i	n essential oil devel	opment.		
		materials	for energy and the	he environment, and	l natural		
		products f	for food and heat	lth			
		3. Have capability and proficiency in critical thinking and					
		problem solving and develop new ideas in the field of					
		essential oil development, materials for energy and the					
		environment, and natural products for food and health					
Content	Analytical problems, errors, and countermeasures errors.						
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	Statistics and chemical analysis: the presentation of data,						
	Statistics of repeated measurements: mean, median, standard						
	deviation, confidence limit and data distribution, Test of						
	significance and examples in analytical chemistry: Test T, F						
	Test and ANOVA, Test of significance and examples in						
	analytical chemistry: chi-squared test and normal distribution,						
	Quality of analytic measurement, Calibration Method, Non-						
	parametric methods, Experimental design and optimization,						
	Multivariate analysis: PCA and PCR introduction.						
Study and examination	Mid-term, Final Examination quiz, and exercises						
requirements and forms of							
examination							
Media employed	Text books, slides (power points), and video						
Reading lists	1. Miller, J.N. and Miller, J.C., 2010, Statistics and						
_	Chemometrics for Analytical Chemistry, Prentice Hall,						
	Sixth Edition						
	2. Otto, M., 2017, Chemometrics – Statistics and Computer						
	Application in Analytical Chemistry, Wiley-VCH, Third						
	Edition						
	3. Skoog, D.A., West, D.M., Holler, F.J., and Crouch, S.R.,						
	2014, Fundamentals Of Analytical Chemistry, Mary Finch,						
	Ninth Edition						

Module Name		Coordination Chemistry					
Module level, if applicable		2 nd year					
Code, if applicable	Code, if applicable		CIB-404				
Semester (s) in which the module is		Fourth semester					
taught							
Person responsible for	or the module	Drs. Allwar, Ph.	D.				
Lecturer(s)		Drs. Allwar, Ph.	D.				
		Ika Yanti, M.Sc.					
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory course					
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 100	1600		
	50	340 minutes x	discussion	(minutes) x 16			
		16 meeting		(meeting)			
Discussion and			Self-learning	Preparation and	3840		
Presentation				follow up 240			
				(minute) x 16 (self-			
Tatal warklaad		learning)					
Total Workload		2 4 CCTS	90.67 n				
Requirements accord	ling to	3.4 ECIS					
avamination regulation		rogulation) Ein	al scoro is ovalua	tod based on assignment	ut and		
examination regulation	5115	reports (40%) a	nd exam (60%)	teu baseu oli assigninen	it anu		
Recommended prere	auisites	Inorganic Chem	istry II				
Related course	quisites	-					
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:			
learning		1. S (Student of	f tomorrow)				
		Have the ability to continue to learn (long life learning) at a					
		higher level in relevant fields					
		2. E (Enterpreneurship and employability)					
		Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		3. N (New and novel idea)					
		Have the ability and proficiency in critical thinking and					
		problem solving and discovering					
		4. I (Information management)					
		Have the abi	lity to collect, an	alyze and organize infor	mation		
		from various sources using the latest information					
		technology.					
Content		Introduction to	coordination che	emistry, bonding theory	ot		
		transition metal compounds; crystal field theory; molecular					
		orbital theory; s	stereocnemistry a	and isomer; properties o	T		
		coordination compounds; preparation and reaction of					
•		complexes.					

Study and examination	Test Based:			
requirements and forms of	Mid-term, final examination, quiz, essay, and structural analysis			
examination	of one or more coordination / complex compounds			
	Authentic/ Performances Based:			
	Task through online-offline, and exercises of identification of			
	compound structure.			
Media employed	Text books, slides (power points), and journal			
Reading lists	1. Crabtree, Robert, H., 2005, The Organometallic			
	Chemistry of the Transition Metals, 4th Edition, John			
	Wiley and Son, New Jersey.			
	2. Canham, R, G., 2005, Descriptive Inorganic Chemistry,			
	4th Edition, John Wiley.			
	3. Bowser, J.R., 1993, Inorganic Chemistry, Second			
	Edition, W.H. Freeman and Company, New York.			
	4. Cotton, F.A., Wilkinson, G., Gaus, P.L., 1995, Kimia			
	Anorganik Dasar, Penerbit Universitas Indonesia,			
	Jakarta.			
	5. Canham, G.R., 2005, Descriptive Inorganic Chemistry,			
	4th Edition, John Wiley.			
	6. Saito and Taro, 1996, Kimia Anorganik, Iwanami			
	Shoten, Tokyo.			
	7. Sukardjo, 1992, Kimia Koordinasi, PT. Rineka Cipta,			
	Jakarta.			

Module Name		Organic Chemi	stry III				
Module level, if app	olicable	2 nd year					
Code, if applicable		COB_405					
Semester (s) in whi	ch the	fourth semeste	er				
module is taught							
Person responsible	for the	Dr. Dwiarso Ru	biyanto				
module							
Lecturer(s)		Dr. Dwiarso rul	piyanto				
		Amri Setyawat	i, M.Sc.				
Language		English- Indone	esia				
Relation to curricul	um	Compulsory co	ourse	1	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours)	32 hours		
	50	1.67 (hours) x	discussion	x 16 (meeting)			
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours		
Presentation		= 27 hours		follow up 2 (hours)			
				x 16 (self-learning)			
Total workload		01 hours					
Credit points							
Requirements acco	rding to	Minimum atte	ndance at lectur	es is 75% (according t	0.1111		
examination regula	tions	regulation). Final score is evaluated based on assignment and					
examination regula		reports (40%) and exam (60%)					
		Each student must achieve a minimum grade/predicate of C for the					
		overall grade point average. If it does not meet, then the student is					
		required to tak	e a test/ repair a	ssignment.			
Recommended pre	requisites	Organic Chemist	ry II				
Related course		-					
Module objectives/	intended	By the end of t	his course studer	nts should be able to:			
learning		1. Can gain knowledge (long life learning) at a higher level in					
		relevar	nt field.				
		2. Have t	he skills to work i	independently or occu	ipy a decent		
		job wit	h opportunity-or	riented.			
Content		The course will	cover:				
		1. Aroma	tics compounds i	nomenclature			
		2. Haloge	nated reaction in	aromatic compounds	5		
		3. Nitratio	on reaction in arc				
		4. SUITON	ion reaction in	aromatic compound			
		6 Structu	in reactions in a	perties and name of h	eterocyclic		
		compounds					
		7. The heterocyclic compound of Ring three					

	8. The heterocyclic compound of Ring four
	9. The heterocyclic compound of Ring five
	10. The heterocyclic compound of Ring six
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Textbooks, journals, slides (power points), and video
Reading lists	1. Eicher, T. and Hauptman, S., 1995, The Chemistry of
_	Heterocycles, Georg Thieme Verlag
	2. R.J. Fessenden dan J.S. Fessenden, A Hadyana Pudjaatmaka,
	kimia Organik jilid 1, Penerbit Erlangga, Yogyakarta.
	3. Sykes, P., 1985, A Guidebook to Mechanism in Organic, John
	Wiley and Sons, Inc., New York
	4. Smith, J.G., 2011, Organic Chemistry, 3 rd Ed, McGraw-Hill
	Company, New York
	5. J. McMurry, 2011, Organic Chemistry, California : Brooks/Cole
	Publishing Company

Module Name Elec		Electrochemistry					
Module level, if appli	cable	2 nd year					
Code, if applicable	de, if applicable		CPB-406				
Semester (s) in which the module is		4 th semester					
taught							
Person responsible for	or the module	Prof. Dr. Is Fatir	nah, S.Si., M.Si.				
Lecturer(s)		Prof. Riyanto, P	h.D.				
		Wiyogo Prio Wi	caksono, S.Si., M.	Si.			
Language		English- Indone	sia				
Relation to curriculur	n I al i	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (nours	active				
		per week per	participation				
Teaching		semester	Collaborative	Lecture: 2 (bours) y	27		
reaching	50	1 67 (hours) x	discussion and	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 hours		follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours	91 hours				
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Fin	al score is evalua	ted based on assignmen	t and		
		reports (25%), e	exam (45%), prese	entation (25%), and atte	ndance		
December of the second		(5%)					
Recommended prere	quisites	Physical Chemi	stry i				
Related course	tandad	By the end of this course students should be able to:					
learning	itended	By the end of the shi	lis course studen	edge (long life learning)	ata		
learning		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		iob with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will	cover:				
		The importance	e of studying elect	rochemistry, redox reac	tion,		
		spontaneous ar	nd non-spontaned	ous reactions, Nernst law	Ι,		
		electrolysis cell	and voltaic cell, v	oltaic cell application: b	attery,		
		accumulator an	d tuel cell, electro	Division Cell application: Fa	raday		
		law, electroplating, electrodeposition, Na industry, chlorine					
		gas, Au, Ai, and Zn industries. Electrolysis application analysis:					
		polentionetry,	cieculogravimetri voltammetry cycl	y, electroprioresis, ic voltammetry anodic a	and		
		polarography, v	oltammetry, cycl	ic voltammetry, anodic a	and		

	cathodic stripping voltammetry. Application of electrolysis in electro synthesis field: organic and inorganic syntheses.			
Study and examination	Mid-term, Final term, presentation, assignment, and			
requirements and forms of	collaborative discussion			
examination				
Media employed	Blended: Text books, slides (power points), and video			
Reading lists	1. Allen J. Bard and Larry R. Faulkner, 2001,			
	Electrochemical Methods: Fundamentals and			
	Applications, 2nd Ed., John Wiley & Sons, Inc., USA			
	2. Riyanto, 2013, Elektrokimia dan Aplikasinya, Graha			
	Ilmu, Yogyakarta			
	3. V. S. Bagotsky, 2006, Fundamentals of			
	Electrochemistry, 2 nd Ed., USA, John Wiley & Sons, Inc.,			
	4. Wicaksono, W.P., 2019, Pengantar Elektrokimia,			
	Yogyakarta: Universitas Islam Indonesia			

Module Name		Computational Chemistry					
Module level, if applicable		2 nd year					
Code, if applicable		CLOB-407					
Semester (s) in which the module is		Fourth semester					
taught							
Person responsible for	or the module	Prof. Dr. Is Fatir	nah, M.Si				
Lecturer(s)		Prof. Dr. Is Fatir	nah, M.Si				
		Wiyogo Prio Wi	caksono, M.Sc				
Language		English-Indones	sia				
Relation to curriculur	n	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 hours		follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours	91 hours				
Credit points		3.4 ECTS	3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Ead	ch student must a	achieve a minimum score	e of 60		
		every point of l	earning outcome	. If it has not been fulfille	ed then		
		the student is o	bliged to do the	exam / assignment of rep	bair for		
		learning outcon	ne				
		Every student must achieve a minimum score/ predicate C. The					
		scoring system used in the Benchmark Reference Assessment					
		(BRA) with the following rating ranges: A : 3.65 A : 3.50 A/B :					
		3.35 B+ : 3.20 B : 3.05 B- : 2.90 B/C : 2.75 C+ : 2.60 C : 2.45 C- :					
		2.30 C/D : 2.15 D : 2.00					
Recommended prere	quisites	Physical Chemi	stry l				
Related course		-					
Module objectives/in	itended	By the end of th	nis course studen	ts should be able to:			
learning		1. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		2. Have the ski	lls to work indepe	endently or occupy a dec	ent		
		job with opp	ortunity oriented	1			
		3. Have the abi	lity and skills in c	ritical thinking and probl	em		
		solving as well as finding new ideas in science and					
		technology o	development				
Content		The course will	cover:				
		1. The basic principle of software to analysis and					
		synthesis in general Chemistry and more specific fields					
		(organi	c, biochemistry, a	analytic, physical chemist	ry or		

	 inorganic) In theory of Ab. Initio, Semiempirical, and Molecular Mechanics 2. An ability to use software to perform analysis and synthesis in chemistry both general and specific fields (organic, biochemistry, analytic, physical chemistry or inorganic) by Gaussian and Hyperchem 		
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and		
requirements and forms of	collaborative discussion		
examination			
Media employed	Text books, slides (power points), and practical		
Reading lists	1. Harno Dwi Pranowo, 2003, Kimia Komputasi, PKKIA		
	2. Leach A.R., 1996, Molecular Modeling, Addison Wesley		
	Longman Limited, England		

Module Name		Chemical Kinetics and Molecular Dynamics				
Module level, if appli	cable	2 nd year				
Code, if applicable		CLOB-408				
Semester (s) in which	the module is	Fourth semester				
taught						
Person responsible for	or the module	Prof. Is Fatimah				
Lecturer(s)		Prof. Is Fatimah	1			
		Imam Sahroni,	M.Sc.			
		M. Miqdam Mu	isawwa, M.Sc.			
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse	T		
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching	50	100 (minutes)	Collaborative	Lecture: 120	32	
	50	x 16 (meeting)	discussion	(minutes) x 16	nours	
Discussion and	-	= 1600 menit	Duccontation	(meeting)	22	
Discussion and		or 27 nours	Presentation	fellow up 120 (hours)	32 hours	
Presentation				v 16 (colf loarning)	nours	
				x to (sell-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum atter	ndance at lecture	s is 75% (according to U	11	
examination regulation	ons	regulation). Fin	al score is evalua	ted based on assignmen	t and	
		reports (30%) a	nd exam (70%)			
Recommended prere	quisites	Physical Chemis	stry II			
Related course		Physical Chemis	stry I			
		Physical Chemis	stry II			
Module objectives/in	itended	By the end of this course students should be able to:				
learning		1. Have the ability to gain knowledge (long life learning)				
		at a higher level in relevant field				
		2. Have the skills to work independently or occupy a				
		decent	Job with opportu	nity-oriented		
		3. Have the ability and skills in critical thinking and				
		and technology development				
Content		The course will	cover:			
		Introduction to	chemical kinetics	and different concepts	with	
		thermodynamic	cs, understanding	of reaction order. mole	cules.	
		mathematical e	quations of react	ion rates, rates of simple	2	
		reactions, rates	of complex reac	tions, experimental meth	nods of	
		determining rates and orders of simple reactions, determining				
		rates and orders of reactions using experiments, specific				
		reactions (chair	n reactions) , poly	merization, oscillatory		

	reactions), femtochemistry, application of kinetics in several				
	applications, effective collision theory, catalysis includes				
	enzyme catalysis, acid-base and transition metal catalysis,				
	theoretical interpretation of reaction rates includes Rice-				
	Ramsperger-Kassel (RRK) and Rice-Ramsperger theory -Kassel-				
	Marcus (RRKM), Potential energy surfaces, photodissociation				
	theory, basics of molecular dynamics including molecular				
	dynamics in gas and solution phases, basics of photochemistry.				
Study and examination	Assigment (1,2 and 3), independent activities, Mid-term, Final				
requirements and forms of	term				
examination					
Media employed	Text books, slides (power points), and video				
Reading lists	1. Fatimah, I., 2015, Kimia Kinetika, Penerbit Graha Ilmu,				
	Yogyakarta, Indonesia .				
	2. Moore & Moore, 1989, Kinetics Chemistry, McGraw-				
	Hill Publisher, New York				

Module Name		Microbiology				
Module level, if applicable		2 nd year				
Code, if applicable		CBB-409				
Semester (s) in which	the module is	Second semester				
taught						
Person responsible for	or the module	Dr. Tatang Shab	our Julianto, M.Si			
Lecturer(s)		Dr. Habibi Hida	yat, M.Si			
		Dr. Tatang Shab	our Julianto, M.Si			
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching		Class	Class	Lecture: 2 (hour) x 16	32 h	
	50	attendance:	attendance	(meeting)		
Discussion and		16 week x 2 x		Preparation and	32 h	
Presentation		0,83 = 27 h	Self-directed	follow up 2 (hour) x		
			studies	16 (self-learning)		
Tatal wantdaad		01 h				
Credit points		$\frac{3111}{24 \text{ ECTS}} \times \frac{16 \text{ wook}}{16 \text{ FA}} = \frac{164 \text{ ECTS}}{16 \text{ FCTS}}$				
Poquiromonts accord	ingto	S.4 ECTS X 10 W	danco at locturo	oc ic 75%		
evamination regulation	nng to	within atter		:5 15 7 5 /0.		
Recommended prere	auisites	Biology				
Related course	quisites	-				
Module objectives/in	tended	By the end of th	nis course studen	ts should he able to:		
learning	tended	1 Have the abi	lity to continue c	of knowledge (long life lea	arning)	
		at a higher le	evel in the releva	nt field.	anne/	
		2. Have the skills to work independently or occupy a decent				
		job with opportunity oriented.				
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in the development of				
		science and technology.				
Content		The course will	cover:			
		Definition and h	nistory of microb	iology, classification of		
		microorganisms	s (prokaryotic, eu	karyotic, and viruses), Sh	ape	
		and structure o	f bacteria, bacter	ia growth properties,		
		pathogenic bac	teria, bacteria no	n pathogenic, antimicrob	bial	
		activity test me	thod, structure, r	norphology and properti	es of	
		viruses, types and groups of fungi, type of antivirus and their				
		microorganism	of action, microc	organism metabolism, mi	crobial	
		genetics.				

Study and examination requirements and forms of examination	Mid-term, Final term, quiz, and assignment.
Media employed	Text books, slides (power points), and video
Reading lists	 Dwijoseputro, D., 2014. Dasar-Dasar Mikrobiologi. Jakarta : Djambatan Jutono, 1980. Pedoman Praktikum Mikrobiologi Umum Untuk Perguruan Tinggi. Yogyakarta: UGM Pelczar M. J., Chan E.C.S., 2008. Dasar-Dasar Mikrobiologi. Jakarta UI Press Pommerville jeffrey C., 3th edition Fundamentals Of Microbiology: Body Systems Edition

Module Name		Practical Cour	rse of Instrumer	ntal Chemistry I				
Module level, if a	pplicable	-						
Code, if applicabl	e	CAB-410						
Semester (s) in wh	nich the	Fourth semest	ter					
module is taught								
Person responsible	e for the	Prof. Riyanto,	, S.Pd., M.Si., P	h.D				
module								
Lecturer(s)		Mai Anugrah	wati, S.Si., M.S	c.				
		Argo Khoirul	Argo Khoirul Anas, S.Si., M.Sc.					
		Wiyogo Prio	Wicaksono, S.S	i., M.Si.				
Language		English - Indo	onesia					
Relation to curricu	ulum	Compulsory c	course		1			
Types of	Class size	Attendance	Forms of	Workload				
teaching and		time (hours	active					
learning		per week	participation					
		per						
T 1'		semester)	T 1 (T 1 4	161			
Teaching	50	0.92 (hours)	Laboratory	Laboratory	16 nours			
	50	0.85 (10018)	practice and	1 (hour) v 16				
		(mosting) =	experiments	(mosting)				
Discussion and	-	(Intering) = 13.28 hours		(meeting)	16 hours			
Presentation		15.20 110015		preparations 1	10 110015			
resentation				(hour) x 16				
				(meeting)				
				(meeting)				
Total workload		45 hours						
Credit points		1.7 ECTS						
Requirements acc	ording to	Minimum attendance at practical work is 100%. Final score is						
examination regul	ations	evaluated based on:						
		• Pretest (20%)						
		• Experiment (30%)						
		• Report (30%)						
		• Final examination (20%)						
		Each student	must achieve a	minimum grade/pred	licate of C			
		for the overall grade point average.						
Recommended pro	erequisites	Practical Cou	rse of Analytica	l Chemistry II				
Related course		-						
Module objectives	s/intended	By the end of	this course stud	lents should be able	to:			
learning		1. Have cons	sistency and ent	husiasm in realizing	positive and			
		Islamic at	titudes and beha	aviors				
		2. Have the a	ability to study	(lifelong learning) at	a higher			
		level in the relevant field with the chemistry of essential						
		oil development, materials for energy and the						
		environme	ent, and natural	products for food an	d health			

Contont	 Have the skills to work independently or gain a decent, opportunity-oriented job in essential oil development, materials for energy and the environment, and natural products for food and health Have leadership skills and productive attitudes toward cooperating (collaborating) or interacting with others in many levels of challenge
Content Stada and an animation	AAS, FIIK, Spectrophotometer UV-VIS
Study and examination	Prefest, practical work, Report, and final exam
requirements and forms of	
Media employed	Text books, guide book, laboratory, slides (power points), and
	video
Reading lists	 Skoog, D.A., Holler, F.J., Crouch, 2006, Principles of Instrumental Analysis, John Willey & Sons, New York. <u>Donald L. Pavia, Gary M. Lampman, George S. Kriz, James</u> <u>A. Vyvyan</u>, 2006, Introduction to Spectroscopy, John Willey & Sons, New York. Willard JH.H., Merit, L.L., J.A dan Settle, F.A., 1998, <i>Instrumental Methods Analysis</i>, 7th ed., Wadswoth Publisher, Belmont, California. Khopkar, S.M., 1990, <i>Konsep Dasar Kimia Analitik</i>, Penerbit Universitas Indonesia, Jakarta. Haris, D., 1994, <i>Quantitative Chemical Analysis</i>, W.H. Freeman & CO. Tim Dosen Kimia FMIPA UII, 2012, <i>Petunjuk Praktikum Kimia Instrumetal 1</i>, FMIPA UII, Jogjakarta

Module Name		Practical Course of Inorganic Chemistry					
Module level, if applicable		2 nd year					
Code, if applicable		CIB-411					
Semester (s) in which the module is		fourth semester					
taught							
Person responsible for	or the module	Drs. Allwar, M.S	Sc., Ph.D.				
Lecturer(s)		M. Miqdam Mu	isawwa, S.Si., M.S	Sc.			
		Argo Khoirul An	as, S.Si., M.Sc.				
		Ika Yanti, S.Si., I	M.Sc.				
Language		Bahasa Indones	sia				
Relation to curriculur	n	Compulsory cou	urse	1	T		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Laboratory	Laboratory Practice	16		
	50	0.83 (hours) x	practice and	1 (hour) x 16	hours		
	-	16 (meeting)	experiments	(meeting)			
Discussion and		= 13 hours		Exams and	16		
Presentation				preparations 1 (hour)	hours		
				x 16 (meeting)			
Total workload		45 hours					
Credit points	Credit points 1.7 EC			1.7 ECIS Minimum attendance at practical work is 100%. Each student			
Requirements accord	ling to	must achieve a minimum grade/predicate of C for the overall					
examination regulations		grade point average. Final score is evaluated based on					
		grade point ave	(2001)	is evaluated based off.			
		Pretest	(20%)				
		Experin	nent (30%)				
		Report	(30%)				
Deserve to t		Final ex	amination (20%)				
Recommended prere	quisites						
Related Course		-					
iviouule objectives/in	itended	By the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a					
		nigner level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		Job with opportunity-oriented Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		solving as well as infuling new fueas in science and technology development					
Content		Preparation of	complex salts and	d double salts determina	ation of		
		molecular form	ulas of complex	compounds, determina	tion of		
		complex ion	composition. n	nanufacture of comple	ex ion		
		tetraamine carbonatocobalt (III) stabilization and isolation of					
		copper (I) compounds, stoichiometry of Amino-Copper (II)					
		complexes, stoi	chiometry of rea	ctions of Cu metal with s	alts Fe.		

Study and examination requirements and forms of examination	determination of ligand field strength, cation exchange resin, co- ion effect, synthesis and recrystallization of chromalum, synthesis of urea-hydrogen peroxide, synthesis of hydrotalcite material, manufacture of calcium sulfate from limestone, determination of acidity of natural minerals, extraction of aluminum from muddy soil. Pretest Report Experiment Presentation
Media employed	Text books, slides (power points), and video
Reading lists	 Cotton, F.A., Wilkinson, G., Gaus, P.L., 1995, <i>Kimia</i> <i>Anorganik Dasar</i>, Penerbit Universitas Indonesia, Jakarta. Sukardjo, 1992, <i>Kimia Koordinasi</i>, PT. Rineka Cipta, Jakarta. Svehla, G., 1990, <i>Buku Teks Analisis Anorganik Kualitatif</i> <i>Makro dan Semimikro</i>, Edisi Ke Lima, Diterjemahakan oleh Setiono, L. dan Pudjaatmaka, H. A., PT. Kalman Media Pusaka, Jakarta Mulyani, I., Marsih, I. N., Mukti, R.R., Hardian, A., dan Thomyres, G., 2016, <i>Penuntun Praktikum Anorganik I Kimia</i> <i>Unsur Golongan Utama</i>, Laboratorium Kimia Anorganik Program Studi Kimia, FMIPA ITB, Bandung. Khunur, M. M., Wardhani, S., Purwonugroho, D., Darjito., Tjahjanto, R. T., Prananto, Y. P., 2012, <i>Diktat Praktikum</i> <i>Kimia Anorganik</i>, Jurusan Kimia Universitas Brawijaya, Malang. Ewine, G.W., 1985, <i>Instrument Method of Chemical</i> <i>Analysis</i>, New York: Mc Graw-Hill Khopkar, 1990, <i>Konsep Dasar Kimia Analitik</i>, UI Press, Jakarta Pudyaatmaka, A.H., 2001, <i>Kamus Kimia</i>, Balai Pustaka, Jakarta Senadi dan Arie, 2015, <i>Petunjuk Praktikum Kimia Anorganik</i> <i>1</i>, Laboratorim Kimia Anorganik FMIPA-UNJANI, Cimahi.

Module Name		Practical of Biochemistry					
Module level, if applicable		2 nd year					
Code, if applicable		CBB-412					
Semester (s) in which	the module is	Second semester					
taught							
Person responsible for	or the module	Dr. Tatang Shabur Juliar	nto, M.Si				
Lecturer(s)		Dr. Habibi Hidayat, M.S	i				
		Dr. Tatang Shabur Juliar	nto, M.Si				
Language		English- Indonesia					
Relation to curriculur	n	Compulsory course		T			
Types of teaching	Class size	Attendance time	Forms of active	Workload			
and learning		(hours per week per	participation				
		semester)					
Teaching	50	Laboratory practice	Laboratory Practice	16 h			
	50	and experiments: 0.83	1 h x 16 weeks	4.6.1			
Discussion and		x 16 weeks = 13 h	Evenue and	16 h			
Presentation			Exams and				
			preparations				
Total workload		45					
Credit points		4J	45 1.7 FCTS v 16 weeker 27.2 FCTS				
Requirements accord	ling to	1.7 LCI3 X 10 WEEKS- 27.2 ECI3 Minimum attendance at Practical is 100% Final score is					
examination regulation	ons	evaluated based on:					
examination regulations		Pretest (20%)					
		Experiment (30%)					
		Report (30%)					
		Final Examination (20%)				
Recommended prere	quisites	Practical course of Orga	anic chemistry				
Related course		-					
Module objectives/ir	itended	By the end of this cours	e students should be ab	ole to:			
learning		1. Have consistency an	d enthusiasm in realizin	g positive			
		attitude and islamic behaviour.					
		2. Have the ability to continue of knowledge (long life learning)					
		at a higher level in the relevant field.					
		3. Have the skills to work independently or occupy a decent					
		job with opportunity oriented.					
		4. Have leadership skills and attitudes in working together and					
		interaction with others.					
Content		The course will cover:					
		Determination of prote	in levels by spectrophot	ometry,			
		propercies of amino activity corbobydroto o	u base, ractors arrecting	ive test fat/ ail			
		activity, carbonyurate qualitative and qualititative test, fat/ oll quality analysis, determination of vitamin Clovel, starch					
		hydrolycis (Ptyalin number), determination of vitamin Clevel, Statch					
		index by Wohlgemuth method, urine analysis, analysis of					
		catalase (peroxidase) ad	ctivity and papain activit	ty analysis.			

Study and examination requirements and forms of examination	Pre test, Practicum, temporary report, and final report
Media employed	-
Reading lists	 Bettelheim and Landesberg, J., 2000, Laboratory Experiments for General, Organic, and Biochemistry, 4th Edition, Harcourt Brace College,
	 Langsjoen, A. Everett, G. W., Lieder, P., Lata, A. J., Experiments In General Organic, and Biological Chemistry, Harcourt Brace Javanovich Publisher, New York
	 Purnomohadi, Agus. 2015. Petunjuk Praktikum Biokimia. Yogyakarta: Uin Sunan Kalijaga
	 Sherman, A., Sherman, S., Russikoff, L., Laboratory Experiments for Basic Chemistry, 2nd Ed., Worth Publisher, Inc., New York
	5. Soewoto, H., 2001, <i>Biokimia : Eksperimen Laboratorium</i> , Bagian Biokimia FKUI, Universitas Indonesia, Jakarta
	 Sitompul, S.M, M, Eko dan Roviq M. 2011. Penuntun Praktikum Biokimia Tanaman. Malang : Universitas Brawijaya
	7. Sudarmadji, S., Haryono, B., Suhardi, 1996, Analisa Bahan Makanan dan Pertanian, Liberty, Jogjakarta
	8. TIM Biokimia. 2017. <i>Petunjuk Praktikum Biokimia II</i> . Malang : Universitas Islam Maulana Malik Ibrahim
	9. Weiner, G., 1989, <i>Experimental in General Chemistry</i> , 5 th Ed., Harcourt Brace Javanovich Publisher, New York.

SEMESTER V

	Kode/				Prasyarat/Prerequiste		erequiste
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
1	CGB-501	Proses Industri Kimia	Chemical Process Industry	2	-	-	-
2	CAB-502	Kimia Instrumental II	Instrumental Chemistry II	2	CAB-401	Kimia Instrumental I	Instrumental Chemistry I
3	CAB-503	Kromatografi	Chromatography	2	CAB-402	Kimia Pemisahan & Pemurnian	Chemical Separation and Purification
4	CIB-504	Elusidasi Struktur Senyawa Anorganik	Inorganic Compound Structure Elusidation	2	CIB-304	Kimia Anorganik II	Inorganic Chemistry II
5	CIB-505	Kimia Material	Material Chemistry	2	CIB-304	Kimia Anorganik II	Inorganic Chemistry II
6	CIB-506	Sintesis Senyawa Anorganik	Synthesis of Inorganic Chemistry	2	CIB-304	Kimia Anorganik II	Inorganic Chemistry II
7	COB-507	Elusidasi Struktur Senyawa Organik	Organic Compound Structure Elusidation	2	COB-405	Kimia Organik III	Organic Chemistry III
8	COB-508	Kimia Organik Fisik	Physical Organic Chemistry	2	COB-405	Kimia Organik III	Organic Chemistry III
9	COB-509	Kimia Organik Sintesis	Organic Synthesis	2	COB-405	Kimia Organik III	Organic Chemistry III
10	CAB-510	Prak. Kimia Instrumental II	Practical Course of Instrumental Chemistry II	1	CAB-410	Prak. Kimia Instrumental I	Practical Course of Instrumental Chemistry I
11	CAB-511	Prak. Kromatografi	Practical Course of Chromatography	1	CAB-309	Prak. Kimia Analitik II	Practical Course of Analytical Chemistry II
Total				20			

Module Name		Chemical Process Industry					
Module level, if app	olicable	e 3 rd year					
Code, if applicable		CGB-501					
Semester (s) in whi	ch the	Fifth semester					
module is taught							
Person responsible	for the	Dr. Dwiarso Ru	biyanto, S.Si., M.	Si.			
module							
Lecturer(s)		Dr. Dwiarso Ru	biyanto, S.Si., M.	Si.			
		Argo Khoirul Ai	nas S.Si., M.Sc.				
		Wiyogo Prio W	icaksono S.Si., M	.Si.			
Language		English- Indone	esia				
Relation to curricul	um	Compulsory co	urse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		1.67 (hours) x	Collaborative	Lecture: 2 (hours)	32 hours		
	50	16 (meeting)	discussion	x 16 (meeting)			
Discussion and		= 27 hours	Presentation	Preparation and	32 hours		
Presentation				follow up 2 (hours)			
				x 16 (self-learning)			
Total workload	91 hours	91 hours					
Credit points 3.4 ECTS							
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII					
examination regula	tions	regulation).					
Recommended pre	requisites	-	-				
Related course		-					
Module objectives/	intended	By the end of this course students should be able to:					
learning		 Have the ability to gain knowledge (long life learning) at a higher level in relevant field 					
		nigher level in relevant field					
		2. Have the skills to work independently or occupy a decent job					
		with opportunity-oriented					
		5. Have the ability and skills in critical thinking and problem					
		development					
Content	Evolution about raw materials mostly found in Indexesia						
Explanation about raw materials mostly found in indonesia,				or in industry			
		and its processing definition of basic operation unit chemical					
		conversion flo	w chart function	evaluation of plant of	onstruction		
Cement industry: types of cement, raw materials and its pro-			its products				
manufacture process ceramic industry types of ceramics ray			mics, raw				
		materials and its products manufacture process. Glass industry:					
		types of glass, raw materials and its products manufacture process					
		Soap industry: types of soap/detergent, raw materials and its					
		products manufacture process, paint industry: types of paints. raw					

	materials and its products manufacture process, essential oil
	industry: types of products and its products manufacture process.
Study and examination	Mid-exam, Final exam, quiz, assignment, and collaborative
requirements and forms of	discussion
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1. Romagnoli, J.A., and Palazoglu, A., 2012, Introduction to Process
	<u>Control, Second Edition (Chemical Industries)</u> , CRC Press.
	2. Chandrasekaran, V.C., 2009, Tank Linings for Chemical Process
	<u>Industries</u> , Smithers Rapra Press.
	3. Felder, R.M., Rousseau, R.W., and Huvard, G.S., 2009,
	<u>Elementary Principles of Chemical Processes</u> , 3 ^{,,,} ed., John Wiley
	& Sons Inc.
	4. Stephenson, R.M., 1996, Introduction to the Chemical
	Process Industries, Van Nostrand, Reinhold, Holland.

Module Name		Instrumental Chemistry II				
Module level, if a	pplicable	-				
Code, if applicabl	e	CAB-502				
Semester (s) in wh	nich the	Fifth semester				
module is taught						
Person responsible	e for the	Prof. Riyanto	, M.Si., Ph.D.			
module						
Lecturer(s)		Prof. Riyanto	, M.Si., Ph.D.			
		Ptof. Agus Ta	Iftazani			
Language		English - Indo	onesia			
Relation to currice	ulum	Compulsory of	course			
Types of	Class size	Attendance	Forms of	Workload		
teaching and		time (hours	active			
learning		per week	participation			
		per				
		semester)				
Teaching			Collaborative	Lecture: 2	32 hours	
_	50	1.67 (hours)	discussion	(hours) x 16		
		x 16		(meeting)		
Discussion and		(meeting) =	Presentation	Preparation and	32 hours	
Presentation		27 hours		follow up 2		
				(hours) x 16		
				(self-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements acc	ording to	Minimum attendance at lectures is 75% (according to UII				
examination regul	ations	regulation).				
		_				
Recommended pr	erequisites	Instrumental of	chemistry 1			
Related course		-				
Module objectives	s/intended	By the end of this course students should be able to:				
learning		1. Have the ability to study (lifelong learning) at a higher				
-		level in the relevant field with the chemistry of essential				
		oil development, materials for energy and the				
		environment, and natural products for food and health				
		2. Have the	skills to work in	dependently or gain	a decent,	
		opportunity-oriented job in essential oil development.				
		materials for energy and the environment, and natural				
products for food and health						
		3. Have capability and proficiency in critical thinking and				
		problem solving and develop new ideas in the field of				
		essential oil development, materials for energy and the				
		environment, and natural products for food and health				

Content	Wavelength relation with energy in x rays, XRD, XRF,
	SEM/EDX, XPS, Gamma Spectrometry analysis techniques,
	AAN / APN analysis techniques, Basic principles, tool
	components, methods and data reading from Surface Area and
	Pore Size Analyzer
Study and examination	Mid-term, Final Examination quiz, and essay about some of
requirements and forms of	those instruments
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1. Duckett, S., and Gilbert, B., 2000, Foundation of
_	Spectroscopy, Oxford University Press, Oxford, UK.
	2. Chen, W.Y., Wang, Y.C., and Kuo, M.S., 2002,
	Determination of total mercury and methylmercury in
	Human hair by GFAAS using 2,3 dimercaptopropane-1-
	sulfonat as a complexing agent, Anal. Scie. 18:255-260.
	3. Christian, G.D. and O'Reilly, I.E., 1986, Instrumental
	Analysis, 2 nd ed., Allyn and Bacon, Inc., Boston.
	4. Ong, E.S., Yong, Y.L., Woo, S.O., and Kee, L.K., 2000,
	Determination of mercury in Chinese-prepared medicine
	using closed vessel microwave digestion with cold vapor
	atomic absorption spectrometry, Anal. Scie. 16:391-395.
	5. Pecsok, R.L., Shields, L.D., Cairns, T., and WcWilliam, I.,
	1976. Modern methods of Chemical Analysis, second
	edition, John Wiley and Sons, Inc. New York.

Module Name		Chromatography						
Module level, if applicable		3 rd year						
Code, if applicable		CAB-503						
Semester (s) in which the module is taught		5 th semester	5 th semester					
Person responsible for	or the module	Prof. Riyanto, N	1.Si., Ph.D.					
Lecturer(s)		Prof. Riyanto, N	1.Si., Ph.D.					
		Prof. Dr.rer.nat	Prof. Dr.rer.nat. Ir. Agus Taftazani					
Language		English- Indone	sia					
Relation to curriculur	n	Compulsory co	urse					
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32			
	50	x 16	discussion	x 16 (meeting)	hour			
		(meeting) =			S			
Discussion and		27 hours	Presentation	Preparation and	32			
Presentation				follow up 2 (hours)	hour			
				x 16 (self-learning)	S			
Total workload		91 hours						
Credit points	. .	3.4 ECTS						
Requirements accord	ling to	Winimum attendance at lectures is 75% (according to UII						
examination regulation	ons	regulation). Fir	al score is evalua	ated based on Assignmer	it and			
Decommonded provervisites		Chomical Sopar	ivilu allu Fillai Exa					
Recommended prerequisites								
Related Course		- By the end of th	nis course studen	ts should be able to:				
learning	itended	1 Have the abi	ility to gain know	ledge (long life learning)	at a			
		higher level in relevant field						
		2 Have the ski	lls to work inden	endently or occupy a dec	ent			
		job with opportunity-oriented						
		3 Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and						
		technology development						
Contont		The course will cover:						
content		Resign the basis and methods of separation: the basis principles						
		of chromatogra	only and its types	column chromatograph	nv:			
		paper chromate	ography: thin lave	er chromatography: thin-	laver			
		chromatograph	v applications in	industry and research: g	as			
		chromatography: high performance liquid chromatography:						
		recent chromatographic developments						
Study and examination		Mid-term, Final	term, assignmer	nt, and presentatation				
requirements and forms of			-					
examination								

Media employed	Textbooks and slides (power points)		
Reading lists	1. Pecsok, R.L., 1968, Modern Methods of Chemical Analysis, 2 ^m		
	ed., John Wiley and Sons Publishers, New York		
	2. Robard, K., 1994, Principles and Pratice of Modern		
	Chromatographic Methods, Academic Press, UK		
	3. Scott, RPW, 2003, Book 1 : Principles and Practice of		
	Chromatography, Chrom-Ed e-book series, Library for		
	Science Publishing, LLC		
	4. Rubiyanto, D., 2013, Teknik Dasar Kromatografi, deepublish,		
	Yogyakarta		
	5. Rubiyanto, D., 2017, Metode Kromatografi, deepublish,		
	Yogyakarta		

E		Elucidation of Inorganic Compounds				
Module level, if applicable		3 rd year				
Code, if applicable		CIB-504				
Semester (s) in which the module is taught		fifth semester				
Person responsible for	or the module	Drs. Allwar, Ph.	D.			
Lecturer(s)		Drs. Allwar, Ph.	D.			
		Ika Yanti, M.Sc.				
Language		English- Indone	sia			
Relation to curriculur	n	Compulsory co	urse	1		
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)			1.000	
Teaching	50	240 minutes v	Collaborative	Lecture: 100	1600	
	50	340 minutes x	discussion	(minutes) x 16		
Discussion and	-	Tomeeting	Solf loarning	(meeting)	2010	
Presentation			Self-learning	follow up 240	3640	
Tresentation				$(minute) \times 16$ (self-		
				learning)		
Total workload		5440 minutes = 90.67 h				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulations		regulation). Fin	al score is evalua	ited based on assignmen	t and	
		reports (40%) a	nd exam (60%)			
Recommended prere	quisites	Inorganic chem	istry II			
Related course		-				
Module objectives/in	itended	By the end of th	nis course studen	ts should be able to:		
learning		1. S (Student o	f tomorrow)			
		higher level in relevant fields				
		nigner level in relevant fields 2 E (Enterprepeurchin and employability)				
		2. E (Enterpreneursnip and employability)				
		nave the skills to work independently or occupy a decent				
		3 N (New and novel idea)				
		Have the ability and proficiency in critical thinking and				
		problem solving and discovering				
Content		Spectroscopic n	nethods for the i	dentification of inorganic	:	
		compounds and	d solid, identifica	tion and characterization	n of	
		inorganic mater	rials using SEM, T	EM, XRD, gas sorption a	nalysis	
		and thermal and	alyses.			
Study and examination		Test Based:				
requirements and forms of		Mid-term, final examination, quiz				
examination						
Media employed		Text books, slides (power points), and journal				

Reading lists	1. Ulrich Müller, 2006, Inorganic Structural Chemistry,
	Second Edition, John Wiley & Sons, Ltd.
	2. Barbara Stuart, 2004, Infrared Spectroscopy:
	Fundamentals and Applications, Wiley Book, New
	York.
	3. Michael E. Brown and Patrick K. Gallagher, 2008,
	Handbook of Thermal Analysis and Calorimetry,
	Elsevier, Amsterdam.
	4. Amelynk, van Dyk, Landuyt, 1997, Handbook of
	Microscopy, Applications in Materials Science, Vol.2,
	Verlagsgesellschaf, Jerman.

Module Name		Materials Chemistry					
Module level, if applicable		3 rd year					
Code, if applicable		CIB-505					
Semester (s) in which	the module is	5 th semester					
taught							
Person responsible for	or the module	Drs. Allwar, M.S	Sc., Ph.D.				
Lecturer(s)		Drs. Allwar, M.S	Sc., Ph.D.				
		Argo Khoirul Ar	nas, S.Si., M.Sc.				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory cou	urse	1			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32		
	50	x 16	discussion	x 16 (meeting)	hour		
	-	(meeting) =			S		
Discussion and		27 hours	Presentation	Preparation and	32		
Presentation				follow up 2 (hours)	hour		
				x 16 (self-learning)	S		
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Fin	hal score is evalua	ated based on Assignmer	it and		
		Reports (40%),	IVIID and Final Ex	amination (60%)			
Recommended prere	quisites	Chemical Separ	ation and Purific	ation			
Related course		- Dy the end of th	ais courso studon	ts should be able to:			
	itended	By the end of the shi	ility to gain know	lodgo (long life loarning)	at a		
learning		higher level in relevant field					
		2 Have the ski	lls to work indon	andantly or accury a day	ont		
		ioh with opportunity-oriented					
		job with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will cover:					
		Introduction of material chemicals: atoms and bonds between					
		atoms, the stru	icture and crysta	llinity of the material; th	e basic		
		character of the	e material is base	ed on its metallic propert	ies and		
		its crystallinity	and its parame	eters; material base ch	aracter		
		based on parameter definition: ductility, strength, compressive					
		strength, tensile strength, malleability, hardness, etc.;					
		application in industry and environments percus materials					
		application in muusiry and environment; porous materials:					
1		classification and application as well as character analysis in					

	catalysts and adsorption; polymer material: polymer and its classification as well as its basic properties of plastics and elastomers and industrial polymers; material alloy: principles of alloy and its basic properties, materials for nuclear energy and / or environmentally friendly materials
Study and examination	Mid-term, Final term, assignment, and presentatation
examination	
Media employed	Textbooks and slides (power points)
Reading lists	 Fahlman,B.D., 2011. <i>Material Chemistry</i>, 2^d ed., Springer, New York Allcock, H.R., 2008, <i>Introduction to Material Chemistry</i>, John Wiley and Sons, New York
	3. KlapAtke, K.M., 2012, Chemistry of High-Energy Material, 2 nd ed., de Gruyter
	4. Gersten, J.I., and Smith, F.W., 2001. <i>The Physic and Chemistry of Materials</i> , Wiley-Interscience
	 Lawrence, H., Van Valack, 1994, Ilmu dan Teknologi Bahan (terjemahan), Erlangga, Jakarta
	6. Van Vlack, L.H., 1993, <i>Elements of Materials Science and Engineering</i> (6th Edition),prentice Hall

Module Name		Synthesis of Inorganic Chemistry				
Module level, if applicable		3 rd year				
Code, if applicable		CIB-506				
Semester (s) in which the module is		Fifth semester				
taught						
Person responsible for	or the module	Drs. Allwar, M.S	Si., Ph.D.			
Lecturer(s)		M. Miqdam Mu	sawwa, M.Sc.			
		Ika Yanti, M.Sc.				
Language		English-Indone	sia			
Relation to curriculur	n	Compulsory co	urse	1	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching		100 (minutes)	Collaborative	Lecture: 120	32	
	50	x 16 (meeting)	discussion	(minutes) x 16	hours	
Discussion and	-	= 1600 menit	Duccontation	(meeting)	22	
Discussion and Procentation		or 27 nours	Presentation	follow up 120 (hours)	3Z	
Presentation				v 16 (colf loarning)	nours	
				x to (sell-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements according to		Minimum atter	ndance at lecture	es is 75% (according to U	11	
examination regulations		regulation). Fin	al score is evalua	ted based on assignmen	t,	
		reports, mid-ter	rm exam and fina	al examp		
Recommended prerequisites		Inorganic chem	istry II			
Related course		-				
Module objectives/ir	ntended	By the end of t	his course stude	nts should be able to:		
learning		1. Have th	e ability to gain l	knowledge (long life lear	ning)	
		at a hig	her level in relev	ant field		
		2. Have the skills to work independently or occupy a				
		decent job with opportunity-oriented				
		3. Have the ability and skills in critical thinking and				
		problem solving as well as finding new ideas in science				
		and technology development				
Content		The course will cover:				
		Synthesis of inorganic compounds and their development,				
		aspects (change	in free energy 1	heat and entrony reacti	on	
		notential equili	ibrium constant :	and reaction temperature	e and	
		kinetics (rate of substitution reaction of Nur in octabedral				
		structures and planar guadrilaterals) in the synthesis of				
		inorganic compounds, inorganic compound synthesis methods:				
		solid state, sol-gel, hydrothermal, precipitation, co-				
		precipitation, sonochemistry, recrystallization, microwave				

	assisted etc., solvent: Separation and purification of solvents,
	Application of inorganic compound synthesis methods
	(semiconductor manufacture, carbon, graphite, clay, complex,
	polymer) and their characterization.
Study and examination	Assigment (1,2 and 3), independent activities, Mid-term, Final
requirements and forms of	term
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1. Jolly, W.L., 1991, The Synthesis and Characterization of
	Inorganic Compounds, Prentice Hall.

Module Name		Organic Compound Structure Elucidations					
Module level, if applicable		3 rd year					
Code, if applicable		COB-507	COB-507				
Semester (s) in which the		Fifth semester					
module is taught							
Person responsible	for the	Dr. Dwiarso rul	biyanto				
module							
Lecturer(s)		Dr. Tatang Sha	bur Julianto				
		Amri Setyawati, M.Sc.					
Language		English-Indone	esia				
Relation to curricul	um	Compulsory course/elected course (dipilih salah satu)					
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours)	32 hours		
	50	1.67 (hours) x	discussion	x 16 (meeting)			
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours		
Presentation		= 27 hours		follow up 2 (hours)			
				x 16 (self-learning)			
		-					
I otal workload		91 hours					
Credit points		3.4 ECTS					
Requirements acco	rding to	IVIIIImum attendance at lectures is 75% (according to UII					
examination regula	tions	reports (40%) and exam (60%)					
		Each student must achieve a minimum grade/predicate of C for the					
		each student must achieve a minimum grade/predicate of C for the					
		required to tak	required to take a test/ repair assignment.				
Recommended pre	requisites	Organic Chemi	istry III	ssignment.			
Related course	requisites	-					
Module objectives/	'intended	By the end of this course students should be able to:					
learning	intended	1 Can gain knowledge (long life learning) at a higher level in					
		relevant field.					
		2. Have the skills to work independently or occupy a decent					
		iob with opportunity oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will	cover:				
		1. The im	portance of Eluci	idation of Organic Con	npound		
		Structu	ure in chemical re	esearch			
		2. Steps t	o know the struc	ture of unknown orga	nic		
		compounds					
		3. Elemental analysis.					
		4. Rule 13					

	5. Principles of UV-Vis spectroscopy and analysis of λ max
	(electronic transitions and wavelength shifts. Woodward
	Fisher's theory and calculations for the diene and Enon
	systems)
	6. Principles of IR spectroscopy and Interpretation of IR
	spectral data (Type of vibration, Hooke's Law, factors
	affecting IR spectra.transmittance, wave number.
	functional group and fingerprint Area)
	7. The working principle of mass spectroscopy
	8. Fundamentals of fragmentation processes, fragmentation
	of functional groups (Mc. Lafferty, retro diels-alder.
	dehydration, and other splitting processes that cause the
	breakup of two bonds)
	9. Analysis of the structure of organic compounds from single
	spectra and FTIR combined spectra, Uv-Vis and MS
	10. Introduction to NMR spectra (shielded/unshielded and
	upper/down field)
	11. Effect of magnetic field: inductive effect and anisotropic
	effect.
	12. Interpretation of NMR Spectra (Coupling, integration, ppm,
	and Splitting).
	13. Interpretation of combined spectra.
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Textbooks, journals, slides (power points), and video
Reading lists	1. Silverstein, R.M., Spectrometric Identification of Organic
	Compound, 7th Edition, John Wiley and Sons Inc.
	2. Pavia, D.L., Lampman, G.M., and Kriz, G.S., 2001,
	Introduction to Spectroscopy, 3rd Edition, Thompson
	Learning, Inc.
	3. Anderson, R.J., Bendel, d., and Groundwater, P.W., 2004,
	Organic spectroscopic analysis, Tutorial Chemistry Texts,
	RSC.
	4. Mclatterty, F.W., 1980, Interpretation of Mass spectra, 3 rd
	Edition, Cornell University, Edisi Indonesia diterjemahkan
	oleh Sastrohamidjojo, H., 1987, Gadjah Mada University
	Press.

Module Name		Physical Organic Chemistry				
Module level, if applicable		3 rd year				
Code, if applicable		COB-508	COB-508			
Semester (s) in which the		Fifth semester				
module is taught						
Person responsible	for the	Dr. Dwiarso Ru	biyanto			
module						
Lecturer(s)		Dr. Dwiarso Ru	biyanto			
		Amri Setyawati, M.Sc.				
Language		English-Indone	esia			
Relation to curricul	um	Compulsory co	urse			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours)	32 hours	
	50	1.67 (hours) x	discussion	x 16 (meeting)		
Discussion and		16 (meeting)	Presentation	Preparation and	32 hours	
Presentation		= 27 hours		follow up 2 (hours)		
				x 16 (self-learning)		
Total workload		91 hours				
Credit points		3.4 EUIS				
Requirements acco	raing to	regulation) Final score is evaluated based on assignment and				
examination regula	lions	reports (40%) and exam (60%)				
		Fach student must achieve a minimum grade/predicate of C for the				
		overall grade point average. If it does not meet then the student is				
		required to tak	o a test/repair a	ssignment	the student is	
Recommended pre	requisites	Organic Chemi	strv II			
Related course	requisites	-	501 y 11			
Module objectives/	intended	By the end of this course students should be able to:				
learning	interface	1. Can gain knowledge (long life learning) at a higher level in				
		relevant field				
		2. Have the skills to work independently or occupy a decent				
		ioh with opportunity oriented				
		3 Have the ability and skills in critical thinking and problem				
		solving	as well as findin	g new ideas in science	and	
		techno	logy developmer	nt.		
		4. Have s	kills in collecting.	analyzing, and organi	zing	
		inform	ation from vario	us sources using the la	itest	
		inform	ation technology			
Content		The course will	cover:			
		Physical chemi	stry aspects of or	rganic chemical reaction	ons, reactive	
		intermediates, carbon ion, carbon radical, carbon, factors that				
		stabilize reactive intermediates, relationship between kinetics				

	equation and reaction mechanism, discussion related to kinetic							
	method, types of tests for reaction mechanism, intermediate							
	trapping, method for stereochemistry labelling.							
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and							
requirements and forms of	collaborative discussion							
examination								
Media employed	Textbooks, journals and review, slides (power points), and video							
Reading lists	1. Isaacs. N.L., 1987, Physical Organic Chemistry, ELBS Longman, UK							
	2. Hine, J., 1962, Physical Organic Chemistry, 2nd. Edition,							
	McGraw-Hill Book Company, Inc.							
	3. Anslyn, E.V., and Dougherty, D.A., 2006, Modern Physical							
	Organic Chemistry, University Science Books							
Module Name		Organic Synthesis						
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Module level, if app	olicable	3 rd year						
Code, if applicable		COB-509						
Semester (s) in whi	ch the	Second semest	er					
module is taught								
Person responsible	for the	Dr. Dwiarso Ru	biyanto					
module								
Lecturer(s)		Nurcahyo Imar	Prakoso M.Sc					
		Dr. Dwiarso Ru	biyanto					
		Amri Setyawat	i, M.Sc.					
Language		English-Indone	esia					
Relation to curricul	um	Compulsory co	ourse		1			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
Taraktar		semester)			22.1			
Teaching	50	1.07 (hours) v	Collaborative	Lecture: 2 (nours)	32 nours			
Discussion and	50	1.67 (nours) x	Drocontation	X 10 (meeting)	22 hours			
Discussion and Procentation		= 27 hours	Presentation	follow up 2 (bours)	52 110015			
FIESEIILation		- 27 110013		x = 16 (self-learning)				
				x 10 (Sell-learning)				
Total workload	1	91 hours	91 hours					
Credit points		3.4 ECTS						
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII						
examination regula	tions	regulation). Final score is evaluated based on assignment and						
		reports (40%) and exam (60%)						
		Each student must achieve a minimum grade/predicate of C for the						
		overall grade point average. If it does not meet, then the student is						
		required to take a test/ repair assignment.						
Recommended pre	requisites							
Related course	(harrier al and	-						
Nodule objectives/	intended	By the end of this course students should be able to:						
learning		1. Can gain knowledge (long life learning) at a higher level in relevant field						
			relevant field.					
		2. Have the skins to work independently of occupy a decent ich with opportunity oriented						
		3 Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and						
		technology development.						
Content		The course will	cover:					
		Synthesis and r	etrosynthesis of	target molecules, stra	tegies in			
			et molecule choo	osing, centralization, a	pproach and			
		shorten of bonding, protecting group and its function in synthesis						
		shorten of bon	ding, protecting	group and its function	in synthesis,			
		shorten of bon the use of com	ding, protecting puter in molecul	group and its function e synthesis both simpl	in synthesis, e and			

Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion (sesuai di RPS)
Media employed	Textbooks, journals and review, slides (power points), and video (sesuai di RPS)
Reading lists	 Rodwell V. W., Bender D. A., Botham K. M., Kennelly P. J., Weil P. A., 2018, Harper's Biochemistry 31st Edition, McGraw-Hill Companies, New York Lieberman M and Peet A, 2018, Marks' Basic Medical Biochemistry: A Clinical Approach 5th Edition, Wolters Kluwer, Philadelphia Ferrier D. R., 2014, Lippincott's Illustrated Reviews: Biochemistry 6th Ed., Lippincott Williams and Wilkins (sesuai di RPS)

Module Name		Practical Course of Instrumental Chemistry II					
Module level, if app	olicable	-					
Code, if applicable		CAB_510					
Semester (s) in whi	ch the	Fifth semester					
module is taught							
Person responsible for the		Prof. Riyanto,	S.Pd., M.Si., Ph	.D			
module							
Lecturer(s)		Mai Anugrahv	vati, S.Si., M.Sc	2.			
		Ika Yanti, S.S.	i., M.Sc.				
Language		Bahasa Indone	esia				
Relation to curricul	um	Compulsory c	ourse	1	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching	50		Laboratory	Laboratory Practice	16		
	50	0.83 (hours)	practice and	1 (hour) x 16	hours		
D' ' 1	-	X 16	experiments	(meeting)	10		
Discussion and		(meeting) =		Exams and	10		
Presentation		15.28 nours		preparations 1 (hour) v 16	nours		
				(nour) x 10 (mosting)			
				(meeting)			
Total workload		45 hours					
Credit points		17 ECTS					
Requirements accor	rding to	Minimum attendance at practical work is 100% Final					
examination regulat	tions	score is evaluated based on:					
		• Pretest (20%)					
		Experi	ment (30%)				
		Report	(30%)				
		• Final examination (20%)					
Recommended prer	requisites	Practical Course of Instrumental Chemistry I					
Related course		-					
Module objectives/	intended	By the end of	this course stude	ents should be able to:			
learning		1. Have consistency and enthusiasm in realizing positive					
		and Islamic attitudes and behaviors					
		2. Have the a	bility to study (I	lifelong learning) at a h	nigher		
		level in the	e relevant field v	with the chemistry of	U		
		essential o	il development,	materials for energy an	nd the		
		environme	nt, and natural p	products for food and h	ealth		
		3. Have the s	kills to work ind	lependently or gain a d	lecent,		
		opportunit	y-oriented job in	n essential oil developr	nent,		
		materials f	or energy and the	ne environment, and na	ıtural		
		products for	or food and heal	th			

Content	 4. Have leadership skills and productive attitudes toward cooperating (collaborating) or interacting with others in many levels of challenge Practical work using XRD, CV, PSA, GSA, SEM/EDX, NMD
Study and examination requirements and forms of examination	NMR Pretest, practical work, Report, final exam
Media employed	Text books, laboratory, slides (power points), and video
Reading lists	 Willard JH., H., Merit, L.L, Dean, J.A dan Settle, F.A., 1998, Instrumental Methods Analysis, 7th. Ed., Wadswoth Puublishers, Belmont, California. Khopkar, S.M., 1990, Konsep Dasar Kimia Analitik, Penerbit Universitas Indonesia, Jakarta. Frank M. Dunnivant, 2004, Environmental Laboratory Exercises for Instrumental Analysis and Environmental Chemistry, Wiley-Interscience. John Kenkel, 2002, Analytical Chemistry for Technicians, Third Edition, CRC Press. Danielle Sapse, and Lawrence Kobilinsky, 2011, Forensic Science Advances and Their Application in the Judiciary System, 1 edition, CRC Press. Dosen Penyusun, Buku Panduan Praktikum Kimia Instrumental II, Lab. Ilmu Kimia FMIPA-UII, Jogjakarta.

Module Name			Practical Course of Chromatography					
Module level, if appli	cable	3 rd year						
Code, if applicable		CAB-511						
Semester (s) in which	the module is	Fifth semester						
taught								
Person responsible for	or the module	Prof. Ri	iyanto					
Lecturer(s)		Argo Kl	hoirul An	as, M.Sc.				
		Wiyogo	o Prio Wi	caksono, M.Si.				
		M. Miq	ıdam Mu	sawwa, M.Sc.				
Language		English	- Indone	sia				
Relation to curriculur	n	Compu	Isory co	urse	I			
Types of teaching	Class size	Attend	ance	Forms of	Workload			
and learning		time (h	ours	active				
		per we	ek per	participation				
		semest	ter)					
Teaching	50	//	,	Laboratory	Laboratory Practice	16		
	50	0.83 (h	ours) x	practice and	1 (hour) x 16	hours		
		16 (me	eting)	experiments	(meeting)			
Discussion and		= 13 nc	burs		Exams and	16		
Presentation					preparations 1 (hour)	hours		
					x 16 (meeting)			
Total workload								
Credit points		1 7 FCTS						
Requirements accord	ling to	Minimum attendance at practical work is 100% Final score is						
examination regulation	ons	evaluated based on:						
		Pretest (20%)						
		• Experiment (30%)						
		 Report (30%) 						
		Final examination (20%)						
Recommended prere	auisites	Practic	al Course	e of Analytical Ch	nemistry II			
Related course		-						
Module objectives/in	tended	By the end of this course students should be able to:						
learning		1. Have consistency and enthusiasm in realizing Islamic						
		attitudes and behaviours						
		2. Have the ability to gain knowledge (long life learning)						
		at a higher level in relevant field						
		3. Have the skills to work independently or occupy a						
		decent job with opportunity-oriented						
		4. Have leadership skills and attitudes in collaborating or						
		interacting with others						
		5. Have skills in scientific literacy, digital, computer,						
			interne	t and internation	al languages			
Content		The co	urse will	cover:				
		concep	ots and pi	actices of analys	is and quantitative techn	iiques		
		using p	aper chr	omatography, th	in layer chromatography	,		
		columr	n chroma	tography, high p	erformance liquid			

	chromatography, gas chromatography and gas			
	chromatography-mass spectroscopy.			
Study and examination	Pretest			
requirements and forms of	Report			
examination	Presentation			
Media employed	Text books (module) and video			
Reading lists	1. Tim dosen Kimia, 2017, Panduan Praktikum			
	Kromatografi, Jurusan Ilmu Kimia			
	2. Pecsok, R.L., 1968, Modern Methods of Chemical			
	Analysis, 2nd ed., John Wiley and Sons Publishers, New			
	York			
	3. Robard, K., 1994, Principles and Pratice of Modern			
	Chromatographic Methods, Academic Press, UK			
	4. Scott, RPW, 2003, Book 1 : Principles and Practice of			
	Chromatography, Chrom-Ed e-book series, Library for			
	Science Publishing, LLC			
	5. Rubiyanto, D., 2017, Metode Kromatografi Prinsip			
	Dasar dan Pendekatan Pembelajaran Kromatografi,			
	deepublish, Yogyakarta			
	6. Rubiyanto, D., 2013, Teknik Dasar Kromatografi,			
	deepublish, Yogyakarta.			

SEMESTER VI

No	Kode/	Matakuliah	Subject	SKS	Prasyarat/Prerequiste		requiste
	Code				Kode/ Code	Matakuliah	Subject
1	CGB-601	Kimia Lingkungan	Enviromental Chemistry	2	CGB-106	Kimia Dasar	General Chemistry
2	CGB-602	Praktek Kerja Lapangan (PKL)	Apprenticeship	2	XXX-000	Studi Industri	Industrial Study
3	CAB-603	Standardisasi	Standardization	2	CAB-502	Kimia Instrumental II	Instrumental Chemistry II
4	CIB-604	Organologam dan Bioanorganik	Organometallic and Bioinorganic	2	CIB-404	Kimia Koordinasi	Coordination Chemistry
5	COB-605	Kimia Bahan Alam	Chemistry of Natural Product	2	COB-405	Kimia Organik III	Organic Chemistry III
6	COB-606	Kimia Minyak Atsiri	Essential Oil Chemistry	2	-	-	-
7	CBB-607	Bioteknologi	Biotechnology	2	CBB-308	Biokimia	Biochemistry
8	COB-608	Praktikum Elusidasi Struktur Senyawa Kimia	Practical Course of Structure Elucidation	1	COB-310	Prak. Kimia Organik	Practical Course of Organic Chemistry
9	COB-609	Praktikum Kimia Bahan Alam	Practical Course of Natural Product Chemistry	1	COB-310	Prak. Kimia Organik	Practical Course of Organic Chemistry
10	COB-610	Praktikum Minyak Atsiri	Practical Course of Essential Oil Chemistry	1	COB-310	Prak. Kimia Organik	Practical Course of Organic Chemistry
11	XXX-000	Matakuliah Pilihan	Elected Courses	2	-	-	-
Total				19			

Elected Courses in Even Semester

	Kode/							Prasyarat/Prei	requiste
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject		
1	CGB-901	Industri Minyak Atsiri	Essential Oils Industry	2	-	-	-		
2	CGB-902	Kimia Kosmetik	Chemistry of Cosmetics	2	COB-305	Kimia Organik II	Organic Chemistry II		
3	CGB-903	Kimia Parfum	Chemistry of Fragrance	2	COB-305	Kimia Organik II	Organic Chemistry II		
4	CGB-904	Oleokimia	Oleochemistry	2	COB-305	Kimia Organik II	Organic Chemistry II		
5	CGB-905	Produk-produk Kimia untuk Kewirausahaan	Chemical Products for Entrepreneurship	2	-	-	-		
Kons	Konsentrasi Industri Kimia								
6	CGB-906	Analisis Air, Tanah dan Udara	Water, Soil and Air Analysis	2	CAB-303	Kimia Analitik II	Analytical Chemistry II		
7	CGB-907	Aplikasi Teknologi Elektrokimia	Application of Electrochemical Technology	2	CPB-406	Elektrokimia	Electrochemistry		
8	CGB-908	Teknologi Air Minum dalam Kemasan	Drinking Water Technology	2	CAB-303	Kimia Analitik II	Analytical Chemistry II		
9	CGB-909	Teknologi Daur Ulang Limbah	Waste Recycling Technology	2	CAB-303	Kimia Analitik II	Analytical Chemistry II		
10	CGB-910	Teknologi Remediasi	Remediation Technology	2	CAB-303	Kimia Analitik II	Analytical Chemistry II		
Kons	entrasi Lingk	ungan dan Energi	•	· · ·					
11	CGB-911	Biokimia Enzim	Biochemistry of Enzyme	2	CBB-308	Biokimia	Biochemistry		
12	CGB-912	Green Chemistry	Green Chemistry	2	-	-	-		
13	CGB-913	Kimia Koloid dan Permukaan	Colloid and Surface Chemistry	2	CPB-306	Kimia Fisika II	Physical Chemistry II		
14	CGB-914	Nanomaterial	Nanomaterial	2	CPB-306	Kimia Fisika II	Physical Chemistry II		
15	CGB-915	Radiokimia	Radiochemistry	2	CPB-306	Kimia Fisika II	Physical Chemistry II		

Module Name		Evironmental Chemistry					
Module level, if appli	cable	3 nd year					
Code, if applicable		CGB-601					
Semester (s) in which	the module is	Sixth semester					
taught							
Person responsible for	or the module	Prof. Riyanto, P	h.D.				
Lecturer(s)		Prof. Riyanto, P	h.D				
		Rudy Syah Putr	a, Ph.D				
		Febi Indah Faja	rwati, S.Si., M.Sc				
Language		English-Indones	sia				
Relation to curriculur	n oli i	Compulsory cou	urse		1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Teeshine		semester)	Callahanativa	1	22		
reaching	50	1.67 (bours) y	discussion	Lecture: 2 (nour) x 16	32 bours		
Discussion and	50	$1.07 (110013) \times$	Drocontation	(meeting) Broparation and	22		
Presentation		= 27 hours	Fresentation	follow up 2 (bour) x	bours		
riesentation		- 27 110013		16 (meeting)	nours		
				10 (meeting)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ing to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Minimum attendance at lectures is 75% (according					
		to UII regulation). Final score is evaluated based on Assignment					
		and Reports (40%), Mid and Final Examination (60%)					
Recommended prere	quisites	General Chemistry					
Related course							
Module objectives/in	tended	1. Have the ability to gain knowledge (long life learning) at a					
learning		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented,					
		3. Have the ability and skills in critical thinking and problem					
		solving as w	ell as finding nev	v ideas in science and			
Contont		technology	development	nantal Chamistry . Daf			
Content		Rollution: Wat	tor Air Soil I	ifo basic knowledge	inition,		
		Environmental	Impact Analysis	(AMDAL) quality stand	about		
		environmental	The properties a	ind functions of natural	aius oi		
		The caractheris	tic properties of t	he body of water in the	aquatic		
		life Physical a	nd chemical pro	nerties of water. Physic	aquatic		
		chemical pro	perties of wa	iter. Water pollution	n and		
		microorganism	s in the water. Er	nvironmental Chemistry	of soil.		
		The properties	and atmospheric	layers, Air polluting ager	nts		
			·				

Study and examination	Mid-term, Final term, assignment, collaborative learning and
requirements and forms of	project-based learning.
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1. <u>Baird</u> , C., and <u>Cann</u> , M., 2008, Environmental
	<i>Chemistry,4thed.,</i> W. H. Freeman.
	2. Manahan, S.E., 2009, Environmental Chemistry, Ninth
	Edition. CRC Press.
	3. VanLoon, G.W., and Duffy, S.J., 2009, Environmental
	Chemistry: A global perspective, 3 rd ed., Oxford University
	Press, USA.
	4. Girard, J.E., 2009, Principles of Environmental Chemistry,
	2 nd ed., Jones & Bartlett Publishers.
	5. Ibanez, J.G., Hernandez-Esparza, M., Doria-Serrano, C., 6.
	Fregoso-Infante, A., and Singh, M.M., 2009, Environmental
	Chemistry: Fundamentals, Springer.
	6. Spiro, T.G., and Stigliani, W.M., 2002, Chemistry of the
	Environment, 2 nd ed., Prentice Hall

Module Name		Apprenticeship					
Module level, if appl	icable	3 rd year					
Code, if applicable		CGB-602					
Semester (s) in which	h the module	Sixth semester					
is taught							
Person responsible for the module		Prof. Is Fatimah	1				
Lecturer(s)		All					
Language		English- Indone	sia				
Relation to curriculu	m	Compulsory co	urse	1			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Teeshine		semester)	Callahanating	Lesture 120	22		
Teaching	50	100 (minutes)	Collaborative	Lecture: 120	32 bours		
	50	(monting) -	uiscussion	(monting)	nours		
Discussion and		1600 menit or	Presentation	Prenaration and	32		
Presentation		27 hours	resentation	follow up 120	hours		
				(hours) x 16 (self-			
				learning)			
				0,			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accore	ding to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ions	regulation). Group assignments, individual assignments, reports					
Recommended prere	equisites	-					
Related course		- By the end of this course students should be able to:					
Module objectives/II	ntended	By the end of this course students should be able to:					
learning		 nave consistency and entrusiasm in realizing islamic attitudes and behaviours 					
		2. Have leadership skills and attitudes in collaborating or					
		interacting with others					
		3 Have ability and skills in global community as well as					
		social awareness that supports the development of					
		science	•				
		4. Have sl	kills in scientific li	teracy, digital, compute	er,		
		internet and international languages					
Content		The course will cover:					
		The field work	practice course for	ocuses on the contribut	ion of		
		student activities in work practices related to analysis, process,					
		quality assuran	ce and research a	and development activi	ties at the		
		Institution whe	re the PKL is imp	lemented.			
Study and examinati	on maga of	The assessment	t system is in acc	ordance with the guide	lines for		
requirements and fo	rins of	Implementing PKL and Thesis for the Chemistry Study Program,					
examination Modia amplexed		TIVIIPA UII	oc (nower noiste) and video			
Media employed		Lext books, slides (power points), and video					

Reading lists	1. Tim penyusun, 2016, Buku Panduan PKL dan Skripsi
	Program Studi Kimia, Yogyakarta

Module Name		Standardization					
Module level, if applicable		3 rd year					
Code, if applicable		CAB-603					
Semester (s) in which taught	the module is	6 th semester					
Person responsible for	or the module	Prof. Rivanto, N	1.Si., Ph.D.				
Lecturer(s)		Prof. Riyanto, N	, Л.Si., Ph.D.				
		Mai Anugerahw	vati, M.Sc.				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	1	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32		
	50	x 16	discussion	x 16 (meeting)	hour		
	-	(meeting) =			S		
Discussion and		27 hours	Presentation	Preparation and	32		
Presentation				follow up 2 (hours)	hour		
				x 16 (self-learning)	S		
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Final score is evaluated based on Assignment and					
D		Reports (40%),	Mid and Final Exa	amination (60%)			
Recommended prere	quisites	Instrumental Ci	nemistry II				
Related course		- By the end of this course students should be able to:					
Iviodule objectives/in	itended	by the end of this course students should be able to:					
learning		higher level in relevant field					
		nigner level	In relevant field	1 .1 .1			
		2. nave the skills to work independently or occupy a decent					
		Job with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will cover:					
		Standardization scope; products standardization; definition of					
		ISO; types of ISO; ISO 9001 and ISO 17025 documents;					
		validation and verification of the testing method; calibration					
		tools; internal a	iudit; manageme	nt review; sampling acco	ording		
		to ISO 2025; laboratory quality assurance; ISO 15189 and ISO					
		14001 documents					
study and examination	JII Smc of	Mid-term, Final term, assignment, collaborative learning and					
equirements and for		project-based l	earning				
examination							

Media employed	Textbooks and slides (power points)
Reading lists	1. Steven M. Spivak and F. Cecil Brenner, (2001),
	Standardization Essentials: Principles and Practice 1 st , CRC
	Press, Francis
	2. Ron Schneiderman, (2015), Modern Standardization: Case
	Studies at the Crossroads of Technology, Economics, and
	Politics, Wiley, New York
	3. Chan, C.C., H.L.Y.C. LEE, & X. Zhang, (2004). Analytical
	Method Validationand Instrumental Performance
	Verification. Willey Intercine A. John Willy and Sons. Inc.,
	Publication
	4. EURACHEM/CITAC Guide CG 4, (2000). Quantifying
	Uncertainty in Analytical Measurement (Ellson, S. L. R.,
	Rosslein, M., & Williams, A., Editor) (second edition). UK
	Department of Trade and Industry as Part of The National
	Measurement System Valid Analytical Measurement (VAM)
	Program
	5. Standard Internasional ISO/IEC 17025, Edisi kedua Tahun
	2005, Persyaratan Umum Kompetensi Laboratorium
	Pengujian dan Laboratorium Kalibrasi

Module Name		Organometalic and Bioinorganic						
Module level, if applicable		3 rd year	3 rd year					
Code, if applicable		CIC-605	CIC-605					
Semester (s) in which the		sixth semester						
module is taught								
Person responsible	for the	Drs. Allwar, M.	Sc., Ph.D.					
module								
Lecturer(s)		Drs. Allwar, M.	Sc. <i>,</i> Ph.D.					
		Argo Khoirul Ai	nas S.Si., M.Sc.					
		Ika Yanti, S.Si.,	M.Sc.					
Language		English-Indone	esia					
Relation to curricul	um	Compulsory co	urse	-	•			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching		1.67 (hours) x	Collaborative	Lecture: 2 (hours)	32 hours			
	50	16 (meeting)	discussion	x 16 (meeting)				
Discussion and		= 27 hours	Presentation	Preparation and	32 hours			
Presentation				follow up 2 (hours)				
				x 16 (self-learning)				
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII						
examination regula	tions	regulation).						
Recommended pre	requisites	Coordination Chemistry						
Related course		-	-					
Module objectives/	intended	By the end of this course students should be able to:						
learning		1. Have the skills to work independently or occupy a decent job						
		with opportunity-oriented						
		2. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and technology						
		development						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and technology						
Carlant			development					
Content		The explanation about the understanding of organometallic and						
		bioinorganic co	mpounds.	institute of succession in				
		i ne explanatio	n about the appl	ications of organomet	and and			
		The 1C and 1C	nipounds.		und			
			electron kule in o	organometanic compo	unu			
		The types of ligands in organometallic compounds.						
		I ne types of bonds and ligands in organometallic compounds.						
		Analysis of bond in organometallic compounds						
		The explanatio	n of the reaction	in organometallic con	npounas.			

	Organometallic compounds in the d-block elements			
	Organometallic compounds in the f-block elements			
	The explanation of the functions of metals in biological systems.			
	The types of essential and non-essential metals in biological			
	systems.			
	Metal toxicity in biological system			
	The mechanism of oxygen in myoglobin and hemoglobin			
	The active sites on myoglobin dan hemoglobin structures			
	The nitrogenase process in biological system			
	The coenzyme B12 reaction			
	The copper enzyme reaction			
	The roles of metal in anticancer, antidiabetic, Tubberculosis			
Study and examination	Mid-term, Final term, quiz, assignment, and collaborative			
requirements and forms of	discussion			
examination				
Media employed	Text books, slides (power points), and video			
Reading lists	1. Crabtree, Robert, H., 2005, The Organometallic Chemistry			
	of the Transition Metals, 4 [®] Edition, John Wiley and Son,			
	Cray H. P. Stiefel E. L. Valentine, J.S. and Pertini I. 2006			
	2. Gray, H.B., Sherel, L. I., Valentine, J.S. and Bertini, I., 2000, Piological Inorganic Chemistry: Structure and Poastivity			
	University Science Press, USA			
	3 Rost-Malone R.M. 2002 Biognorganic Chemistry: A Short			
	Course, John Wiley and Sonn Inc. New Jersey			
	A Post-Malone P.M. 2007 <i>Biognorganic Chemistry:</i> A Short			
	4. Noat-indione, N.W., 2007, Biodifiorgunic Chemistry. A Short			
	5 Wolfgang K And Brigitte S 1991 <i>Biognorganic Chemistry</i>			
	Inorganic Elements in the Chemistry of life John Wiloy and			
	Son Inc. New Jersey			
	Soft file, New Jersey.			

Module Name		Chemistry of Marine Natural Product					
Module level, if applicable		-					
Code, if applicable		COB-605					
Semester (s) in which	n the module is	six	six				
taught							
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si.				
Lecturer(s)		Dhina Fitriastut	i, S.Si., M.Sc.				
		Nurcahyo Iman	Prakoso, M.Sc.				
Language		English-Indone	sia				
Relation to curriculur	n	Compulsory co	urse	1	Г		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Teeshine		semester)	Callahanating	Lastura 100	1.000		
reaching	50	240 minutos y	discussion	Lecture: 100	1000		
	50	340 minutes x	discussion	(minutes) x 16			
Discussion and		To meeting	Solf loarning	(meeting)	2040		
Discussion and			Self-learning	follow up 240	5640		
Fresentation				$(minute) \times 16$ (self-			
				learning)			
Total workload		5440 minutes = 90.67 h					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulati	ons	regulation). Final score is evaluated based on assignment and					
		reports (40%) a	nd exam (60%)	C C			
Recommended prere	quisites	Organic Chemis	try 3				
Related course		-					
Module objectives/ir	ntended	By the end of th	nis course studen	ts should be able to:			
learning		1. S (Stude	ent of tomorrow)				
		Have the ability to continue to learn (long life learning)					
		at a higher level in relevant fields					
		2. E (Enterpreneurship and employability)					
		Have the skills to work independently or occupy a					
		decent job with opportunity-oriented					
		3. N (New and novel idea)					
		Have the ability and proficiency in critical thinking and					
Contont		problem solving and discovering					
Content		introduction to primary and secondary metabolites, isolation					
		chemical and	nhysical nrone	rties of phenolic subs	tances		
		alkaloid ternenoid steroid alvoside introduction to chemistry					
		of essential oils					
Study and examination		Assignments, mid-semester and final semester examinations					
requirements and forms of		Assignments. m	id-semester and	final semester examinat	ions		
requirements and for	on rms of	Assignments, m	id-semester and	final semester examinat	ions		

Media employed	Text books, slides (power points), video, website, journal,		
	review, regulation of cosmetics		
Reading lists	1. Verma, A., and Tandon, V., 2009, Chemistry of Natural		
	Products, Shree Publishers & Distributors.		
	2. Rahman, A., 2012, Studies in Natural Products Chemistry,		
	<u>Volume 36: Bioactive Natural Products, 1sted.,</u> Elsevier.		
	3. Tringali, C., 2011, Bioactive Compounds from Natural		
	<u>Sources, Second Edition: Natural Products as Lead</u>		
	<u>Compounds in Drug Discovery</u> ,CRC Press.		
	4. Kool, E.T., Barton, D., Nakanishi, J., and Meth-Cohn, O.,		
	2002, Comprehensive Natural Products Chemistry: DNA		
	and Aspects of Molecular Biology, 1 st ed., CRC Press.		
	5. Buss, A.D., Butler, M.S., and Neidle, S., 2009, Natural		
	Product Chemistry for Drug Discovery, RSC Biomolecular		
	Sciences, Royal Society of Chemistry.		
	6. Thomson, R.H., 2008. <u>The Chemistry of Natural</u>		
	<u>Products</u> , 2 nd ed., Springer.		
	7. Civjan, N., 2012, Natural Products in Chemical Biology,		
	1 st ed., Wiley.		
	8. Sarker, S.D., 2010, Natural Products Isolation (Methods		
	<u>in Biotechnology)</u> , 2 nd ed., Humana Press.		
	9. Gang, D.R., 2012, Phytochemicals, Plant Growth, and the		
	<u>Environment (Recent Advances in Phytochemistry)</u> ,		
	Springer.		
	10. Robinson, T., 1991, The Organic Constituens of Higher		
	Plants, 6 th Ed., Diterjemahkan oleh Kosasih		
	Padmawinata, Penerbit ITB, Bandung.		

Module Name		Essential Oil Chemistry						
Module level, if applicable		3 rd year						
Code, if applicable		COB-606						
Semester (s) in whic	h the module	Sixth semester						
is taught								
Person responsible f	or the module	Dr. Dwiarso Rul	biyanto, M.Si.					
Lecturer(s)		Dr. Dwiarso Rul	biyanto, M.Si.					
Language		English- Indone	sia					
Relation to curriculu	m	Compulsory co	urse	1	Г			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching	50	100 (minutes)	Collaborative	Lecture: 120	32			
	50	x 16	discussion	(minutes) x 16	hours			
Diversity and		(meeting) =	Description	(meeting)	22			
Discussion and		1000 menit of	Presentation	follow up 120	32 bours			
Presentation		27 110013		(bours) x 16 (solf	nours			
				(nours) x to (sen-				
				icariiiig)				
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements according to		Minimum atter	ndance at lecture	es is 75% (according to	UII			
examination regulation	ions	regulation). Final score is evaluated based on assignment and						
		reports (30%) a	nd exam (70%)					
Recommended prere	equisites	-						
Related course		-						
Module objectives/i	ntended	By the end of this course students should be able to:						
learning		1. Have the ability to gain knowledge (long life learning) at						
		a higher level in relevant field						
		2. Have the skills to work independently or occupy a						
		accent job with opportunity-oriented						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as infuling new ideas in science and technology development						
Contant		The course will cover:						
Content		The history of the development of assential ail knowledge						
		sources and me	thods of isolatio	n of essential oils analy	isis and			
		synthesis of ess	ential oil derivat	ives and other derivativ	e			
		products are so	me of the topics	discussed in the lecture	- e. Types			
		of essential oils	typical of Indone	esia and the world. such	n as			
		citronella oil, clove oil, patchouli oil, eucalyntus oil, fennel oil						
		turpentine oil, Lawang oil, nutmeg oil, basil oil were used as						
		further topics to be discussed by students in discussion. Students						

	can also choose other types of essential oils that are relevant to			
	the essential field.			
Study and examination	Assigment (1,2 and 3), independent activities, Mid-term, Final			
requirements and forms of	term			
examination				
Media employed	Text books, slides (power points), and video			
Reading lists	1. Guenther, E., 1986, Minyak Atsiri, diterjemahkan oleh S.			
	Ketaren, UI Press, Jakarta			
	2. 2. Sastrohamidjojo, H., 2004, Kimia Minyak Atsiri, cetakan			
	pertama, Gadjah Mada University Press, Jogjakarta			
	3. 3. Lutony, T.L. dan Rahmayati, Y., 1999, Produksi dan			
	Perdagangan Minyak Atsiri, cetakan ke-4, PT Penebar			
	Swadaya, Jakarta			
	4. 4. Baser, K.H.C. and Buchbauer, G., 2010, Handbook of			
	essential oils : science, technology, and applications, CRC			
	Press, Taylor & Francis Group			

Module Name		Biotechnology					
Module level, if applicable		3 rd year					
Code, if applicable		CBB-607	CBB-607				
Semester (s) in which the module is		sixth semester					
taught							
Person responsible for	or the module	Dr. Tatang Shak	our Julianto, M.Si				
Lecturer(s)		Dr. Tatang Shat	our Julianto, M.Si				
		Dr. Habibi Hida	yat, M.Si				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	1	n		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		Class	Class	Lecture: 2 (hour) x 16	32 h		
	50	attendance:	attendance	(meeting)			
Discussion and		16 week x 2 x		Preparation and	32 h		
Presentation		0,83 = 27 h	Self-directed	follow up 2 (hour) x			
			studies	16 (self-learning)			
Total workload		91 h					
Credit points		3.4 ECTS x 16 w	veek = 54.4 ECTS				
Requirements accord	ling to	Minimum atter	Minimum attendance at lectures is 75%.				
examination regulation	ons						
Recommended prere	quisites	Biochemistry					
Related course		-					
Module objectives/ir	itended	By the end of the	nis course studen	ts should be able to:			
learning		1. Have the ability to continue of knowledge (long life learning)					
		at a higher level in the relevant field.					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity oriented.					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in the development of					
		science and technology.					
Content		The course will cover:					
		Introduction to biotechnology, introduction to the					
		fermentation process, microbial growth, fermentation					
		technique, fermentation medium, sterilization, aeration and					
		agitation, extraction and purification of fermentation product,					
		microbial isolation and storage in industry, introduction to					
		genetic engineering, components in gene cloning, isolation and					
		purification of DNA, PCR analysis.					
Study and examination		Mid-term, Final	term, quiz, and	assignment.			
requirements and forms of							
examination			1. I	• • •			
iviedia employed		Text books and	sildes (power po				
Reading lists		1. Peter F.	Stanbury, Alla	n W., 1984, Principl	les of		
		Fermentast	ion Technology,	Pergamon Press, Oxford			

2.	Brown T.A., 1991, Gen Cloning on Introduction
	diterjemahkan oleh Soemiarti A. M., dan Praseno, Yayasan
	Essentia Medica, Yogyakarta

Module Name		Practical Courses of Structure Elucidation					
Module level, if applicable		3 rd year					
Code, if applicable		COB-608					
Semester (s) in which	the module is	6 th semester					
taught							
Person responsible fo	or the module	Dr. Dwiarso Rul	biyanto, S.Si., M.S	òi.			
Lecturer(s)		Dr. Dwiarso Rul	biyanto, S.Si., M.S	Si.			
		Amri Setyawati	, S.Si., M.Sc.				
		Ika Yanti, S.Si., I	M.Sc.				
Language		English- Indone	sia				
Relation to curriculur	n	Compulsory co	urse	I	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Laboratory works	50		Laboratory	Laboratory Practice	16		
	50	0.83 (nours) x	practice and	1 (nour) x 16	nours		
		16 (meeting)	experiments	(meeting)	10		
		= 13.28 hours		Exams and	10		
				y 16 (mooting)	nours		
				x 10 (meeting)			
Total workload		45 hours					
Credit points		1.7 ECTS					
Requirements according to		Minimum atter	ndance at practic	al work is 100%. Final sc	ore is		
examination regulations		evaluated based on pre-test (20%, reports (30%), laboratory					
		works (35%), ar	nd final exam (15	%)			
Recommended prere	quisites	Practical Course	e of Organic Che	mistry			
Related course							
Module objectives/in	tended	By the end of the	nis course studen	ts should be able to:			
learning		1. Have consist	ency and enthus	iasm in realizing Islamic			
		attitudes and behaviours					
		2. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		3. Have the skills to work independently or occupy a decent					
		Job with opportunity-oriented					
		4. nave reducts nip skins and attitudes in collaborating of					
		5 Have skills in scientific literacy digital computer interact					
		and international languages					
Content		The course will	cover.				
		Interpretation	of FTIR. LIV-Vis M	IS, and NMR spectra			
		characterization of clay porous catalyst semi-conductor					
		polymer, and nanoscale materials: performing the structure					
		analysis both from single spectra and combined spectra: draw					
		the compounds structure from spectra analysis; writing					

	practical course report of structure analysis to train the students in writing scientific reports			
Study and examination requirements and forms of examination	Pre-test, scientific report, laboratory work skill, final term			
Media employed	Blended: Practical guidebook/textbook, slide (PowerPoint), video, laboratory, research paper, google classroom			
Reading lists	 Tim dosen kimia FMIPA UII, 1999, Penuntun Praktikum Elusidasi Struktur Senyawa Organik, FMIPA UII, Jogjakarta. Anderson, R.J., Bendel, d., and Groundwater, P.W., 2004, Organic spectroscopic analysis, Tutorial Chemistry Texts, RSC. Silverstein, R.M., 2005, Spectrometric Identification of Organik Compound, 7th Edition, John Wiley and Sons Inc. Pavia, D.L., Lampman, G.M., and Kriz, G.S., 2001, Introduction to Spectroscopy, 3rd Edition, Thompson Learning, Inc. Anthony, R. West, 1989, Solid State Chemistry and Its Applications, John Willey and Sons, New York. Jolly, WL., 1991, the Synthesis and Characterization of Inorganic Compositions, prentice hall. Niemansverdriet, J.W., 2000, Spectroscopy in Catalysis, Willey-VCH, New York. Mclafferty, F.W., 1980, Interpretation of Mass spectra, 3rd Edition, Cornell University, Edisi Indonesia diterjemahkan oleh Sastrohamidjojo, H., 1987, Gadjah Mada University Proses 			

Module Name		Practical Course of Natural Product Chemistry					
Module level, if applicable		3 rd year					
Code, if applicable		COB-609					
Semester (s) in which the		sixth semester					
module is taught							
Person responsible	for the	Dr. Dwiarso Ru	lbiyanto				
module							
Lecturer(s)		Dr. Dwiarso Rubiyanto Amri Setyawati, M.Sc. Imam Sahroni, M.Sc.					
Language		Indonesia					
Relation to curriculu	im	Compulsory c	ourse				
Types of teaching and learning	Class size	AttendanceForms of activeWorkloadtime (hoursactive per week per semester)participation		Workload			
Teaching	50	3	0.83 (hours) x 16 (meeting) = 13.28 hours	Laboratory practice and experiments	Laboratory practice 1(hour) x 16 meeting)		
Discussion and Presentation				Preparation and follow up 5 (hour) x 14 (self-learning)	Examination and preparation 1 (hours) x 16 meeting		
Total workload		45 hours					
Credit points		1.7 ECTS					
Requirements acco examination regulat	rding to ions	Minimum attendance at lectures is 100%. Final score is evaluated based on: pre-test (20%), Practice (30%), report (30%), assessment (20%)					
Recommended prei	requisites	Practical Course of Organic Chemistry					
Related course	1						
Related course-Module objectives/intended learningBy the end of this course students should be able to: 1. Have consistency and enthusiasm in realizing Islar and behaviours2. Have the ability to gain knowledge (long life learn higher level in relevant field3. Have the skills to work independently or occupy a with opportunity-oriented4. Have leadership skills and attitudes in collaboratir interacting with others5. Have skills in scientific literacy, digital, computer, international languages			iic attitudes ng) at a decent job g or nternet and				
Content		The course will cover:					

	The Practical course of Isolation of Caffeine from Tea Leaves, Isolation of Trimyristin from Nutmeg Seeds, Isolation of Curcumin from Curcuma, Isolation of Eugenol from Cloves, Isolation of Nicotine from Tobacco, Isolation of Phenolic Acid from Lignin, Isolation dan Identification of Solanine inside the Potato Tissues, Tanin Analysis from Leaf Samples using Prussian Blue Method, Identification of Alkaloid Group Compounds, Identification of Flavonoid Group Compounds.
Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion
Media employed	Text books, slides (power points), and video
Reading lists	 Verma, A., and Tandon, V., 2009, Chemistry of Natural Products, Shree Publishers & Distributors. Rahman, A., 2012, Studies in Natural Products Chemistry, Volume 36: Bioactive Natural Products, 1st ed, Elsevier. Tringali, C., 2011, Bioactive Compounds from Natural Sources, Second Edition: Natural Products as Lead Compounds in Drug Discovery,CRC Press. Kool, E.T., Barton, D., Nakanishi, J., and Meth-Cohn, O., 2002, Comprehensive Natural Products Chemistry : DNA and Aspects of Molecular Biology, 1st ed, CRC Press. Buss, A.D., Butler, M.S., and Neidle, S., 2009, Natural Product Chemistry for Drug Discovery, RSC Biomolecular Sciences, Royal Society of Chemistry. Thomson, R.H., 2008, The Chemistry of Natural Products, 2nd ed, Springer. Civjan, N., 2012, Natural Products in Chemical Biology, 1st ed, Wiley. Sarker, S.D., 2010, Natural Products Isolation (Methods in Biotechnology), 2nd ed, Humana Press. Gang, D.R., 2012, Phytochemicals, Plant Growth, and the Environment (Recent Advances in Phytochemistry, VSD. Markham, K.R., 1988, Techniques of Flavonoids Identification, diterjemahkan oleh Kosasih Padmawinata, Penerbit ITB, Bandung 12. Robinson, T., 1991, The Organic Constituens of Higher Plants, 6-th Ed., Diterjemahkan oleh Kosasih Padmawinata, Penerbit ITB, Bandung

Module Name		Essential Oil Chemistry					
Module level, if applicable		3 rd year					
Code, if applicable		COB-606					
Semester (s) in which the module is		Sixth semester					
taught							
Person responsible for	or the module	Dr. Dwiarso Ru	ibiyanto, M.Si.				
Lecturer(s)		Dr. Dwiarso Ru	ibiyanto, M.Si.				
Language		English- Indon	esia				
Relation to curriculur	n	Compulsory co	ourse				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Laboratory	Laboratory Practice	16		
	50	0.83 (hours) x	practice and	1 (hour) x 16	hours		
		16 (meeting)	experiments	(meeting)			
Discussion and		= 13.28 hours		Exams and	16		
Presentation				preparations 1 (hour)	hours		
				x 16 (meeting)			
Tatal address							
		45 nours					
Credit points		1./ EUIS					
Requirements accord	ling to	ivinimum attendance at practical work is 100%. Final score is					
examination regulation	2115	e Directost (20%)					
		• Figure (20%) • Experiment (20%)					
		• Experiment (30%)					
		Report (30%) Final examination (20%)					
De server en de dament		Final e	xamination (20%)) 			
Recommended prere	quisites	Practical Cour	se of Organic Che	emistry			
Related course	* • • • • • •	- By the end of this course students should be able to:					
lviodule objectives/in	tended	by the end of this course students should be able to:					
learning		1. Have consistency and entrusiasm in realizing Islamic attitudes and behaviours					
		A Have the ability to gain knowledge (long life learning)					
		2. Have the ability to gain knowledge (long the learning)					
		3. Have the skills to work independently or occupy a					
		decent job with opportunity-oriented					
		4. Have leadership skills and attitudes in collaborating or					
		interacting with others					
		5. Have skills in scientific literacy, digital, computer.					
		internet and international languages					
Content		The course wi	ll cover:				
		The history of	the development	of essential oil knowledg	je,		
		sources and methods of isolation of essential oils, analysis and					
		synthesis of essential oil derivatives and other derivative					
		products are some of the topics discussed in the lecture. Types					
		of essential oils typical of Indonesia and the world, such as					

	citronella oil, clove oil, patchouli oil, eucalyptus oil, fennel oil,			
	turpentine oil, Lawang oil, nutmeg oil, basil oil were used as			
	further topics to be discussed by students in discussion.			
	Students can also choose other types of essential oils that are			
	relevant to the essential field.			
Study and examination	Pretest			
requirements and forms of	Report			
examination	Presentation			
Media employed	Text books, slides (power points), and video			
Reading lists	1. Guenther, E., 1986, Minyak Atsiri, diterjemahkan oleh S.			
	Ketaren, UI Press, Jakarta			
	2. 2. Sastrohamidjojo, H., 2004, Kimia Minyak Atsiri, cetakan			
	pertama, Gadjah Mada University Press, Jogjakarta			
	3. 3. Lutony, T.L. dan Rahmayati, Y., 1999, Produksi dan			
	Perdagangan Minyak Atsiri, cetakan ke-4, PT Penebar			
	Swadaya, Jakarta			
	4. 4. Baser, K.H.C. and Buchbauer, G., 2010, Handbook of			
	essential oils : science, technology, and applications, CRC			
	Press, Taylor & Francis Group			

Module Name		Essential Oils Industry						
Module level, if applicable		-						
Code, if applicable		CGB-901	CGB-901					
Semester (s) in which the		-						
module is taught								
Person responsible	for the	Dr. Dwiarso Ru	biyanto, S.Si., M.	.Si.				
module								
Lecturer(s)		Dr. Dwiarso Ru	biyanto, S.Si., M.	.Si.				
		Amri Setyawat	i, S.Si., M.Sc.					
Language		English - Indon	esia					
Relation to curricul	um	Elected course		1	1			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching	50	4.67 (1.4.4.4.)	Collaborative	Lecture: 2 (hours)	32 hours			
	50	1.67 (hours) x	discussion	x 16 (meeting)				
Discussion and		16 (meeting)	Presentation	Preparation and	32 nours			
Presentation		= 27 nours		tollow up 2 (nours)				
				x 16 (self-learning)				
Total workload		91 hours	01 hours					
Credit points		3.4 FCTS (1.sks makul praktikum dan pop praktikum = 1.7 FCTS)						
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to LUI						
examination regula	tions	regulation). Bisa ditambah dengan yang lain iika dapat mendukung						
		Each student m	Each student must achieve a minimum grade/predicate of C for the					
		overall grade point average. If it does not meet then the student is						
		required to take a test/ repair assignment (kalimat ini hanya untuk						
		mata kuliah core).						
Recommended pre	requisites	Jika ada (penulisan nama mata kuliahnya harus sesuai dengan di						
		RPS)						
Related course		Jika ada (penulisan nama mata kuliahnya harus sesuai dengan di						
		RPS)						
Module objectives/	intended	Lihat di table hubungan CPL dan mata kuliah (terlampir), yang						
learning		dituliskan bukan singkatannya, tapi deskripsi CPLnya yang						
		Derbanasa Inggris.						
		1 Have the al	hility to gain know	nis should be able to: wledge (long life loarn	ing) at a			
		1. Have the al	l in relevant field	l l l l l l l l l l l l l l l l l l l	ing) at a			
		2 Have the el	rills to work indo	i nandantly or occupy o	decent ich			
		2. Have the skills to work independently or occupy a decent job						
		With opportunity-oriented Have the ability and skills in critical thinking and problem						
			solving as well as finding new ideas in science and technology					
		5. Have the al	vell as finding ne	w ideas in science and	technology			

Content	Introduction to essential oil, materials and products using essential oils, synthesis of essential oil derivative for commercial products, essential oil product formulations, commercial essential oil standardization, techniques of essential oil testing, essential oil				
	industry concepts, technology of essential oils production,				
	equipment selection according to location/land, technical design				
	considerations, types of factories/distillation plants, development				
	of essential oil industry, research and technology of essential oil,				
	analysis of business opportunities of essential oil.				
Study and examination	Mid-term, Final Examination quiz, and essay about essential oils ,				
requirements and forms of	question about essential quality analysis, business opportunity and				
examination	industrial design.				
Media employed	Text books, slides (power points), and video				
Reading lists	1. <u>Tucker</u> , L., 2012, Introductory Guide to Aromatherapy,				
	2nded., EMS Publishing.				
	2. Lutony, T.L. dan Rahmayati, Y., 1999, Produksi dan				
	Perdagangan Minyak Atsiri, cetakan ke-4, PT. Penebar Swadaya Jakarta				
	3 Satrohamidioio H 2004 Kimia Minyak Atsiri cetakan				
	pertama, Gadiah Mada University Press, Yogyakarta				
	4. Tuley de Silva K et al. 1995. A Manual on The Essential Oils				
	Industry, papers of 3rd UNIDO (United Nations Industrial				
	Development Organization) Workshop On Essential Oil and				
	Aroma Chemical Industries. Eskisher. Turkey.				
	5. Ketaren S., 1985. Pengantar Teknologi Minyak Atsiri. Balai				
	Pustaka. Jakarta.				
	6. Guenther, 1987. Minvak Atsiri Jilid 1. Universitas Indonesia.				
	Jakarta				

Module Name		Chemistry of Cosmetics					
Module level, if applicable		-					
Code, if applicable		CGB-902					
Semester (s) in which the module is		Elective	e course				
taught Darson rosnansible fr	r the medule		area Duk	ivanta MSi			
Person responsible in	or the module	Dr. Dwi		i M So			
Lecturer(s)		Unina F		1, 101.30.			
		English	I, IVI.SC.	sia			
Relation to curriculur	n	Flected		510			
Types of teaching	Class size	Attenda	Elected course		Workload		
and learning		time (hours		active	Workload		
and learning		ner wee	ek ner	narticination			
		semest	er)	purcleipución			
Teaching			,	Collaborative	Lecture: 100	1600	
	50	340 mi	nutes x	discussion	(minutes) x 16		
		16 me	eeting		(meeting)		
Discussion and				Self-learning	Preparation and	3840	
Presentation				_	follow up 240		
					(minute) x 16 (self-		
					learning)		
Total workload		5440 minutes = 90.67 h					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Final score is evaluated based on assignment and					
		reports	(40%) a	nd exam (60%)			
Recommended prere	quisites	Organic chemistry II					
Related course		- By the end of this course students should be able to:					
Module objectives/in	itended	By the end of this course students should be able to:					
learning		L. S (Student of tomorrow) Have the ability to continue to learn (long life learning)					
		nave the ability to continue to learn (long life learning)					
		at a nigher level in relevant fields					
		2. E (Enterpreneursnip and employability)					
		decent ich with opportunity-oriented					
		3 N (New and novel idea)					
		Have the ability and proficiency in critical thinking and					
		problem solving and discovering					
Content		1.	The che	mistry of cosmet	ic (definition, function ar	nd type	
			of cosm	etics).	. ,		
		2.	Anatom	y and function of	f skin, hair and nails. Gen	eral	
			concept	s and rules abou	t cosmetics in Indonesia	and	
			other co	ountries.			
		3. Analytical methods for cosmetics in another countries.					
		4. UV filters in sunscreen and other cosmetics in terms of					
		regulatory and analytical methods.					

	 Monitoring and quality control of photostability test of sunscreen compound.
	6. Tanning and Whitening agent in cosmetics in terms of
	regulatory and analytical methods.
	7. Coloring agents and preservatives in cosmetic products
	in terms of regulatory and analytical methods.
	 Surfactant in cosmetics: determination and analysis method.
	 Skin-care products: bioactive compounds and analytical methods.
	10. Herbal cosmetics: formulations and sources of bioactive compounds.
	11. Test the safety and efficacy of cosmetic products.
	12. Formulations of hand cream herbal and synthetic face
	cream.
	13. Formulation of hair coloring herbal and synthetic
	lipsticks.
	14. Analysis of cosmetic product business opportunity.
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books, slides (power points), video, website, journal,
	review, regulation of cosmetics
Reading lists	1. A. Salvador and A. Chisvert, 2007, Analysis of Cosmetic
	Products, Elsevier Science, Oxford.
	2. F. F. Williams and W. H. Schmitt, 1996, Chemistry and
	I echnology of the Cosmetics and Toiletries Industry,
	Blackie Academic and Professional Publisher, London.
	3. Ajazuddin and S. Sarat, Applications of novel drug
	delivery system for herbal formulations, Fitoterapia 81
	(2010), pp. 680–689, Elsevier

Module Name		Chemistry of Fragrance					
Module level, if applicable		-					
Code, if applicable		CGB-903					
Semester (s) in which the module is		Elective	e course				
taught							
Person responsible for	or the module	Dr. Dw	iarso Rub	oiyanto, M.Si.			
Lecturer(s)		Dr. Dw	iarso Rub	oiyanto, M.Si.			
		Amri Setyawati, M.Sc.					
Language		English	- Indone	sia			
Relation to curriculur	n	Elected	d course				
Types of teaching	Class size	Attendance		Forms of	Workload		
and learning		time (hours		active			
		per we	ek per	participation			
		semest	ter)				
Teaching				Collaborative	Lecture: 100	1600	
	50	340 mi	inutes x	discussion	(minutes) x 16		
		16 me	eeting		(meeting)		
Discussion and				Self-learning	Preparation and	3840	
Presentation					follow up 240		
					(minute) x 16 (self-		
					learning)		
Total workload		5440 minutes = 90.67 h					
Credit points		3.4 ECTS					
Requirements according to		Minimum attendance at lectures is 75% (according to UII					
	0						
examination regulation	ons	regulat	t ion). Fin	al score is evalua	ted based on assignmen	t and	
examination regulation	ons	regulat reports	t ion). Fin s (40%) a	al score is evalua nd exam (60%)	ted based on assignmen	t and	
examination regulation	quisites	regulat reports Organic	t ion). Fin s (40%) a c chemis	al score is evalua nd exam (60%) try ll	ted based on assignmen	t and	
examination regulation Recommended prere Related course	quisites	regulat reports Organic -	t ion). Fin s (40%) a c chemis	al score is evalua nd exam (60%) try ll	ted based on assignmen	t and	
examination regulation Recommended prere Related course Module objectives/in	quisites	regulat reports Organic - By the	tion). Fin 5 (40%) a c chemis end of th	al score is evalua nd exam (60%) try II nis course studen	ted based on assignmen	t and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1.	tion). Fin s (40%) a c chemis end of th S (Stude	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow)	ted based on assignmen	t and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1.	tion). Fin s (40%) a c chemis end of th S (Stude Have th	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir	ted based on assignmen ts should be able to: nue to learn (long life lea	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites	regulat reports Organic - By the 1.	tion). Fin s (40%) a c chemis end of th S (Stude Have the at a high	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2.	tion). Fin s (40%) a c chemis end of th S (Stude Have the at a high E (Enter	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and	ts should be able to: nue to learn (long life lea ant fields employability)	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2.	tion). Fin s (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) adependently or occupy a	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportu	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea)	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) dependently or occupy a nity-oriented	rning)	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented ficiency in critical thinking	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 1.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) adependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites	regulat reports Organia - By the 1. 2. 3. 1. 2.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) adependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry as	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 1. 2. 3.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry ss me	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 3. 1. 2. 3. 4.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural Sources	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume sources as perfur of synthesis of p	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) ndependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry and perfume industry s me erfume materials	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 3. 1. 2. 3. 4. 5.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural Sources Grade p	al score is evalua nd exam (60%) try II his course studen ent of tomorrow) e ability to contin- ner level in releva preneurship and e skills to work in ob with opportu- and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume sources as perfu- of synthesis of p erfume ingredier	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) adependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry s me erfume materials nts in the market and its	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 3. 1. 2. 3. 4. 5.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural Sources Grade p isolation	al score is evalua nd exam (60%) try II his course studen ent of tomorrow) e ability to contir her level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume sources as perfur of synthesis of p erfume ingredier n process.	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry s me erfume materials its in the market and its	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 3. 1. 2. 3. 4. 5. 6.	tion). Fin (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural Sources Grade p isolation Organic	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contir ner level in releva preneurship and e skills to work in ob with opportur and novel idea) e ability and prof n solving and disc ction of perfume ation of perfume	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) idependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry ss me erfume materials its in the market and its d food and perfumes	rning) a g and	
examination regulation Recommended prere Related course Module objectives/in learning	quisites tended	regulat reports Organic - By the 1. 2. 3. 3. 1. 2. 3. 4. 5. 6. 7.	tion). Fin (40%) a (40%) a c chemis end of th S (Stude Have the at a high E (Enter Have the decent j N (New Have the problem Introduc Classific Natural Sources Grade p isolatior Organic The che	al score is evalua nd exam (60%) try II nis course studen ent of tomorrow) e ability to contin- ner level in releva preneurship and e skills to work in ob with opportu- and novel idea) e ability and profi- n solving and disc ction of perfume ation of perfume sources as perfu- to f synthesis of p erfume ingredier n process. chemistry behin- mical functional	ted based on assignmen ts should be able to: nue to learn (long life lea ant fields employability) adependently or occupy a nity-oriented ficiency in critical thinking overing and perfume industry es me erfume materials nts in the market and its d food and perfumes group of perfume compo	rning) a g and ounds	

	9. Emulsions and solutions			
	10. Sensory perfume analysis			
	11. Analysis of perfumes with chemical instrumentation			
	12. The practice of making perfume derivatives			
	13. Analysis of perfume business opportunities			
	14. Perfume entrepreneurial products			
	(group presentations)			
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and			
requirements and forms of	collaborative discussion			
examination				
Media employed	Text books, slides (power points), video, journal, review			
Reading lists	1. <u>Sell</u> , C.S., 2006. The Chemistry of Fragrances: From			
	Perfumer to Consumer (RSC Paperbacks), 2 nd ed., Royal			
	Society of Chemistry.			
	2. <u>Pybus</u> , H.D., and <u>Sell</u> , C.S., 2004. The Chemistry of			
	Fragrances, 1 st ed., Royal Society of Chemistry.			
	3. <u>Sequin</u> , M., 2012.The Chemistry of Plants: Perfumes,			
	Pigments, and Poisons, Royal Society of Chemistry.			
	4. <u>Groom</u> , N., 1997, New Perfume Handbook, 2 nd ed.,			
	Springer.			
	5. <u>Barille</u> , E., <u>Laroze</u> , C., and <u>Blondel</u> , T., 1995, <i>The Book of</i>			
	<i>Perfume, Flammarion,</i> 1 st ed.			
	6. <u>Ellena</u> , J.C., 2011, Perfume: The Alchemy of Scent, 1 st ed.,			
	Arcade Publishing.			

Module Name		Oleochemistry					
Module level, if applicable		-					
Code, if applicable		CGB-904					
Semester (s) in which the module is		Even semester					
taught							
Person responsible for	or the module	Dr. Tatang Shab	our Julianto, S.Si.,	M.Si.			
Lecturer(s)		Dr. Habibi Hida	yat				
		Wiyogo Prio Wi	caksono, S.Si., M	Si.			
Language		English-Indone	sia				
Relation to curriculur	n	Elected course					
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Tooching		semester)	Collaborativo	Lactura: 2 (bours) y	27		
reacting	50	1 67 (bours) x	discussion and	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Prenaration and	32		
Presentation		= 27 hours	Tresentation	follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Final score is evaluated based on assignment and					
		reports (25%), exam (50%), and presentation (25%)					
Recommended prere	quisites	General chemistry					
Related course		-					
Module objectives/in	itended	by the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a higher level in relevant field					
		1 Have the skills to work independently or occupy a decent					
		iob with opportunity-oriented					
		3 Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will cover:					
		Production pathway of chemicals from oleochemicals.					
		Vegetable oils and their derivate, animal oils and their derivate,					
		petroleum and	its derivate.				
Study and examination	on	Mid-term, Final	term, presentati	on, assignment, and			
requirements and for	rms of	collaborative discussion					
examination							
Media employed		Blended: Text b	ooks, slides (pow	er points), and video			
Reading lists		1. F. D. Gu	Instone, Richard J	ohn Hamilton, 2001,			
		Oleochemical Manufacture and Applications, CRC Press					

2.	Arpe, H.J., and Hawkins, S., 2010, Industrial Organic					
	Chemistry, 5thed., Wiley-VCH.					
3.	Fife, B., 2007, The Palm Oil Miracle, 1st edition,					
	Piccadilly Books, Ltd.					
4.	Susan A. Penna, 2011, <i>Oil Palm: Cultivation, Production</i> <i>and Dietary Components (Agriculture Issues and</i> <i>Policies)</i> Nova Science Publishers					
Module Name		Chemical Products for Entrepreneurship				
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Module level, if applicable		Elective course				
Code, if applicable		CGB-905				
Semester (s) in which the module is		Elective course				
taught						
Person responsible for	or the module	Prof. Dr. Is Fatir	nah			
Lecturer(s)		Prof. Dr. Is Fatir	nah			
		Ika Yanti, M.Sc				
Language		English- Indone	sia			
Relation to curriculur	n	Elected course	Γ	1	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching	50	4.67 (1	Collaborative	Lecture: 2 (hours) x	32	
Discussion and	50	1.67 (nours) x	discussion	16 (meeting)	nours	
Discussion and		16 meeting =	Presentation	Preparation and	32 haura	
Presentation		27 110013		101000 up 2 (110013) x	nours	
Total workload		91 hours				
Credit points						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Final score is evaluated based on assignment and				
		reports (40%) and exam (60%)				
Recommended prere	quisites	-				
Related course		-				
Module objectives/ir	itended	By the end of th	nis course studen	ts should be able to:		
learning		1. Endeavor to	continue to stud	ly (lifelong learning) at a	higher	
		level in the	relevant field wit	h the chemistry of esser	ntial oil	
		development, materials for energy and the environment,				
		and natural	products for food	l and health		
		2. Have the skills to work independently or gain a decent,				
		opportunity-oriented job in the area of essential oil				
		development, materials for energy and the environment,				
		and natural products for food and health				
		5. Have Capab	lying and develo	on new ideas in the f	ield of	
		essential oil development materials for energy and the				
		environment, and natural products for food and health				
Content		The course will	cover:			
		Entrepreneursh	ip strategy, ch	allenge in entrepreun	ership,	
		development	of business ba	ased on chemical pro	oducts,	
		natural/herbal medicine, business of essential oil-based			l-based	
		products				
Study and examination	on	Mid-term, final	term, quiz, essay	related to entrepreneur	ship	
requirements and for	rms of	based chemistry, and group-discussion assignments				
examination						

Media employed	Blended (lecture and students' presentation)			
Reading lists	1. Thackray, A., and Myers, Jr., M., 2010, Arnold O. Beckman:			
	One Hundred Years of Excellence (Chemical Heritage			
	Foundation Series in Innovation and Entrepreneurship,			
	Chemical Heritage Foundation.			
	2. Certo, Samuell, 1985, Management of Organization and			
	Human Resources, IOWA, WMC Brown Company			
	Publisher.			
	3. Drucker, Peter F., 1991, Inovasi dan Kewirausahaan,			
	Praktek dan Dasar-dasar, diterjemahkan oleh Rusjdi Naib,			
	Jakarta, Erlangga.			
	4. Hisrich Robet, D. and Michael P. Peter, 1989,			
	Entrepreneurship, Starting, Developing, and Managing a			
	New Enterprise, Boston, Rochard D Twin, Inc.			
	5. Kao, John J., 1991, The Entrepreneur, Englewood, Cliffs,			
	New Jersey, Prentice Hall.			
	6. Masykur Wiratno, 1992, Pengantar Kewiraswastaan,			
	Kerangka Dasar Memasuki Dunia Bisnis, BPFE, Jogjakarta.			
	7. Meredith G.G. et al, Kewirausahaan, Teori dan Praktek,			
	diterjemahkan oleh Asparyogi, Jakarta.			
	8. Stevensens, H.H., 1995, We Create Entrepreneur's			
	Success, Harvard Pub. Co. Inc., New York.			

Module Name		Water, Soil and Iai Analysis					
Module level, if applicable		-					
Code, if applicable		CGB-906					
Semester (s) in which the		-					
module is taught							
Person responsible	for the	Prof. Riyanto, F	Ph.D.				
module							
Lecturer(s)		Prof. Riyanto, F	Ph.D				
		Febi Indah Faja	Febi Indah Fajarwati, S.Si., M.Sc				
		Mai Anugrahwa	ati, S.Si., M.Sc				
Language		English - Indon	esia				
Relation to curricul	um	Elected course			1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
Teeshive		semester)	Callahanating		22 h a una		
reaching	ГО	1.67 (hours) y	discussion	Lecture: 2 (nours)	32 nours		
Discussion and	50	$1.07 (1001S) \times$	Brocontation	Reparation and	22 hours		
Presentation		= 27 hours	Fresentation	follow up 2 (bours)	52 110013		
Tresentation		- 27 110013		x 16 (self-learning)			
Total workload		91 hours	I				
Credit points		3.4 ECTS					
Requirements acco	rding to	Minimum attendance at lectures is 75% (according to UII					
examination regula	tions	regulation). Minimum attendance at lectures is 75% (according to					
		UII regulation). Final score is evaluated based on Assignment and					
		Reports (40%), Mid and Fina	l Examination (60%)		
Recommended pre	requisites	Analytical Chemistry II					
Related course							
Module objectives/	'intended	By the end of this course students should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a higher					
		level in relevant field					
		2. Have the skills to work independently or occupy a decent job					
		with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem solving					
		as well as finding new ideas in science and technology					
Content		SNI sampling	technique for	groundwater surfac	e water and		
		wastewater. P	reparation of w	ater samples before	analysis and		
		storage of sam	ples, Water quali	ty standard parameter	rs according to		
		the latest regul	lations, How to a	nalyze water with phy	sical, chemical		
		and biological parameters, Method of water analysis with					
		radioactive parameters, Ground standards of soil parameters in					
		accordance with applicable regulations, Sampling and preparation					

	of soil samples, Analysis of soil parameters, Analysis of gas parameters.
Study and examination requirements and forms of examination	Mid-term, Final term, assignment, collaborative learning and project-based learning.
Media employed	Text books, slides (power points), and video
Reading lists	 Standar Nasional Indonesia Method American Standard Testing and Material (ASTM International) Method Riyanto. 2014. Validasi dan Verifikasi Metode Uji Sesuai dengan ISO/IEC 17025 Laboratorium Pengujian dan Kalibrasi. Yogyakarta : Deepublish

Module Name		Application of Electrochemical Technology					
Module level, if applicable		-	-				
Code, if applicable		CGB-907	CGB-907				
Semester (s) in which the module is		Even semester					
taught							
Person responsible for	or the module	Prof. Riyanto, P	h.D.				
Lecturer(s)		Prof. Riyanto, P	h.D.				
		Rudy Syahputra	a, Ph.D.				
		Wiyogo Prio Wi	caksono, S.Si., M.	Si.			
Language		English- Indone	sia				
Relation to curriculur	n	Elected course	Elected course				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
_		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion and	16 (meeting)	hours		
Discussion and		16 (meeting)	Presentation	Preparation and	32		
Presentation		= 27 hours		follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum atter	ndance at lecture	s is 75% (according to U	11		
examination regulation	ons	regulation). Fin	al score is evalua	ted based on assignmen	t and		
		reports (25%), e	exam (45%), prese	entation (25%), and atte	ndance		
		(5%)					
Recommended prere	quisites	Electrochemist	ry				
Related course		-					
Module objectives/in	itended	By the end of th	his course student	ts should be able to:			
learning		 πave the ability to gain knowledge (long life learning) at a higher level in relevant field 					
		Righer level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		JOD WITH OPPORTUNITY-OFIENTED					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		Floctrochomist	cover.	attony fuel cell iowelny			
			usebold industry	allery, ruer cell, jewelly,	uch ac		
		nolarography of	velie voltammetr	and chemical analysis s	waste		
		polarography, cyclic voltammetry, electrode designs for waste					
Study and examinativ	n	Mid-term Final	term presentati	on assignment and			
requirements and forms of		collaborative discussion					
examination							
Media employed		Blandad: Taxt books, slides (nower points), and video					
Lineala ciripioyea		Biended: Text books, slides (power points), and video					

Reading lists	1. Bagotsky, V.S., 2006, Fundamentals of
	electrochemistry, New Jersey: John Wiley and Sons Inc.
	2. Kissinger, P.T. & Heineman, W.R., 1996, Laboratory
	techniques in electroanalytical chemistry, Second
	edition, New York: Marcel Dekker. Inc.
	3. Lund, H. & Hammerich, O., 2001, Organic
	electrochemistry, Fourth Edition, Revised and
	Expanded, New York: Marcel Dekker, Inc.
	4. Ciriminna, R., Palmisano, G., Pina, C.D., Rossic, M., &
	Pagliaroa, M., 2006, One–pot electrocatalytic oxidation
	of glycerol to DHA, Tetrahedron Letters, 47: 6993–
	6995.
	5. Lamy, C., Belgsir, E.M. & Leger, J.M., 2001,
	Electrocatalytic oxidation of aliphatic alcohols:
	Application to the direct alcohol fuel cell (DAFC), J.
	Appl. Electrochem. 31: 799–809.

Module Name		Drinking Water Technology				
Module level, if applicable		4 th year				
Code, if applicable		CGB-908				
Semester (s) in which the module is		Seventh semester				
taught						
Person responsible for	or the module	Prof. Riyanto				
Lecturer(s)		Prof. Riyanto				
		Imam Sahroni,	M.Sc.			
Language		English-Indone	sia			
Relation to curriculur	n	elected course		I		
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
Taaching		semester)	Collaborativa	Looturo, 2 (hours)	22	
reaching	50	1.67 (bours) v	discussion	Lecture: 2 (nours) x	32 bours	
Discussion and	50	1.07 (nours) x 16 (monting)	Drecentation	Droparation and	22	
Discussion and		= 27 bours	Presentation	follow up 2 (bours) y	52 bours	
riesentation		- 27 110013		16 (self-learning)	nours	
				10 (Sen learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Fin	al score is evalua	ted based on assignmen	t and	
		reports (40%) a	nd exam (60%)	_		
Recommended prere	quisites	Analytical Chemis	stry II			
Related course		-				
Module objectives/intended		By the end of th	nis course studen	ts should be able to:		
learning		1. Have the ability to gain knowledge (long life learning) at a higher level in relevant field				
		higher level	in relevant field			
		2. Have the skills to work independently or occupy a decent				
		Job with opportunity-oriented				
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
Content		The course will cover:				
		The concents of Water source as raw material of Drinking				
		Water In Packing (TDWP). Quality control of TDWP raw				
		materials, Analy	sis of TDWP raw	material parameters, St	ages of	
		TDWP manufac	turing process, P	hase of pH regulation pro	ocess	
		and coagulation	n on TDWP manu	facturing, Phase of scree	ning	
		process, disinfectant in various ways such as ozonation and RO				
		TDWP manufacturing process, SNI of TDWP products,				
		Regulation of the Minister of Health and Minister of Trade in				
		TDWP products, TDWP product quality parameters include				

	physics, chemistry, biology and radioactive, How to analyze physical parameters in TDWP, How to analyze Chemical parameters in TDWP, How to analyze Biological and radioactive parameters in TDWP, How to store TDWP products, How to store TDWP products.		
Study and examination requirements and forms of examination	Mid-term, Final term, presentation, quiz, assignment, and collaborative discussion		
Media employed	Text books, slides (power points), and video		
Reading lists	 <u>Spellman</u>, F.S., and <u>Drinan</u>, J.E., 2012, <i>The Drinking Water</i> <i>Handbook</i>, 2nd ed., Second Edition, CRC Press. <u>American Water Works Association</u>, <u>Edzwald</u>, J., 2010, <i>Water</i> <i>Quality & Treatment: A Handbook on Drinking Water (Water</i> <i>Resources and Environmental Engineering Series)</i>, 6th ed., McGraw-Hill Professional. 		

Module Name		Waste Recycling Technology					
Module level, if applicable		2 nd year					
Code, if applicable		CGB-909					
Semester (s) in which the module is		Elective course in even semester					
taught							
Person responsible for	or the module	Prof. Riyanto, P	h.D.				
Lecturer(s)		Prof. Riyanto, P	h.D.				
		Mai Anugrahwa	ati, S.Si., M.Sc.				
Language	_	English- Indone	sia				
Relation to curriculur	n	Elected course	,	I	1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32		
	50	x 16	discussion	x 16 (meeting)	hour		
		(meeting) =	Described	Description	S		
Discussion and		27 nours	Presentation	Preparation and	32		
Presentation				v 16 (colf loarning)	nour		
Tatalworklaad		X 16 (seif-learning) S					
Credit points							
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to LIII					
examination regulation	ans	regulation) Fin	al score is evalua	ated based on Assignmer	nt and		
		Reports (40%).	Mid and Final Exa	amination (60%)			
Recommended prerequisites		-					
Related course		-					
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:			
learning		1. Have the ability to gain knowledge (long life learning) at a					
		higher level in relevant field					
		2. Have the skills to work independently or occupy a decent					
		job with opportunity-oriented					
		3. Have the ability and skills in critical thinking and problem					
		solving as well as finding new ideas in science and					
		technology development					
Content		The course will cover:					
		Introduction of	waste recycling t	echnology, the types of	waste		
		that can be recy	vcled. waste recv	cling techniques, recycle	solid		
		waste, recycling	z liquid waste. re	cvcling of gas waste, hou	sehold		
		waste recycling	techniques, recv	cling laundry waste, recy	/cling		
		of mining waste, biomass and biogas, recycling of chrome					
		waste, plastic waste treatment, processing waste paper, used					
		oil, scrap metal	s, glass and other	rs			

Study and examination	Mid-term, Final term, quiz, and task	
requirements and forms of		
examination		
Media employed	Textbooks and slides (power points)	
Reading lists	1. Skoog, D.A., West, D.M., James Holler, F., 1994, Analytical	
	Chemistry, Saunder College Pubs, Philadelphia.	
	2. Maczulak, A.E., 2009, Waste Treatment (Green	
	Technology), Facts On File Inc; 1 edition	
	3. Kreith, F., and Tchobanoglous, G., 2002, Handbook of Solid	
	Waste Management,2 nd ed., McGraw-Hill Professional.	

Module Name		Remediation Technology				
Module level, if applicable		-				
Code, if applicable		CGB-910				
Semester (s) in which the module is		Even semester				
taught						
Person responsible for	or the module	Prof. Riyanto, P	h.D.			
Lecturer(s)		Rudy Syahputra	a, Ph.D.			
		Mai Anugrahwa	ati, S.Si., M.Sc.			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course	•			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours) x	32	
	50	1.67 (hours) x	discussion and	16 (meeting)	hours	
Discussion and		16 (meeting)	Presentation	Preparation and	32	
Presentation		= 27 hours		follow up 2 (hours) x	hours	
				16 (self-learning)		
Total workload		91 hours				
Credit points	l	3.4 EUIS				
Requirements accord	ling to	Winimum atter	idance at lecture	s is 75% (according to U	ll tand	
examination regulations		regulation). Fin	al score is evalua	recontation (25%)	t and	
Decembra de decembra de 1999		Applytical Char	nictry II			
Recommended prerequisites			ilisti y li			
Module objectives / intended		By the end of th	nis course student	s should be able to:		
learning	licitaca	1 Have the abi	ility to gain knowl	edge (long life learning)	at a	
		higher level	in relevant field		ata	
		2. Have the skills to work independently or occupy a decent				
		job with opportunity-oriented				
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
		technology development				
Content		The course will cover:				
		The concept of phytoremediation in the use of green plants				
		and related microbes, soil changes, and agronomy technique to				
		remove or degrade contaminants in environments including				
		soils, sludge, se	diments, surface	water and groundwater,	, study	
		the related topi	ics such as applica	ation of phytoremediation	on	
		technology for water decontamination from persistent organic				
		contaminants; phytoremediation for soil contaminated by				
		uranium; phytoremediation using mangrove wet fields;				
		phytoextraction ability of corn and sunflower plants and				
		phytoremediation process in swamp.				

Study and examination	Mid-term, Final term, presentation, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Blended: Text books, slides (power points), and video
Media employed Reading lists	 Blended: Text books, slides (power points), and video 1. Govindwar, S.P., 2011, Phytoremediation Technologies for the Removal of Textile Dyes: An Overview and Future Prospect (Environmental Remediation Technologies Regulations and Safety), Nova Science Publishers. 2. Ke, L., and Tam, N.F.Y., 2012, Phytoremediation Using Constructed Mangrove Wetlands: Mechanisms and Application Potential (Environmental Science, Engineering and Technology), Nova Science Publishers. 3. Willey, N., 2010, Phytoremediation: Methods and Reviews (Methods in Biotechnology), Humana Press Inc. New Jersey. 4. Golubev, I.A., 2011, Handbook of Phytoremediation (Environmental Science, Engineering and Technology), Nova Science Publishers. 5. Comino, E., Cerise, F., and Rosso, M., 2011, Wastewaters Phytoremediation: Lessons Learned - a Full Case Study (Environmental Remediation Technologies, Regulations and Safety), Nova Science Publishers. 6. Omasa, K., Saji, H., Youssefian, S., and Kondo, N., 2002, Air Pollution and Plant Biotechnology: Prospects for Phytomonitoring and Phytoremediation, Springer, New York. 7. Lipnick, R.L., Mason, R.P., Phillips, M.L., and Pittman, C.U., 2001, Chemicals in the Environment, Fate Impacts, and Remediation, American Chemical Society, Washington 8. Mishra, A., and Clark, J.H., 2013, Green Material For Sustainable Water Remediation and Treatment, The Royal Society of Chemistry, Cambridge 9. Li, D., 2012, Contaminated Sites Remediation, Trans Tech Publications Ltd, Switzerland 10. Reddy, K. and Cameselle, C., 2009, Electrochemical Remediation Technologies for Polluted Soils, Sediments
	and Groundwater, John Wiley and Sons, Inc., New
	Jersey

Module Name		Biochemistry of Ezyme						
Module level, if appli	cable	3 rd year						
Code, if applicable		CGB-911						
Semester (s) in which	the module is	Sixth semester						
taught								
Person responsible for the module		Dr. Tatang Shat	our Julianto, M.Si					
Lecturer(s)		Dr. Habibi Hida	yat, M.Si					
		Dr. Tatang Shat	Dr. Tatang Shabur Julianto, M.Si					
Language English- Indonesia								
Relation to curriculur	Im Elective course			1				
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours act						
		per week per	participation					
		semester)			221			
Teaching	50	Class	Class	Lecture: 2 (nour) x 16	32 n			
Discussion and	50	attendance:	attendance	(meeting)	22.6			
Discussion and		16 Week X Z X	Colf dimented	Preparation and	32 N			
Presentation		0,65 - 27 11	sell-directed	10110W up 2 (110ur) x				
Total workload				10 (Sell-learning)				
Credit points 2.4 ECTS x 16 week = E4.4 ECTS								
Requirements accord	ling to	S:4 LCT3 X 10 WEEK - 54:4 LCT3						
evamination regulation	nng tu	Willing attendance at lectures is 75%.						
Recommended prere	onisites	Biochemistry						
Related course	quisites	-						
Module objectives/in	tended	By the end of this course students should be able to:						
learning		1. Have the ability to continue of knowledge (long life learning)						
		at a higher level in the relevant field.						
		2. Have the skills to work independently or occupy a decent						
		job with opportunity oriented.						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in the development of						
		science and technology.						
Content		The course will	cover:					
		Introduction of enzyme, enzyme components, enzyme						
		classification,	enzyme workin	g model, coenzyme, e	enzyme			
		kinetics, enzyme inhibitor, enzyme activity regulation, factors						
		affecting the catalytic activity of enzyme, and enzymatic						
		application.						
Study and examination	on 	Mid-term, Fina	I term, quiz, and	assignment.				
requirements and for	rms of							
examination								
Reading lists		1 ext books and slides (power points)						
reading lists		1. Saryono., 2	2012 BIOKIMIU EN	ziiii. Tugyakarta : Numea Inzim Belbuk com Jokart	· . ·			
		2. Saŭikin, IVI,	ZUIZ. BIOKIMIA E lika	inzini Beibuk.com. Jakart	.d .			
1		vvidya ivied	likd					

3.	Sumaryati, E. 2013. Ampuhnya Enzim Tubuh. Yogyakarta :
	Trans Idea Publishing
4.	Ngili Y, 2013. Protein dan Enzim. Bandung : Rekayasa Sains

Module Name		Green Chemistry						
Module level, if appli	cable	2 nd year						
Code, if applicable		CGB-912						
Semester (s) in which	the module is	Elective course	in even semeste	r				
taught								
Person responsible for	or the module	Prof. Dr. Is Fati	mah, M.Si.					
Lecturer(s)		Prof. Dr. Is Fati	mah, M.Si.					
		Gani Purwiando	ono, Ph.D.					
Language		English-Indone	sia					
Relation to curriculur	n	Elected course	5		Γ			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (nours	active					
		per week per	participation					
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32			
reaching	50	x 16	discussion	x 16 (meeting)	hour			
		(meeting) =			S			
Discussion and		27 hours	Presentation	Preparation and	32			
Presentation				follow up 2 (hours)	hour			
				x 16 (self-learning)	s			
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII						
examination regulation	ons	regulation). Final score is evaluated based on Assignment and						
		Reports (40%), Mid and Final Examination (60%)						
Recommended prere	quisites	-						
Related course		-						
Module objectives/in	itended	by the end of this course students should be able to:						
learning		1. Have the ability to gain knowledge (long life learning) at a						
		Have the skills to work independently or occupy a decent						
		2. Have the skills to work independently or occupy a decent						
		Job with opportunity-oriented						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and						
Contont		tecnnology development						
Content		12 principles of Groop Chamistry, stamic second visits						
		reduction superior design: renewable energy: renewable						
		chemicals, and some green chemistry applications in industry						
		and environment						
Study and examination	on	Mid-term, Final term, assignment, and presentation						
requirements and forms of								
examination								
Media employed		Textbooks and	slides (power poi	ints)				
Reading lists 1. Fatimah, I., 2017, Kimia Hijau, , Yogyakarta, Indonesia								

Module Name Colloid and Surface Chemistry								
Module level, if appli	cable	-						
Code, if applicable		CGB-913						
Semester (s) in which	the module is	Even semester						
taught								
Person responsible for	or the module	Prof. Dr. Is Fatir	nah, M.Si					
Lecturer(s)		Prof. Dr. Is Fatir	nah, M.Si					
		Salmahaminati,	PhD					
Language		English-Indone	sia					
Relation to curriculur	n	Elected course			1			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
Tooching		semester)	Collaborativo	Locture: 2 (bours) y	22			
reaching	50	1 67 (bours) x	discussion	16 (meeting)	bours			
Discussion and		16 (meeting)	Presentation	Prenaration and	32			
Presentation		= 27 hours	Tresentation	follow up 2 (hours) x	hours			
				16 (self-learning)				
Total workload	•	91 hours						
Credit points		3.4 ECTS						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII						
examination regulation	ons	regulation).						
		The scoring system used in the Benchmark Reference						
		Assessment (BRA) with the following rating ranges: A : 3.65 A- :						
		3.50 A/B : 3.35 B+ : 3.20 B : 3.05 B- : 2.90 B/C : 2.75 C+ : 2.60 C :						
		2.45 C- : 2.30 C	/D : 2.15 D : 2.00					
Recommended prere	quisites							
Related course		-						
logrning	itended	By the end of this course students should be able to:						
learning		 паче the ability to gain knowledge (long life learning) at a higher level in relevant field 						
		2 Have the skills to work independently or occupy a decent						
		iob with opportunity oriented						
		3. Have the ability and skills in critical thinking and problem						
		solving as well as finding new ideas in science and						
		technology o	development					
Content		The course will	cover:					
		1. The the	oretical concepts	s of structures and prope	erties			
		and the	changes of matt	er including the energy a	and			
		kinetics	s, identification, s	eparation, characterizati	on,			
		transfo	rmation, chemica	al synthesis, micro molec	ular			
		and its application						

	 The logical, critical systematical and innovative thinking in the development and implementation of science and/or technology according to their field of expertise;
	and/or technology according to their field of expertise,
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books, and slides (power points)
Reading lists	1. Birdi. K. S., 2010, Colloid and Surface Chemistry: principle
	and applicatio. CRC Press. New York.
	2. Shaw. D. 1992. Introduction to Colloid and Surface
	Chemistry, 4th Edition, Elsevier Publisher

Module Name		Nanomaterial					
Module level, if appli	cable	Elective course					
Code, if applicable		CGB-914					
Semester (s) in which	the module is	Elective course					
taught							
Person responsible for	or the module	Prof. Dr. Is Fatir	nah				
Lecturer(s)		Prof. Dr. Is Fatir	nah				
		Wiyogo Prio Wi	caksono, M.Si				
		Ika Yanti, M.Sc					
Language		English-Indone	sia				
Relation to curriculur	n Class size	Elected course	Farma af				
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (nours	active				
		per week per	participation				
Tooching		semester)	Collaborativo	Locture: 2 (hours) y	27		
reacting	50	1.67 (bours) v	discussion	16 (meeting)	bours		
Discussion and		16 meeting =	Presentation	Prenaration and	32		
Presentation		27 hours	resentation	follow up 2 (hours) x	hours		
				16 (self-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Final score is evaluated based on assignment and					
		reports (40%) and exam (60%)					
Recommended prere	quisites	Physical Chemi	stry II				
Related course		-					
Module objectives/in	tended	By the end of this course students should be able to:					
learning		1. Endeavor to continue to study (lifelong learning) at a higher					
		level in the relevant field with the chemistry of essential oil					
		development, materials for energy and the environment,					
		and natural products for food and health					
		2. Have the skills to work independently or gain a decent,					
		opportunity-oriented job in the area of essential oil					
		and natural products for food and health					
		3 Have canability and proficiency in critical thinking and					
		problem solving and develop new ideas in the field of					
		essential oil development, materials for energy and the					
		environment, and natural products for food and health					
Content		The course will cover:					
		Theoretical c	oncept, synthe	esis and classification	on of		
		nanomaterial,	and application	of nanomaterial in	sensor,		
		medic, pharmacy, catalyst, coating and energy.					
Study and examination	on	Mid-term, Final	term, presentati	on, drawing a concept m	iap,		
requirements and for	rms of	and writing an a	article				
examination							

Media employed	Blended (lecture and students' presentation)			
Reading lists	1. Dieter Vollath, 2013, Nanomaterials: An Introduction to			
	Synthesis, Properties and Applications, 2 nd Edition, Wiley			
	and Sons, New York.			
	2. Guozhong Cao, 2004, Nanostructures and Nanomaterials:			
	Synthesis, Properties, and Applications, World Scienctific,			
	New York.			
	3. A. K. Haghi, Ajesh K. Zachariah, Nandakumar Kalarikkal,			
	2013, Nanomaterials: Synthesis, Characterization, and			
	Applications, CRC Press, New York.			

Module Name		Radiochemistry							
Module level, if appli	cable	-							
Code, if applicable		CGB-915							
Semester (s) in which	n the module is	Even semester	Even semester						
taught									
Person responsible for	or the module	Prof. Dr. Is Fati	mah, M.Si						
Lecturer(s)		Prof. Dr.rer.nat	. Agus Taftazani,	APU					
		Prof. Dr. Is Fati	mah, M.Si						
Language		English- Indone	sia						
Relation to curriculu	n	Elected course							
Types of teaching	Class size	Attendance	idance Forms of Workload						
and learning		time (hours	active						
		per week per	participation						
		semester)							
Teaching			Collaborative	Lecture: 2 (hours) x	32				
	50	1.67 (hours) x	discussion	16 (meeting)	hours				
Discussion and		16 (meeting)	Presentation	Preparation and	32				
Presentation		= 27 hours		follow up 2 (hours) x	hours				
				16 (self-learning)					
Total workload		91 hours							
Credit points		2 A ECTS							
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII							
examination regulati	ons	regulation). The scoring system used in the Benchmark							
		Reference Assessment (BRA) with the following rating ranges: A							
		: 3.65 A- : 3.50 A/B : 3.35 B+ : 3.20 B : 3.05 B- : 2.90 B/C : 2.75							
		C+ : 2.60 C : 2.45 C- : 2.30 C/D : 2.15 D : 2.00							
Recommended prere	equisites	Physical Chemi	stry II						
Related course		-							
Module objectives/ir	ntended	By the end of t	nis course studen	ts should be able to:					
learning		1. Have the ability to gain knowledge (long life learning) at a							
		higher level in relevant field							
		2. Have the skills to work independently or occupy a decent							
		job with opportunity oriented							
		3. Have the ability and skills in critical thinking and problem							
		solving as well as finding new ideas in science and							
Cantari		technology development							
Content		The course will	cover:	(
		I. Ine the	eoretical concept	s or structures and prope	erties				
		and the changes of matter including the energy and							
		transformation, chemical synthesis, micro molecular							
			and its application; the basis theory of the source						
1		and its	annlication: the	hasic theory of the course	e				
		and its	application: the l	pasic theory of the course	e				

	science and/or technology according to their field of
	expertise; nuclear power plants, medical field and
	research / rock element determination &
	archaeological / how to analyze / environment /
	agriculture / treatment, core / gross alpha and gross
	beta equations, the dangerous of radioactive
	compound
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books and slides (power points)
Reading lists	1. Choppin, G., Rydberg, J., and Liljenzin, J.O., 2001,
	Radiochemistry and Nuclear Chemistry, 3 th ed.,
	Butterworth-Heinemann, USA.
	2. Friedlander, G., and Kennedy J.W., 2011, Introduction to
	Radiochemistry, John Welly and Sons Inc. New York.
	3. Russell, R.C.J., 2012, Radiochemistry, Bookvika Publishing.
	4. Loveland, W.D., Morrissey, D.K., and Seaborg, G.T., 2001,
	Modern Nuclear Chemistry, John Welly and Sons Inc., New
	Jersey.
	5. Lieser, K.H., 2001, Nuclear and Radiochemistry:
	Fundamentals and Applications, Welly-VCH Weinheim,
	Germany.

SEMESTER VII

	Kode/				Prasyarat/Prerequiste		requiste
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
1	UNI-701	Islam Rahmatan Lil Alamin	Islam as Mercy to the World	3	-	-	-
2	UNI-702	KKN	Community Service	2		*)	
3	CGB-703	Proposal Skripsi	Thesis Proposal	3	CGB-302	Metodologi Penelitian Dan Bahasa Indonesia	Research Methodology and Bahasa
4	CAB-704	Bahan Berbahaya Beracun (B3)	Hazardous and Toxic Subtances	2	CAB-303	Kimia Analitik II	Analytical Chemistry II
5	XXX-000	Matakuliah Pilihan	Elected course	2	-	-	-
6	XXX-000	Matakuliah Pilihan	Elected course	2	-	-	-
7	XXX-000	Matakuliah Pilihan	Elected course	2	-	-	-
8	XXX-000	Matakuliah Pilihan	Elected course	2	-	-	-
9	XXX-000	Matakuliah Pilihan	Elected course	2	-	-	-
Total				20			

Elected Courses in Odd Semester

	Kode/				Prasyarat/Prerequiste		
No	Code	Matakuliah	Subject	SKS	Kode/ Code	Matakuliah	Subject
Kons	<mark>entrasi Kewi</mark>	rausahaan Kimia					
1	CGB-916	Kimia Aditif	Chemistry of Additives	2	COB-305	Kimia Organik II	Organic Chemistry II
2	CGB-917	Kimia Bahan Pangan	Food Chemistry	2	COB-305	Kimia Organik II	Organic Chemistry II
3	CGB-918	Kimia Hasil kelautan	Chemistry of Marine Natural Products	2	COB-605	Kimia Bahan Alam	Chemistry of Natural Product
4	CGB-919	Kimia Tekstil	Textile Chemistry	2	COB-305	Kimia Organik II	Organic Chemistry II
5	CGB-920	Kimia Zat Warna	Chemistry of Dye and Pigment	2	COB-305	Kimia Organik II	Organic Chemistry II
Kons	entrasi Indus	stri Kimia	·				
6	CGB-921	Kimia Forensik	Forensic Chemistry	2	CAB-502	Kimia Instrumental II	Instrumental Chemistry II
7	CGB-922	Kimia Medisinal	Medicinal Chemistry	2	COB-305	Kimia Organik II	Organic Chemistry II
8	CGB-923	Kimia Minyak Bumi	Petroleum Chemistry	2	-	-	-
9	CGB-924	Kimia Organik Industri	Industrial Organic Chemistry	2	COB-305	Kimia Organik II	Organic Chemistry II
10	CGB-925	Mikrobiologi Industri	Industrial Microbiology	2	-	-	-
Kons	entrasi Lingl	kungan dan Energi			1		
11	CGB-926	Geokimia	Geochemistry	2	CIB-505	Kimia Material	Material Chemistry
12	CGB-927	Kimia Bahan Berpori	Porous Materials Chemistry	2	CIB-505	Kimia Material	Material Chemistry
13	CGB-928	Kimia Katalis	Catalyst Chemistry	2	CPB-306	Kimia Fisika II	Physical Chemistry II
14	CGB-929	Kimia Pestisida	Pesticide Chemistry	2	CIB-604	Organologam dan Bioanorganik	Organometallic and Bioinorganic
15	CGB-930	Fitokimia	Phytochemistry	2	COB-605	Kimia Bahan Alam	Chemistry of Natural Product

Module Name		Islam as Mercy to the World						
Module level, if appli	cable	4 th year						
Code, if applicable		UNI-701						
Semester (s) in which	the module is	7 th semester						
taught								
Person responsible for the module		Prof. Dr. Is Fatir	nah, M.Si.					
Lecturer(s)		Prof. Dr. Is Fatir	nah, M.Si.					
		Gani Purwiando	ono, Ph.D.					
Language		English- Indone	sia					
Relation to curriculur	n	Compulsory course						
Types of teaching	Class size	Attendance	Workload					
and learning		time (hours	active					
		per week per	participation					
		semester)						
Teaching		2.5 (hours) x	Collaborative	Lecture: 3 (hour) x 16	48			
	50	16	discussion	(meeting)	hour			
		(meeting) =			S			
Discussion and		40 nours	Presentation	Preparation and	48			
Presentation				tollow up 3 (nours)	nour			
Tatal workload		126 hours		x 16 (self-learning)	S			
Credit points								
Requirements accord	ling to	S.I ECIS						
examination regulation	ning to	regulation) Final score is evaluated based on Assignment and						
examination regulation	5115	Reports (40%) Mid and Final Examination (60%)						
Recommended prere	auisites							
Related course	44151125	5.1 FCTS						
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:				
learning		1. Have consistency and enthusiasm in realizing Islamic						
5		attitudes and behaviours						
		1. Have the ability to gain knowledge (long life learning) at a						
		higher level in relevant field						
		2 Have the skills to work independently or occupy a decent						
		ioh with opportunity-oriented						
Content		The course will	cover:					
Content		I he course will cover:						
		field of science	contemporary n	rohlems in the nerspecti	ve of			
		Islam as mercy to the world						
Study and examination		Mid-term. Final	term, assignmer	nt. and presentation				
, requirements and for	ms of		, 0	, ,				
examination								
Media employed		Textbooks and	slides (power poi	nts)				
Reading lists		1. Fazlur Rahm	an, 1985. <i>Islam d</i>	lan Modernitas, Tentang				
		Tranformasi Intelektual						

2. Khalil abdul Karim. 2005. Negara Madinah: Politik
Penaklukan Masyarakat Arab
3. Fazlur Rahman, Islam, terj. Ahsin Muhammad. Pustaka
Bandung
4. Nurchalish Madjid, Islam Doktrin dan Peradaban

Module Name		Thesis proposal				
Module level, if app	olicable	4th year				
Code, if applicable		CGB-703				
Semester (s) in whi	ch the	Seventh semester				
module is taught						
Person responsible	for the	Dr. Dwiarso Ru	biyanto, S.Si., M.	Si.		
module						
Lecturer(s)		All Lectures				
Language		Bahasa Indone	sia			
Relation to curricul		Compulsory co	Forme of	Markland		
and loarning	Class size	Attendance	Forms of	workload		
anu leanning		ner week per	narticination			
		semester)	participation			
Teaching		2.5 (hours) x	Collaborative	Lecture: 3 (hours)	48 hours	
	50	16 (meeting)	discussion	x 16 (meeting)	ie neuro	
Discussion and		= 40 hours	Presentation	Preparation and	48 hours	
Presentation				follow up 3 (hours)		
				x 16 (self-learning)		
Total workload 136 hours		136 hours				
Credit points		5.1 ECTS	5.1 ECTS			
Requirements according to		Every student must achieve a minimum score/predicate of C				
examination regulations		Research methodology and Bahasa				
Recommended prerequisites Research methodology and ballasa						
Related course	course -					
Module objectives/intended		By the end of this course students should be able to:				
learning		1. Have consistency and enthusiasm in realizing Islamic attitudes				
		and behaviors				
		2. Have leadership skills and attitudes in collaborating or interacting with others				
		3 Have ability and skills in global community as well as social				
		awareness that supports the development of science				
		4. Have skills in scientific literacy. digital. computer. internet and				
international languages			,			
Content		Students perform proposal preparation, discussion, presentation in				
		open seminar session. Students must participate as speaker and				
audience for research proposal se		seminar.				
Study and examination Independent assignment and essay		id essay				
requirements and f	orms of	The assessment system is in accordance with the				
examination		implementation guidelines for thesis of Chemistry Department				
		in the Faculty of Mathematics and Natural Sciences, Islamic				
University of Indonesia (UII)						
Media employed		Power point sli	de presentation			

Reading lists	1. Polina, Agnes Maria dan Siang, Jong Jek., 2005., Kiat Jitu
	Menyusun Skripsi. Yogyakarta.
	2. Tim Dosen Penyusun, 2020. Buku Panduan Skripsi dan
	Pelaksanaan Praktek Kerja Lapangan (PKL), Prodi Ilmu Kimia
	FMIPA-UII, Yogyakarta

Module Name		Hazardous and Toxic Substances				
Module level, if applicable		4 nd year				
Code, if applicable		CAB-704				
Semester (s) in which	the module is	VII (Seven)				
taught						
Person responsible for	or the module	Prof. Riyanto, P	h.D.			
Lecturer(s)		Prof. Riyanto, P	h.D			
		Rudy Syah Putr	a, Ph.D			
		Mai Anugrahwa	ati, S.Si., M.Sc			
Language		English-Indones	sia			
Relation to curriculur	n lou ·	Compulsory cou	urse			
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (nours	active			
		per week per	participation			
Tooching		semester)	Collaborativa	Locture: 2 (hour) x 10	27	
reaching	50	1.67 (hours) y	discussion	(meeting)	bours	
Discussion and	50	$1.07 (10013) \times$ 16 (meeting)	Brecentation	Preparation and	22	
Presentation		= 27 hours	riesentation	follow up 2 (bour) x	hours	
resentation		- 27 110013		16 (meeting)	nours	
				10 (meeting)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	Requirements according to		Minimum attendance at lectures is 75% (according to UII			
examination regulations		regulation). M	inimum attendar	nce at lectures is 75% (acc	cording	
		to UII regulation). Final score is evaluated based on Assignment				
		and Reports (40%), Mid and Final Examination (60%)				
Recommended prere	quisites	Analytical Cher	nistry II			
Related course						
Module objectives/in	tended	1. Have the ability to gain knowledge (long life learning) at a				
learning		higher level in relevant field				
		2. Have the skills to work independently or occupy a decent				
		job with opportunity-oriented,				
		3. Have the ability and skills in critical thinking and problem				
			solving as well as finding new ideas in science and			
Contort		Having the ability to mention the rules of Hererdeus and Tavia				
Content		Traving the ability to mention the rules of Hazardous and Toxic Substances, and Hazardous and Toxic Waste, Having the ability				
		to explain the symbols and labels within the latest rules (orders				
		Having the ability to explain the methods of Hazardous and Toxic				
		Waste treatment. Having the ability to explain the physical				
		biological, chemical methods in the Hazardous and Toxic Waste				
		treatment, Having the ability to explain the methods of				
		Hazardous and Toxic Waste treatment, Having the ability to				
		explain the storing procedures of Hazardous and Toxic Waste,				
		Having the ability to explain the management, labels and				

	symbols, as well as the treatment of used oil waste, <i>batik</i> waste and laundry waste
Study and examination requirements and forms of examination	Mid-term, Final term, assignment, collaborative learning and project-based learning.
Media employed	Text books, slides (power points), and video
Reading lists	 Kepdal 01/ BAPEDAL/09/1995 Tata Cara & Persyaratan Teknis Penyimpanan & Pengumpulan Limbah B3. Kepdal 02/BAPEDAL/09/1995 tentang Dokumen Limbah B3. Kepdal 03/BAPEDAL/09/1995 tentang Persyaratan teknis pengelolaan limbah B3. Kepdal 04/BAPEDAL/09/1995 tentang Tata Cara Penimbunan Hasil Pengolahan, Persyaratan Lokasi Bekas Pengolahan dan Lokasi Penimbunan Limbah B3. Kepdal 05/BAPEDAL/09/1995 tentang Tata Cara Memperoleh Izin Pengelolaan Limbah B3. Kepdal 02/BAPEDAL/05/1994 tentang Tata Cara Memperoleh Izin Pengelolaan Limbah B3. Kepdal 02/BAPEDAL/01/1998 tentang Tata Laksana Pengawasan Pengelolaan Limbah B3. Kepdal 03/BAPEDAL/01/1998 tentang Tata Cara dan Persyaratan Penyimpanan dan Pengumpulan Minyak Pelumas Bekas. Manahan, S, 1994, Environmental Chemistry, Sixth Edition, Lewis Publishers, Florida. PP No. 18/1999 Jo. PP No. 85/1999 tentang Pengelolaan Limbah Bahan Berbaha & Beracun, sebagai revisi dari PP RI No. 19/1994 Jo. PP No. 12/1995, PP 101 tahun 2014 tentang Pengelolaan Limbah B3.

Module Name		Chemistry of Additives				
Module level, if applicable		Elective course				
Code, if applicable		CGB-916				
Semester (s) in which the module is		Elective course				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si			
Lecturer(s)		Dr. Dwiarso Rul	oiyanto, M.Si			
		Dhina Fitriastut	i, M.Sc.			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course		1	I	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
leaching	50		Collaborative	Lecture: 2 (hours) x	32	
D'an arta and	50	1.67 (nours) x	discussion	16 (meeting)	nours	
Discussion and		16 meeting =	Presentation	Preparation and	32	
Presentation		27 110015		16 (solf loarning)	nours	
Total workload		01 hours				
Credit points						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to IIII				
examination regulations		regulation). Final score is evaluated based on assignment and				
		reports (40%) a	nd exam (60%)			
Recommended prerequisites		Organic Chemis	stry II			
Related course		-	•			
Module objectives/intended		By the end of th	nis course studen	ts should be able to:		
learning		1. Endeavor to	continue to stud	ly (lifelong learning) at a	higher	
		level in the relevant field with the chemistry of essential oil				
		development, materials for energy and the environment,				
		and natural products for food and health				
		2. Have the sk	kills to work inc	lependently or gain a o	decent,	
		opportunity-	opportunity-oriented job in the area of essential oil development materials for energy and the environment			
		development, materials for energy and the environment,				
		and natural products for food and health				
		s. nave capability and proliciency in critical trinking and				
		essential oil development materials for energy and the				
		environment, and natural products for food and health				
Content		The course will cover:				
		Definition of additive and its scope, additives in foods and				
		beverages, additives in oil and lubricants industry. additives in				
		polymer industry, additives in cement industry, additives in				
		paint industry, and chemical analysis of additives.				
Study and examination		Mid-term, Final term, and quiz				
requirements and forms of						
examination						

Media employed	Blended (lecture and students' presentation)
Reading lists	1. Smith, J., and Hong-Shum, L., 2011, Food Additives Data
	Book, 2 nd ed., Wiley-Blackwell.
	2. Leatherhead Food International, 2008, Essential Guide to
	Food Additives Royal Society of Chemistry; 3 rd edition.
	3. Farlow, C.H., 2004, Food Additives: A Shopper's Guide to
	What's Safe & What's Not, KISS For Health Publishing; 5
	Revised edition.
	4. Minich, D.M., 2009, An A-Z Guide to Food Additives: Never
	Eat What You Can't Pronounce, 1 st ed., Conari Press.
	5. Nielsen, S.S., 2003, Food Analysis, Third Edition, Kluwer
	Academic, New York.
	6. Rudnick, L.R., 2007, Lubricant additives, chemistry and
	application, CRC, London.

	 A solution for problems in general chemistry and in more specific fields such as identifications, analysis, isolation, transformation and macromolecular synthesis through the knowledge application: structure, properties, molecular transformations both energy and kinetics, analysis methods and synthesis in chemistry and application of the relevant technologies Understanding and mastering the analytical skills in industrial chemistry, energy and environmental analysis
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books, slides (power points), and video
Reading lists	1 Belitz H.D. Grosch W. and Schieberle P. 2009 Food
incouning insta	Chemistry 4 th ed Springer
	2 De Man I M 1999 Principle of Food Chemistry (Food
	Sciencetext series) 2 rd ed springer
	2 Duncan A W 2011 The Chemistry of Food and Nutrition
	createspace
	4. Coultate, T.P. 2009.Food: The Chemistry of Its Components
	(RSC paperback), 5 th ed royal society of chemistry
	5. Yadav, S. 2002. Food Chemistry, Non basic stock line
	6. Supardi, Imam. 1999. Mikrobiologi dalam pengolahan dan
	keamanan pangan

Module Name		Chemistry of Marine Natural Products			
Module level, if applicable		-			
Code, if applicable		CGB-918			
Semester (s) in which the module is		Odd semester			
taught					
Person responsible for	or the module	Dr. Dwiarso Rul	biyanto, M. Si		
Lecturer(s)		Dr. Dwiarso Rul	biyanto, M. Si		
		Amri Setyawati	, S.Si., M.Sc.		
Language		English- Indone	sia		
Relation to curriculun	n	elected course	1	I	1
Types of teaching	Class size	Attendance	Forms of	Workload	
and learning		time (hours	active		
		per week per	participation		
		semester)			
Teaching	50	4.67 (1	Collaborative	Lecture: 2 (hours) x	32
Discussion and	50	1.67 (nours) x	discussion	16 (meeting)	nours
Discussion and		16 (meeting)	Presentation	Preparation and	32 bours
Presentation		- 27 Hours		101000 up 2 (110013) x 16 (solf loarning)	nours
				TO (Sell-learning)	
Total workload		91 hours			
Credit noints		3.4 ECTS			
Requirements according to		Minimum attendance at lectures is 75% (according to UII			
examination regulations		regulation).		, U	
_		The scoring syst	tem used in the E	Benchmark Reference	
		Assessment (BF	RA) with the follo	wing rating ranges: A : 3.	65 A- :
		3.50 A/B : 3.35	B+: 3.20 B: 3.05	B-: 2.90 B/C: 2.75 C+: 2	2.60 C :
		2.45 C- : 2.30 C	/D : 2.15 D : 2.00		
Recommended prere	quisites	Chemistry of N	atural Product		
Related course		-			
Module objectives/in	tended	By the end of the	nis course studen	ts should be able to:	
learning		 πave the ability to gain knowledge (long life learning) at a higher level in relevant field 			
		nigner level in relevant field			
		2. nave the skills to work independently or occupy a decent			
		3. Have the ability and skills in critical thinking and problem			
		solving as well as finding new ideas in science and			
		technology development			
Content		The course will cover:			
		1. Identification, analysis, isolation, transformation and			
		chemical synthesis performed and isolation of marino			
		chemical synthesis performed and isolation of marine			
		2 A proper decision in solving problems according to the			
		result of data and information analysis analyze			
		informa	ation and chemic	al data of marine produc	ts
		correct	lv.		
		 A proper decision in solving problems according to the result of data and information analysis, analyze information and chemical data of marine products 			

Study and examination	Mid-term, Final Examination quiz, and essay					
requirements and forms of						
examination						
Media employed	Text books, and slides (power points)					
Reading lists	1. Brightwell, C.R., 2007, Marine Chemistry, Tfh Pubns Inc.					
	2. Steele, J.H., Thorpe, S.A., and Turekian, K.K., 2010, Marine					
	Chemistry & Geochemistry: A derivative of the					
	Encyclopedia of Ocean Sciences, Academic Press; 1 edition.					
	3. Satanarayana, D., 2007, Marine Chemistry, Daya Publishing					
	House.					
	4. Kiyota, H., Fujiwara, K., Kiyota, H., Nagata, T., Nakagawa,					
	M., Nishida, A.,Okino, T., Sasaki, M., Satake, M., Shindo,					
	M.,and Yotsu-Yamashita, M., 2010, Marine Natural					
	Products (Topics in Heterocyclic Chemistry). Springer;					
	Softcover reprint of hardcover 1st ed.					
	5. E.K. Duursma And R. Dawson, 1981, Marine Organic					
	Chemistry: Evolution, Composition, Interactions And					
	Chemistry Of Organic Matter In Seawater, ELsevier					
	Scientific Publishing Company.					
Module Name		Textile Chemistry				
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Module level, if applicable		2 nd year				
Code, if applicable		CGB-919				
Semester (s) in which	the module is	Elective course in odd semester				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si.			
Lecturer(s)		Dr. Dwiarso Rul	oiyanto, M.Si.			
		Nurcahyo Iman	Prakoso, M.Sc.			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course				
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching		1.67 (hours)	Collaborative	Lecture: 2 (hours)	32	
	50	x 16	discussion	x 16 (meeting)	hours	
Discussion and		(meeting) =	Presentation	Preparation and	32 h	
Presentation		27 hours		follow up 2 (hours)	hours	
				x 16 (self-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Final score is evaluated based on Assignment and				
		Reports (40%),	Mid and Final Exa	amination (60%)		
Recommended prere	quisites	-				
Related course		-				
Module objectives/in	tended	By the end of the	nis course studen	ts should be able to:		
learning		1. Have the abi	lity to gain know	ledge (long life learning) at a	
		higher level	in relevant field			
		2. Have the ski	lls to work indep	endently or occupy a de	cent	
		job with opp	ortunity-oriente	d		
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
		technology development				
Content		The course will cover:				
		Understanding and purpose; chemical knowledge about the				
		structure and chemical properties of textile fibers				
		generally; testing of textile fabrics; testing of dyes on batik				
		using UV-Vis spectrophotometer; chemical endurance testing;				
		recent research progress related to analysis of compound				
		content, chemical structure, effects and general use of				
			functional textiles			
Study and examination	on	Mid-term, Final	term, assignmer	nt, and presentation		
requirements and for	ms of					
examination	examination					

Media employed	Textbooks and slides (power points)
Reading lists	1. Collier, B.J., and Epps, H.H., 1998, Textile Testing and
	Analysis, 1 ed., Prentice Hall
	2. Fan, Q., 2005, Chemical Testing of Textiles, CRC Press
	3. Hendrodiantopo, dkk. 1998, Teknologi penyempurnaan,
	Sekolah Tinggi teknologi Tekstil, Bandung
	4. Lubis, A., dkk. , 1994, Teknologi penyempurnaan, Sekolah
	Tinggi teknologi Tekstil, Bandung
	Cagarra, J., et. al, 1991, Wool bleaching with reducing agent
	in the precence of sodium lauryl sulphate. Instatuto de
	investigation Textil Y Cooperation Industrial, Universidat
	Politenica de Catalunya terassa, Spain

Module Name		Chemistry of Dye and Pigment				
Module level, if applicable		-				
Code, if applicable		SFA-215				
Semester (s) in which the module is		Odd semester				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M. Si			
Lecturer(s)		Dr. Dwiarso Rul	oiyanto, M. Si			
		Nurcahyo Iman	Prakoso, M.Sc			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course				
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours) x	32	
	50	1.67 (hours) x	discussion	16 (meeting)	hours	
Discussion and		16 (meeting)	Presentation	Preparation and	32	
Presentation		= 27 hours		follow up 2 (hours) x	hours	
				16 (self-learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). The	e scoring system	used in the Benchmark		
		Reference Asse	ssment (BRA) wit	h the following rating ra	nges: A	
		: 3.65 A- : 3.50	A/B : 3.35 B+ : 3.2	20 B : 3.05 B- : 2.90 B/C :	2.75	
		C+: 2.60 C: 2.4	5 C-: 2.30 C/D: 2	2.15 D : 2.00		
Recommended prere	quisites	Organic Chemis	stry II			
Related course		-				
Module objectives/in	tended	By the end of th	his course studen	ts should be able to:		
learning		higher level in relevant field				
		1 Have the skills to work independently or accurve decent				
		2. Have the skills to work independently or occupy a decent				
		JOD WITH OPPORTUNITY OFIERTED				
		5. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
Contont		The source will source				
Content		I ne course Will cover:				
		1. The analytical skills in industrial chemistry, energy and				
		environmental analysis				
		2. A decision in solving problems according to the result				
Study and examination		Mid-term Final term presentation discussion and assignment				
requirements and forms of		what term, rinar term, presentation, discussion and assignment				
examination						
Media employed		Text books, link	download and s	lides (power points)		
iviedia employed		Text books, link download and slides (power points)				

Reading lists	1.	Christie, R.M., 2001, Colour Chemistry (RSC Paperbacks),
		Royal Society of Chemistry.
	2.	Bamfield, P., and Hutchings, M.G., 2010, Chromic
		Phenomena: Technological Applications of Colour
		Chemistry, Royal Society of Chemistry.
	3.	Nassau, K., 2001, The Physics and Chemistry of Color, 2 nd
		ed., John Welly and Sons Inc. Canada.
	4.	4. Christie, R.M., Mather, R.R., and Wardman, R.H.,
		2000, The Chemistry of Colour Application, Wiley-Blackwell

Module Name		Forensics Chemistry				
Module level, if applicable		-				
Code, if applicable		CGB-921				
Semester (s) in which the module is		Odd semester				
taught						
Person responsible for	or the module	Prof. Riyanto, P	h.D.			
Lecturer(s)		Prof. Riyanto, P	h.D.			
		Dr. Maisari Uta	mi, S.Si.			
		Wiyogo Prio Wi	caksono, S.Si., M.	Si.		
Language		English- Indone	sia			
Relation to curriculur	n	Elected course		1		
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
Teaching			Collaborative	Lecture: 2 (hours) x	32	
	50		discussion and	16 (meeting)	hours	
Discussion and		1.67 (hours) x	Presentation	Preparation and	32	
Presentation		16 (meeting)		follow up 2 (hours) x	hours	
		= 27 hours		16 (self-learning)		
Total workload		91 hours				
Credit points		3.4 FCTS				
Requirements accord	ling to	Minimum atter	ndance at lecture	s is 75% (according to L		
examination regulation	ons	regulation). Fin	al score is evalua	ted based on assignmen	t and	
chaimation regulation		reports (25%), exam (50%), and presentation (25%)				
Recommended prere	quisites	Instrumental C	hemistry II	(
Related course	•	-	•			
Module objectives/in	tended	By the end of th	nis course student	ts should be able to:		
learning		1. Have the abi	lity to gain knowl	edge (long life learning)	at a	
		higher level in relevant field				
		2. Have the skills to work independently or occupy a decent				
		job with opportunity-oriented				
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
		technology development				
Content		The course will cover:				
		The duty of forensic chemist, toxicology, drugs and its law, the				
		synthesis of drugs, the law of alcohol and its analytical method,				
		DNA & fingerprint analysis, small analysis, sample and sensitive				
		analysis technic	lue			
Study and examination		Mid-term, Final term, presentation, assignment, and				
requirements and for	ms of	collaborative discussion				
examination						
Media employed		Blended: Text books, slides (power points), and video				

Reading lists	1. Khan, J.I., Kennedy, T.J., and Christian, D.R., 2012, Basic				
	Principles of Forensic Chemistry, Humana Press,				
	Springer, New York.				
	2. Bell, S., 2012, Forensic Chemistry (2nd Edition), Pearson,				
	New York.				
	3. James, S.H., Nordby, J.J., and Bell, S., 2014, Forensic				
	Science: An Introduction to Scientific and Investigative				
	Techniques, Fourth Edition 4th Edition, CRC Press, New				
	York.				
	4. Bertino, A.J., and Bertino, P., 2015, Forensic Science:				
	Fundamentals and Investigations 2nd Edition, South-				
	Western Educational, New York.				

Module Name		Medicinal Chemistry						
Module level, if applicable		-						
Code, if applicable		CGB-922						
Semester (s) in which the module is		Elective course						
taught								
Person responsible to	or the module	Dr. Dwia	arso Rut	Diyanto, IVI.SI.				
Lecturer(s)		Dnina Fr		I, IVI.SC.				
		Amn Set	Amri Setywati, S.Si., M.Sc.					
Pelation to curriculur	n	Eligiisii-	course	Sid				
Types of teaching		Attenda	nce	Forms of	Workload			
and learning	Class 3126	Attenuance		active	WORKIOAU			
and icarring		ner wee	k ner	narticination				
		semeste	er)	participation				
Teaching				Collaborative	Lecture: 100	1600		
	50	340 min	utes x	discussion	(minutes) x 16			
		16 mee	eting		(meeting)			
Discussion and				Self-learning	Preparation and	3840		
Presentation					follow up 240			
					(minute) x 16 (self-			
					learning)			
Total workload		5440 minutes = 90.67 h						
Credit points		3.4 ECTS						
Requirements according to		Minimu	m atten	idance at lecture	es is 75% (according to U			
examination regulations		regulatio	on). Fina (1997)	al score is evalua	ited based on assignmen	t and		
		reports	(40%) ai	nd exam (60%)				
Recommended prerequisites		Organic	Chemis	try II				
Related course			مط مڈ +ام		to chould be chic to.			
logrning	tended	By the e	na or tri S (Studo	is course studen	ts should be able to:			
learning		Have the ability to continue to learn (long life learning)						
		at a higher level in relevant fields						
		2. F (Enterpreneurship and employability)						
		2. E (Enterpreneursnip and employability) Have the skills to work independently or occupy a						
			decent i	ob with opportu	nity-oriented			
		3. N	N (New	and novel idea)				
		Have the ability and proficiency in critical thinking and						
		problem solving and discovering						
Content		1.	Definiti	on and scope of	medicinal chemistry, dru	g		
			classific	ation, and impor	tant chemical-physical			
			propert	ies in drug activi	ty			
		2.	Drug de	velopment: look	ing for a guiding compo	und,		
		development of guiding compounds, Drug						
		development procedures, rational drug design						
			3. Relationship					
		structure and physical chemical properties with the						

	process of absorption, distribution and secretion of drugs
	 Relationship of metabolic structures and processes of drugsRelation of structure, solubility and biological
	activity
	Quantitative relationship between structure and activity (HKSA)
	6. Isolation and identification
	active compounds from natural substances that have been empirically used for treatment
	7. The synthesis of the analogous structure of the basic
	form of the compound having treatment activity
	potential
	8. HKSA anticancer compounds, HKSA antimalarial
	compounds, HKSA antibacterial compounds, HKSA anti-
	inflammatory compounds
Study and examination	Mid-term, Final term, presentation, quiz, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books, slides (power points), video, website, journal
Reading lists	1. Siswandono dan Bambang Soekardjo, Eds. Kimia
	Medisinal I dan II. Sura-baya, Airlangga University Press,
	2000.
	2. Stephen Hanessian, Hugo Kubinyi, Gerd Folkers, 2014,
	Natural Products in Medicinal Chemistry: Methods and
	Principles in Medicinal Chemistry, Wiley-VCH

Module Name		Petroleum Chemistry				
Module level, if applicable		Elective course				
Code, if applicable		CGB-923				
Semester (s) in which the module is		Elective course				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	piyanto, M.Si			
Lecturer(s)		Dr. Dwiarso Rul	piyanto, M.Si			
		Nurcahyo Iman	Prakoso, M.Sc			
Language		English-Indone	sia			
Relation to curriculur	n	Elected course				
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (nours	active			
		per week per	participation			
Tooching		semester)	Collaborativo	Lactura: 2 (hours) y	22	
reaching	50	1.67 (bours) y	discussion	16 (meeting)	52 bours	
Discussion and	50	$1.07 (10013) \times$ 16 meeting =	Presentation	Dreparation and	32	
Presentation		27 hours	resentation	follow up 2 (hours) x	hours	
				16 (self-learning)	nours	
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). Final score is evaluated based on assignment and				
		reports (40%) and exam (60%)				
Recommended prerequisites		-				
Related course		-				
Module objectives/in	itended	By the end of th	nis course studen	ts should be able to:		
learning		1. Endeavor to continue to study (lifelong learning) at a higher				
		level in the	relevant field wit	h the chemistry of esser	ntial oil	
		and natural products for food and health				
		and natural	ville to work ind	i and nealth	dacant	
		opportunity-oriented job in the area of essential oil				
		development, materials for energy and the environment				
		and natural products for food and health				
		3. Have capability and proficiency in critical thinking and				
		problem solving and develop new ideas in the field of				
		essential oil development, materials for energy and the				
		environment, and natural products for food and health				
Content		The course will	cover:			
		The compositio	n of petroleum a	nd its products, classifica	ition of	
		petroleum, petroleum and its products tests, products of				
		petroleum, che	emical and phys	sical properties of petr	oleum,	
		petroleum eval	uation, and gene	ral petroleum refining pr	ocess.	
Study and examination	on mag of	Mid-term; Final term; individual assignment: making a list of				
requirements and for	TIMS OF	composition, cla	assification, and	products of petroleum in	atad	
examination		Indonesia; and group assignments: presenting papers related				

	to research and development of oil and petroleum mining			
	methods.			
Media employed	Blended (lecture and students' presentation)			
Reading lists	1. Brouwer, M.P., 2011, Oil Refining and the Petroleum			
	Industry (Energy Science, Engineering and T echnology),			
	Nova Science Publishers Inc.			
	2. Fink, J.K., 2011, Petroleum Engineer's Guide to Oil Field			
	Chemicals and Fluids, 1 st ed., Gulf Professional Publishing.			
	3. Fahim, M.A., Al-Sahhaf, T.A., and Elkilani, A., 200			
	Fundamentals of Petroleum Refining, 1 st ed., Elsevier			
	Science.			
	4. Kelland, M.A., 2009, Production Chemicals for the Oil and			
	Gas Industry, CRC Press.			
	5. Leffler, W.L., 2008, Petroleum Refining in Nontechnical			
	Language, Fourth Edition, PennWell Corp.			

Module Name		Industrial Organic chemistry						
Module level, if applicable		-						
Code, if applicable		CGB-924						
Semester (s) in which the module is		Odd semester						
taught								
Person responsible for	or the module	Dr. Dwiarso R	ubiyanto, M.Si.					
Lecturer(s)		Dr. Dwiarso R	ubiyanto, M.Si.					
		Nurcaho Imar	Prakoso, M.Sc.					
Language		English- Indor	esia					
Relation to curriculur	n	elected cours	e (dipilih salah sat	u)	I			
Types of teaching	Class size	Attendance	Forms of	Workload				
and learning		time (hours	active					
		per week per	participation					
		semester)						
leaching	50	4.67 (1	Collaborative	Lecture: 2 (hours) x	32			
	50	1.67 (nours) x	discussion	16 (meeting)	nours			
Discussion and		16 (meeting)	Presentation	Preparation and	32			
Presentation		- 27 Hours		10110W up 2 (flours) x	nours			
				10 (Self-learning)				
Total workload		91 hours						
Credit points		3.4 ECTS						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII						
examination regulation	ons	regulation). F	nal score is evalua	ited based on assignmen	t			
		(30%), midter	m (35%), and Final	exam (35%)				
		The scoring sy	stem used in the E	Benchmark Reference				
			Assessment (BRA) with the following rating ranges: A : 3.65 A- :					
		3.50 A/B : 3.3	5 B+ : 3.20 B : 3.05	B-: 2.90 B/C: 2.75 C+: 2	2.60 C :			
		2.45 C- : 2.30	C/D : 2.15 D : 2.00					
Recommended prere	quisites	Organic Chem	istry II					
Related course		-						
Module objectives/in	itended	By the end of this course students should be able to:						
learning		1. Have the ability to gain knowledge (long life learning) at a						
		higher level in relevant field						
			2. Have the skills to work independently or occupy a decent					
		Job with opportunity oriented						
		solving as well as finding new ideas in science and						
		technology development						
Content		The course wi	ll cover					
		1. Posin	entrepreneurshir	o skill, creative, innovativ	e and			
		inden	endent: field of or	ganic chemical industries	s that			
		are both basic and finished products. the industry level						
		to generate job opportunities						
		2. The analytical skills in industrial chemistry, energy and						
		enviro	onmental analysis					

Study and examination	Mid-term, Final term, presentation, assignment, and
requirements and forms of	collaborative discussion
examination	
Media employed	Text books and slides (power points)
Reading lists	1. Wittcoff, H.A. and B.G. Reuben, "Industrial Organic
	Chemicals", John Wiley & Sons, Inc., 1996
	2. Chenier, P.J., 2002, Survey of Industrial Chemistry, 3rd
	edition, Kluwer Publishing, New York.

Module Name		Industrial Microbiology					
Module level, if applicable		2 rd year					
Code, if applicable		CGB-925					
Semester (s) in which the module is		fourth semester					
taught							
Person responsible for	or the module	Dr. Tatang Shat	our Julianto, M.Si				
Lecturer(s)		Dr. Habibi Hida	yat, M.Si				
		Dr. Tatang Shat	our Julianto, M.Si				
Language		English- Indone	sia				
Relation to curriculur	n	Elective course	1	1			
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching		Class	Class	Lecture: 2 (hour) x 16	32 h		
	50	attendance:	attendance	(meeting)			
Discussion and		16 week x 2 x	Self-directed	Preparation and	32 h		
Presentation		0,83 = 27 h	studies	follow up 2 (hour) x			
				16 (self-learning)			
Total workload	Total workload		91 h				
Credit points		3.4 ECTS x 16 w	eek = 54.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75%.					
examination regulation	ons						
Recommended prere	quisites	Biochemistry					
Related course		-					
Module objectives/in	itended	by the end of this course students should be able to:					
learning		at a higher level in the relevant field					
			at a nigner level in the relevant field.				
		iob with opportunity oriented					
		3 Have the ability and skills in critical thinking and problem					
		5. Have the abi	all as finding now	, ideas in the development	enn at of		
		science and technology.					
Content		The course will cover:					
content		Definition application basic microbiology sciences					
		identification of microhial types. Gram staining nathogen and					
		non nathogen hacteria, classification various types of microhes					
		produced in the chemical, energy, and environmental analysis					
		industries based on taxonomic levels.					
Study and examination		Mid-term, Final term, guiz, and assignment.					
requirements and forms of		,	, , , ,	0			
examination							
Media employed		Text books and	slides (power po	oints)			
Reading lists		(1) Dwijoseput	ro, D., 2014. Das	ar-Dasar Mikrobiologi. Ja	akarta :		
		Djambatan.					
		(2) Jutono, 1980. Pedoman Praktikum Mikrobiologi Umum					
		Untuk Perguruan Tinggi. Yogyakarta: UGM					

(3	3)	Pelczar M. J., Chan E.C.S., 2008. Dasar-Dasar Mikrobiologi.
		Jakarta UI Press
1	1.	Pommerville jeffrey C., 3 th edition Fundamentals Of
		Microbiology: Body Systems Edition

Module Name		Geochemistry				
Module level, if applicable		-				
Code, if applicable		CGB-926				
Semester (s) in which the module is		Electiv	e course			
taught						
Person responsible for	or the module	Drs. Al	lwar, M.S	Sc., Ph.D.		
Lecturer(s)		Dr. No	or Fitri, N	1.Si.		
		Febi In	idah Fajai	rwati, S.Si., M.Sc.		
Language		English	n- Indone	sia		
Relation to curriculur	n	Electe	d course		I	Г
Types of teaching	Class size	Attend	lance	Forms of	Workload	
and learning		time (I	nours	active		
		per we	ек per	participation		
Taashing		semes	ter)	Callaborativa	Lastura, 100	1600
Teaching	50	240 m	inutos v	discussion	(minutes) x 16	1000
	50	16 m	eeting	uiscussion	(minutes) × 10	
Discussion and		10111	leeting	Self-learning	Prenaration and	3840
Presentation				Sen rearring	follow up 240	5040
					(minute) x 16 (self-	
					learning)	
Total workload		5440 minutes = 90.67 h				
Credit points		3.4 ECTS				
Requirements accord	ing to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regula	tion). Fin	al score is evalua	ted based on assignmen	t and
		report	s (40%) a	nd exam (60%)		
Recommended prere	quisites	Organi	ic chemis ⁻	try ll		
Related course		-				
Module objectives/in	tended	By the	end of th	nis course studen	ts should be able to:	
learning		1.	S (Stude	ent of tomorrow)		. 、
			Have the	e ability to contir	nue to learn (long life lea	rning)
		2. E (Enterpreneurship and employability)				
		2. E (Enterpreneursnip and employability) Have the skills to work independently or occupy a				
		decent job with opportunity-oriented				
		3. N (New and novel idea)				
		Have the ability and proficiency in critical thinking and				
		problem solving and discovering				
Content		1. Earth phenomena related to the distribution of				
		elements, minerals and mineral occurrences.				
		2. Analyze the process of forming a mineral in the earth.				
		3.	Identify	the content of early and the content of early and the content of early and the content of the co	xisting elements on eartl	h.
Study and examination	Study and examination		ased:			
requirements and forms of		Mid-term, final examination, quiz, essay and mineral				
examination		classification of chemical elements in the earth.				
		Authe	ntic/ Per	formance Based:		

	Task through online-offline, and presentation via 3D image media on geochemical minerals		
Media employed	Text books, slides (power points), video, website, journal, review, regulation of cosmetics		
Reading lists	 Michard, G. and Allegre, C.J., 1974, Introduction to Geochemistry, D.Reidel Publishing Company, Boston, USA. Albarede, F., 2009, Geochemistry An Introduction, 2st 		
	ed., Cambridge University Press. 3. Walther, J.V., 2008, Essential of Geochemistry, 2 st ed., Jones & Bartlett Publishers		
	 Misra, K.C., 2012, Introduction to Geochemistry: Principles and Applications, 1sted., Wiley-Blackwell 		

Module Name		Porous Materials Chemistry				
Module level, if applicable		3 rd year				
Code, if applicable		CGB-927				
Semester (s) in which the module		Elective				
is taught						
Person responsible f	or the module	Drs. Allwar, M.S	Sc., Ph.D			
Lecturer(s)		Argo Khoirul Ar	nas, M.Sc.			
Language		English- Indone	sia			
Relation to curriculu	m	Compulsory co	urse	T	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)	.			
Teaching	5.0	100 (minutes)	Collaborative	Lecture: 120	32	
	50	x 16	discussion	(minutes) x 16	hours	
Discussion and		(meeting) =	Duccontation	(meeting)	22	
Discussion and		1000 menit of	Presentation	follow up 120	32 hours	
Fresentation		27 110013		(bours) x 16 (solf	nours	
				(nours) x 10 (sen-		
				icariiig)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements according to		Minimum atter	ndance at lecture	es is 75% (according to	UII	
examination regulations		regulation). Fin	al score is evalua	nted based on assignme	nt and	
		reports (30%) a	nd exam (70%)			
Recommended prere	equisites	Material Chem	istry			
Related course		-				
Module objectives/ii	ntended	By the end of this course students should be able to:				
learning		1. Have the ability to gain knowledge (long life learning) at				
		a nigher level in relevant field				
		2. Have the skills to work independently or occupy a				
		uecent job with opportunity-oriented				
		5. Have the ability and skills in critical thinking and problem				
		technology development				
Content		The course will cover:				
		Basic knowledge of norous materials properties (density and				
		pasic knowledge of porous materials, properties (density and norosity nore size, specific surface area) techniques or methods				
		used in the manufacture of norous materials (sintering sol-gel				
		and washing), types of porous materials, pore structure (BFT).				
		BJH, volume, pore distribution, adsorption-desorption theory				
		(adsorption isotherm)), as well as the application of porous				
		materials in the environmental, catalyst, pharmaceutical,				
		medical, and other fields.				

Study and examination	Assigment (1,2 and 3), independent activities, Mid-term, Final		
requirements and forms of	term		
examination			
Media employed	Text books, slides (power points), and video		
Reading lists	 Bruce, D.W., O'Hare, D. and Walton, R.I. eds., 2011. Porous materials. John Wiley & Sons. Ishizaki, K., Komarneni, S. and Nanko, M., 1998. Porous Materials: Process technology and applications (Vol. 4). Springer Science & Business Media. 		
	 Rouquerol, J., Rouquerol, F., Llewellyn, P., Maurin, G. and Sing, K.S., 2014. Adsorption by powders and porous solids: principles, methodology and applications. Academic press. 		

Module Name		Catalyst Chemistry					
Module level, if applicable		Elective course					
Code, if applicable		CGB-928					
Semester (s) in which the module is		Elective course					
taught							
Person responsible for	or the module	Prof. Dr. Is Fatir	nah				
Lecturer(s)		Prof. Dr. Is Fatir	nah				
		Gani Purwiando	ono, M.Sc., Ph.D				
Language		English- Indone	sia				
Relation to curriculur	n	Elected course	1		1		
Types of teaching	Class size	Attendance	Forms of	Workload			
and learning		time (hours	active				
		per week per	participation				
		semester)					
Teaching			Collaborative	Lecture: 2 (hours) x	32		
	50	1.67 (hours) x	discussion	16 (meeting)	hours		
Discussion and		16 meeting =	Presentation	Preparation and	32		
Presentation		27 hours		follow up 2 (hours)	hours		
				x 16 (self-learning)			
Total workload		91 hours					
Credit points		3.4 ECTS					
Requirements accord	ling to	winimum attendance at lectures is 75% (according to UII					
examination regulation	ons	regulation). Final score is evaluated based on assignment and					
December and ad a rare	quisitos	reports (40%) a					
Recommended prere	quisites	Physical Chemis	stry ii				
Module objectives /ir	tended	- By the end of th	nis course studen	ts should be able to:			
learning	itenueu	1 Endeavor to	continue to studen	ts siloulu be able to. dv (lifelong learning) a	t a higher		
learning		level in the relevant field with the chemistry of essential oil					
		developmen	t, materials for e	nergy and the environ	ment, and		
		natural prod	ucts for food and	l health			
		2. Have the sl	kills to work ind	dependently or gain a	a decent,		
		opportunity-	opportunity-oriented job in the area of essential oil				
		development, materials for energy and the environment, and					
		natural products for food and health					
		3. Have capability and proficiency in critical thinking and					
		problem solving and develop new ideas in the field of					
		essential oil development, materials for energy and the					
		environment, and natural products for food and health					
Content		The course will cover:					
		The definition of catalyst and how catalyst works, catalysis					
		mechanism and types of catalyst, concept of kinetics and					
		thermodynamics in catalyst, isothermal equation in Langmuir					
		and Freundlich, heterogenous catalyst (fundamentals,					
		properties, mechanism and its preparation), homogenous					
		catalyst, general acid base catalysts, acid base catalyst, mass					
		transfer in catalyst and organometalic catalyst, enzyme catalyst,					

	semiconductor-based catalyst: electrocatalysis, photocatalysis			
	and sonocatalysis			
Study and examination	Mid-term, final term, individual and group assingment, and			
requirements and forms of	practice presentation of research proposals			
examination				
Media employed	Blended (lecture and students' presentation)			
Reading lists	1. Ross, J.R.H., 2011, Heterogeneous Catalysis: Fundamentals			
	and Applications, 1 st ed., Elsevier.			
	2. Somorjai, G.A., and Li, Y., 2010, Introduction to Surface			
	Chemistry and Catalysis, 2 nd ed., Wiley.			
	3. Barbaro, P., and Liguori, F., 2010, Heterogenized			
	Homogeneous Catalysts for Fine Chemicals Production:			
	Materials and Processes (Catalysis by Metal Complexes), 1 st			
	ed., Springer.			
	4. Augustine, R.L., 1995, Heterogeneous Catalysis for the			
	Synthetic Chemist, Marcel Dekker Inc., New York.			
	5. White, M.G., 1990, Heterogeneous Catalysis, prentice Hall,			
	Inc., London.			

Module Name		Pesticide Chemistry				
Module level, if applicable		Elective course				
Code, if applicable		CGB-929				
Semester (s) in which the module is		Elective course				
taught						
Person responsible for	or the module	Dr. Dwiarso Rul	oiyanto, M.Si			
Lecturer(s)		Dr. Dwiarso Rul	oiyanto, M.Si			
		Nurcahyo Iman	Prakoso, M.Sc.			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course	1	1	1	
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
leaching	50		Collaborative	Lecture: 2 (hours) x	32	
D'an arta and	50	1.67 (nours) x	discussion	16 (meeting)	nours	
Discussion and		16 meeting =	Presentation	fellow up 2 (hours) v	32 haura	
Presentation		27 110015		16 (colf loarning)	nours	
Total workload		01 hours		TO (Sell-learning)		
Credit points						
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to LIII				
examination regulation	nng to	regulation). Final score is evaluated based on assignment and				
		reports (40%) a	nd exam (60%)			
Recommended prerequisites		Organometallic	and Bioanorgan	ic		
Related course		-	0			
Module objectives/in	tended	By the end of th	nis course studen	ts should be able to:		
learning		1. Endeavor to	continue to stud	ly (lifelong learning) at a	higher	
		level in the	relevant field wit	h the chemistry of esser	ntial oil	
		development, materials for energy and the environment,				
		and natural	products for food	and health		
		2. Have the sk	kills to work ind	ependently or gain a o	decent,	
		opportunity-oriented job in the area of essential oil				
		development, materials for energy and the environment,				
		and natural products for food and health				
		5. Have capability and proticiency in critical thinking and				
		problem solving and develop new ideas in the field of				
		environment and natural products for food and health				
Content		The course will cover:				
		Definition and	introduction to r	esticide, natural and sv	nthetic	
		pesticides. che	mical aspects o	f various types of pes	ticides:	
		organochlorine	insecticide,	carbamate, organoph	ospate.	
		rodenticide, nematocide, etc., analysis methods: sampling of				
		pesticide residue, instrumental analysis, effect of pesticides to				
		environment, prevention methods, crops protection and				
		prevention from contaminants.				

Study and examination	Mid-term, final term, assignment to search and make the lists			
requirements and forms of	for the composition of products of Indonesian agricultural			
examination	pesticides, and assignment to present the materials about			
	pesticides as a group.			
Media employed	Blended (lecture and students' presentation)			
Reading lists	 Pang, G.F., Liu, Y.M., Cao, Y.Z., and Fan, C.L., 2012, Determination of Pesticides and Related Chemicals in Grains and Cereals, Nova Science Pub Inc. Stenersen, J., 2004, Chemical Pesticides: Mode of Action and T oxicology, 1st ed., CRC Press. Buchel, K.H., 1983, Chemistry of Pestisida, John Wiley and Sons, New Y ork. Chakrabarty, A.M., 1982, Biodegradation and Detoxification of Enviromental Pollution, CRC Press, Florida USA. Sastroutomo, S.S., 1992, Pestisida, Dasar dan Dampak Penggunaannya, Gramedia, Jakarta. 			

Module Name		Phytochemistry				
Module level, if applicable		-				
Code, if applicable		CGB-930				
Semester (s) in which the module is taught		Odd semester				
Person responsible for	or the module	Dr. Dwiarso Rul	biyanto, M.Si			
Lecturer(s)		Dr. Dwiarso Rul	biyanto, M.Si			
		Dhina Fitriastut	i, M. Sc			
Language		English- Indone	sia			
Relation to curriculur	n	Elected course				
Types of teaching	Class size	Attendance	Forms of	Workload		
and learning		time (hours	active			
		per week per	participation			
		semester)				
leaching	50	4.67 (1	Collaborative	Lecture: 2 (hours) x	32	
Discussion and	50	1.67 (nours) x	discussion	16 (meeting)	nours	
Discussion and Presentation		= 27 hours	Presentation	follow up 2 (bours) y	3Z	
Fresentation		- 27 110013		16 (self-learning)	nours	
				10 (Self learning)		
Total workload		91 hours				
Credit points		3.4 ECTS				
Requirements accord	ling to	Minimum attendance at lectures is 75% (according to UII				
examination regulation	ons	regulation). The	e scoring system	used in the Benchmark		
		Reference Asse	ssment (BRA) wit	h the following rating ra	nges: A	
		: 3.65 A- : 3.50	A/B : 3.35 B+ : 3.2	20 B : 3.05 B- : 2.90 B/C :	2.75	
Becommended prorequisites		C+:2.60 C:2.4	5 C-: 2.30 C/D: 2	2.15 D : 2.00		
Recommended prerequisites		Chemistry of N	atural Product			
Related course	topologi	-		to chould be chic to.		
loorning	itended	by the end of this course students should be able to: 1 Have the ability to gain knowledge (long life learning) at a				
learning		 паче the ability to gain knowledge (long life learning) at a higher level in relevant field 				
		2 Have the skills to work independently or occupy a decent				
		iob with opportunity oriented				
		3. Have the ability and skills in critical thinking and problem				
		solving as well as finding new ideas in science and				
		technology development				
Content		The course will cover:				
		1. The the	eoretical concepts	s of structures and prope	erties	
		and the changes of matter including the energy and				
		kinetics, identification, separation, characterization,				
		transformation, chemical synthesis, micro molecular				
		and its application				
		2. A proper decision in solving problems according to the result of data and information analysis				
		result c	of data and inform	nation analysis		

Study and examination	Mid-term, Final term, presentation, assignment, and			
requirements and forms of	collaborative discussion			
examination				
Media employed	Text books, and slides (power points)			
Reading lists	1. Harborne, J.B., 1987, Phytochemical Methods,			
	Diterjemahkan oleh Kosasih Padmawinata dan Iwang			
	Sudiro, Penerbit ITB, Bandung			
	2. Marby, J.T., Markham, K.R., Thomas, M.B., 1970, The			
	Systematic Identification of Flavonoids, Springer Verlag,			
	Berlin			
	3. Markham, k.R. & William, C.A., 1980, Phytochemistry			
4. Markham, K.R., 1988, Techniques of Flavonoids				
	Identification, diterjemahkan oleh Kosasih Padmawinata,			
	Penerbit ITB, Bandung			
	5. Robinson, T., 1991, The Organic Constituens of Higher			
	Plants, 6¬th Ed., Diterjemahkan oleh Kosasih			
	Padmawinata, Penerbit ITB, Bandung			

SEMESTER VIII

No	Kode/ Code	Matakuliah	Subject	SKS	Prasyarat		
					Kode/ Code	Matakuliah	Subject
1	CGC-801	Skripsi	Thesis	6	CGB-703	Proposal Skripsi	Thesis Proposal
Total				6			

Module Name		Thesis						
Module level, if a	pplicable	-						
Code, if applicabl	e	CGC-801						
Semester (s) in wl	nich the	Eight semester						
module is taught								
Person responsible	e for the	Dr. Dwiarso Rubiyanto, S.Si., M.Si.						
module								
Lecturer(s)		All lecturers in Study Program of B.Sc. Chemistry						
Language		English or Indonesia						
Relation to currice	ulum	Compulsory course						
Types of	Class size	Attendance	Forms of	Workload				
teaching and		time (hours	active					
learning		per week	participation					
		per						
Tasahina		semester)	Conducting	Data Callestian	200 h avera			
Teaching	50		conducting	Data Collection	200 nours			
	50	-	thesis	and analysis				
			writing					
Discussion and	-		writing	Writing up thesis	60 hours			
Presentation				and revision after	oo nouis			
1 resentation				examination				
				Exams and	12 hours			
				preparations				
Total workload		272 hours						
Credit points		10.2 ECTS						
Requirements acc	ording to	Final score is evaluated based on:						
examination regul	ations	• Experiment						
		• Report						
		• Thesis exam						
Recommended pr	erequisites	Thesis Proposal						
Related course		-						
Module objective	s/intended	By the end of this course students should be able to:						
learning		1. Have consistency and enthusiasm in realizing positive and						
		Islamic attitudes and behaviors						
		2. nave the ability to study (inferiong learning) at a higher						
		oil development, meterials for energy and the						
		environment, and natural products for food and health						
		3 Have leadership skills and productive attitudes toward						
		cooperating (collaborating) or interacting with others in						
		many levels of challenge						
		4 Have the	ability to collect	t analyze and organ	ize			
		information from various sources using the latest						
		information technology in chemistry journals and						

	databases related to essential oil development, materials
	for energy and the environment, and natural products for
	food and health
	5. Have capability and proficiency in the association of the
	chemistry global community and social awareness that
	supports chemistry science
	6. Have scientific, digital, and computer proficiency, internet
	literacy, and mastery of international language skills to
	support research and development in chemistry.
Content	Various topics in chemistry
Study and examination	Experiment, report, and final exam for thesis
requirements and forms of	
examination	
Media employed	guide book and laboratory
Reading lists	1. Tim Penyusun, 2016, Buku panduan PKL dan Skripsi
	program Studi Kimia, Yogyakarta

Curriculum Documents **2017**

Semester I Semester II Semester III Semester IV Semester V Semester VI Semester VII Semester VIII Pendidikan Agama Islam Rahmatan Lil Islam Ulil ALbab Islam Alamin Metodologi Penelitian dan Proses Industri Komputasi Kimia Kimia Minyak Atsiri Bahasa Indonesia Bahasa Inggris Kewirausahaan Kimia untuk Kimia Kimia Proposal Skripsi Elektrokimia Kimia Kuantum Pancasila Kewarganegaraan Kromatografi Kinetika Kimia dan anajemen dan Skripsi Dinamika Molekul Teknik Kimia Fisika I Kimia Fisika II Organologam dan Laboratorium Bioanorganik Bahan Berbahaya **Fisika Dasar** Kimia Analitik I Kimia Analitik II Beracun (B3) Sintesis Senyawa Anorganik dan Pemurnian Kimia Lingkungan Kimia Dasar Kimia Anorganik I Kimia Anorganik II Kimia Koordinasi Elusidasi Struktur KKN dan Senyawa Anorganik Biologi Kimia Bahan Alam Kimia Organik II Kimia Organik III Kimia Organik I Kimia Material MK.Pilihan Pr. Elusidasi Mikrobiologi Struktur Senyawa Matematika Untuk Elusidasi Struktur Matematika Dasar MK. Pilihan Kimia ≁ Senyawa Organik Kimia Biokimia Kemometri Pr. Kimia Bahan Pr. Fisika Dasar 🤸 Kimia Organik Fisik MK.Pilihan Alam Pr. Kimia Kimia Organik Pr. Kimia Dasar Pr. Kimia Analitik I Pr. Kimia Analitik II Pr. Kimia Minyak MK. Pilihan Atsiri Pr.Kimia Instrumental II ONDI LKID Pr. Kimia Organik Pr. Biokimia Bioteknologi Pr. Kromatografi BTAQ MK.Pilihan Kapita Selekta Pr. Kimia Fisika Pr. Kimia Anorganik Praktik Kerja Lapangan (PKL)

3.3 MAP OF COURSES