UNIVERSITAS
NEGERI
YOGYAKARTA

CURRICULUM 2014

COURSE SPECIFICATION

Bachelor of Education
In Chemistry
FMIPA - UNY

Content

Chemistry Laboratory Management

	YOGYAKARTA STATE UNIVERSITY **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **CHEMISTRY EDUCATION DEPARTMENT / CHEMISTRY EDUCATION STUDY PROGRAM**

SEMESTER LESSON PLAN					
COURSE	**CODE**	**COURSE CLUSTER**	**WEIGHT (CREDITS)**	**SEMESTER**	**DATE OF COMPLETION**
Chemistry Laboratory Management	KIP 6205	Analysis Chemistry	2	4	
AUTHORIZATION	**Lesson Plan Developer**		**MPK Coordinator**		**HEAD OF STUDY PROGRAM**
	Dra. Regina Tutik P., M.Si		Sunarto, M. Si.		Sukisman Purtadi, M.Pd.

Learning Outcomes (LO)	**LO-Study Program**	
	LO-1	The graduates of Chemistry Education Study Program can demonstrate the spirit of religiousness, moral, ethics, and Indonesian character in life within the society, the state, and the country
	S	A.8. embodying academic values, norms, and ethics;
		A.9. demonstrating accountability on the job of respective expertise independently; and
		A.10. having the sincerity, commitment, determination to develop the students' attitudes, values, and abilities based on the values of local wisdom, as well as having the motivation to act for the benefit of the students and society in general
	LO-3	The graduates of Chemistry Education Study Program cam apply the concepts, principles, laws, and theories of Chemistry, as well as the science, education and Chemistry education that are continuously improving as a part of lifelong learning
	P	C.1. mastering theoretical concepts on chemical structure, dynamics, and energy, as well as the basic principles of separation, analysis, synthesis, and charaterization
		C.2. applying chemistry knowledge in various cases
	LO-4	The graduates of Chemistry Education Study Program can adapt scientific work skills and learning that are

		continuously improving in lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. being able to apply logical, critical, systematic, and innovative thinking in the context of science and technology development or implementation that pays attention to and apply humanities values that are in line with the respective expertise;
		D.2. being able to study the implications of the science and technology development or implementation that pays attention to and apply humanities values that are in line with the respective expertise based on the scientific principles, procedure, and ethics in order to generate solutions, ideas, designs, or art criticisms;
		D.4. being able to make decisions accurately in the context of solving problems in the respective field based on the result of analysis of information and data;
		D.5. being able to document, save, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Chemistry Education Study Program can adapt critical and creative thinking in solving problems related to personal and professional life
		E.1. being able to demonstrate independent, quality, and measured work performance;
		E.2. being able to maintain and develop good professional network with the supervisor, colleagues, and peers both inside and outside the institution;
		E.3. taking responsibility for the achievement of group work and supervising as well as evaluating the completion of work assigned to workers under their authority;
		E.4. carrying out a process of self-evaluation of work groups under their authority, and being able to manage the class independently
	KK	-
	CP – MK	
	CO – 1 CO - 2	Students are able to work safely in the laboratory (A8, A9, A10, D1, D2, E1, E2, E3, E4) Students are able to administer correct performance assessments in laboratories (A8, A9, A10, C2, E1)
	CO - 3	Students are able to master theories regarding (1) definitions, objectives, and scopes of laboratory management, (2) laboratory defintions and functions, (3) laboratory design and layout, (4) equipment management, (5) material management, (6) criteria for selecting equipment, (7) work safety in laboratories, (8) conducting learning assessment in laboratories, (9) laboratory waste management, (10) hazardous experimental techniques, and (11) MSDS (C1, C2, D1, D2, D3, D4, D5)
	CO - 4	Students are able to manage laboratory equipment and materials well, calibrate and use laboratory equipment, and are skilled at preparing solutions and reagents (C1, C2, E1, E2, E3, E4)
Course Description	This course discusses (1) definitions, objectives, and scopes of laboratory management, (2) laboratory defintions and functions, (3) laboratory design and layout, (4) equipment management, (5) material management, (6) criteria for selecting equipment, (7) work safety in laboratories, (8) conducting learning assessment in laboratories, (9) laboratory waste management, (10) hazardous experimental techniques, and (11) MSDS	

Learning Material/Topic	1. Definitions, objectives, scopes of laboratory management, learning process, lecture contract, and laboratory rule of conduct 2. Laboratory defintions and functions 3. Laboratory design and layout 4. Types and functions of equipment 5. Equipment management 6. Criteria for selecting equipment 7. Conducting learning assessment in laboratories 8. Types, properties, and organization of materials 9. Solutions and reagents preparation 10. Work safety in laboratories 11. Laboratory waste management 12. Hazardous experimental techniques 13. MSDS	
References	**Main Source**	
	U.1. Djupri Padmawinata, dkk. (1983). *Pengelolaan Laboratorium IPA*. Jakarta: P2LPTK, Depdikbud U.2. Sumanto Imam Khasani, Keselamatan Kerja di Laboratorium, Gramedia	
	Supplement	
	P.1. Archenhold, et all. (1978). *School Science Laboratories, A Handbook of Design Management and Organization*. London : John Murray P.2. Everet, K. & Hughes, D. (1979). *A Guide to Laboratory Design*, London : Butterworths P.3. L. Tobing, Rangke. (1972). *Penuntun Demonstrasi dan Praktikum Sederhana dalam Ilmu Kimia*. Medan : Monora P4. Manufacturing Chemists Association. (1972). *Guide for Safety in The Chemical Laboratory.* New York : Van Nostrand Reinhold Company	
Learning Media	**Software**	**Hardware**
	-	Whiteboard and stationery
Team-Teaching	-	
Prerequisite Course	Basics of Analytical Chemistry	

Learning Activities

Week	Sub-Learning Outcomes-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Material (Reference)	Assessment Weight (%)
1	L1. Students are able to master theoretical concepts on definitions, objectives, and scope of laboratory management (M2)	Explaining the definitions, objectives, and scope of laboratory management	**Assessment criteria:** Accuracy of the answer **Assessment Form:** Written test **Assessment Instrument:** Test Items	Contextual Instruction (TM : 1 x (2 x 50'))	definitions, objectives, and scope of laboratory management (M2) (U1, U2, P1, P2, P3, P4)	3%
2	L2. Students are able to master theoretical concepts on definitions and functions of laboratory (M2)	Explaining the definitions and functions of a laboratory	**Assessment criteria:** Accuracy of the answer **Assessment Form:** Written test, Observation **Assessment Instrument:** Test Items, observation sheets, assessment rubric	Contextual Instruction (TM : 1 x (2 x 50') Designing an ideal laboratory layout (BT-BM : 2 x (2 x 60'))	Definitions and functions of ideal laboratory design and layout (U1, U2, P1, P2, P3, P4)	6%
	L3. Students are able to create an ideal laboratory design and layout (M2)	Developing ideal laboratory design and layout				
3	L4. Students are able to explain the types and functions of laboratory equipment (M2)	Explaining the types and functions of laboratory equipment	**Assessment criteria:** Accuracy of the answer **Assessment Form:** Written test **Assessment Instrument:** Test Items	Contextual Instruction (TM : 1 x (2 x 50'))	Types and functions of laboratory equipment (U1, U2, P1, P2, P3, P4)	3%
4	L5. Students are able to manage practicum equipment based on procedures (M3)	Managing practicum equipment based on procedures (M3)	**Assessment criteria:** Accuracy of the answer **Assessment Form:** Written test **Assessment Instrument:** Test Items	Contextual Instruction (TM : 1 x (2 x 50'))	Proper management of practicum tools (U1, U2, P1, P2, P3, P4)	3%
5	L6. Students are able	Selecting the right	**Assessment criteria:**	Contextual Instruction	Selection of the	3%

Week	Sub-Learning Outcomes-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Material (Reference)	Assessment Weight (%)
	to select the right equipment according to their needs and available funds (M2, M3)	equipment according to their needs and available funds	Accuracy of the answer **Assessment Form:** Written test **Assessment Instrument:** Test Items	(TM : 1 x (2 x 50'))	right equipment according to their needs and available funds (U1, U2, P1, P2, P3, P4)	
6	L7. Students are able to conduct activities in the laboratory (M1)	Assessing laboratory activities	**Assessment criteria:** Accuracy of the answer **Assessment Form:** Written test **Assessment Instrument:** Test Items	Contextual Instruction (TM : 1 x (2 x 50'))	Assessment of laboratory activities (U1, U2, P1, P2, P3, P4)	3%
7	Mid-Term Exam			Written Exam (TM : 1 x (2 x 50')		25%
8-9	L8. Students are able to manage materials correctly (M2, M3)	Managing ingredients according to their nature	**Assessment criteria:** Accuracy of answer **Form of Assessment:** Written test **Assessment Instrument:** test items	Contextual Instruction (TM : 2 x (2 x 50')	Material management according to its nature (U1, U2, P1, P2, P3, P4)	3%
10	L9. Students are able to prepare solutions and reagents (M3)	Making solutions and reagents	**Assessment criteria:** Accuracy of answer **Form of Assessment:** Written test **Assessment Instrument:** test items	Contextual Instruction (TM : 1 x (2 x 50')	The Creation of reagents and solutions (U1, U2, P1, P2, P3, P4)	3%
11	L10. Students are able to work safely in laboratories (M1)	Identifying the equipment needed and the attitude taken to work safely	**Assessment criteria:** Accuracy of answer **Form of Assessment:**	Contextual Instruction (TM : 1 x (2 x 50')	The equipment and attitude needed to work	3%

Week	Sub-Learning Outcomes-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Material (Reference)	Assessment Weight (%)
			Written test **Assessment Instrument:** test items		safely (U1, U2, P1, P2, P3, P4)	
12-13	L11. Students are able to manage laboratory waste (M1, M2)	Managing waste properly	**Assessment criteria:** Accuracy of answer **Form of Assessment:** Written test, observation **Assessment Instrument:** test items**,** observation sheet, assessment rubric	Contextual Instruction (TM : 1 x (2 x 50') Assignment 2: Conducting observations in research/school/hospital laboratories and writing reports. (BT-BM: 2 x (2 x 60 '))	Waste management (U1, U2, P1, P2, P3, P4)	6%
14	L12. Students are able to explain hazardous experiment techniques (M2)	Explaining hazardous experiment techniques	**Assessment criteria:** Accuracy of answer **Form of Assessment:** Written test **Assessment Instrument:** test items	Contextual Instruction (TM : 1 x (2 x 50')	Hazardous experiment techniques (U1, U2, P1, P2, P3, P4)	3%
15	L13. Students are able to recognize material safety data sheets (M2)	Recognizing the material safety data sheet (MSDS)	**Assessment criteria:** Accuracy of answer **Form of Assessment:** Written test, observation **Assessment Instrument:** test items**,** observation sheet,	Contextual Instruction (TM : 2 x (2 x 50') Assignment 3: Investigating the MSDS of a chemical and	MSDS (U1, U2, P1, P2, P3, P4)	6%

Week	Sub-Learning Outcomes-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Material (Reference)	Assessment Weight (%)
			assessment rubric	present it. (BT-BM: 2 x (2 x 60 '))		
16	Final Exam			Written Exam (TM : 2 x (2 x 50')		30%

ASSESSMENT

No.	Components	Weight
1.	Classroom Activities	10%
2.	Assignments	35%
3.	Mid-Term Exam	25%
4.	Final Exam	30%
	Total	100%

Student Mark = $\frac{(Score\ of\ Classroom\ Activity\ x\ 10)+(Score\ of\ Assignments\ x\ 35)+(Score\ of\ Mid-Term\ Exam\ x\ 25)+(Score\ of Final\ Exam\ x\ 30)}{100}$

Entrepreneurship Education

	UNIVERSITAS NEGERI YOGYAKARTA **FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM** **JURUSAN PENDIDIKAN KIMIA / PROGRAM STUDI PENDIDIKAN KIMIA**					
RENCANA PEMBELAJARAN SEMESTER						
MATAKULIAH		**KODE**	**RUMPUN MK**	**BOBOT (SKS)**	**SEMESTER**	**TGL PENYUSUNAN**
Entrepreneurship		MKU 6212		2	II	
OTORISASI		**Dosen Pengembang RPS**		**Koordinator MPK**		**Ka PRODI**
		Ir. Endang Dwi Siswani, M.T.		Sukisman Purtadi, M.Pd.		Sukisman Purtadi, M.Pd.
Capaian Pembelajaran (CP)	**CPL- PRODI**					
	ELO-1	The graduates of Chemistry Education Study Program can demonstrate the spirit of religiousness, moral, ethics, and Indonesian character in life within the society, the state, and the country				
	S	A.8. embodying academic values, norms, and ethics;				
		A.9. demonstrating accountability on the job of respective expertise independently; and				
		A.10. having the sincerity, commitment, determination to develop the students' attitudes, values, and abilities based on the values of local wisdom, as well as having the motivation to act for the benefit of the students and society in general				
	ELO-2	The graduates of Chemistry Education Study Program can demonstrate outonomy work in indi				
		B.1. master basic knowledge of entrepreneurship				
		B.2. master entrepreneur skill				
		B.3. internalize outonomy, struggling, and entrepreneurship spirit and attitude;				
	P	-				
	KU	-				
	KK	-				

	CP – MK	
	M1	Students are able to demonstrate responsible dan collaborative attitude, also do the task autonomosly (A.8, A.9, A.10).
	M2	Students are able to apply theoretical concepts on being entrepreneur, thinking for changing, creative thinking, act orientation, risk taking, leaderships, bussines ethics, x-factor, marketing, starting new bussines (B.1. B.2, B.3)
Deskripsi Singkat MK	Mata kuliah ini bertujuan membekali mahasiswa: membangun **spirit/jiwa dan karakter wirausaha**, memahami **konsep kewirausahaan**, dan melatih keterampilan/skill berwirausaha. Cakupan materi matakuliah ini meliputi: pengembangan spirit/jiwa dan karakter wirausaha, motivasi berprestasi, berpikir kreatif, hakekat kewirausahaan, etika bisnis dan tanggungjawab sosial, mencari gagasan baru, manajemen produksi, keuangan, pemasaran dan SDM, peluang usaha, *bussines plan*.	
Materi Pembelajaran/ Pokok Bahasan	1. Being entrepreneur 2. thinking for changing, 3. creative thinking, 4. act orientation, 5. risk taking, 6. leaderships, 7. bussines ethics, 8. x-factor, 9. marketing, 10. starting new bussines	
Pustaka	**Utama**	
	U.1. Rhenald Kasali, Dkk (2010), Modul Kewirausahaan, Penerbit Hikmah (PT Mizan Publika), Jakarta	
	Pendukung	
	P.1. Buchari Alma. (2006). *Kewirausahaan*. Edisi kesepuluh. Bandung: Alfabeta P.2. Geoffrey G. Meredith dkk. (1996) *Kewirausahaan, Teori dan Praktek*. Edisi kelima. Jakarta: PT Pustaka Binaman Pressindo. P.3. Justin G. Longenecker dkk.(2001). *Kewirausahaan Manajemen Usaha Kecil*. Jakarta: PT. Salemba Empat Patria. P.4. Rusman Hakim. (1998). *Kiat Sukses Berwiraswasta.* Edisi Kedua. *Jakarta*: PT Elex Media Media Komputindo.	
Media Pembelajaran	**Perangkat Lunak**	**Perangkat Keras**
	File PPT	LCD, Spidol, *White Board*, Laptop
Team-Teaching	-	
Matakuliah Syarat	-	

Learning Activities

Week	Sub Learning Outcomes	Indicators	Criteria and Format Assessment	Learning Method (Time Allocation)	Learning Materials (Literatures)	Score Weight (%)
1	L.1. Students understand the meaning of 'Entrepreneurship', an entrepreneur's character, types of entrepreneur and instill students' desire to run an entrepreneurship (M2).	Students are able to explain correctly about entrepreneurship's meaning, an entrepreneur's character, types of entrepreneur and students have desire to run an entrepreneurship.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 1 x (2 x 50'))	a. Learning Contract (commitment,togetherness, communication system, sylabbus) b. Chapter I. *Menjadi Wirausaha* (U.1, P.1)	2%
2,3	L.2. Students understand the importance of thinking about change, mindset, understand the mindset of entrepreneurship and understand the financial intelligence theory (M2).	Students are able to explain correctly about the importance of thinking about change, role of entrepreneurship mindset and financial intelligence theory	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 2 x (2 x 50'))	Chapter II. *BerpikirPerubahan* (U.1, P.1)	4%
4,5	L.3. Students understand that creativity is the basic of an entrepreneur; understand the obstacles in creative thinking;, understand how to measure the potential of creativity, and understand how	Students are able to explain the importance of creativity for an entrepreneur correctly, are able to explain correctly the obstacles of creative thinking that can hinder the progress of a business, can explain correctly about how to increase	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 2 x (2 x 50'))	Chapter III. Berpikir Kreatif (U.1, P.2, P.3)	4%

Week	Sub Learning Outcomes	Indicators	Criteria and Format Assessment	Learning Method (Time Allocation)	Learning Materials (Literatures)	Score Weight (%)
	to enhance the creativity (M1).	creativity and set free from bondage.				
6	L.4. Students understand about the character that is action-oriented, as well as the attitudes, and actions that need to be acquired to become individuals who are action-oriented (M2).	Students are able to explain correctly the character of action-oriented, attitudes and actions that need to be acquired to become an action-oriented person.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 1 x (2 x 50'))	Chapter IV. Berorientasi Pada Tindakan (U.1,P.2-P.4)	4%
7	L.5. Students understand about: the concept of risks, how risk taking needs to be done, the potential risks that occur when starting a business, and how to manage the risks (M2).	Students are able to explain correctly about the concept of risks, how risk taking needs to be done, the potential risks that occur when starting a business, and how to manage the risks.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 1 x (2 x 50'))	Chapter V. Pengambilan Risiko (U.1,P.2-P.4)	2%
8	Mid Test			Written Exam (TA : 1 x (2 x 50'))		30%
9	L.6. Students understand about: the importance of leadership for an entrepreneur, the differences between a manager and a leader, and the theory of early leadership (M2).	Students are able to explain correctly about the importance of leadership for an entrepreneur, about the differences between a manager and a leader, and the theory of early leadership.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Question and Answer (TA : 1 x (2 x 50'))	Chapter VI. Kepemimpinan (U.1, P.1, P.2)	2%
10	L.7. Students understand about: the	Students are able to explain correctly about the	**Assessment Criteria:** Accuracy, Logical Thinking	Lectures and Question and Answer	Chapter VII. Etika Bisnis	2%

Week	Sub Learning Outcomes	Indicators	Criteria and Format Assessment	Learning Method (Time Allocation)	Learning Materials (Literatures)	Score Weight (%)
	role of ethics in business and "the secrets" of long-term success (M2).	role of ethics in business, and about the "secrets" of long-term success.	**Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	(TA : 1 x (2 x 50'))	(U.1, P.1)	
11	L.8. Students understand about: the "X" factors, how to find and explore the "X" factors, and attitudes towards the "X" factors (M2).	Students are able to explain correctly about the notion of "X" factors, how to find and explore the "X" factors, and attitudes towards the "X" factors.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Discussion and Assignment (TM : 1 x (2 x 50')) Task: Illustration of 2 kiosks with the same type of business is presented, students are asked to analyze the factors that affect both profit and loss. (BM : 1 x (2 x 50')	Chapter VIII. Faktor "X" (U.1)	2%
12	L.9. Students understand about: ways to look for new ideas, about the various types of groups of business fields (creative, consultative, service and analytical) (M2).	Students are able to explain correctly about ways to look for new ideas, about the various types of groups of business fields (creative, consultative, service and analytical)	**Assessment criteria:** Accuracy, LogicalThinking **Form of Assessment:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and assignments (TM : 1 x (2 x 50')) Task: Make new ideas of creative business papers (BM : 1 x (2 x 50')	Chapter IX. Mencari Gagasan Usaha (U.1, P.2-P.4)	4%
13	L.10. Students understand about: concepts of marketing, marketing's strategies and tactics (M2).	Students are able to explain correctly about concepts of marketing, marketing's strategies and tactics.	**Assessment criteria:** Accuracy, LogicalThinking **Form of Assessment:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and assignments (TM : 1 x (2 x 50')) Task : Analyzing the marketing tactics of several business illustrations (BM : 1 x (2 x 50')	Chapter X. Pemasaran (U.1, P.3, P.4)	4%

Week	Sub Learning Outcomes	Indicators	Criteria and Format Assessment	Learning Method (Time Allocation)	Learning Materials (Literatures)	Score Weight (%)
14, 15	L.11. Students understand the steps on starting a new business (M2).	Students are able to explain correctly about steps on starting a new business.	**Assessment Criteria:** Accuracy, Logical Thinking **Assessment Form:** Test (Oral and Written Quiz) **Assessment Instrument:** Questions	Lectures and Assignments (TA : 2 x (2 x 50')) Task : Making a PKM-K proposal (BM : 1 x (2 x 50')	Chapter XI. *Memulai Sebuah Usaha* (U.1, P.1, P.3, P.4)	10%
16	Final Examination			(TM : 1 x (2 x 50'))		30%

ASSESSMENT

No.	Evaluation Components	Weight
1.	Assignments	20%
2.	Mid Term Examination	30%
3.	Final Term Examination	30%
4.	Activities	20%
	Total	100%

$$\text{Students' Score} = \frac{(Assignment\ score x 30) + (Activity x 10) + (MidTest score x 30) + (FinalTest x 30)}{100}$$

Entrepreneurship On Education Based On It Courses

UNIVERSITAS NEGERI YOGYAKARTA **FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM** **JURUSAN PENDIDIKAN KIMIA / PROGRAM STUDI PENDIDIKAN KIMIA**					
RENCANA PEMBELAJARAN SEMESTER					
MATAKULIAH	**KODE**	**RUMPUN MK**	**BOBOT (SKS)**	**SEMESTER**	**TGL PENYUSUNAN**
Wirausaha Pembelajaran Berbasis IT	MPK 6218	Mata Kuliah Kependidikan Kimia	2	Gasal (pilihan)	
OTORISASI	**Dosen Pengembang RPS**		**Koordinator MPK**		**Ka PRODI**
	Jaslin Ikhsan, Ph.D		Dr. Das Salirawati, M.Si.		Sukisman Purtadi, M.Pd.

Capaian Pembelajaran (CP)	**CPL- PRODI**	
	ELO-1	The graduates of Chemistry Education Study Program can demonstrate the spirit of religiousness, moral, ethics, and Indonesian character in life within the society, the state, and the country
	S	A.8. embodying academic values, norms, and ethics;
		A.9. demonstrating accountability on the job of respective expertise independently; and
		A.10. having the sincerity, commitment, determination to develop the students' attitudes, values, and abilities based on the values of local wisdom, as well as having the motivation to act for the benefit of the students and society in general
	ELO-2	The graduates of Chemistry Education Study Program can demonstrate outonomy work in indi
		B.1. master basic knowledge of entrepreneurship
		B.2. master entrepreneur skill
		B.3. internalize outonomy, struggling, and entrepreneurship spirit and attitude;
	ELO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong

		learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	ELO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies the value of humanities in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of the humanities in accordance with their expertise based on rules, procedures and scientific ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis
	ELO-5	D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
		The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently
	KK	-
	CP – MK	
	M1	demonstrate an attitude of responsibility and independence in carrying out the given tasks as prospective chemistry teacher in high school, and understand the principles of entrepreneurship

	M2	describe the characteristics and develop Chemistry learning media for Computer Assisted Instruction (CAI), Web-Based Learning (WBL), and Mobile-Based Learning (MBL) including: CAI 5, CAI 6, CAI 7, MBL 9, MBL 10, MBL 11 , and WBL 8; understand the steps to validate Chemistry learning media 12 and understand the procedures for producing Chemistry learning media 13; and understand the tips for marketing Chemistry learning media
	M3	understand the role of ICT as an alternative solution to the problem of effective Chemistry learning in high school / vocational school based on the results of field observations and studies of relevant research results
Deskripsi Singkat MK	Through this course students are prepared to design and produce IT-based learning media in the form of multimedia applications, games, virtual labs. The learning materials include identification of chemistry learning problems in high school and university, identification of alternative learning solutions through IT-based media, identification of CAI learning support media, website-based learning, and mobile-based learning, development of audio-visual learning media, web 2.0-based learning media and html5, and Android, IOS-based media, media validation, media production, and media marketing.	
Materi Pembelajaran/ Pokok Bahasan	1. include identification of chemistry learning problems in high school and university, 2. identification of alternative learning solutions through IT-based media, 3. identification of CAI learning support media, 4. website-based learning, and mobile-based learning, 5. development of audio-visual learning media, web 2.0-based learning media and html5, and 6. Android, IOS-based media, 7. media validation, 8. media production, 9. media marketing.	
Pustaka	**Utama**	
	U.1. Azhar Arsyad. (1997). Media Pengajaran. Jakarta : Grafindo. U.2. Arief S. Sadiman, dkk. (1993). Media Pendidikan. Pengertian, Pengembangan dan Pemanfaatannya. Jakarta: Pustekkom dan PT Raja Grafindo Persada.	
	Pendukung	
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Media Pembelajaran	**Perangkat Lunak**	**Perangkat Keras**
	File PPT, flash CS6, Sigil dan/atau flipper, construct2	LCD, Spidol, *White Board*
Team-Teaching	-	
Matakuliah Syarat	Kimia Dasar	

Learning Activities

Week(s)	Sub-CP-MK (achievement course)	Indicator	Assessment Form and Criteria	Learning Method (Time Allocation)	Learning Materials (References)	Assessment' weights (%)
1	L.1. Students understand the overview of lecture content, competencies to be achieved, learning and assessment techniques	-	-	Information Discussion, Brainstorming (TM: 1 x (2 x 50 '))	Course overview covers (1) the objectives of lectures, (2) learning materials, (3) assessment systems, (4) lecture assignments (U.1, U.2, P.1 - P.20)	-
2	L.2. Students are able to understand the principles of entrepreneurial learning (M1)	a. Mastered the definition of entrepreneurship b. Identification of entrepreneurial opportunities in the field of chemistry education and learning c. Understanding the principles of entrepreneurship in the field of chemistry learning	**Assessment criteria:** Accuracy, depth of analysis **Form of Assessment:** Non Test and Test (quiz) **Assessment Instrument:** Evaluation rubric of study results and written questions	Information Discussion, Brainstorming (TM: 1 x (2 x 50 ')) Task 1 Reviewing papers in international journals (2 papers) (BT-BM: 2 X (2 X 60 '))	a. Definition of entrepreneurship b. Entrepreneurial opportunities in education and learning c. The principle of entrepreneurship in the field of chemistry learning (U.1, U.2, P.1 – P.25)	5%
3	L.3. Students are able to understand the role of ICT as an alternative solution to learning problems (M3)	a. Identification of educational problems by students b. The realization of the idea of alternative ICT-based solutions to educational problems by students c. Understanding of	**Assessment criteria:** Accuracy **Form of Assessment:** Test (quiz) **Assessment Instrument:** Written question	Expository and Discussion (TM: 1 x (2 x 50 '))	a. Identification of education and learning problems b. Utilization of ICT in education at home and abroad	5%

Week(s)	Sub-CP-MK (achievement course)	Indicator	Assessment Form and Criteria	Learning Method (Time Allocation)	Learning Materials (References)	Assessment' weights (%)
		government policies related to the role of ICT in education and learning d. Realizing the importance of ICT in chemistry education and learning.			c. Indonesian government policy on the role of ICT in chemistry education and learning (U.1, U.2, P,1, P.5,P.22)	
4	L.4. Students are able to describe the characteristics of chemistrylearning media such as Computer Assisted Instruction (CAI), Web-Based Learning (WBL), and Mobile-Based Learning (MBL) (M2).	a. Understanding of several ICT-based unconventional learning models: CAI, WBL, and MBL b. Identifying relevant types of media for ICT-based unconventional learning	**Assessment criteria:** Accuracy, collaboration skills **Form of Assessment:** Non-Test and Test (quiz) **Assessment Instrument:** Rubric assessment for cooperation skills and written questions	Cooperative Learning (TM : 1 x (2 x 50'))	a. ICT-based learning models b. Media supporting the implementation of ICT-based learning models (U.1, U.2)	5%
5	L.5. Students are able to develop Audio Video media for chemistry learning through CAI (M2).	a. Developing chemistry learning video scenarios b. Completing a video development project c. Obtaining a chemistry learning video	**Assessment criteria:** Product quality (video), process skills **Form of Assessment:** Non-Test **Assessment Instrument:** Assessment rubric for product skills and product assessment	*Cooperative Project Based Learning* (guided practicum, online tutorials, presentation) (TM : 1 x (2 x 50')) Task 1 Develop a chemistry learning video (BT-BM: 1 X (2 X 60'))	a. Preparation of learning video scenarios b. Development of chemistry learning videos (U.1, U.2)	5%
6,7	L.6. Students are able to develop 3-dimensional media	a. Arranging storyboard and flowchart of 3D chemistry media	**Assessment criteria:** Product quality (3D media), process skills	*Cooperative Project Based Learning* (guided practicum, online	a. Compilation of 3D media storyboards	7%

Week(s)	Sub-CP-MK (achievement course)	Indicator	Assessment Form and Criteria	Learning Method (Time Allocation)	Learning Materials (References)	Assessment' weights (%)
	for chemistry learning through CAI (M2).	b. Completing 3D media development project, and c. Acquired 3-D chemical media.	**Form of Assessment:** Non Test (observasi) **Assessment Instrument:** Assessment rubric for product skills and product assessment	tutorials, presentation) (TM : 2 x (2 x 50')) Task 2 Developing 3-dimensional chemistry learning media (BT-BM: 2 X (2 X 60'))	and flowcharts b. Development of 3-dimensional chemical media (U.1, U.2, P.23)	
8	L.7. Students are able to develop animation media for chemistry learning through CAI (M2).	a. Compilingstory board and flow chart ofchemistry animation media b. Completing of animation media development project, and c. Obtaining chemistry animation media	**Assessment Criteria:** Product quality (chemistry animation media), process skills **Assessment Form:** Non Test (observation) **Assessment Instrument:** Process skills assessment rubric and product assessment	*Cooperative Project Based Learning*(guided practice, online tutorial, presentation) (TM : 1 x (2 x 50')) Task 3 Developing chemistry animation media (BT-BM: 1 X (2 X 60'))	a. Compilation of story board and flow chart animation media through CS6 b. Development of animation media through Flash CS6 application	7%
9	L.8. Students are able to develop HTML5-based chemistry learning media for WBL (M2).	a. Compiling story board and flow chart of HTML5-web based chemistry media, b. Completing HTML5-web based chemistry media development project, and c. Obtaining HTML5-web based chemistry media.	**Assessment Criteria:** Product quality (HTML5-web based media), process skills **Assessment Form:** Non Test (observation) **Assessment Instrument:** Process skills assessment rubric and product assessment	*Cooperative Project Based Learning*(guided practice, online tutorial, presentation) (TM : 1 x (2 x 50')) Task 4 Developing HTML5-web based learning media (BT-BM: 1 X (2 X 60'))	a. Definition of HTML5 b. Development of HTML5-based chemistry learning media (U.1, U.2, P.22)	7%
10	L.9. Students are able	a. Compiling story board	**Assessment Criteria:**	*Cooperative Project Based*	a. Compilation of	7%

Week(s)	Sub-CP-MK (achievement course)	Indicator	Assessment Form and Criteria	Learning Method (Time Allocation)	Learning Materials (References)	Assessment' weights (%)
	to develop e-book media for MBL (M2).	and flow chart of e-book chemistry media, b. Completing e-book media development project, and c. Obtaining e-book chemistry learning media.	Product quality (e-book chemistry media), process skills **Assessment Form:** Non Test (observation) **Assessment Instrument:** Process skills assessment rubric and product assessment	*Learning*(guided practice, online tutorial, presentation) (TM : 1 x (2 x 50')) Task 5 Developing e-book chemistry learning media (BT-BM: 1 X (2 X 60'))	story board and flow chart of e-book media through Sigil application and/or flipper b. Development of e-book media through Sigil application and/or flipper (U.1, U.2)	
11, 12	L.10. Students are able to develop android-based media for MB	a. Compiling the story boards and flow charts of android-based media games with CS6 or construct2 b. Completing an Android-based game media development project with CS6 or construct2, and c. Obtaining android-based game media with CS6 or construct2.	**Assessment criteria:** Product quality (android-based game media), process skills **Form of Assessment:** Non Test (observation) **Assessment Instrument:** Process skills assessment product rubric and product assessment	*Cooperative Project Based Learning* (guided labs, online tutorials, presentations) (TM : 1 x (2 x 50')) Task 6 Develop android-based game media (BT-BM: 1 X (2 X 60'))	a. Arranging the story board and flow chart of android-based media games with CS6/construct2 b. Developing the android-based media game with CS6/construct2 (P.7-P.11, P.15-20, P.24)	7%
13	L.11. Students are able to understand the steps in the chemistry learning media validation (M2).	The operational steps of validation of one of the mediums that have been developed are described	**Assessment criteria:** Accuracy **Form of Assessment:** Test (quiz) **Assessment Instrument:** Written question	Expository and Brainstorming (TM : 1 x (2 x 50'))	a. Validation principles b. Step validation of chemistry learning media (U.1, U.2, P.1-P.25)	5%

Week(s)	Sub-CP-MK (achievement course)	Indicator	Assessment Form and Criteria	Learning Method (Time Allocation)	Learning Materials (References)	Assessment' weights (%)
14	L.12. Students are able to understand the chemical learning media production procedures (M2).	The resulting media according to its type	**Assessment criteria:** Accuracy **Form of Assessment:** Test (quiz) **Assessment Instrument:** Written question	Expository and Brainstorming (TM : 1 x (2 x 50'))	Production of ICT-based chemistry learning media (U.1, U.2, P.1-P.25)	5%
15	L.13. Students are able to understand the chemistry learning media marketing tips (M2).	a. Increasing the lobbying capabilities b. Identifying the market potential of chemical learning media products c. Mastering marketing techniques of chemical learning media products	**Assessment criteria:** Accuracy, communication skills **Form of Assessment:** Non Test **Assessment Instrument:** Essay assessment rubric and communication skills	Expository, Brainstorming, Discussion (Presentation) (TM : 1 x (2 x 50')) Task 7 Make an essay about the market potential and marketing techniques of chemical learning media products (BT-BM: 1 X (2 X 60'))	a. Product marketing b. Government policies in the field of small and medium entrepreneurs (U.1, U.2, P.1-P.25)	5%
16	Final Exam			(TM : 1 x (2 x 50'))		30%

ASSESSMENT

No.	Evaluation Component	Percentage
1.	Activity	10%
2.	Task	60%
3.	Final Exam	30%
	Total	100%

Students Score = $\frac{(Activity\ Score\ x\ 10)+(Task\ Score\ x\ 60)+(Final\ Exam\ Score\ x\ 30)}{100}$

Review of Chemical Curriculum

	UNIVERSITAS NEGERI YOGYAKARTA **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **CHEMISTRY EDUCATION DEPARTMENT/ CHEMISTRY EDUCATION STUDY PROGRAMME**					
COURSE SPECIFICATION						
COURSE NAME		**COURSE CODE**	**COURSE CLASSIFICATION**	**WORKLOAD (SKS)**	**SEMESTER**	**DATE OF PREPARATION**
Review of Chemical Curriculum		MPK 6201	Educational Basis Subject	2	3	
AUTHORIZATION		**Course Spesification Developer**		**Module Coordinator**		**Coordinator of Study Programme**
		Dr. Das Salirawati		Dr. Das Salirawati, M.Si.		Sukisman Purtadi, M.Pd.
Learning Outcomes	**ELO**					
	ELO-1	The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life				
	S	A.8. Internalize academic values, norms and ethics				
		A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and				
		A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in				

		general
	ELO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	ELO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies the value of humanities in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of the humanities in accordance with their expertise based on rules, procedures and scientific ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	ELO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of

		work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently
	KK	-
	CO	
	M1	Students are serious in understanding the curriculum that applies in learning in Indonesia (A10, C3).
	M2	Students are able to master the ways of developing curriculum in the administration of education, in terms of objectives (competencies), content (materials), processes (methods), and evaluations, examines curriculum development in Indonesia and curricula that apply in Indonesia today, especially the chemistry curriculum (C3, D2).
	M3	Students are able to analyze the chemistry curriculum in junior and senior high schools, as well as the chemistry curriculum from countries in the world, design curriculum at the learning level in the form of Learning Implementation Plans (C3, D1, D2)
	M4	-
Brief Course Description	Through this course students are expected to be able to understand the development of the curriculum, design examples of curriculum component models and compile their syllabus, they are also expected to understand the implemented chemistry curriculum in certain level of the school.	
Content	1. Various views about the curriculum 2. The role of the teacher in curriculum development 3. Development of the curriculum in Indonesia 4. Curriculum K-13 5. Scientific Approach 6. Learning models in K-13 7. Study various chemistry curricula 8. Lesson plan based on K-13	

References	Basis	
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	Suggested Reading	
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	P.12. _____. (2015). *Materi Pelatihan Guru Implementasi Kurikulum 2013 Tahun 2015 SMA/SMK Mata Pelajaran Kimia*. Jakarta: Kemdikbud RI. P.13. Kemdiknas. (2003). *UU RI No. 20/2003 tentang: Sistem Pendidikan Nasional*. Jakarta: Depdiknas. P.14. _____ (2005). *PP RI No. 19/2005 tentang: Standar Nasional Pendidikan*. Jakarta: Depdiknas RI. P.15. _____ (2005). UU RI No. 14/2005 tentang: Guru dan Dosen. Jakarta: Depdiknas RI. P.16. Liliasari, et al. (1998). *Kurikulum dan materi kimia SMU*. Jakarta: UT.	
Learning Media	**Software**	**Hardware**
	Video PowerPoint	Laptop Whiteboard Projector
Team-Teaching	Dr. Das Salirawati, M.Si.; Dr. Antuni Wiyarsi, S.Pd.Si.,M.Sc.; Dina, S.Pd.,M.Pd.	
Pre-requisite Course	-	

Learning Activity

Week	Sub Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (References)	Weight (%)
1-2	L1. Students are able to explain various views of curriculums, foundations of curriculum development, curriculum components, and curriculum levels (M2).	Explaining various perspectives of curriculums, foundations of curriculum development, curriculum components, and curriculum levels (M2).	**Assessment Criteria:** Concept Comprehension **Assessment Form:** Written Test **Assessment Instrument:** Question Sheet	Lectures and questions and answers (TM : 1 x (2x 50') (BM-BT : 1 x (2 x 50')	Various views of curriculums (U2, P6, P16)	4%
3-4	L2. Students are able to analyze teacher's roles in curriculum development, system analysis, and implementation (M3).	Explaining about teacher's profession and competences as well as teacher's role in curriculum development.	**Assessment Criteria :** Concept comprehension **Assessment Form:** Written test **Assessment Instrument:** Question sheet	Lectures and discussions (TM : 1 x (2x 50') (BM-BT : 1 x (2 x 50')	Teacher' roles in curriculum development (U2, P6, P13-16.	4%
		Solving problems/cases related to system analysis.	**Assessment Criteria :** Concept comprehension	Group Discussion (TM : 1 x (2x 50')		5%

Week	Sub Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (References)	Weight (%)
			Assessment Form: Written test **Assessment Instrument:** Question sheet	(BM-BT : 1 x (2 x 50')		
5	L3. Students are able to analyze the development implemented curriculums in Indonesia (M2)	Explaining the development of the implemented curriculums in Indonesia.	**Assessment Criteria :** Concept comprehension **Assessment Form:** Written test **Assessment Instrument:** Question sheet	Lectures and discussions (TM : 1 x (2x 50') (BM-BT : 1 x (2 x 50')	CHAPTER III Curriculum Development in Indonesia (U2, P16).	4%
6-7	L4. Students are able to review the establishment of the 2013 Curriculum (K-13) and its various backgrounds (M2).	Explaining various backgrounds of the 2013 curriculum establishment and its elements of changes.	**Assessment Criteria :** Concept comprehension **Assessment Form:** Written test **Assessment Instrument:** Question sheet	Lectures and Questions and Answers (TM : 2 x (2x 50') (BT : 2 x (2 x 50')	The 2013 Curriculum (U2, P1, P5, P6, P9-P12)	4%
8	L5. Students are able to analyze the relationship among Core Competence, Basic Competence, and GPA (M3).	Showing the relationship among Core Competence, Basic Competence, and GPA based on the Education and Culture Minister Regulation	**Assessment Criteria :** Logic, Systematics, comprehensiveness **Assessment Form:** Non-test (Assignment) **Assessment Instrument:** Scoring Rubric	Lectures and assignments (TM : 1 x (2x 50') Assignment: Analyzing the relationship between Core Competence and Basic Competence based on Education and Culture Minister Regulation	Education and Culture Minister Regulation No 59, 103, 104 Year 2014 (P6, P7, P10)	5 %

Week	Sub Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (References)	Weight (%)
				(BM-BT : 1 x (2 x 50')		
9-10	L6. Students are able to analyze the implementation of scientific approach in the 2013 curriculum (M3).	Mastering scientific approach and its application by identifying the suitability of the learning video display with scientific approach components.	**Assessment Criteria :** Logic, Systematics, Comprehensiveness **Assessment Form:** Non-test (Product Assessment) **Assessment Instrument:** Scoring Rubric	Lectures and assignments (TM : 2 x (2x 50') Assignment: identifying the advantages and weaknesses of the learning videos and components of scientific approach (BM-BT : 2 x (2 x 50')	Scientific Approach (P3, P6, P8, P11).	5%
11-12	L7. Students are able to review various learning model recommended by the 2013 Curriculum (M3).	Showing the differences of learning models recommended by the 2013 Curriculum.	**Assessment Criteria :** Concept Comprehension **Assessment Form:** Written Test **Assessment Instrument:** Question Sheet	Lectures and assignments (TM : 2 x (2x 50') Assignment: Designing one of the samples of Chemistry learning model using the recommended models by the 2013 curriculum (BM-BT : 2 x (2 x 50')	The 2013 curriculum learning models K-13 (P3, P7, P9-P11).	4%
		Demonstrating the designs of chemistry learning models recommended by the 2013 Curriculum.	**Assessment Criteria :** Logic, Systematics, Comprehensiveness **Assessment Form:** Non-test, performance test **Assessment Instrument:** Scoring rubric of concept structure and comparison between a theoretical concept and			5%

Week	Sub Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (References)	Weight (%)
			its implementation			
13-15	L8. Students are able to analyze the Chemistry curriculum of Integrated Science subject in junior high schools and senior high schools Chemistry curricula used around the world (M3).	Analyzing four components of Chemistry curriculum used in a country.	**Assessment Criteria :** Logic, Systematics, Comprehensiveness **Assessment Form:** Non-test, result of review **Assessment Instrument:** Scoring Rubric	Lectures and assignments (TM : 3 x (2x 50') Assignment 1 : Criticizing junior high school chemistry curriculum in Integrated Science subject and four components of senior high school chemistry including the goal, content, process (method), and evaluation from countries around the world. (BM-BT : 2 x (2 x 50')	Review of Various Chemistry Curriculum (U1, U2, P4-P8).	5%
		Presenting the results of a country chemistry curriculum analysis in groups	**Assessment Criteria :** Logic, Systematics, Comprehensiveness **Assessment Form:** Non-test (presentation). **Assessment Instrument:** Scoring rubric			10%
16	L9. Designing a complete curriculum at the level of learning in the form of Lesson Plan.	Developing lesson plans based the 2013 curriculum by taking one of Chemistry sub-topics in both junior and senior high schools	**Assessment Criteria :** Logic, Systematics, Comprehensiveness **Assessment Form:** Non-test, (lesson plans) **Assessment Instrument:** Scoring rubric	Lectures and assignments (TM : 1 x (2x 50') Task: developing lesson plans on one of Chemistry sub topics based on the 2013 curriculum (BM-BT : 1 x (2 x 50')	The 2013 Curriculum Lesson Plans (P3, P7-P14).	10%

Week	Sub Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (References)	Weight (%)
17	**FINAL EXAM**			Written Test (1x 90')		30%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

ASSESSMENT

No.	Component of Evaluation	Weight
1.	Assignment	30%
2.	Mid-term exam	20%
3.	Final exam	30%
4.	Activity	20%
	Total	100%

$$\text{Mark} = \frac{(Assignment\,x30) + (Activityx\ 20) + (Mid - termexamx20) + (Finalexamx30)}{100}$$

	UNIVERSITAS NEGERI YOGYAKARTA **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **CHEMISTRY EDUCATION DEPARTMENT/ CHEMISTRY EDUCATION STUDY PROGRAMME**

COURSE SPECIFICATION

COURSE NAME	COURSE CODE	COURSE CLASSIFICATION	WORK LOAD (SKS)	SEMESTER	DATE OF PREPARATION
Chemistry Learning Media	MPK 6202	Chemistry Education Subject	2	3	

AUTHORIZATION	Course Spesification Developer	Module Coordinator	Coordinator of Study Programme
	Erfan Priyambodo, M.Si	Dr. Das Salirawati, M.Si.	Sukisman Purtadi, M.Pd.

Learning Outcomes	**ELO**	
	PLO-1	The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life
	S	A.8. Internalize academic values, norms and ethics;
		A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and
		A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in general
	PLO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of

		chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
		C.4. Mastering the basics of scientific methods and the principles of using Information and Communication Technology (ICT) in learning chemistry.
	PLO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	PLO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of

		work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently
	KK	-
	CO	
	M1	Students mean business in designing innovative learning media (A8, A 10, C3)
	M2	Students are able to mention various types of learning media and their functions, plan chemistry learning media that is in accordance with the material contained in the chemical syllabus in schools (SMA / SMK), describe the production techniques of various chemical learning media (C3, D2).
	M3	Students are able to design media and apply learning media produced to explain the chemical concepts that exist in schools (SMK / SMK) (C3, D2, E1).
	M4	-
Brief Course Description	In this course we will discuss the meaning of learning media, the role and function of learning media, types of learning media, planning and selection of learning media, production techniques for learning media, learning media presentation techniques, and evaluation of learning media, which are specific to learning chemistry. It is expected that after completing this lecture students will be equipped with the use of learning media, especially the teaching and learning process in schools so that they can enhance the quality of the teaching and learning process which ultimately can improve the quality of learning outcomes	
Content	1. The scope of learning media 2. Classification of instructional media 3. Learning media selection techniques 4. Development of learning media with the ASSURE model 5. Visual media (graphics) in chemistry learning media 6. Audio-visual media in chemistry learning 7. Three-dimensional media (visual aids, real objects or models) in chemistry learning 8. Production of chemical learning media	

References	**Basis**		
	U.1. Azhar Arsyad. (1997). *Media Pengajaran*. Jakarta : Grafindo U.2. Arief S. Sadiman, dkk. (1993). *Media Pendidikan. Pengertian, Pengembangan dan Pemanfaatannya*. Jakarta: Pustekkom dan PT Raja Grafindo Persada U.3. Gerlach, Vernon S.; Ely, Donald P., and Rob Melnick. (1980). *Teaching and Media. A Systematic Approach*. New Jersey: Prentice-Hall, Inc U.4. Heinich, Robert et.a. (1993). *Instructional Media and the New Technologies of Instruction*. New York : Macmillan U.5, Erfan Priyambodo (2014) Media Pembelajaran Kimia : Pengembangan dan Pemanfaatannya. *Diktat Kuliah*.		
	Suggested Reading		
	-		
Learning Media	**Software**		**Hardware**
	Video PowerPoint		Laptop Whiteboard Projector
Team-Teaching	Marfuatun, S.Pd.Si.,M.Si.; Anggiyani Ratnaningtyas Eka Nugraheni, S.Pd.Si.,M.Pd.; Dina, S.Pd.,M.Pd.		
Pre-requisite Course	-		

Learning Activity

Week	Sub-Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (Reference)	Weight (%)
1	Students understand the lectures and the implemented system used in lectures.	-	-	Discussion, Brainstorming (TM : 1 x (1x50′)	Course Overview including (1) course objective, (2) syllabus, (3) Scoring system, and (4) course assignments	-
2	L1. Students understand the scope of Chemistry learning media (M2).	Understanding the importance of media in Chemistry learning	**Assessment Criteria:** Logic, Systematics, and Comprehensiveness **Assessment Form:** Written test (quiz), Non-test (journal review) **Assessment Instrument:** Scoring Rubric and question sheet	Expository (TM : 1 (2x 50′) (BM-BT : 1 x (2 x 50′)	The scope of learning media (U1, U2, U3, U5)	5%
3	L2. Students understand the classifications of Chemistry learning media.	Understanding the characteristics and use of learning media	**Assessment Criteria:** Logic, Systematics, and Comprehensiveness **Assessment Form:** Non-test (journal review) **Assessment Instrument:** Scoring Rubric	Expository (TM : 1 (2x 50′) Assignment: journal review on learning media classification (BM-BT : 1 x (2 x 50′)	Learning media classification (U1, U2, U3, U5).	5%

Week	Sub-Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (Reference)	Weight (%)
4	L3. Students understand the techniques for selecting media in Chemistry learning.	Understanding the main consideration and criteria for selecting learning media	**Assessment Criteria:** Logic, Systematics, and Comprehensiveness **Assessment Form:** Non-test (assignment) **Assessment Instrument:** Scoring Rubric	Expository (TM : 1 (2x 50') (BM-BT : 1 x (2 x 50')	Techniques for selecting learning media (U1, U2, U3, U5)	5%
5	L4. Students understand the techniques for developing Chemistry learning media.	Understanding the steps used in developing learning media based on ASSURE model	**Assessment Criteria:** Logic, Systematics, and Comprehensiveness **Assessment Form:** Non-test **Assessment Instrument:** Scoring Rubric	Expository (TM : 1 (2x 50') (BM-BT : 1 x (2 x 50')	Developing learning media using SSURE model (U4, U5).	5%
6-7	L5. Students understand the techniques for developing visual media.	Developing and using visual media in Chemistry learning	**Assessment Criteria:** Ideas, creativity, and concept comprehension **Assessment Form:** Non-test (media score) **Assessment Instrument:** Scoring Rubric	Expository, Tutorial, and Practicum (TM : 2 (2x 50') Assignment: designing visual media for Chemistry learning (BM-BT : 2 x (2 x 50')	Visual media (Graphic) in Chemistry learning (U2-U5)	10%
8	L6. Students understand the techniques for developing audio visual media.	Developing and using audio visual media in Chemistry learning	**Assessment Criteria:** Ideas, creativity, and concept comprehension **Assessment Form:** Non-test (media score) **Assessment Instrument:**	Expository, Tutorial, and Practicum (TM : 2 x (2x 50') Assignment: designing audio visual media for Chemistry learning	Audio visual media for Chemistry learning (U3-U5)	5%

Week	Sub-Learning Outcome-Course	Indicator	Assessment Criteria and Form	Learning Method (Estimated Time)	Learning Material (Reference)	Weight (%)
			Scoring Rubric	(BM-BT : 2 x (2 x 50′)		
9	MID-SEMESTER EXAM			Written Test (TM : 1 x 90′)		15%
10-11	L7. Students understand the techniques for developing three dimensional learning media.	Developing and using three dimensional learning media	**Assessment Criteria:** Ideas, creativity, and concept comprehension **Assessment Form:** Non-test (media score) **Assessment Instrument:** Scoring Rubric	Expository, Tutorial, and Practicum (TM : 2 (2x 50′) Assignment: designing three dimensional media for Chemistry learning (BM-BT : 2 x (2 x 50′)	Three dimensional media (realia, real things, or model) for Chemistry learning (U3-U5)	10%
12-15	L8. Students are able to develop learning media for Chemistry learning	Using media suitable for Chemistry lesson plans Using learning media to explain a Chemistry concept	**Assessment Criteria:** Systematics and comprehensiveness **Assessment Form:** Non-test (group assignment and presentation) **Assessment Instrument:** Scoring Rubric	Guided group practicum (TM : 3 x (2x 50′) Assignment: designing media suitable for one of the available media and using the developed media to explain Chemistry concepts (BM-BT : 3 x (2 x 50′)	Developing Chemistry Learning Media (U4, U5)	20%
16	**FINAL EXAM**			Written Test (1x100′)		30%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

ASSESSMENT

No.	Component of Evaluation	Weight

1.	Assignment	30%
2.	Mid-term exam	15%
3.	Final exam	30%
4.	Activity	25%
	Total	100%

$$\text{Mark} = \frac{(Assignment\,x30) + (Activityx\,25) + (Mid - termexamx15) + (Finalexamx\,30)}{100}$$

Instructional Strategies of Chemistry

UNIVERSITAS NEGERI YOGYAKARTA **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **DEPARTMENT OF CHEMISTRY EDUCATION / CHEMISTRY EDUCATION STUDY PROGRAMME**					
COURSE SPECIFICATION					
COURSE NAME	**CODE**	**COURSE CATEGORY**	**WORK-LOAD**	**SEMESTER**	**DATE OF PREPARATION**
Instructional Strategies of Chemistry	MPK 6303	Chemistry Subject Specific Educational Course (MKDK)	3 SKS	4	
AUTHORIZATION	**Course Spesification Developer**		**Module Coordinator**		**Coordinator of Study Programme**
	Dr. Das Salirawati, M.Si		Dr. Das Salirawati, M.Si.		Sukisman Purtadi, M.Pd.
Learning Outcomes	**Learning Outcome**				
	LO-1	The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life			
	S	A.8. Internalize academic values, norms and ethics;			
		A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and			
		A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local			

		wisdom values and noble values and have the motivation to act for the benefit of students and society in general
	LO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	LO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of

		work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently
	LO-6	The graduates of Bachelor of Education in Chemistry implement cooperative skills in conducting their duties and solving problems
	KK	F.2. being able to identify chemistry learning problems, and choose alternative solutions based on existing theories and research findings and implement them in guided research.
	Course Outcome	
	M1	Responsible to study chemical learning strategies to achieve teacher pedagogical competence (A9).
	M2	Describing the basic concepts of chemical learning strategies and problems in chemistry learning and various learning strategies, both in the form of approaches, methods, techniques, and learning models (C3, D2).
	M3	Mastering various basic teaching skills as a basis for planning learning strategies and developing learning models with scientific approaches (D4, 1, F2).
	M4	Applying appropriate learning strategies in dealing with unexpected situations a
Course Description	Through this course, students are expected to be able to plan learning strategies that are suitable for chemistry subjects in schools (high school, vocational) which include approaches, methods, techniques, models, and the ability to develop learning models with a scientific approach.	
Content	The course contains of the followings materials: understanding learning strategies, chemistry learning problems, basic teaching skills, public speaking, method approaches, techniques, and learning models, scientific approaches, learning models, strategies to face unexpected situations.	
References	**Basis**	
	U.1. Ad Rooijakkers. (1993). *Mengajar dengan sukses*. Jakarta: Grasindo. U.2. Hans-Dieter Barke, Al Hazari, & Sileshi Yitbarek. (2009). *Misconceptions in chemistry*. Heidelberg: Springer U.3. Hans-Dieter Barke, Gunther Harsch, & Siegbert Schmid. (2009). *Essentials of chemical education*. Heidenberg: Springer. U.4. John Vivian. (2008). *Teori Komunikasi Massa*. Jakarta: Kencana Prenada Media Group	

	U.5. Made Wina. (2011). *Strategi pembelajaran inovatif kontemporer: suatu tinjauan konseptual operasional*. Jakarta: Bumi Aksara. U.6. Mel Silberman. (2002). *Active learning : 101 Strategi pembelajaran aktif*. Yogyakarta : Yappendis. U.7. Moh. Uzer Usman. (2000). *Menjadi guru profesional.* Bandung: Remaja Rosdakarya. U.8. Munif Chatib. (2011). *Gurunya manusia*. Bandung: Mizan Media Utama. U.9. Neila Ramdhani. (2012). *Menjadi guru inspiratif*. Jakarta: titian Foundation Publisher. U.10. Onong Uchjana Effendy. (2007). *Ilmu Komunikasi: Teori dan Praktek*. Bandung: Remaja Rosdakarya. U.11. Paul Suparno. (2005). *Miskonsepsi & perubahan konsep pendidikan fisika*. Jakarta: Grasindo. U.12. Rob Batho, et. al. (2005). *Learning and teaching in secondary schools*. London: Bell & Bain Ltd. U.13. Syaiful Bahri Djamarah & Aswan Zain. (2010). Strategi belajar-mengajar. Jakarta: Rineka Cipta. U.14. Tresna Sastrawijaya. (1998). *Proses belajar-mengajar kimia*. Jakarta: Depdikbud	
	Suggested	
	P.1. Depdiknas. (2014). Permendiknas No. 103/2014 tentang Pembelajaran pada Pendidikan Dasar dan Pendidikan Menengah. Jakarta: Depdiknas.	
Learning Media	**Software**	**Hardware**
	Learning Video Power Point	Laptop Whiteboard Projector
Team-Teaching	-	
Pre-requisite Course	-	

Learning Activities

Week	Sub-LO-Course	Indicators	Criteria & Form of Assessment	Learning methods (Estimated time)	Learning Materials (Literature)	Assessment Weight (%)
1-2	L1. Students are able to describe the understanding of learning strategies & problems in learning chemistry (M1, M2).	Students are able to: 1. explain the understanding of learning strategies & their variables. 2. explain problems in learning chemistry.	**Assessment criteria:** Logic, systematics, completeness **Form of Assessment:** Written test (quiz) and Non-test (Assignment of problem analysis of chemistry learning). **Assessment Instrument:** Test items, Scoring rubric	Lectures and assignments (TM: 2 x (3 x 50 ') Task 1: analyzing the chemistry learning problems that occur in schools from various sources (BT-BM: 2 x (3 x 50 ')	Kimia (U2, U4, U9, U11) Definition of learning strategies. Problems in Chemistry Learning (U2, U4, U9, U11)	4%
3-5	L2. Students are able to master a variety of basic teaching skills as a basis for planning learning strategies (M3).	Students are able to determine the right basic skills selected in learning.	**Assessment criteria:** Concept comprehension **Form of Assessment:** Written test (quiz) **Assessment Instrument:** Test Items	Lectures and assignments (TM : 3 x (3 x 50') Discussion on various teaching skills (BT: 2 x (3 x 50')	Basic Teaching Skills (U1, U3, U12, U15).	4%
6-7	L3. Students are able to master the ability of public speaking to support successful learning (M3).	Students are able to explain the meaning & use of public speaking in learning.	**Assessment criteria:** Concept comprehension **Form of Assessment:** Written test (quiz) **Assessment Instrument:** Test Items	Lectures and Discussion (TM : 1 x (3 x 50')	*Public Speaking* (U4, U10)	4%

Week	Sub-LO-Course	Indicators	Criteria & Form of Assessment	Learning methods (Estimated time)	Learning Materials (Literature)	Assessment Weight (%)
		Mastering public speaking actively through practice.	**Assessment criteria:** Confidence, conceptual understanding, presentation accuracy **Form of Assessment:** Non-test (performance) **Assessment Instrument:** Observation sheet	Presentation (TM : 1 (1x150′)		10%
8	L4. Students are able to describe the understanding of approaches, techniques, methods, and learning models (M2).	Students are able to explain the differences in understanding of approaches, methods, techniques, & learning models.	**Assessment criteria:** Confidence, conceptual understanding, presentation acacuracy **Form of Assessment:** Written test (quiz) **Assessment Instrument:** Question Sheet	Lectures and Discussion (TM : 3 x (3 x 50′) Discussion on differences of approaches, methods, techniques, & learning models. (BT: 2 x (3 x 50′)	Approaches, methods, techniques, & learning models. (U5, U6, U13, U14)	4%
9	L5. Students are able to provide examples of approaches, methods, techniques & learning models (M2),	Students are able to show differences in approaches, methods, techniques & learning models through examples.	**Assessment criteria:** Logic, systematics, completeness **Form of Assessment:** Non-test (Product of discussion) **Assessment Instrument:** Scoring rubric	Discussion (TM : 1 x (3 x 50′) Group discussion about the different approaches, methods, techniques and learning models. (BT: 1 x (3 x 50′)	Approaches, methods, techniques, & learning models (U6, U14).	10%
10-12	L6. Students are able to explain about the	Students are able to explain the scientific	**Assessment criteria:** Participation, Concept	Discussion (TM : 3 x (3 x 50′)	Scientific Approach	10%

Week	Sub-LO-Course	Indicators	Criteria & Form of Assessment	Learning methods (Estimated time)	Learning Materials (Literature)	Assessment Weight (%)
	scientific approach & its application in learning chemistry (M2).	approach and examples of its application	comprehension **Form of Assessment:** Non-test (Performance) **Assessment Instrument:** Observation sheet	Group discussion on a scientific approach (BT: 3 x (3 x 50′)	Understanding and Philosophy of Scientific Approach. Steps of a Scientific Approach (P1).	
13-15	L7. Designing chemistry learning models with a scientific approach (M3).	Presenting the design of learning models using a scientific approach with modifications.	**Assessment criteria:** Logic, systematics, completeness **Form of Assessment:** Assignment of designing learning model products using a scientific approach **Assessment Instrument:** Scoring rubric	Lectures and Discussion (TM : 3 x (3 x 50′) Task: Designing a chemistry learning model with a scientific approach based on modification of existing learning models. (BM-BT: 2 x (3 x 50′)	Learning Models in K-13 Curriculum - *Problem Based Learning* (PBL), *Project Based Learning* (PjBL), *Discovery Learning* (DL) (P1, U6).	10%
		Presenting the designs of learning models in groups.	**Assessment criteria:** Product Presentation , the concept accuracy **Form of Assessment:** Non-test (Performance) **Assessment Instrument:** Scoring rubric	Presentation (TM : 1 (3x50′)		10%
16	L8. Students know various strategies for dealing with unexpected	Students are able to determine strategies for dealing with	**Assessment criteria:** Logic, accuracy of strategy, creativity,	Lectures and Discussion (TM: 2 x (3x50′)	Strategies for dealing with unexpected	4%

Week	Sub-LO-Course	Indicators	Criteria & Form of Assessment	Learning methods (Estimated time)	Learning Materials (Literature)	Assessment Weight (%)
	situations during the learning process (M4).	unexpected situations during the learning process.	**Form of Assessment:** Written test (quiz) **Assessment Instrument:** Question sheet		situations (U1, U7, U8, U9).	
17	**FINAL EXAM**			1X90'		30%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

Assessment

No.	Component	Weight
1.	Assignment	30%
2.	Quiz	20%
3.	Final Exam	30%
4.	Activity	20%
	Total	100%

UNIVERSITAS NEGERI YOGYAKARTA **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **DEPARTMENT OF CHEMISTRY EDUCATION / CHEMISTRY EDUCATION STUDY PROGRAMME**					
COURSE SPECIFICATION					
COURSE NAME	**CODE**	**COURSE CATEGORY**	**WORK-LOAD**	**SEMESTER**	**DATE OF PREPARATION**
	MPK 6204	Chemistry Subject Specific Educational Course (MKDK)	3 SKS	5	
AUTHORIZATION	**Course Spesification Developer**		**Module Coordinator**		**Coordinator of Study Programme**
	Marfuatun., M.Si.		Dr. Das Salirawati, M.Si.		Sukisman Purtadi, M.Pd.

Learning Outcomes	**Learning Outcome**	
	LO-1	The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life
	S	A.8. Internalize academic values, norms and ethics;
		A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and
		A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in general

	LO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	LO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently

	LO-6	The graduates of Bachelor of Education in Chemistry implement cooperative skills in conducting their duties and solving problems
	KK	F.1. being able to plan and do chemistry learning in a guided school in accordance with the characteristics of students and the study material through a scientific approach using various learning resources and learning media based on science and technology, and the potential of the local environment, according to content standards, processes and assessments so that students have process skills science, critical thinking, creative and problem solving
	Course Outcome	
	CO1	be responsible for applying technology in chemistry learning.
	CO2	understand ICT and its integration in Chemistry learning, understand the basics of ICT-assisted learning, understand the principles of ICT-based learning, develop IT-based learning plans.
	CO3	develop chemical learning media for computer assisted instruction, develop chemical learning media for mobile-based learning, apply ICT-based non-conventional Chemistry learning models and utilize ICT as an ICT-based delivery system for Chemistry learning
Course Description	This course is a compulsory subject for students of Chemistry Education FMIPA UNY. In this global era, ICT is seen as an important tool in learning, including learning Chemistry. ICT can help learning both as a learning media, as well as a means of delivering learning content in a delivery system. As a media, ICT helps students to understand learning material. As a tool in a delivery system, ICTs can increase flexibility in accessing learning content.	
Content	By studying this course, students are expected to be able to understand the principles of ICT-based chemistry learning and be competent in utilizing ICT for learning chemistry both as a means of delivering learning content and as a learning media. This course discusses the notion of ICT, the integration of ICT in chemistry learning, the understanding and implementation of ICT-based chemical learning content systems, the understanding of learning media, the roles and types of ICT-based learning media, the planning and selection of chemical learning media, development, validation and evaluation ICT-based chemical learning media, as well as the implementation of ICT in chemistry learning. After this learning, students are expected to be able to develop ICT-based chemistry learning media and use it as virtual learning content by utilizing ICT as a delivery system.	
References	**Basis**	

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Learning Media	**Software**	**Hardware**
	Learning Video Power Point	Tools and Chemicals Whiteboard and stationery Projector
Team-Teaching		
Prerequisites course		

Learning Activities

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
1	Students understand the overview of lecture contents, competencies to be achieved, and learning and assessment techniques.	-	-	Lecture and question-answer activity (TM: 1 (2x50')	Course overview covering the course objectives, learning materials, assessment systems, and assignments.	-
2	L1. Students understand ICT and its integration in chemistry learning (M2).	Students are able to: 1. identify the advantages and disadvantages of ICT in Chemistry learning 2. understand the role of chemistry in improving access to learning and the quality of learning, 3. understand the importance of ICT	**Assessment Criteria:** Logic, systematics, comprehensiveness **Assessment Form:** Written test (quiz), Non-test (journal reviews) **Assessment Instrument:** Assessment Rubric, Question sheets	Expository (TM: 1 (2x 50') Assignment 1: a review of research papers from international journals on ICT and its integration in chemistry learning (BM-BT: 1 x (2 x 50')	Definition and integration of ICT in education and learning (U1-U27)	5%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
		in the process of chemistry learning, 4. understanding ICTs and their relevance to chemistry learning methods/strategies				
3	L2. Students understand ICT-assisted learning models (M2).	Students are able to: 1. understand the chemistry learning strategy with CAI, 2. understand chemistry learning strategies with WBL 3. understand the technique of disseminating chemical contents with DVB-S and TV-Education	**Assessment Criteria:** Concept Accuracy **Assessment Form:** Written test (quiz) **Assessment Instrument:** Question sheets	Expository and Discussion (TM: 1 (2x50 ') Gather information through the internet and TV- education educational broadcasts (BT: 1 x (2 x 50 ')	Computer-assisted instruction (CAI), Web-based learning (WBL), Mobile-based Learning, Distribution of learning materials through Digital Video Broadcasting (DVB) over satellite (DVB-S) and TV-Education (U1-U27).	5%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
4	L3. Students are able to understand the principles of ICT-based learning (M2)	Students are able to: 1. understand instructional principles and the role of ICT in the application of instructional principles. 2. understand the stages of the ASSURE development model, 3. understand the stages of the ADDIE development model, 4. understand the stages of the Borg & Gall development model, 5. understand the stages in the Dick & Carey development model	**Assessment Criteria:** Concept accuracy, logic, and delivery **Assessment Form:** Written test (quiz), non-test (presentation) **Assessment Instrument:** Question sheets, assessment rubric	Cooperative Learning Method (TM: 1x(2x50') (BM-BT: 1 x(2x50')	Identification of ICT-based learning principles - ICT-based learning development models (U1-U27)	5%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
5-6	L4. Students are able to develop ICT-based lesson plans (M3).	Students are able to: 1. develop an ICT-based lesson plan 2. create a storyboard for developing learning materials, 3. create a flowchart for developing learning materials, develop LOMs, 4. manage program mapping	**Assessment Criteria:** Logic, systematics, comprehensiveness **Assessment Form:** Non-test (assignment) **Assessment Instrument:** Assessment rubric	Cooperative Learning Method, tutorial, guided practicum, presentation. (TM : 2 x (2x50') Assignment: Developing a lesson plan, storyboard, flowchart, and program mapping (BM-BT: 2 x (2x50')	Developing a lesson plan, storyboard, flowchart and developing Learning Object Material (LOM) and program mapping (2x100').	5 %
7	L5. Students are able to use ICT as an ICT-based delivery system for learning chemistry (M3).	Students are able to: 1. understand the definitions of CMS and LMS, 2. identify the characteristics of CMS and LMS that are good for learning, and choose LMS for chemistry learning 3. carry out learning with LMS	**Assessment Criteria:** Logic, systematics, comprehensiveness **Assessment Form:** Non-test (assignment) **Assessment Instrument:** Assessment rubric	Expository, Tutorial, Guided Practicum (group) (TM: 1 x (2 x 50') Assignment: a review on LMS and CMS in chemistry learning and its implementation (BM-BT; 1 x (2x50')	Developing e-learning for chemistry learning (U7, U24, U27)	5%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
8-10	L6. Students are able to develop learning media for computer-assisted instruction (M3).	Students are able to produce computer-based media, animation, 3D, on certain topics in groups with the guidance of the lecturer	**Assessment Criteria:** Logic, comprehensiveness, creativity **Assessment Form:** Non-test (assignment) **Assessment Instrument:** Assessment rubric	Expository, Tutorial, Guided Practicum (group) (TM: 3 x (2x50') Assignment: Designing mobile-based media in the form of AV media and flash animation on certain chemistry topics in groups (BT-BM: 3 x (2x50')	Developing AV media, developing animation with flash (U1-U6, U25, U27)	15%
11-13	L7. Students are able to develop learning media for mobile-based learning (M3).	Students are able to produce mobile-based media works on certain topics in groups with the guidance of the lecturer	**Assessment Criteria:** Logic, comprehensiveness, creativity **Assessment Form:** Non-test (assignment) **Assessment Instrument:** Assessment rubric	Expository, Tutorial, Guided Practicum (group) (TM: 3 x (2x50') Assignment: Designing mobile-based media with CS6 construct on specific chemistry topics in groups (BT-BM: 3 x (2x50')	Introduction of CS6 or construct for developing mobile-based media (U9-U13, U17-U22, U26)	15%
14-15	L8. Students are able to implement non-conventional chemistry learning models based on ICT (M3).	Students are able to: 1. Implement learning with LMS and media developed by students in groups 2. Present ICT-based learning products	**Assessment Criteria:** Ideas, creativity, and content delivery **Assessment Form:** Non-test (assignments and presentations) **Assessment**	Expository, Tutorial, Guided Practicum (group) (TM: 3 X (2 X 50 ') Assignment: The use of media developed and presentations of student work	The practice of implementing the selected non-conventional learning model (U1-U27).	15 %

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
		developed in groups.	**Instrument:** Assessment rubric	(BM-BT: 1 (2 x 50 ′)		
16	**FINAL EXAM**			1x100′		30%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

Assessment

No	CO	Assessment Object	Assessment Technique	Weight
1	CO1, CO2, CO3.	Assignments Quiz Final Exam Participation	Presentation / written test	30% 20% 30% 20%
			Total	100%

Chemistry Learning Assessment

<table>
<tr><td colspan="2">UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY EDUCATION / CHEMISTRY EDUCATION STUDY PROGRAMME</td></tr>
<tr><td colspan="7">COURSE SPECIFICATION</td></tr>
<tr><td colspan="2">COURSE NAME</td><td>CODE</td><td>COURSE CATEGORY</td><td>WORK-LOAD</td><td>SEMESTER</td><td>DATE OF PREPARATION</td></tr>
<tr><td colspan="2"></td><td>MPK 6204</td><td>Chemistry Subject Specific Educational Course (MKDK)</td><td>3 SKS</td><td>5</td><td></td></tr>
<tr><td colspan="2" rowspan="2">AUTHORIZATION</td><td colspan="2">Course Spesification Developer</td><td colspan="2">Module Coordinator</td><td>Coordinator of Study Programme</td></tr>
<tr><td colspan="2">Rr. Lis Permana Sari, M.Si</td><td colspan="2">Dr. Das Salirawati, M.Si.</td><td>Sukisman Purtadi, M.Pd.</td></tr>
<tr><td rowspan="5">Learning Outcomes</td><td colspan="2">Learning Outcome</td><td colspan="4"></td></tr>
<tr><td>LO-1</td><td colspan="5">The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life</td></tr>
<tr><td rowspan="3">S</td><td colspan="5">A.8. Internalize academic values, norms and ethics;</td></tr>
<tr><td colspan="5">A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and</td></tr>
<tr><td colspan="5">A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in general</td></tr>
</table>

	LO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	LO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently

	LO-6	The graduates of Bachelor of Education in Chemistry implement cooperative skills in conducting their duties and solving problems
	KK	F.1. being able to plan and do chemistry learning in a guided school in accordance with the characteristics of students and the study material through a scientific approach using various learning resources and learning media based on science and technology, and the potential of the local environment, according to content standards, processes and assessments so that students have process skills science, critical thinking, creative and problem solving
	Course Outcome	
	CO1	learn the assessment of learning outcomes in accordance with the assessment ethics.
	CO2	explain the principles of Chemistry Learning Outcomes, apply procedures for competency-based assessment activities in chemistry learning, test the validity and reliability of assessment instruments, and change scores to values according to the criteria that apply in school
	CO3	compile questions on the assessment of chemistry learning outcomes that meet the rules of preparing good questions, develop various assessment instruments according to the development of the Chemistry curriculum
Course Description	Chemistry Learning Assessment is a chemistry education discipline, which studies the problems of planning, implementing, and reporting the assessment of chemistry learning outcomes. Lecture material begins with the introduction of various terms commonly used in the assessment of chemistry learning outcomes, followed by techniques and instruments for evaluating chemistry learning outcomes, how to compile instruments for evaluating chemistry learning outcomes, processing assessment results, analyzing assessment instruments, and compiling reports. Various new approaches discussed in this lecture include the use of objective statements in the form of competencies, competency classification based on the dimensions of cognitive processes and alternative dimensions of knowledge and assessment	
Content	By studying this course, students are expected to be able to understand the principles of ICT-based chemistry learning and be competent in utilizing ICT for learning chemistry both as a means of delivering learning content and as a learning media. This course discusses the notion of ICT, the integration of ICT in chemistry learning, the understanding and implementation of ICT-based chemical learning content systems, the understanding of learning media, the roles and types of ICT-based learning media, the planning and selection of chemical learning media, development, validation and evaluation ICT-based chemical learning media, as well as the implementation of ICT in chemistry learning. After this learning, students are expected to be able to develop	

	ICT-based chemistry learning media and use it as virtual learning content by utilizing ICT as a delivery system.	
References	**Basis**	
	Anderson, L. W. and D. R. Kathwohl (Ed.). (2001). *A Taxonomy for Learning, Teaching, and Assessing*. New York: Longman Asmawi Zainul dan Noehi Nasoetion. (2001). *Penilaian Hasil Belajar*. Jakarta: PAU Universitas Terbuka. Gronlund, N. E . (1981). *Measurement and Evaluation in Teaching, 5th Ed*. New York MacMillan Publishing Co. Hall, Gene E. And Jones Horward L. (1976). *Competency-Based Education: A Process for the Developing Improvement of Education*. New York: Prentice-Hall, Inc.	
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Learning Media	**Software**	**Hardware**
	Learning Video Power Point	Tools and Chemicals Whiteboard and stationery Projector
Team-Teaching	Rr. Lis Permana Sari, M.Si.; Dr. Das Salirawati, M.Si.	
Prerequisites course		

Learning Activities

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
1	L1. Students are able to explain the principles, objectives, and objects of Chemistry learning assessment (M1).	Students are able to: 1. explain the object of Chemistry and the object of science 2. Chemistry education; 3. mention the meaning of measurement, assessment, and evaluation of Chemistry learning achievement; 4. state the objectives, functions, and principles of evaluating Chemistry learning achievement; 5. explain the meaning of objects, subjects, and ethics of the assessment of Chemistry learning achievement	**Assessment criteria:** The understanding of the concept, systematics, completeness **Form of Assessment:** Non-exam (Assignment examines the principles, objectives, and objects of assessment of learning achievement) **Assessment Instrument:** Assessment rubric	Contextual instruction, discussion, individual assignment (TM: 1 (3x 50 ') Task 1: review and discuss the principles, objectives and objects of assessment of learning outcomes in Chemistry (BM-BT: 1 x 3 x 50 ')	Measurement, Assessment and Evaluation of Chemistry Learning Achievement. Objectives, Functions and Principles of Assessment of Chemistry Learning Achievement. Objects, Subjects, and Ethics of Chemistry learning assessment (U1-U6).	5%
2	L2. Students are able to explain the objectives of Chemistrylearning in the form of competencies (M2).	Students are able to: 6. explain the difference between graduate competency standards and competency	**Assessment criteria:** Systematics, completeness **Form of Assessment:** Non-exam (Assignment) **Assessment Instrument:**	Problem based learning (TM: 1 (3x 50 ') Task 2: review and discuss learning objectives in the form of	Assessment Techniques for Learning Achievement of Chemistry Exams	5%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		standards as well as that between competency standards and basic competencies; 7. Describe basic competencies as indicators of learning achievement; 8. explain the relationship between learning competencies and the assessment of Chemistry learning achievement; 9. mention the taxonomy of learning competence on the cognitive aspects, both the dimensions of cognitive processes and the dimensions of knowledge; 10. explain the competency of learning in affective and psychomotor aspects.	Assessment rubric	competencies (BM-BT: 1 x 3 x 50 ′)	(U1-U6).	

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
3	L3. Students are able to mention assessment techniques and assessment instruments in the form of examination (M2).	Students are able to: 1. describe the distribution of assessment techniques and their assessment instruments; 2. explain the difference between assessment techniques and Chemistry learning achievement assessment instruments; 3. explain the differences between the written exam technique and the oral and action exam; 4. explain the relationship between the taxonomy of educational aspects of cognitive competence (dimensions of cognitive processes and dimensions of knowledge) and	**Assessment criteria:** The understanding of the concept, systematics, completeness **Form of Assessment:** Non-exam (Assignment examines the principles, objectives, and objects of assessment of learning achievement) **Assessment Instrument:** Assessment rubric	Problem based learning (TM: 1 (3x 50 ') Task 3: review various assessment instruments. (BM-BT: 1 x 3 x 50 ′)	Assessment Techniques for Learning Achievement of Chemistry Exams (U1-U6).	5%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		assessment instruments.				
4	L4. Students are able to explain the strengths and weaknesses of objective and essay questions (M3).	Students are able to: 1. explain the strengths and weaknesses of essay questions; 2. develop questions about cognitive aspects and scoring methods; 3. explain the strengths and weaknesses of objective questions; 4. develop objective questions on cognitive aspects;	**Assessment criteria:** Conformity with the rules of writing questions, completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment examines the principles, objectives, and objects of assessment of learning achievement) **Assessment Instrument:** Assessment rubric	Problem based learning (TM: 1 (3x 50 ') Task 4: develop objective form Chemistry questions and break down according to rules (BM-BT: 1 x 3 x 50 ')	Chemistry learning assessment Instrument (U1-U6)	5%
5-6	L5. Students are able to mention assessment techniques and assessment instruments in non-exam forms L6. Students are able to develop alternative assessments for learning achievement in Chemistry.	Students are able to: 1. explain the difference between examination assessment techniques and non-exam assessment techniques; 2. provide the distribution of non-examination assessment techniques and their	**Assessment criteria:** Conformity with the rules of writing questions, completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment examines the principles, objectives, and objects of	Problem based learning (TM: 2 (3x 50 ') Task 5: develop affective and psychomotor assessment instruments along with scoring guidelines (BM-BT: 1 x 3 x 50 ') Task 6: develop alternative assessment	Chemistry learning assessment Instrument (U1-U6)	5%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		assessment instruments; 3. explain the difference between observation assessment techniques and interview techniques and a questionnaire; 4. explain the advantages and disadvantages of non-examination assessment techniques; 5. explain the relationship between the taxonomic objectives of the affective aspects of education with the learning achievement; 6. develop affective and psychomotor competency instruments and their scoring system; 7. provide meaning and use of alternative assessments;	assessment of learning achievement) **Assessment Instrument:** Assessment rubric	instruments and their rubrics. (BM-BT: 1 x 3 x 50 ′)		

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		8. develop examples of alternative assessment instruments and their rubrics.				
7	L7. Students are able to develop a blueprint and Chemistry test items to measure cognitive aspects of C1-C6 (M3).	Students are able to: 1. estimate the comparison of the dimensions of cognitive processes about Chemistry learning achievement; 2. develop Chemistry test items on the factual knowledge of Chemistry (C1, K1); 3. develop Chemistry test items on the conceptual knowledge of Chemistry (C1, K2); 4. develop Chemistry test items on the chemical procedural knowledge (C1, K3); 5. develop Chemistry test items on the understanding factual	**Assessment criteria:** Conformity with the rules of writing questions, completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment on developing test items) **Assessment Instrument:** Assessment rubric	Problem based learning (TM: 1 (3x 50 ') Task 7: develop cognitive aspects Chemistry problems (C1-C6). (BM-BT: 1 x 3 x 50 ′)	Objects of Competency Assessment for Cognitive Aspects	5%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		Chemistry and conceptual knowledge of Chemistry (C2, K1 and C2, K2); 6. develop Chemistry test items on the application of chemical knowledge, both factual and conceptual ((C3, K2 and C2, K3).				
8	L8. Students are able to develop a blueprint and Chemistry test items to measure cognitive aspects of C1-C6 (M3).	Students are able to: 1. develop Chemistry test items analyzing chemical metacognitive knowledge (C4, K4); 2. c develop Chemistry test items evaluating chemical metacognitive knowledge (C5, K4); 3. develop Chemistry test items to create chemical metacognitive knowledge (C6, K4).	**Assessment criteria:** Conformity with the rules of writing questions, completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment on developing test items) **Assessment Instrument:** Assessment rubric	Problem based learning (TM: 1 (3x 50 ') Task 8: develop cognitive aspects Chemistry problems (C1-C6). (BM-BT: 1 x 3 x 50 ′)	Objects of Dimension Assessment of High Level Cognitive Processes (U1-U6)	5%
9-10	L9. Students are able to describe the stages in processing Chemistry	Students are able to: 1. develop Chemistry test items analyzing	**Assessment criteria:** Conformity with the rules of writing questions,	Problem based learning (TM: 2 (3x 50 ') Task 9: change the score	Assessment Approaches (PAP and PAN) (U1-	10%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
	learning achievement (M2). L10. Students are able to process scores into grades by means of PAP and PAN (M2).	chemical metacognitive knowledge (C4, K4); 2. develop Chemistry test items evaluating chemical metacognitive knowledge (C5, K4); 3. develop Chemistry test items to create chemical metacognitive knowledge (C6, K4).	completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment on converting scores into grades) **Assessment Instrument:** Assessment rubric	of an exam or assignment result to a score using the PAN and PAP approaches. (BM-BT: 2 x 3 x 50 ′)	U6).	
11-12	L11. Students are able to describe the stages in the procedure of evaluating Chemistry learning achievement (M3).	Students are able to: 1. compiling a grid of Chemistry learning achievement, both in the form of test questions and exam questions; explain the basic preparation of Chemistry learning achievement questions; 2. explain the principle of writing Chemistry learning achievement test items in the form of description and objectives;	**Assessment criteria:** Logic, systematics, completeness **Form of Assessment:** Non-exam (Assignment) **Assessment Instrument:** Assessment rubric	Problem based inquiry (TM: 2 (3x 50 ′) Task 10: do the planning and construction of questions, implementing and collecting data, processing data, interpreting data and reporting. (BM-BT: 2 x 3 x 50 ′)	Stages of the procedure of Chemistry learning achievement assessment (U1-U6)	10%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		3. writing Chemistry learning achievement questions in the form of tests or examinations;				
13-14	L13. Students are able to conduct validity and reliability tests (M2).	Students are able to: 1. Mention the difference in theory validity and empirical validity; 2. explain the meaning of distinguishing features, the level of difficulty, and the spread of answers to objective questions; 3. explain the meaning of the power of differentiation, the level of difficulty of the question description; 4. calculate the validity of objective items and breakdown items; 5. Calculating the reliability of objective questions and	**Assessment criteria:** Validity of the test procedure and interpretation of results **Form of Assessment:** Non-exam (Assignment on conducting validity and reliability tests on the test items) **Assessment Instrument:** Assessment rubric	Problem based inquiry (TM: 2 (3x 50 ′) Task 11: test the validity and reliability of the questions. (BM-BT: 2 x 3 x 50 ′)	Specifications and Characteristics of Item Grain (U1-U6) Characteristics of Problem Devices (U1-U6)	10%

Week	Sub-learning Outcome	Indicator	Assesment Criteria & Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
		description problems.				
15	L15. Students are able to make a simulation report on student learning achievement (report cards) according to the criteria applicable in school.	Students are able to make a simulation report on student learning achievement (report cards) according to the criteria applicable in school.	**Assessment criteria:** Conformity with the rules of writing questions, completeness, accuracy and accuracy, suitability of the concept. **Form of Assessment:** Non-exam (Assignment on compiling student learning achievement) **Assessment Instrument:** Assessment rubric	Problem based inquiry (TM: 1 (3x 50 ') Task 12: compile report cards (BM: 1x 3 x 50 ')	Simulation reports of student learning outcomes according to the criteria applicable at school	5%
16	**FINAL EXAMINATION**					25%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

Assessment

No	CO	Assessment	Assessment	Weight

		Object	Technique	
1	CO1, CO2, and CO3,	Assignment Final Exam Participation	Presentation / written test	50% 25% 25%
			Total	100%

Program Development of Chemistry Learning

<table>
<tr><td colspan="2">UNIVERSITAS NEGERI YOGYAKARTA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF CHEMISTRY EDUCATION / CHEMISTRY EDUCATION STUDY PROGRAMME</td></tr>
<tr><td colspan="2">COURSE SPECIFICATION</td></tr>
<tr><td>COURSE NAME</td><td>CODE</td><td>COURSE CATEGORY</td><td>WORK-LOAD</td><td>SEMESTER</td><td>DATE OF PREPARATION</td></tr>
<tr><td>Program Development of Chemistry Learning</td><td>MPK 6306</td><td>Chemistry Subject Specific Educational Course (MKDK)</td><td>3 SKS</td><td>5</td><td></td></tr>
<tr><td>AUTHORIZATION</td><td colspan="2">Course Spesification Developer</td><td colspan="2">Module Coordinator</td><td>Coordinator of Study Programme</td></tr>
<tr><td></td><td colspan="2">Heru Pratomo Al., M.Si.</td><td colspan="2">Dr. Das Salirawati, M.Si.</td><td>Sukisman Purtadi, M.Pd.</td></tr>
<tr><td rowspan="5">Learning Outcomes</td><td colspan="2">Learning Outcome</td><td colspan="3"></td></tr>
<tr><td>LO-1</td><td colspan="4">The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life</td></tr>
<tr><td rowspan="3">S</td><td colspan="4">A.8. Internalize academic values, norms and ethics;</td></tr>
<tr><td colspan="4">A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and</td></tr>
<tr><td colspan="4">A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in general</td></tr>
</table>

	LO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	LO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.3. Able to compile a scientific description of the results of the study above in the form of a thesis or final project report, and upload it on the college page;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently
	LO-6	The graduates of Bachelor of Education in Chemistry implement cooperative skills in conducting their duties and solving problems
	KK	F.1. being able to plan and do chemistry learning in a guided school in accordance with the characteristics of students

		and the study material through a scientific approach using various learning resources and learning media based on science and technology, and the potential of the local environment, according to content standards, processes and assessments so that students have process skills science, critical thinking, creative and problem solving
	Course Outcome	
	M1	1. apply an educational learning model (A8, A9, A10, D2, E1, E3,E4) 2. apply learning media according to the lesson plan in learning (A8, A9, A10, D2, E1, E3,E4)
	M2	1. study the chemistry syllabus for Senior High School/Islamic Senior High School (C2, C3, D2, D4) 2. describe core competencies and basic competencies into indicators, and learning objectives (C2, C3, D2, D4)
	M3	1. make planning on the implementation of learning activities outside the classroom (A8, A9, A10, D2, E1, E3,E4) 2. plan learning based on assessment results in the form of enrichment and remedial (A8, A9, A10, D2, E1, E3,E4,)
	M4	1. arrange annual programs, semester programs and chemistry learning programs (C2, C3, D1, F1) 2. prepare lesson plan for learning according to the guidelines for preparing lesson plans (A8, A9, A10, D5, E1, E4, F1) 3. arrange teaching materials according to the indicators and learning objectives that have been formulated (A8, A9, A10, D5, E1, E4, F1) 4. develop an assessment learning and apply them to learning (A8, A9, A10, D2, E1, E3,E4, F1)
Course Description	This course is designed to provide skills for students in developing chemistry learning programs that are active, innovative, creative, interesting and authentic. Therefore, the discussion in this course includes: compiling the semester program, explaining the procedure of curriculum analysis, setting the indicators according to Core Competency-Basic Competency, determining the subject matter / study material for a Basic Competency, designing learning strategies that educate, student-centered contextual learning , designing learning media, as well as authentic assessment in the domain of attitudes, cognitive, and skills, and producing learning devices (Lesson Plan to assessment instruments)	
Content	1. Learning Programme in Senior High School 2. High School Chemistry Learning Syllabus 3. Formulating an indicators based on basic competencies 4. Guidline for preparing lesson plans 5. Developing a lesson plan with learning models that activate their students	

	6. Developing teaching materials 7. Developing teaching-learing media 8. Developing learning assessment i.e worksheet, and evaluation tools 9. Arranging an annual learning programs in the laboratory or the environment 10. Arranging an remidial	
References	**Basis**	
	U.1. Majid, Abdul. 2009. *Perencanaan Pembelajaran.* Bandung: Remaja Rosdakarya. U.2. Permendikbud RI No. 21 th 2016 tentang Standar Isi U.3 Permendikbud RI No. 22 th 2016 tentang Standar Proses U.4. Permendikbud RI No. 23 th 2016 tentang Standar Penilaian U.5. Permendikbud Tahun 2016 Nomor 024 tentang Kompetensi Inti dan Kompetensi Dasar U.6. Prihantoro, Agung. 2010. *Kerangka Landasan untuk Pembelajaran, Pengajaran dan Assessmen.* Yogyakarta: Pustaka Pelajar.	
	Suggested	
	P.1. Suyanti,Retno Dwi. 2010, *Strategi pembelajaran pimia*. Yogyakarta: Graha Ilmu. P.2. Wena, Made. 2011. *Strategi pembelajaran inovatif kontemporer: suatu tinjauan konseptual operasional*. Jakarta: Bumi Aksara. P.2. Buku-buku Kimia untuk SMA	
Learning Media	**Software**	**Hardware**
	Learning Video Power Point	Tools and Chemicals Whiteboard and stationery Projector
Team-Teaching		
Prerequisites course	Review of Chemical Curriculum Instructional Strategies of Chemistry	

Learning Activities

Week	Sub-LO-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
1.	L1. Students develop annual programs, semester programs and chemistry learning programs (M4)	Designing chemistry learning programs per semester	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument:** Project assessment sheet	*Project Based Learning* (TM : 1 x (3 x 50') Project 1: developing annual programs, semester programs and chemistry learning programs (BT-BM: 1 x (3 x 50')	School Learning Program	5 %
2.	L2. Students study the syllabus for chemistry subjects for senior and vocational high school.	Studying the syllabus of chemistry subjects for senior high school	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment **Assessment Instrument:** Task assessment sheet	*Problem Based Learning* (TM : 1 x (3 x 50') Task 1: developing a syllabus of chemistry lessons (BT-BM: 1 x (3 x 50')	Syllabus of Chemistry learning in Senior High School	5 %
3.	L3. Students describe core competencies and basic competencies into indicators, and learning objectives (M3)	Being able to formulate indicators and determine learning objectives	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment **Assessment Instrument:** Task assessment sheet	Group discussion (TM : 1 x (3 x 50') Task 2: formulating core competencies and basic competencies into indicators, and learning objects in groups (BT-BM: 1 x (3 x 50')	Formulating indicators based on basic competencies	5 %

Week	Sub-LO-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
4	L4. Students develop lesson plans according to the guidelines (M4)	Being able to develop lesson plans	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment **Assessment Instrument:** Task assessment sheet	Group discussion (TM : 1 x (3 x 50′) Task 3: developing lesson plans (BT-BM: 1 x (3 x 50′)	Lesson plans	5 %
5	L5. Students develop teaching materials according to indicators and learning objectives (M4)	Being able to develop teaching materials according to lesson plans	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment **Assessment Instrument:** Task assessment sheet	Group discussion (TM : 1 x (3 x 50′) Task 4: developing teaching materials according to lesson plans (BT-BM: 1 x (3 x 50′)	Material Development	5 %
6-7	L6. Students apply educating learning models (M1)	Being able to develop educating learning scenarios according to teaching materials	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument:** Project assessment sheet	*Project Based Learning* (TM : 2 x (3 x 50′) Project 2: developing educating learning scenarios according to teaching materials (BT-BM: 2 x (3 x 50′)	Development of learning models	5 % 5 % 5 % 5 %
8	L7. Students apply learning media according to the lesson plans in learning (M4)	Being able to determine media according to teaching materials in the lesson plans	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment	Individual Assignment (TM : 1 x (3 x 50′) Task 5: determining appropriate learning media based on teaching	Development of Learning Media	

Week	Sub-LO-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
			Assessment Instrument: Task assessment sheet	materials and lesson plans (BT-BM: 1 x (3 x 50′)		
9	L8. Students develop assessments and apply them in learning (M3)	Being able to design assessment instruments according to teaching materials in the lesson plan	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Assignment **Assessment Instrument:** Task assessment sheet	Individual Assignment, (TM : 1 x (3 x 50′) Task 6: developing assessment instruments (BT-BM: 1 x (3 x 50′)	Development of learning assessment	
10	L9. Students design the implementation of learning outside the classroom (M2, M4)	Being able to design learning in laboratories and environment	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument**: Project assessment sheet	*Project Based Learning* (TM : 1 x (3 x 50′) Project 3: designing chemistry learning in the laboratory and environment (BT-BM: 1 x (3 x 50′)	Learning planning in the laboratory and environment	
11	L10. Students design learning according to the results of the assessment in the form of enrichment and remedial (M2,M4)	Being able to design remedial and enrichment programs according to assessment results	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument**: Project assessment sheet	*Project Based Learning* (TM : 1 x (3 x 50′) Project 4: designing remedial and enrichment programs (BT-BM: 1 x (3 x 50′)	Remedial and enrichment programs	5 %
12	L11. Students develop chemistry learning	Producing chemistry learning programs in high	**Assessment criteria:** Attitude, knowledge,	*Project Based Learning* (TM : 1 x (3 x 50′)	Practicing to develop semester	10 %

Week	Sub-LO-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
	programs (M2, M4)	school	performance **Form of Assessment:** Product **Assessment Instrument**: Project assessment sheet	Project 5: develop chemistry learning programs for high schools (BT-BM: 1 x (3 x 50′)	and annual programs	
13-14	L12. Students develop lesson plans in accordance with the applicable curriculum (M2, M4)	Producing lesson plans to be applied for teaching in schools	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument**: Project assessment sheet	*Project Based Learning* (TM : 2 x (3 x 50′) Project 6: developing lesson plans that are ready to be used for teaching in schools according to the applicable curriculum (BT-BM: 1 x (3 x 50′)	Practice in developing lesson plans	10 %
15	L13. Students create learning media and student work sheets (M4)	Producing learning media and work sheets according to the lesson plans	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product **Assessment Instrument**: Project assessment sheet	*Project Based Learning* (TM : 1 x (3 x 50′)\ Project 7: making media and worksheets (BT-BM: 1 x (3 x 50′)	Practice to develop learning media and work sheets	5 %
16	L14. Students produce attitude and skill assessment instruments (M4)	Producing attitude and skills assessment instruments along with the rubrics.	**Assessment criteria:** Attitude, knowledge, performance **Form of Assessment:** Product	*Project Based Learning* (TM :1 x (3 x 50′) Project 8: developing attitude and skills assessment instruments	Practice to develop attitude and skills assessment	5 %

Week	Sub-LO-Course	Indicators	Criteria & Assessment Form	Learning Method (Time Estimation)	Learning Materials (Literature)	Assessment Weight (%)
			Assessment Instrument: Project assessment sheet	(BT-BM: 1 x (3 x 50′)		
17	**FINAL EXAM**			Written Test (TM: 1 x (3 x 50′)		20%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

Assessment

No	Assessment Object	Assessment Technique	Weight
1	Assignments	Presentation and written test	60%
2	Final Exam		20%
3	Participation		20%
		Total	100%

High School Chemistry

	UNIVERSITAS NEGERI YOGYAKARTA **FACULTY OF MATHEMATICS AND NATURAL SCIENCES** **DEPARTMENT OF CHEMISTRY EDUCATION / CHEMISTRY EDUCATION STUDY PROGRAMME**				
COURSE SPECIFICATION					
COURSE NAME	**CODE**	**COURSE CATEGORY**	**WORK-LOAD**	**SEMESTER**	**FORM DATE**
High School Chemistry	MPK 6307	Chemistry Subject Specific Educational Course (MKDK)	3 SKS	6	
AUTHORIZATION	**Course Spesification Developer**		**Module Coordinator**		**Coordinator of Study Programme**
	Sukisman Purtadi		Dr. Das Salirawati, M.Si.		Sukisman Purtadi, M.Pd.

Learning Outcomes	**Learning Outcome**	
	LO-1	The graduates of Bachelor of Education in Chemistry demonstrate religious spirit, moral, ethics, and characters of Indonesia in a community, society, and state life
	S	A.8. Internalize academic values, norms and ethics;
		A.9. Demonstrate an attitude of responsibility for work in their area of expertise independently; and
		A.10. Have sincerity, commitment, sincerity to develop attitudes, values, and abilities of students based on local wisdom values and noble values and have the motivation to act for the benefit of students and society in general

	LO-3	The graduates of Bachelor of Education in Chemistry apply the concepts, principles, laws, and theories of chemistry, science, education, and chemistry education that are continuously updated as a part of lifelong learning
	P	C.2. Applying chemistry knowledge in various cases
		C.3. Mastering theoretical concepts about educational theory, student development, chemical pedagogical knowledge, learning methodology, curriculum, and learning evaluation;
	LO-4	The graduates of Bachelor of Education in Chemistry adapt scientific work skills and chemical learning skills that are continuously updated as a part of lifelong learning to solve problems related to chemistry and chemistry education
	KU	D.1. Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities' values in accordance with their fields of expertise;
		D.2. Able to study the implications of the development or implementation of science and technology that pay attention to and apply the value of humanities in accordance with their expertise based on scientific rules, procedures and ethics in order to produce solutions, ideas, designs or art criticism;
		D.4. Able to make appropriate decisions in the context of problem solving in their areas of expertise, based on the results of information and data analysis;
		D.5. Able to document, store, secure, and rediscover data to ensure validity and prevent plagiarism.
	LO-5	The graduates of Bachelor of Education in Chemistry adapt the ability for critical and creative thinking in dealing with problems in their careers or personal lives
		E.1. Able to show independent, quality and measurable performance;
		E.2. Able to maintain and develop networks with mentors, colleagues, colleagues both inside and outside the institution;
		E.3. Able to take responsibility for the achievement of group work and supervise and evaluate the completion of work assigned to workers under their responsibilities;
		E.4. Able to carry out a process of self-evaluation of work groups under its responsibility, and be able to manage learning independently

	PLO-6	The graduates of Bachelor of Education in Chemistry implement cooperative skills in conducting their duties and solving problems
	KK	F.2. being able to identify chemistry learning problems, and choose alternative solutions based on existing theories and research findings and implement them in guided research.
	Course Outcome	
	M1	Students are able to evaluate the concept structure in the chemistry curriculum that applies at the high school level (C2, C3, D1)
	M2	Students are able to analyze the structure of chemical concepts in high school and their learning is based on the nature of science (C2, C3, D2, D4)
	M3	Students are able to analyze difficult concepts and misconceptions in learning chemical concepts in high school (C2, C3, D2, D4)
	M4	Students are able to arrange written ideas to teach chemistry in high school based on the analysis of chemical concepts in high school (A8, A9, A10, D5, E1, E4)
Course Description	This course gives experience to students to analyze chemical concepts learned at the high school / MA level in accordance with the applicable curriculum. The course material is focused on content analysis in the curriculum, learning strategies that emphasize the nature of chemistry as part of Nature of Science (NOS), difficulties, mistakes (and misconceptions), and other problems that often occur in learning these concepts, and the latest developments on learning chemical concepts in high school / MA. Lectures are carried out with discussions, demonstrations, assignments, and other strategies that can provide students with experience in learning chemistry at the high school level.	
Content	1. Chemistry in the curriculum in high school / MA 2. Basic particles 3. Chemical and Stoichiometric Changes 4. Chemical bonds 5. Energy, reaction rate, and chemical equilibrium 6. Acids and bases 7. Redox and electrochemistry 8. Chemical Elements and their Abundance	

	9. Organic chemistry and natural ingredients 10. Misconceptions and Reductions 11. Ideas for Choice Concepts	
References	**Basis**	
	U.1. Taber, K.S., 2012. *Teaching Secondary Chemistry*, 2nd Ed. Association for Science Education : London U.2. Oxtoby, D.W., Gillis, H.P. , Campion, A., (2012). Principles of Modern Chemistry-Cengage Learning. U.3. Silberberg, M.S. (2007), Principles of general chemistry . 1st ed. McGraw Hill: New York, NY.	
	Suggested	
	P.1.Kurikulum Kimia di SMA yang berlaku (Lampiran 09 Permendikbud Tahun 2016 Nomor 024 tentang Kompetensi Inti dan Kompetensi Dasar Pelajaran pada Kurikulum 2013 pada Pendidikan Dasar dan Pendidikan Menengah) P.2. Buku Kimia untuk SMA	
Learning Media	**Software**	**Hardware**
	Learning Video Power Point	Tools and Chemicals Whiteboard and stationery Projector
Team-Teaching		
Prerequisites course	Basic Chemistry	

LEARNING ACTIVITIES

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
1	L1. Students are able to analyze the structure of chemistry concepts for the senior high school (SHS) level (M1)	The logic of the concept structure which is accurate based on references Systematic concept structure created	**Assessment Criteria:** Logic, systematics, comprehensiveness **Assessment Form:** Non-test, assessment of the concept structure created and its comparisons **Assessment Instrument:** Assessment Rubric of Concept Structure and Comparison between theoretical concepts and their implementation	Problem Based Learning (TM: 1 x (3 x 50 ') Assignment 1: Structure Analysis of Chemistry Concepts and Evaluation of Chemistry Structures in the applicable curriculum (BT-BM: 1 x (3 x 60 ')	1.Chemistry in the SHS/Islamic SHS curriculum (P1, P2)	10%
	L2. Students are able to analyze the structure of the chemistry concepts in the chemistry curriculum at the SHS level prevailing in Indonesia (M1)	Systematic concept structure Concept comprehensiveness				
	L3. Students are able to evaluate the structure of the chemistry concepts in the chemistry curriculum at the SHS level prevailing in Indonesia (M1)	The comparative logic of the concept structure that exists between the theory and practice in the curriculum				
2	L4. Students are able	The ability to analyze the	**Assessment Criteria:**	Problem Based Learning	2. Basic Particles	20%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
	to analyze the structure of the basic particle concept and its learning in SHSs based on the nature of science (M2)	structure of concepts and learning stages used for this concept is based on the nature of science	Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	(TM : 1 x (3 x 50') **Assignment 1:** Structure Analysis of Chemistry Concepts and Evaluation of Chemical Structures in the applicable curriculum (BT-BM: 1 x (3 x 60')	(U1 – U3, P2)	
3	L5. Students are able to analyze the concept structure of the chemistry and stoichiometric changes and its learning in SHSs based on the nature of science (M2)	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	Problem Based Learning (TM: 1 x (3 x 50') and BM: 1 x (3x60')	3. Chemical and Stoichiometric Changes (U1 – U3, P2)	
4	L6. Students are able to analyze the structure of bond concepts in SHSs and its learning is based on the nature of science (M2)	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	Problem Based Learning (TM: 1 x (3 x 50') and BM: 1 x (3x60')	4.Chemical bonds (U1 – U3, P2)	
5 – 6	L7. Students are able to analyze the concept	The ability to analyze the structure of concepts and	**Assessment Criteria:** Problem-solving skills related to	Problem Based Learning (TM: 2 x (3 x 50') and	5.Energy, reaction rate	

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
	structure of energy, reaction rates, and chemical equilibrium in SHSs and its learning based on the nature of science (M2)	learning stages used for this concept is based on the nature of science	the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	BM: 2 x (3x60')	and chemical equilibrium (U1 – U3, P2)	
7	Competency Test 1 (UK 1)					
8	L8. Students are able to analyze the concept structure of bonds in SHSs and its learning based on the nature of science (M2)	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	Problem Based Learning (TM: 1 x (3 x 50') and BM: 1 x (3x60')	6.Acids and bases (U1 – U3, P2)	20%
9	L9. Students are able to analyze the concept structure of chemical bonds in SHSs and their learning based on the nature of science (M2)	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	Problem Based Learning (TM: 1 x (3 x 50') and BM: 1 x (3x60')	7.Redox and electrochemistry (U1 – U3, P2)	
10	L10. Students are able to analyze the concept structure of bonds in SHSs and their learning based on the	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test	Problem Based Learning (TM : 1 x (3 x 50') and BM: 1 x (3x60'))	8.Chemical Elements and their Abundance (U1 – U3, P2)	

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
	nature of science (M2)		**Assessment Instrument:** Written test for HOTS			
11	L11. Students are able to analyze the concept structure of bonds in SHSs and their learning based on the nature of science (M2)	The ability to analyze the structure of concepts and learning stages used for this concept is based on the nature of science	**Assessment Criteria:** Problem-solving skills related to the concept and learning **Assessment Form:** Test **Assessment Instrument:** Written test for HOTS	Problem Based Learning (TM: 1 x (3 x 50') and BM: 1 x (3x60')	9. Organic chemistry and natural ingredients (U1 – U3, P2)	
12	Competency Test 2 (UK 2)					
13-14	L12. Students are able to analyze difficult concepts and misconceptions in learning the selected concepts in SHSs (M3)	• The urgency of proposed learning difficulties • Accuracy of misconceptions that often occur • The novelty of literature chosen • Depth of analysis • The ability to make meaningful conclusions	**Assessment Criteria:** Urgency, accuracy, novelty, depth of analysis, meaningfulness **Assessment Form:** Non-Test **Assessment Instrument:** Assessment rubric for essay	Problem Based Learning (TM : 2 x (3 x 50') **Assignment 2:** Analysis of difficult concepts and/or concept misconceptions (BT-BM: 2 x (3 x 60')	10. Learning Difficulties and Misconceptions on the selected concepts (U1, supporting journals)	20%
15-16	L13. Students compose an essay related to the idea of chemistry learning in	• Completeness of the essay component • Use of the latest literature	**Assessment Criteria:** Urgency, accuracy, novelty, depth of analysis, meaningfulness **Assessment Form:**	Problem Based Learning (TM : 1 x (3 x 50') **Assignment 3:** Essay on the idea of chemistry	11. Ideas for the selected concepts (U1,	20%

Week	Sub Learning Outcome	Indicator	Assessment Criteria and Form	Learning Method (Time Estimations)	Learning Material (Literature)	Assessment Weight (%)
	SHSs based on the results of the analysis of chemical concepts in SHSs (M4)	• Novelty of ideas • Problem-solving logic	Non-Test **Assessment Instrument:** Assessment rubric for essay	learning in SHSs (BT-BM: 1 x (3 x 60'))	supporting journals)	
	L14. Students are able to communicate their essays in different media (M4)	Right media choice Communication skills	**Assessment Criteria:** Accuracy, communication skills **Assessment Form:** Non-Test **Assessment Instrument:** Assessment rubric for media and communication	Project-Based Learning (TM : 1 x (3 x 50') **Assignment 4:** Communication of ideas (BT-BM: 3 x (3 x 60')		10%

TM : Face-to-face Meeting
BM : Independent Learning
BT : Structured Learning

Assessment

No	Assessment Object	Weight
1	Assignment	40%
2	Midterm Examination	20%
3	Final Examination	20%
4	Participation	20%
		100%