

CONTENT

MKKPs	1
(PS701) APPLIED STATISTICS	1
(PS702) PHILOSOPHY OF SCIENCE	3
(PS709) CHEMISTRY RESEARCH METHODOLOGY	6
MKKIPS	8
(KI707) SELECTED TOPICS IN PHYSICAL CHEMISTRY	8
(KI711) SELECTED TOPICS IN ORGANIC CHEMISTRY	11
(KI712) SELECTED TOPICS IN ANALYTICAL CHEMISTRY	14
(KI713) SELECTED TOPICS IN INORGANIC CHEMISTRY	17
(KI723) SELECTED TOPICS IN BIOCHEMISTRY	19
(KI724) COMPUTATIONAL CHEMISTRY	22
(KI725) CHARACTERIZATION AND MEASUREMENT IN CHEMISTRY	25
MKKPPS-MATERIAL CHEMISTRY	27
(KI726) MATERIAL DESIGN AND PROCESS	27
(KI727) POLYMERIC MATERIAL.....	30
(KI728) COMPOSITE AND CERAMIC MATERIALS	33
(KI729) MATERIAL SYNTHESIS AND CHARACTERIZATION	35
(KI730) MATERIAL CHEMISTRY RESEARCH STUDY	38
MKKIPS-BIOLOGICAL CHEMISTRY	41
(KI731) FUNCTIONAL FOOD COMPONENTS	41
(KI732) DRUG MOLECULE SYNTHESIS.....	44
(KI733) MOLECULAR MECHANISM AND DRUG BIOTRANSFORMATION	47
(KI734) MEDICAL AND NUTRITIONAL BIOCHEMISTRY	50
(KI735) BIOLOGICAL CHEMISTRY RESEARCH STUDY	53
(KI736) FUNCTIONAL FOOD COMPONENTS	55
THESIS	58
(KI799) THESIS	58



MASTER IN CHEMISTRY

MODULE HANDBOOK

MKKPs

(PS701) APPLIED STATISTICS

Module name:	Applied Statistics	
Module level, if applicable:	Graduate	
Code:	PS701	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr.Soja Siti Fatimah, M.Si	
Lecturer(s):	Dr.Soja Siti Fatimah, M.Si; Fitri Khoerunnisa, Ph.D.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	150 minutes	12
Workload:	Total workload is 136 hours (4,8 ECTS) per semester which consists of 40 hours (1,4 ECTS) lectures, 48 hours (1,7 ECTS) structured activities, and 48 hours (1,7 ECTS) self-study per week for 16 weeks	
Credit points:	4,8 ECTS (3 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Describe and handle various types of measurement error ● CLO2. Come to an acceptable conclusion based on statistical test ● CLO3. Utilized minitab for multivariate analysis ● CLO4. Explained quality of analytical measurement, sampling and quality control ● CLO5. Apply statistic to chemical measurement data 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction and overview ● Week 2: Measurement error ● Week 3-4: Statistical tests ● Week 5-6: Factorial experimental design 	



	<ul style="list-style-type: none"> ● Week 7-8: Multivariate analysis ● Week 9: Midterm exam ● Week 10-11: Quality of analytical measurements ● Week 12: Chemometry ● Week 13-15: Case studies ● Week 16: Final exam 																					
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Objects</th> <th>Assessment Techniques</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4">1</td> <td rowspan="4">1-5</td> <td>- Mid-term exam</td> <td rowspan="4">Written test</td> <td>30%</td> </tr> <tr> <td>- Final exam</td> <td>30%</td> </tr> <tr> <td>- Project</td> <td>30%</td> </tr> <tr> <td>- Assignments</td> <td>10%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	30%	- Final exam	30%	- Project	30%	- Assignments	10%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																		
1	1-5	- Mid-term exam	Written test	30%																		
		- Final exam		30%																		
		- Project		30%																		
		- Assignments		10%																		
Total				100%																		
Forms of media:	Board, LCD Projector, Laptop/Computer.																					
Literature:	<ol style="list-style-type: none"> 1. Hage, DS & Carr, JD. 2011, Analytical Chemistry and Quantitative Analysis, Pearson Prentice Hall, New Jersey, USA 2. Harmita, 2004, Petunjuk Pelaksanaan Validasi Metode Analisis dan cara perhitungannya, Majalah Kefarmasian, Vol.1 No.3:117-135 ISSN 1693-9883. 3. Kenkel John, 2014, Analytical Chemistry for Technicians, Fourth Ed.CRC Press, New York 4. Miller James, N. and Miller Jane C. 2005, Statistic and Chemometric for Analyticals Chemistry, fifth Ed.Pearson Ed.Lim. (Main Reference) 5. Riyanto, 2014, Validasi dan Verifikasi Metode Uji, Deepublish, Yogja 6. Skoog, D.A., West, D.M., and Holler, F.J., 2014. Fundamentals of Analytical Chemistry. 9th edition. New York: Saunders College Publishing. 																					

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1			✓					
CLO2			✓					
CLO3			✓					
CLO4			✓					
CLO5			✓					



(PS702) PHILOSOPHY OF SCIENCE

Module name:	Philosophy of Science	
Module level, if applicable:	Graduate	
Code:	PS702	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Hendrawan, M.Si.	
Lecturer(s):	Dr. Hendrawan, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Understand the development of scientific method and its effect on the segregation epistemic field.● CLO2. Perform explanation and inference● CLO3. Understand the viewpoint of scientific realism and anti-realism● CLO4. Understand the concept of scientific changes and revolutions● CLO5. Understand the role of experiments in science● CLO6. Understand and present philosophical publication on chemistry.	



Content:	<ul style="list-style-type: none"> ● Week 1: Science and scientific methods ● Week 2: Science, philosophy of science, and segregation between science and pseudoscience ● Week 3: Scientific inference ● Week 4: Scientific explanation ● Week 5: Scientific realism and anti-realism ● Week 6: Scientific changes and revolutions ● Week 7: The role of experiments in science ● Week 8: Midterm exam ● Week 9-15: Review, discussion and presentation on chemistry related philosophical works ● Week 16: Final exam 																				
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center; vertical-align: middle;">1</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">1-6</td> <td>- Mid-term exam</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">35%</td> </tr> <tr> <td>- Presentation</td> <td style="text-align: center;">Observation</td> <td style="text-align: center;">35%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-6	- Mid-term exam	Written test	30%	- Final exam	35%	- Presentation	Observation	35%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																	
1	1-6	- Mid-term exam	Written test	30%																	
		- Final exam		35%																	
		- Presentation	Observation	35%																	
Total				100%																	
Forms of media:	Board, LCD Projector, Laptop/Computer.																				
Literature:	<ol style="list-style-type: none"> 1. Kuipers, T. A. F. (2007); Law, Theory, and Research Program (Handbook of The Philosophy of Science); Elsevier. 2. Merrilee H. Salmon et al. (1992); Introduction to the Philosophy of Science; Prentice-Hall, Inc. 3. Godfrey-Smith, Peter (2003); Theory and Reality: an introduction to the philosophy of science; The University of Chicago Press, Ltd.; London. 4. Ladyman, James (2001); Understanding philosophy of science; Routledge; New York. 5. Mahner, M. (2007); Demarcating Science from non-science (Handbook of The Philosophy of Science); Elsevier. 6. Hempel, C.G. (1966); Philosophy of Natural Science; Prentice-Hall, Inc. 7. Kuhn, T.S. (1992); The Structure of Scientific Revolutions; Third Edition; The University of Chicago Press. 8. Baird, D., Scerri, E.; and McIntyre, L. (2006), Philosophy of Chemistry: Synthesis of a New Discipline; Springer 																				



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1					✓	✓		
CLO2					✓	✓		
CLO3					✓	✓		
CLO4					✓	✓		
CLO5					✓	✓		
CLO6					✓	✓		



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

MASTER IN CHEMISTRY

MODULE HANDBOOK

(PS709) CHEMISTRY RESEARCH METHODOLOGY

Module name:	Chemistry Research Methodology	
Module level, if applicable:	Graduate	
Code:	PS709	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Prof. Dr. Agus Setiabudi, M.Si.	
Lecturer(s):	Prof. Dr. Agus Setiabudi, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	150 minutes	12
Workload:	Total workload is 136 hours (4.8 ECTS) per semester which consists of 40 hours (1.41 ECTS) lectures, 48 hours (1.71 ECTS) structured activities, and 48 hours (1.71 ECTS) self-study.	
Credit points:	4.8 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Analyze research data and presenting in the form of scientific publication● CLO2. Understand types and methods of chemistry research● CLO3. Formulate problems based on results of experiments● CLO4. Devise appropriate scientific study to solve a problem● CLO5. Present the study results in a scientific forum	



Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: Types of studies ● Week 3-6: Chemistry related literature studies ● Week 7-8: Composing article review and formulating research problems ● Week 9: Midterm exam ● Week 10-12: Academic writing ● Week 13: Occupational health and safety in the laboratory ● Week 14-15: Presentation technique ● Week 16: Final exam 																			
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">1</td> <td rowspan="3" style="text-align: center;">1-5</td> <td>- Mid-term exam</td> <td rowspan="3" style="text-align: center;">Written test</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Assignments</td> <td style="text-align: center;">20%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	40%	- Final exam	40%	- Assignments	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-5	- Mid-term exam	Written test	40%																
		- Final exam		40%																
		- Assignments		20%																
Total				100%																
Forms of media:	Board, LCD Projector, Laptop/Computer.																			
Literature:	<ol style="list-style-type: none"> 1. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, 2nd Edition, SAGE Publications, Sprongfield, 2005 2. Dodd., J. S. (Editor), The ACS Style Guide: A Manual for Authors and Editors 2nd Edition, American Chemical Society; 2000 																			

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1				✓	✓	✓	✓	
CLO2				✓	✓	✓	✓	
CLO3				✓	✓	✓	✓	
CLO4				✓	✓	✓	✓	
CLO5				✓	✓	✓	✓	



MKKIPS

(KI707) SELECTED TOPICS IN PHYSICAL CHEMISTRY

Module name:	Selected Topics in Physical Chemistry	
Module level, if applicable:	Graduate	
Code:	KI707	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Hendrawan, M.Si.	
Lecturer(s):	Dr. Hendrawan, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Understands properties of gases and laws describing it.● CLO2. Understands laws of thermodynamics and their applications in thermochemistry● CLO3. Understands fundamental aspects of chemical kinetics and their applications● CLO4. Apply didactical and pedagogical principles to taught chemical concepts through the context of physical chemistry.● CLO5. Work independently or collaboratively to solve a particular problem.	



Content:	<ul style="list-style-type: none"> ● Week 1: Ideal gas and real gases ● Week 2: Fundamentals, 0th and 1st Laws of thermodynamics ● Week 3: Enthalpy and Laws of Thermochemistry ● Week 4: Review and discussions ● Week 5: Carnot Cycle, 2nd and 3rd Laws of Thermodynamics ● Week 6: Gibbs Free Energy and Equilibrium ● Week 7: Review and Discussion ● Week 8: Midterm exam ● Week 9: Phase diagrams and Gibbs Phase Rule ● Week 10: Thermodynamics of solutions ● Week 11: Modern models for ion in solutions ● Week 12: Thermodynamics of electrochemical cells ● Week 13: Fundamentals of chemical kinetics and Arrhenius equation ● Week 14: Chemical kinetics of complex reactions ● Week 15: Phenomenological theory of chemical kinetics ● Week 16: Final exam 																			
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 35%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center; vertical-align: middle;">1</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">1-5</td> <td>- Mid-term exam</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">Written test</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Individual assignment</td> <td style="text-align: center;">20%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	40%	- Final exam	40%	- Individual assignment	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-5	- Mid-term exam	Written test	40%																
		- Final exam		40%																
		- Individual assignment		20%																
Total				100%																
Forms of media:	Board, LCD Projector, Laptop/Computer.																			
Literature:	<ol style="list-style-type: none"> 1. Levin, I.N., Physical Chemistry, 6th Edition, McGraw-Hill, New York, 2009. 2. Atkins, P.W., Physical Chemistry, Third Edition, Oxford University Press, 1986. 3. Barrow, G.M., Physical Chemistry, Fourth Edition, McGraw-Hill, Tokyo, 1971 4. Steinfeld, J. I., Francisco, J. S., and Hase, W. L., Chemical Kinetics and Dynamics, Second Edition, Prentice-Hall, Inc., New Jersey, 1999. 																			



PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							
CLO3	✓							
CLO4	✓							
CLO5	✓							



(KI711) SELECTED TOPICS IN ORGANIC CHEMISTRY

Module name:	Selected Topics in Organic Chemistry	
Module level, if applicable:	Graduate	
Code:	KI711	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Ratnaningsih Eko S, M.Si.	
Lecturer(s):	Prof. Dr. Asep Kadarohman, M.Si; Dr. Ratnaningsih Eko Sardjono, M.Si; Dr. Iqbal Musthapa, M.Si; Dr. Siti Aisyah, M.Si	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Apply factual and conceptual knowledge of fundamentals of organic chemistry● CLO2. Compare the stability, structures, and reactions of intermediate species.● CLO3. Describe stereochemical aspects of organic reactions.● CLO4. Understand organic reaction mechanisms.● CLO5. Understand thermodynamics and kinetics of organic reactions.● CLO6. Analyzing publication on recent progress in organic chemistry.	



Content:	<ul style="list-style-type: none"> ● Week 1: Introduction and overview ● Week 2: Induction effect ● Week 3: Resonance effect ● Week 4: Carbonium ● Week 5: Carbanion ● Week 6: Free radicals ● Week 7: Midterm exam ● Week 8: Kinetics and thermodynamics control of organic reaction ● Week 9: Electrophilic attack ● Week 10: Nucleophilic attack ● Week 11-12: C-C bonds formation ● Week 13: Stereochemical aspect of organic reaction ● Week 14-15: Project presentation ● Week 16: Final exam 																					
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 25%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: top;">1</td> <td rowspan="4" style="text-align: center; vertical-align: top;">1-5</td> <td>- Mid-term exam</td> <td rowspan="4" style="text-align: center; vertical-align: top;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Project</td> <td style="text-align: center;">10%</td> </tr> <tr> <td>- Quiz</td> <td style="text-align: center;">10%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	30%	- Final exam	30%	- Project	10%	- Quiz	10%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																		
1	1-5	- Mid-term exam	Written test	30%																		
		- Final exam		30%																		
		- Project		10%																		
		- Quiz		10%																		
Total				100%																		
Forms of media:	Board, LCD Projector, Laptop/Computer.																					
Literature:	<ol style="list-style-type: none"> 5. Kitson, T.M. ,1988, Organic Chemistry (A Guide to Common Themes), Edward Arnold, A division of Hodder & Stoughton, London 6. Solomon, T.W. G. and Fryhle, G.B., 2004, Organic Chemistry, Singapore: John Wiley & Sons. 7. Issacs, N.S. ,1987, Physical Organic Chemistry 8. Isaacs, N.S., 1975. Reactive Intermediates in Organic Chemistry 9. Ansyln, E.V. and Dougherty, D.A., 2006, Modern Physical Organic Chemistry, Singapore: University Science Book 																					



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							
CLO3	✓							
CLO4	✓							
CLO5	✓							
CLO6	✓							



(KI712) SELECTED TOPICS IN ANALYTICAL CHEMISTRY

Module name:	Selected Topics in Analytical Chemistry	
Module level, if applicable:	Graduate	
Code:	KI712	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Soja Siti Fatimah, M.Si	
Lecturer(s):	Dr. Soja Siti Fatimah, M.Si; Dra. Zackiyah, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understands application of spectroscopic techniques for biological and material chemistry ● CLO2. Understands application of chromatography techniques for biological and material chemistry ● CLO3. Understands application of electroanalytical techniques for biological and material chemistry ● CLO4. Explained metabolomic analysis 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction and overview ● Week 2: Ultraviolet-Visible spectroscopy ● Week 3: Infrared spectroscopy ● Week 4: Nuclear Magnetic Resonance and Mass Spectrometry 	



	<ul style="list-style-type: none"> ● Week 5: Classical chromatography ● Week 6: High-Performance Liquid Chromatography ● Week 7: Gas Chromatography ● Week 8: Midterm exam ● Week 9: Galvanostat ● Week 10: Potentiostat ● Week 11: Cyclic voltammetry ● Week 12-13: Metabolomics ● Week 14-15: Project ● Week 16: Final exam 																			
<p>Study/exam achievements:</p>	<p>The final mark will be weight as follow:</p> <table border="1" data-bbox="630 772 1382 1062"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Objects</th> <th>Assessment Techniques</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1</td> <td rowspan="3">1-4</td> <td>- Mid-term exam</td> <td rowspan="3">Written test</td> <td>40%</td> </tr> <tr> <td>- Final exam</td> <td>40%</td> </tr> <tr> <td>- Individual assignment</td> <td>20%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-4	- Mid-term exam	Written test	40%	- Final exam	40%	- Individual assignment	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-4	- Mid-term exam	Written test	40%																
		- Final exam		40%																
		- Individual assignment		20%																
Total				100%																
<p>Forms of media:</p>	<p>Board, LCD Projector, Laptop/Computer.</p>																			
<p>Literature:</p>	<ol style="list-style-type: none"> a. McNair, H.M. and Bonelli, E.J., By Kosasih Padmawinata, 1988. Dasar Kromatografi Gas, Penerbit ITB, Bandung b. Christian, G.D., 1994, Analytical Chemistry, 5th Ed., John Wiley & Sons, New York. c. Day, R. A. & Underwood, A. L., Trans. By A Hadyana Pudjaatmaka, 1989, Analisis Kimia Kuantitatif, Penerbit Erlangga, New York. d. Gutter, R.J., et al., Trans. By Kosasih Padmawinata, (1991), Pengantar Kromatografi, 2nd Ed., Penerbit ITB, Bandung e. Harvey, D. 2000, Modern Analytical Chemistry, International ed., Mc.Graw Hill, Boston. f. Jeffery, G.H., Baset, J., Mendham, J., Denney, R.C. 1989. Vogel's Textbook of Quantitative Chemical Analysis. 5th edition. Longman Scientific & Technical, New York. g. Skoog, D.A., West, D.M., and Holler, F.J., 2014. Fundamentals of Analytical Chemistry. 9th edition. New York: Saunders College Publishing. 																			



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							
CLO3	✓							
CLO4	✓							



(KI713) SELECTED TOPICS IN INORGANIC CHEMISTRY

Module name:	Selected Topics in Inorganic Chemistry	
Module level, if applicable:	Graduate	
Code:	KI713	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Ahmad Mudzakir, M.Si.	
Lecturer(s):	Dr. Ahmad Mudzakir, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understand structures, properties, and reactivity of inorganic compounds ● CLO2. Explain the relation between structure of inorganic compounds with macroscopic phenomena. 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction and overview ● Week 2: Chemical vs material ● Week 3-4: Solid state material chemistry ● Week 5-6: Coordination chemistry ● Week 7-8: Organometallic chemistry ● Week 9: Midterm exam ● Week 10-13: Bioinorganic chemistry ● Week 14-15: Chemistry of iron in enzyme and protein 	



	<ul style="list-style-type: none"> • Week 16: Final exam 															
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 10%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 10%;">Weight</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1-2</td> <td> <ul style="list-style-type: none"> - Presentation - Assignments - Final exam - Midterm exam </td> <td> <ul style="list-style-type: none"> Observation Written test </td> <td> <ul style="list-style-type: none"> 20% 20% 30% 30% </td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-2	<ul style="list-style-type: none"> - Presentation - Assignments - Final exam - Midterm exam 	<ul style="list-style-type: none"> Observation Written test 	<ul style="list-style-type: none"> 20% 20% 30% 30% 	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight												
1	1-2	<ul style="list-style-type: none"> - Presentation - Assignments - Final exam - Midterm exam 	<ul style="list-style-type: none"> Observation Written test 	<ul style="list-style-type: none"> 20% 20% 30% 30% 												
Total				100%												
Forms of media:	Board, LCD Projector, Laptop/Computer.															
Literature:	<ol style="list-style-type: none"> Huheey, J.E., Keiter, E.A., and Keiter, R.L. Inorganic Chemistry: Principles of Structure and Reactivity, 4th Ed, Harper Collins College Publishers, 1993. Peter Day, Leonard V. Interrante, and Anthony R. West. Toward Defining Materials Chemistry (IUPAC Technical Report). Pure Appl. Chem., Vol. 81, No. 9, pp. 1707–1717, 2009. L. Smart and E. Moore, Solid State Chemistry, An Introduction, 3rd Ed., CRC Press, 2005 S. F. A. Kettle (auth.) - Physical Inorganic Chemistry: A Coordination Chemistry Approach-Springer-Verlag Berlin Heidelberg (1996) Wai-Yeung Wong (eds.)-Organometallics and Related Molecules for Energy Conversion-Springer-Verlag Berlin Heidelberg (2015) Manfred Bochmann-Organometallics and Catalysis. An Introduction-Oxford (2015) Rosette M. Roat-Malone-Bioinorganic Chemistry: A Short Course-Wiley-Interscience (2007) Wolfgang Kaim, Brigitte Schwederski, Axel Klein-Bioinorganic Chemistry - Inorganic Elements in the Chemistry of Life_ An Introduction and Guide-Wiley (2013) 															

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							



(KI723) SELECTED TOPICS IN BIOCHEMISTRY

Module name:	Selected Topics in Biochemistry	
Module level, if applicable:	Graduate	
Code:	KI723	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr. Heli Siti Halimatul M., M.Si.	
Lecturer(s):	Dr. Heli Siti Halimatul M., M.Si.; Gun Gun Gumilar, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	<p>After taking this course the students have ability to:</p> <ul style="list-style-type: none"> ● CLO1. Understand structures and functions of biomolecule in organism ● CLO2. Understand protein detection, isolation and purification techniques ● CLO3. Understand basic principle of biomolecule testing from natural products ● CLO4. Understand enzymatic process mechanisms. ● CLO5. Understand metabolism of carbohydrate, lipid and protein, as well as their interconnection. ● CLO6. Explained the flow of genetic information, ● CLO7. Apply ICT to study congenital metabolic disease. 	



	<ul style="list-style-type: none"> ● CLO8. Understand molecular docking ● CLO9. Perform molecular docking 																					
Content:	<ul style="list-style-type: none"> ● Week 1: Carbohydrate ● Week 2: Lipid ● Week 3: Amino acid and protein ● Week 4: Nucleic acid and nucleotides ● Week 5-6: Biomolecule identification ● Week 7: Isolation and Purification of protein ● Week 8: Midterm exam ● Week 9: Enzymatic process mechanism ● Week 10: Carbohydrate metabolism ● Week 11: Lipid metabolism ● Week 12: Protein metabolism ● Week 13: Flow of genetic information ● Week 14: Congenital metabolic disease ● Week 15: Molecular docking ● Week 16: Final exam 																					
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 10%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 30%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: top;">1</td> <td rowspan="4" style="text-align: center; vertical-align: top;">1-8</td> <td>- Mid-term exam</td> <td rowspan="4" style="text-align: center; vertical-align: top;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Project</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Quiz</td> <td style="text-align: center;">10%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-8	- Mid-term exam	Written test	30%	- Final exam	30%	- Project	30%	- Quiz	10%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																		
1	1-8	- Mid-term exam	Written test	30%																		
		- Final exam		30%																		
		- Project		30%																		
		- Quiz		10%																		
Total				100%																		
Forms of media:	Board, LCD Projector, Laptop/Computer.																					
Literature:	<ol style="list-style-type: none"> a) Poedjadi, A. dan Supriyanti, FM. (2005). Fundamentals of Biochemistry. b) Voet, D. and Voet, G.J., (2010). Biochemistry. Fourth edition. c) Mathews and Van Holde M. (2000). Biochemistry 2nd edition. d) Lehninger, A.L., Nelson, D.I. and Cox, M.M. (2011) Principles of Biochemistry, 2nd edition, Worth Publisher, New York e) Pratt, C.W. and Cornely (2011) Essential Biochemistry, 2nd edition, John Wiley and Sons, Inc, New York f) Lubert Stryer (2000). Biochemistry. W.H. Freeman company, New York. g) Heli Siti Halimatul, Dea Rachmania, dan Fina Nurjanah (2019). Modul Molecular Docking Mikroalga. 																					



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							
CLO3	✓							
CLO4	✓							
CLO5	✓							
CLO6	✓							
CLO7	✓							
CLO8	✓							
CLO9	✓							



(KI724) COMPUTATIONAL CHEMISTRY

Module name:	Computational Chemistry	
Module level, if applicable:	Graduate	
Code:	KI724	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Hafiz Aji Aziz, M.Si.	
Lecturer(s):	Hafiz Aji Aziz, M.Si., Dr. Budiman Anwar, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Compulsory course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Understands the fundamental principles and concepts in computational chemistry.● CLO2. Understands the methods and approaches used in molecular dynamic and Monte Carlo simulation● CLO3. Applied the methods and approaches in geometry optimization of molecular structure in order to determine its structure and energy, as well as analyzing it.● CLO4. Understand QSAR analysis methods.● CLO5. Describing application of density functional theory for solid state modeling.	



Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: Molecular mechanics with introduction to molecular dynamics simulation ● Week 3-4: Ab initio quantum chemistry methods ● Week 5: Semiempirical quantum chemistry methods ● Week 6: Density functional theory method ● Week 7: Introduction to molecular dynamic simulation ● Week 8: Introduction to Monte Carlo simulation ● Week 9: Mid-term exams ● Week 10-11: Introduction to Drug design ● Week 12: Solid state density functional theory ● Week 13-15: Group Project ● Week 16: Group Project presentation 																						
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 25%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">1</td> <td rowspan="2" style="text-align: center;">1,2,4,5</td> <td>- Mid-term exam</td> <td rowspan="2" style="text-align: center;">Written test</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Individual assignment</td> <td style="text-align: center;">15%</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">Project</td> <td style="text-align: center;">Presentation</td> <td style="text-align: center;">45%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1,2,4,5	- Mid-term exam	Written test	40%	- Individual assignment	15%	2	3	Project	Presentation	45%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																			
1	1,2,4,5	- Mid-term exam	Written test	40%																			
		- Individual assignment		15%																			
2	3	Project	Presentation	45%																			
Total				100%																			
Forms of media:	Board, LCD Projector, Laptop/Computer, Computational Chemistry Softwares																						
Literature:	<ol style="list-style-type: none"> 1. Cramer, Christopher J., Essentials of Computational Chemistry: Theories and Models, 2nd edition, John-Wiley & Sons, Ltd., 2004. 2. Jensen, Frank, Introduction to Computational Chemistry, 2nd edition, John-Wiley & Sons, Ltd., 2007. 3. Young, David C., Computational Chemistry: A Practical Guide for Applying Techniques to Real-World Problems, Wiley-Interscience Publication, 2001. 4. James Haile, Molecular Dynamics Simulation: Elementary Methods, John Wiley & Sons, 1997. 5. Reuven Y. Rubinstein, Dirk P. Kroese, Simulation and the Monte Carlo Method, 3rd Edition, John Wiley & Sons, 2016. 6. Matthias Dehmer, Kurt Varmuza, Danail Bonchev, Statistical Modelling of Molecular Descriptors in QSAR/QSPR, John Wiley & Sons, 2012. 																						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	<p>7. Faulon, Jean-Loup dan Bender, Andreas (editor), Handbook of Chemoinformatics and Algorithms, CRC Press, Chapman and Hallbook, London UK, 1976.</p> <p>8. Roy, Kunal, Kar, Supratik, Das, Rudra Narayan (editor), A Primer on QSAR/QSPR Modeling, Springer International Publishing, 2015.</p> <p>9. Satoh, Introduction to Practice Molecular Simulation, Elsevier, 2011.</p>
--	---

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1		✓	✓					
CLO2		✓	✓					
CLO3		✓	✓					
CLO4		✓	✓					
CLO5		✓	✓					



(KI725) CHARACTERIZATION AND MEASUREMENT IN CHEMISTRY

Module name:	Characterization and Measurement in Chemistry	
Module level, if applicable:	Graduate	
Code:	KI725	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr.Eng. Asep Bayu Dani Nandiyanto, S.T., M.Eng.	
Lecturer(s):	Dr.Eng. Asep Bayu Dani Nandiyanto, S.T., M.Eng.; Fitri Khoerunnisa, Ph.D.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understands the lectures and assessments ● CLO2. Understands terminology and concepts of measurement and characterization ● CLO3. Synthesize simple chemical reaction and analyzing the products ● CLO4. Report on the research results 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2-3: Conventional analysis ● Week 4-5: IR spectroscopy ● Week 6-7: XRD spectroscopy ● Week 8: Midterm exam 	



	<ul style="list-style-type: none"> ● Week 9: SEM and EDX ● Week 10-13: Discussion on the Synthesize simple chemical reaction and analyzing the products ● Week 14-15: Discussion on how to report on the research results ● Week 16: Final exam 																			
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%;"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Objects</th> <th>Assessment Techniques</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1</td> <td rowspan="3">1-4</td> <td>- Mid-term exam</td> <td rowspan="3">Written test</td> <td>30%</td> </tr> <tr> <td>- Final exam</td> <td>30%</td> </tr> <tr> <td>- Individual assignment</td> <td>40%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-4	- Mid-term exam	Written test	30%	- Final exam	30%	- Individual assignment	40%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-4	- Mid-term exam	Written test	30%																
		- Final exam		30%																
		- Individual assignment		40%																
Total				100%																
Forms of media:	Board, LCD Projector, Laptop/Computer.																			
Literature:																				

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓							
CLO2	✓							
CLO3	✓							
CLO4	✓							



MKKPPS-MATERIAL CHEMISTRY

(KI726) MATERIAL DESIGN AND PROCESS

Module name:	Material Design and Process	
Module level, if applicable:	Graduate	
Code:	KI726	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	1 st	
Module coordinator:	Dr.Eng. Asep Bayu Dani Nandiyanto, S.T., M.Eng.	
Lecturer(s):	Dr.Eng. Asep Bayu Dani Nandiyanto, S.T., M.Eng.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Understands concepts and topics of the lectures● CLO2. Understands theory for material design and process● CLO3. Understands aspects affecting material performances● CLO4. Understands how to design and synthesize granular and film type materials● CLO5. Understands concepts and applications of engineering drawing for chemistry● CLO6. Design chemical reactor and reaction for plants● CLO7. Understands idealized engineering and economics aspect of chemistry	



	<ul style="list-style-type: none"> ● CLO8. Apply concepts of structure, energetic, kinetics and analysis for design and processing 																			
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2-4: Material performance ● Week 5-7: Application of engineering for material design ● Week 8: Midterm exam ● Week 9: Introduction to engineering drawing ● Week 10-11: Design of chemical reaction and reactor system ● Week 12-15: Identification of demand and feasibility study ● Week 16: Final exam 																			
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 10%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 30%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">1</td> <td rowspan="3" style="text-align: center;">1-5</td> <td>- Mid-term exam</td> <td rowspan="3" style="text-align: center;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Individual assignment</td> <td style="text-align: center;">40%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	30%	- Final exam	30%	- Individual assignment	40%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-5	- Mid-term exam	Written test	30%																
		- Final exam		30%																
		- Individual assignment		40%																
Total				100%																
Forms of media:	Board, LCD Projector, Laptop/Computer.																			
Literature:	<ol style="list-style-type: none"> 1. Farag, M. M. (2007). Materials and process selection for engineering design. CRC Press. 2. Nandiyanto, A.B.D., A.T. Hadirahmanto, A. Ahid, F. Cinthya, M.B. Jafarian, R. Murida, S. Mutiara, S. Asyiah, and W. Liswanti: "Pengantar Sains dan Teknologi Nano", Penerbit: UPI Press, ISBN:979-3786-81-0 3. Nandiyanto, A.B.D., R. Ragadhita, A. Sukmafitri, M. Fiandini: "Pengantar Gambar Teknik untuk Kimia dan Teknik Kimia", Penerbit: RPI Press, ISBN: 978-623-90344-2-9 4. Nandiyanto, A.B.D., R. Ragadhita: "Evaluasi ekonomi perancangan pabrik kimia", Penerbit: RPI Press, ISBN: 978-623-90344-0-5 																			

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						
CLO3	✓	✓						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO4	✓	✓						
CLO5	✓	✓						
CLO6	✓	✓						
CLO7	✓	✓						
CLO8	✓	✓						



(KI727) POLYMERIC MATERIAL

Module name:	Polymeric Material	
Module level, if applicable:	Graduate	
Code:	KI727	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. Budiman Anwar, M.Si.	
Lecturer(s):	Dr. Budiman Anwar, M.Si. Dr. Galuh Yuliani, M.Si.	
Language:	Bahasa Indonesia	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisites course(s):	Selected Topics in Physical Chemistry (KI707)	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Explaining the development, classification, and nomenclature of the polymeric material.● CLO2. Explaining the principles of polymerization reaction mechanisms, including stepwise, chain-growth, ionic, coordination, and ring opening polymerization.● CLO3. Explaining the types of copolymers and the principles of copolymerization process.● CLO4. Explaining the relationship between structure with physicochemical properties of polymeric materials.● CLO5. Explaining the physical and chemical analytical methods to investigate the structure and properties of polymeric materials.	



	<ul style="list-style-type: none"> ● CLO6. Explaining the type of average molecular weight of polymers and their distribution and the methods of determining them. ● CLO7. Explaining the principles of polymer modification to produce new materials with desired properties. ● CLO8. Explaining the principles of polymer degradations and how to stabilize them. 																												
Content:	<ul style="list-style-type: none"> ● Introduction to polymer chemistry ● Polymerization mechanisms ● Copolymerization ● Structure and properties of polymers ● Analysis and testing of polymeric materials ● Molecular weight of polymer and its determination ● Polymer modifications ● Polymer degradation and stability 																												
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1"> <thead> <tr> <th>N o</th> <th>C L O</th> <th>Assessmen t Object</th> <th>Assessment Techniques</th> <th>Weig ht</th> </tr> </thead> <tbody> <tr> <td rowspan="3">1</td> <td rowspan="3">CLO1, CLO2, and CLO3,</td> <td>a. Individual assignments</td> <td rowspan="3">Written test and Project report</td> <td>10%</td> </tr> <tr> <td>b. Unit Test 1</td> <td>25%</td> </tr> <tr> <td>c. Project</td> <td>15%</td> </tr> <tr> <td rowspan="3">2</td> <td rowspan="3">CLO4, CLO5, CLO6, CLO7, and CLO8</td> <td>a. Individual assignments</td> <td rowspan="3">Written test and Project report</td> <td>10%</td> </tr> <tr> <td>b. Unit Test 2</td> <td>25%</td> </tr> <tr> <td>c. Project</td> <td>15%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td>100%</td> </tr> </tbody> </table>	N o	C L O	Assessmen t Object	Assessment Techniques	Weig ht	1	CLO1, CLO2, and CLO3,	a. Individual assignments	Written test and Project report	10%	b. Unit Test 1	25%	c. Project	15%	2	CLO4, CLO5, CLO6, CLO7, and CLO8	a. Individual assignments	Written test and Project report	10%	b. Unit Test 2	25%	c. Project	15%	Total				100%
N o	C L O	Assessmen t Object	Assessment Techniques	Weig ht																									
1	CLO1, CLO2, and CLO3,	a. Individual assignments	Written test and Project report	10%																									
		b. Unit Test 1		25%																									
		c. Project		15%																									
2	CLO4, CLO5, CLO6, CLO7, and CLO8	a. Individual assignments	Written test and Project report	10%																									
		b. Unit Test 2		25%																									
		c. Project		15%																									
Total				100%																									
Forms of media:	Board, LCD Projector, Laptop/Computer.																												
Literature:	<ol style="list-style-type: none"> 1. Billmeyer, F.W., Jr., (1984) <i>Textbook of Polymer Science</i>, 3rd ed., John Wiley & Son, Inc. 2. Carraher, C.E., Jr., (2013) <i>Introduction to Polymer Chemistry</i>, 3rd ed., Taylor & Francis Group, LLC. 3. Chanda, M., (2013) <i>Introduction to Polymer Science & Chemistry: A Problem-Solving Approach</i>, 2nd ed., Taylor & Francis Group, LLC. 4. Gnanou Y. and Fontanille, M. (2008) <i>Organic and Physical Chemistry of Polymers</i>, 1st ed., John Wiley & Sons, Inc. 																												



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	5. Schnabel, W. (1982) <i>Polymer Degradation – Principles and Practical Applications</i> , 1 st ed. Hanser International, New York.
--	---

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8	MC-1
CLO1	✓	✓							
CLO2	✓	✓							
CLO3	✓	✓							
CLO4	✓	✓							
CLO5	✓	✓							
CLO6	✓	✓							
CLO7	✓	✓							
CLO8	✓	✓							



(KI728) COMPOSITE AND CERAMIC MATERIALS

Module name:	Composite and Ceramic Materials	
Module level, if applicable:	Graduate	
Code:	KI728	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. rer. nat. Ahmad Mudzakir, M.Si.	
Lecturer(s):	Dr. rer. nat. Ahmad Mudzakir, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	150 minutes	12
Workload:	Total workload is 136 hours (4.8 ECTS) per semester which consists of 40 hours (1.41 ECTS) lectures, 48 hours (1.71 ECTS) structured activities, and 48 hours (1.71 ECTS) self-study.	
Credit points:	4.8 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understands structure and physicochemical properties of ceramics and composites materials ● CLO2. Understands relation and interrelation between structure and physicochemical properties in ceramics and composites materials ● CLO3. Understands essential concepts for material ceramics and composites 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: History and development of ceramic material ● Week 3: Binary compounds and materials ● Week 4: Structure of glass and complex crystals ● Week 5: Phase diagram of solid materials 	



	<ul style="list-style-type: none"> ● Week 6: Furnace and ceramic processing ● Week 7: Defects, charges, and diffusion ● Week 8: Phase boundaries, particles, and pores ● Week 9: Midterm exam ● Week 10: Introduction to composite materials ● Week 11: Mechanical properties of composite materials ● Week 12: Effect of temperature on composite materials ● Week 13: Bio-composites and recycling process ● Week 14: Composite materials fabrication ● Week 15: Application of composite materials ● Week 16: Final exam 																					
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">1</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">1-5</td> <td>- Mid-term exam</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Quiz</td> <td style="text-align: center;">20%</td> </tr> <tr> <td>- Individual assignment</td> <td style="text-align: center;">20%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	30%	- Final exam	30%	- Quiz	20%	- Individual assignment	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																		
1	1-5	- Mid-term exam	Written test	30%																		
		- Final exam		30%																		
		- Quiz		20%																		
		- Individual assignment		20%																		
Total				100%																		
Forms of media:	Board, LCD Projector, Laptop/Computer.																					
Literature:	<ol style="list-style-type: none"> 1. Barry C. C., Grant N. M. - Ceramic Materials_ Science and Engineering (2007) 2. Philippe Boch, Jean-Claude Nièpce - Ceramic Materials_ Processes, Properties and Applications-Wiley-ISTE (2007) 3. Dena Rosslere - Developments in Ceramic Materials Research -Nova Science Publishers (2008) 4. T. W. Clyne, D. Hull - An Introduction to Composite Materials-Cambridge University Press (2019) 5. (Materials Research and Engineering) Chawla, Krishan Kumar - Composite Materials_ Science and Engineering-Springer (2010) 																					

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						
CLO3	✓	✓						



(KI729) MATERIAL SYNTHESIS AND CHARACTERIZATION

Module name:	Material Synthesis and Characterization	
Module level, if applicable:	Graduate	
Code:	KI729	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. rer. nat. Ahmad Mudzakir, M.Si.	
Lecturer(s):	Dr. rer. nat. Ahmad Mudzakir, M.Si. Prof. Dr. Agus Setiabudi, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	150 minutes	12
Workload:	Total workload is 136 hours (4.8 ECTS) per semester which consists of 40 hours (1.41 ECTS) lectures, 48 hours (1.71 ECTS) structured activities, and 48 hours (1.71 ECTS) self-study.	
Credit points:	4.8 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Apply chemistry related knowledge for material synthesise ● CLO2. Apply chemistry related knowledge for material characterization ● CLO3. Come to a proper conclusion based on material characterization data ● CLO4. Operate and understands chemical instrumentations 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: Chemical reaction for material synthesis ● Week 3-7: Principle of material synthesis ● Week 8: Midterm exam ● Week 9-15: Material characterization ● Week 16: Final exam 	



Study/exam achievements:	The final mark will be weight as follow:				
	No	CLO	Assessment Objects	Assessment Techniques	Weight
	1	1-4	- Mid-term exam	Written test	35%
			- Final exam		35%
			- Quiz		10%
- Individual assignment			10%		
- Labwork				10%	
Total				100%	
Forms of media:	Board, LCD Projector, Laptop/Computer.				
Literature:	<ol style="list-style-type: none"> 1. Fahlman, B. D., Materials Chemistry, Springer, Dordrecht, 2007. 2. Allcock, H. R., Introduction to Materials Chemistry, Wiley and Sons, New Jersey, 2008. 3. G. Blasse and B. C. Grabmaier. Luminescent Materials-Springer-Verlag Berlin Heidelberg (1994). 4. Joel S. Miller, Marc Drillon - Magnetism_ Molecules to Materials I-V-Wiley-VCH (2005) 5. Boltz, J., Sputtered Tin Oxide and Titanium Oxide Thin Films as Alternative Transparent Conductive Oxides, Disertasi pada Fakultas für Mathematik, Informatik und Naturwissenschaften der RWTH Aachen University, 2011. 6. Alias, S.S. and Mohamad, A.A., Synthesis of Zinc Oxide by Sol-Gel Method for Photoelectrochemical Cells, Springer, Singapore, 2014. 7. D F Shriver_ M A Drezdzon-The manipulation of air-sensitive compounds-Wiley (1986) 8. Leng, Y., Materials Characterization: Introduction to Microscopic and Spectroscopic Methods, John Wiley & Sons (Asia) Pte Ltd, Singapore, 2008. 9. Theophanides, T., Infrared Spectroscopy – Materials Science, Engineering and Technology, InTech Janeza Trdine, Croatia, 2012. 10. M. Fernandes - Practical Guide to Resolving Single-Crystal Structures (2006) 				

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO3	✓	✓						
CLO4	✓	✓						



(KI730) MATERIAL CHEMISTRY RESEARCH STUDY

Module name:	Material Chemistry Research Study	
Module level, if applicable:	Graduate	
Code:	KI730	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	3 rd	
Module coordinator:	Prof. Dr. Agus Setiabudi, M.Si.	
Lecturer(s):	Prof. Dr. Agus Setiabudi, M.Si., Fitri Khoerunnisa, Ph.D.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	Characterization and Measurement in Chemistry (KI725), Material Design and Process (KI726), Polymer Material (KI727), Composite and Ceramic Materials (KI728), Material Synthesis and Characterization (KI729)	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Apply material chemistry concepts studying material chemistry research paradigm● CLO2. Analyze various topics in recent material chemistry research● CLO3. Communicate results of material chemistry research● CLO4. Designing research study for a selected topic in material chemistry● CLO5. Identify relevant journal as target for publication	



Content:	<ul style="list-style-type: none"> ● Week 1: Material chemistry research paradigm ● Week 2: Research trend on functional porous materials ● Week 3: Research trend on nanomaterials ● Week 4: Research trend on polymer and composite materials ● Week 5: Research trend on renewable materials ● Week 6: Research trend on auxetic materials ● Week 7: Midterm exam ● Week 8-12: Analysis and presentation on relevant research topic ● Week 13-15: Scientific writing practice ● Week 16: Final exams 																												
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">1</td> <td style="text-align: center;">1-2</td> <td>- Exam</td> <td rowspan="2" style="text-align: center;">Written test</td> <td style="text-align: center;">30%</td> </tr> <tr> <td style="text-align: center;">3-5</td> <td>- Assignments</td> <td style="text-align: center;">10%</td> </tr> <tr> <td></td> <td></td> <td>- Presentation</td> <td></td> <td style="text-align: center;">30%</td> </tr> <tr> <td></td> <td></td> <td>- Research proposal</td> <td></td> <td style="text-align: center;">30%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-2	- Exam	Written test	30%	3-5	- Assignments	10%			- Presentation		30%			- Research proposal		30%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																									
1	1-2	- Exam	Written test	30%																									
	3-5	- Assignments		10%																									
		- Presentation		30%																									
		- Research proposal		30%																									
Total				100%																									
Forms of media:	Board, LCD Projector, Laptop/Computer.																												
Literature:	<ol style="list-style-type: none"> 5. T.C. Lim, Auxetic Materials and Structures, Springer, Singapore, 2015 6. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 1: Structure and Chemistry, Wiley, 2017 7. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 2: Design and Manufacturing, Wiley, 2017 8. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 4: Functionalization, Wiley, 2017 9. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 6: Polymeric Composites, Wiley, 2017 																												



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	<p>10. P.S. Liu and G.F. Chen, Porous Materials, Waltham, 2014</p> <p>11. S.K. Sharma, Handbook of Materials Characterization, Cham, Elsevier, 2018</p> <p>12. S.B. Mishra and S. Alok, Handbook of Research Methodology, New Delhi, EduCreation Publishing, 2018</p> <p>13. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 7: Nanocomposites: Sciences and Fundamentals, Wiley, 2017</p> <p>14. V.K. Thakur, M.K. Thakur and M.R. Kessler, Handbook of Composites from Renewable Materials Volume 8: Nanocomposites: Advanced Application, Wiley, 2017</p>
--	--

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓		✓				✓
CLO2	✓	✓		✓				✓
CLO3	✓	✓		✓				✓
CLO4	✓	✓		✓				✓



MKKIPS-BIOLOGICAL CHEMISTRY

(KI731) FUNCTIONAL FOOD COMPONENTS

Module name:	Functional Food Components	
Module level, if applicable:	Graduate	
Code:	KI731	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. Siti Aisyah, M.Si.	
Lecturer(s):	Dr. Siti Aisyah, M.Si.; Drs. Ali Kusrijadi, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Understands definition, regulation and classification of functional food● CLO2. Understands relation between health and functional food● CLO3. Understands the changes in bioactive compound to improve functional food● CLO4. Understands recent research and demand for functional food products● CLO5. Work individually or collectively to solve given assignments	



Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: Health and functional food ● Week 3-4: Bioactive components of functional foods ● Week 5: Prebiotic, syn-biotic, and probiotic ● Week 6-8: Carbohydrate and fiber ● Week 9: Midterm exam ● Week 10-11: Starch and food functionalization ● Week 12: Phenolic compounds in functional food ● Week 13: Phenolic compounds in functional food ● Week 14: Pigments and phytosterol in functional food ● Week 15: Food fortification ● Week 16: Final exam 																						
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">1</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">1-5</td> <td>- Mid-term exam</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">Written test</td> <td style="text-align: center;">35%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">35%</td> </tr> <tr> <td>- Quiz</td> <td rowspan="2" style="text-align: center; vertical-align: middle;">Observation</td> <td style="text-align: center;">10%</td> </tr> <tr> <td>- Project</td> <td style="text-align: center;">20%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	35%	- Final exam	35%	- Quiz	Observation	10%	- Project	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																			
1	1-5	- Mid-term exam	Written test	35%																			
		- Final exam		35%																			
		- Quiz	Observation	10%																			
		- Project		20%																			
Total				100%																			
Forms of media:	Board, LCD Projector, Laptop/Computer.																						
Literature:	<ol style="list-style-type: none"> 15. Wildman, R. E. (2016). Handbook of Nutraceuticals and Functional Foods. CRC Press 16. Gibson, G. R. and Williams, M. C. (2001). Functional Foods Concept to Product. CRC Press. 17. Vattem, D.A. and Maitin V.(2016). Functional Foods, Nutraceuticals and Natural Products, Concepts and Applications. DEStech Publications, Inc 18. Garrow,J.S,James W.P.T, Ralph A., (2001), Human Nutrition and Dietetics, 10th edition, Churchill livingstone, London 19. Belitz, H.D., Grosch, W & Schieberle (2009), Food Chemistry 4th revised and extended ed, Springer-Verlag, Berlin. 20. Damodaran, S., Parkin, K & Fennema, O.R, edited (1997) Fennema's Food Chemistry, CRC Press 21. Aisyah,S. (2015), Induction of prenylated isoflavonoids and stilbenoids in legumes, Wageningen University 22. Ottaway, P. B. (Ed.). (2008). Food fortification and supplementation: Technological, safety and regulatory aspects. Elsevier. 																						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						
CLO3	✓	✓						
CLO4	✓	✓						
CLO5	✓	✓						



MASTER IN CHEMISTRY

MODULE HANDBOOK

(KI732) DRUG MOLECULE SYNTHESIS

Module name:	Drug molecule synthesis	
Module level, if applicable:	Master	
Code:	KI732	
Sub-heading, if applicable:		
Classes, if applicable:		
Semester:	2 nd	
Module coordinator:	Dr. Ratnaningsih Eko Sardjono, M.Si.	
Lecturer(s):	Dr. Ratnaningsih Eko Sardjono, M.Si	
Language:	Bahasa Indonesia	
Classification within the curriculum:	Elective courses	
Type of Teaching	Contact hours per week during the semester	Class Size
Lecture (Expository, discussion, exercise)	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisites course(s):	Selected Topics in Organic Chemistry (KI713)	
Course outcomes:	CLO1 Performing retrosynthetic analysis on aromatic target drug molecules CLO2 Performing retrosynthetic analysis on aliphatic target drug molecules CLO3 Designing synthesis routes of aromatic drug molecules CLO4 Designing synthesis routes of aliphatic drug molecules CLO5 Selecting the best synthesis route from several alternative designs for the synthesis of aromatic drug molecules	



	CO6 Selecting the best synthesis route from several alternative aliphatic drug molecular synthesis route designs route																			
Content	<ol style="list-style-type: none"> 1. Aromatic compounds reaction review 2. The basic principle of aromatic medicinal compounds synthesis 3. Application of functional group disconnection and interconnection techniques in the synthesis of aromatic medicinal compounds. 4. Strategy of aromatic medicinal compounds synthesis 5. Aliphatic compounds reaction review 6. Disconnection of one C-X group 7. Chemo-selectivity strategy 8. Disconnection of two C-X groups 9. Protective group 10. Disconnection of 1,1 C-C 																			
Study/exam achievements:	<p>CLO1, CLO2, CLO3, CLO4, CLO5 The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Object</th> <th>Assessment techniques</th> <th>Weight (%)</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">1</td> <td rowspan="3" style="text-align: center;">CLO 1-6</td> <td style="text-align: center;">Task</td> <td rowspan="3" style="text-align: center;">Written test</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">Mid exam</td> <td style="text-align: center;">40</td> </tr> <tr> <td style="text-align: center;">Final exam</td> <td style="text-align: center;">40</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100</td> </tr> </tbody> </table>	No	CLO	Assessment Object	Assessment techniques	Weight (%)	1	CLO 1-6	Task	Written test	20	Mid exam	40	Final exam	40	Total				100
No	CLO	Assessment Object	Assessment techniques	Weight (%)																
1	CLO 1-6	Task	Written test	20																
		Mid exam		40																
		Final exam		40																
Total				100																
Forms of media:	Board, LCD Projector, Laptop/Computer																			
Literature:	<ol style="list-style-type: none"> 1. Carey, F.A., and Giuliano, R.M., 2011, <i>Organic Chemistry</i>, 8thed, The Mc-Graw Hills Companies. 2. Mc Murry, J.E., 2012, <i>Organic Chemistry</i>, 8th ed., Brooks/Cole Cengage Learning. 3. Warren, S., 1982, <i>Organic Synthesis: The Disconnection Approach</i>, John Wiley & Sons. 																			



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						
CLO3	✓	✓						
CLO4	✓	✓						
CLO5	✓	✓						
CLO6	✓	✓						



MASTER IN CHEMISTRY

MODULE HANDBOOK

(KI733) MOLECULAR MECHANISM AND DRUG BIOTRANSFORMATION

Module name:	Molecular Mechanism and Drug Biotransformation	
Module level, if applicable:	Graduate	
Code:	KI733	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2	
Module coordinator:	Gun Gun Gumilar, M.Si.	
Lecturer(s):	Dr. Iqbal Musthepa, M.Si. and Gun Gun Gumilar, M.Si.	
Language:	Bahasa Indonesia	
Type of Teaching	Contact hours per week during the semester	Class Size
Lecture (Expository, discussion, exercise)	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisites course(s):	Selected Topics in Organic Chemistry (KI711), Selected Topics in Biochemistry (KI723)	
Course outcomes:	<ul style="list-style-type: none">● CLO1: Have the ability to describe xenobiotics metabolism● CLO2: Have knowledge of Cytochrome P450● CLO3: Has the ability to provide examples of enzymes that play a role in the oxidation process● CLO4: Have the ability to explain esters and amides hydrolysis● CLO5: Have knowledge about enzymes that related to xenobiotic metabolism● CLO6: Has the ability to describe the transport of xenobiotics and their metabolites● CLO7: Has the ability to explain metabolism and toxicity● CLO8: Have the ability to describe the metabolic activation of drugs, industrial chemicals, pyrolysis products, and natural products	



Content:	Lecture materials include: <ol style="list-style-type: none"> 1. Overview of xenobiotic metabolism 2. Cytochrome P450 3. Oxidative enzymes 4. Hydrolysis of esters and amides 5. Epoxide hydrolase enzyme 6. Glucosyltransferase enzyme 7. Sulfotransferase enzyme 8. Enzyme glutathione S-transferase 9. Transport of xenobiotics and their metabolites 10. Metabolism and toxicity 11. Metabolic activation of drugs 12. Metabolic activation of industrial chemicals 13. Metabolic activation of pyrolysis products 14. Metabolic activation of natural products 																							
Study/exam achievements:	CLO1-8 The final mark will be weight as follow:																							
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 5%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 35%;">Assessment Object</th> <th style="width: 25%;">Assessment techniques</th> <th style="width: 20%;">Weight (%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CLO 1-8</td> <td>Task</td> <td rowspan="3">Written test</td> <td>20</td> </tr> <tr> <td></td> <td></td> <td>Mid exam</td> <td>40</td> </tr> <tr> <td></td> <td></td> <td>Final exam</td> <td>40</td> </tr> <tr> <td colspan="4">Total</td> <td>100</td> </tr> </tbody> </table>	No	CLO	Assessment Object	Assessment techniques	Weight (%)	1	CLO 1-8	Task	Written test	20			Mid exam	40			Final exam	40	Total				100
	No	CLO	Assessment Object	Assessment techniques	Weight (%)																			
	1	CLO 1-8	Task	Written test	20																			
		Mid exam	40																					
		Final exam	40																					
Total				100																				
Forms of media:	Board, LCD Projector, Laptop/Computer																							
Literature:	<ol style="list-style-type: none"> 1. G. Gordon Gibson and Paul Skett (2001). Introduction to Drug Metabolism, 3rd Ed. Nelson Thornes Company. 2. Ioannides & Costa (editors) (2001). Enzyme systems that metabolise drugs and other xenobiotics, 1st Ed. Wiley. 3. Paul R. Ortiz De Montellano (2004). Cytochrome P450: Structure, Mechanism, and Biochemistry, 3rd Ed. Kluwer Academic Publishers 																							

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CO1	✓	✓						
CO2	✓	✓						
CO3	✓	✓						
CO4	✓	✓						
CO5	✓	✓						
CO6	✓	✓						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CO7	✓	✓						
CO8	✓	✓						



(KI734) MEDICAL AND NUTRITIONAL BIOCHEMISTRY

Module name:	Medical and Nutritional Biochemistry	
Module level, if applicable:	Graduate	
Code:	KI734	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. Florentina Maria Titin Supriyanti, M.Si.	
Lecturer(s):	Dr. Florentina Maria Titin Supriyanti, M.Si; Dr. Hayat Sholihin M.Sc.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	Selected Topics in Organic Chemistry (KI711), Selected Topics in Biochemistry (KI723)	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understands the lectures and module ● CLO2. Understands biochemical reactions in food ● CLO3. Understands biochemistry and chemistry of water ● CLO4. Understands food browning reaction ● CLO5. Understands definition and function of functional food ● CLO6. Understands drug molecule interaction ● CLO7. Understands ADMET ● CLO8. Understands principles and mechanism of medical treatment 	
	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2-3: Biochemical reactions in food ● Week 4-5: Biochemistry and chemistry of water 	



Content:	<ul style="list-style-type: none"> ● Week 6-7: Food browning reaction ● Week 8: Midterm exam ● Week 9-10: Functional food ● Week 11-12: Drug molecule interaction ● Week 13-14: ADMET ● Week 15: Principles and mechanism of medical treatment ● Week 16: Final exam 																			
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #cccccc;"> <th style="width: 10%;">No</th> <th style="width: 15%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 25%;">Assessment Techniques</th> <th style="width: 20%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">1</td> <td rowspan="3" style="text-align: center;">1-5</td> <td>- Mid-term exam</td> <td rowspan="3" style="text-align: center;">Written test</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Assignments</td> <td style="text-align: center;">20%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	40%	- Final exam	40%	- Assignments	20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																
1	1-5	- Mid-term exam	Written test	40%																
		- Final exam		40%																
		- Assignments		20%																
Total				100%																
Forms of media:	Board, LCD Projector, Laptop/Computer.																			
Literature:	<ol style="list-style-type: none"> 23. Harper, (2018), Biochemistry, 30th edition, EGC Medical Publisher, Jakarta. 24. Hui.Y.H, (2006), Food Biochemistry and Food Processing, Blackwell Publishing, USA. 25. Khan.R., (1993), Low Calorie Food and Food Ingredients, Chapman and Hall, London, UK. 26. Almatsier, S. (2005), Diet Guide, Gramedia Pustaka Utama, Jakarta 27. Almatsier, S., (2004), Fundamental Principles of Nutritional Science, Gramedia Pustaka Utama, Jakarta 28. Rohman.A.(2014), Drug Analysis, UGM Press, Yogyakarta. 29. Nogrady,T., (2007), Medicinal Chemistry, Macmillan Publish, USA. 30. Sulistia, G.G. (2005), Farmakologi dan Terapi , Fakultas Kedokteran Universitas Indonesia, Jakarta. 31. Winarno,F.G., dkk, (2003), Flora Usus dan Yoghurt, M-Brio Press, Bogor. 32. Winarno,F.G., (1986), Enzim Pangan, M-Brio Press, Bogor. 																			

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO3	✓	✓						
CLO4	✓	✓						
CLO5	✓	✓						
CLO6	✓	✓						
CLO7	✓	✓						
CLO8	✓	✓						



MASTER IN CHEMISTRY

MODULE HANDBOOK

(KI735) BIOLOGICAL CHEMISTRY RESEARCH STUDY

Module name:	Biological Chemistry Research Study	
Module level, if applicable:	Graduate	
Code:	KI735	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	3rd	
Module coordinator:	Dr. Iqbal Musthapa, M.Si.	
Lecturer(s):	Dr. Iqbal Musthapa, M.Si.; Siti Aisyah, M.Si, Ph.D.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none">● CLO1. Apply natural product isolation technique to produce a scientific work● CLO2. Apply natural product derivatization technique to produce a scientific work● CLO3. Performed natural product research using relevant equipment● CLO4. Understands recent research and demand for functional food products	
Content:	<ul style="list-style-type: none">● Week 1: Introduction● Week 2-3: Isolation of primary and secondary metabolites● Week 4-6: Derivatization of natural products● Week 7: Midterm exam● Week 8-10: Characterization of natural products	



	<ul style="list-style-type: none"> • Week 11-12: Application of natural products • Week 13-15: Recent progress in natural products research • Week 16: Final exam 															
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1"> <thead> <tr> <th>No</th> <th>CLO</th> <th>Assessment Objects</th> <th>Assessment Techniques</th> <th>Weight</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1-4</td> <td>- Mid-term exam - Final exam - Assignments</td> <td>Written test</td> <td>40% 40% 20%</td> </tr> <tr> <td colspan="4">Total</td> <td>100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-4	- Mid-term exam - Final exam - Assignments	Written test	40% 40% 20%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight												
1	1-4	- Mid-term exam - Final exam - Assignments	Written test	40% 40% 20%												
Total				100%												
Forms of media:	Board, LCD Projector, Laptop/Computer.															
Literature:	<ol style="list-style-type: none"> 1. G. Bagalkotkar, S. R. Sagineedu, M. S. Saad and J. Stanslas, "Phytochemicals from <i>Phyllanthus niruri</i> Linn. and their pharmacological properties: a review", <i>Journal of Pharmacy and Pharmacology</i>, (2006), 58: 1559–1570 2. Xiaohui Xinga, Steve W. Cuia, Shaoping Nie, Glyn O. Phillips, H. Douglas Goff, Qi Wang, "A review of isolation process, structural characteristics, and bioactivities of water-soluble polysaccharides from <i>Dendrobium</i> plants", <i>Bioactive Carbohydrates and Dietary Fibre</i> 1, (2013), 131–147. 3. S.M. Willfor, A.I. Smeds, B.R. Holmbom, "Review : Chromatographic analysis of lignans", <i>Journal of Chromatography A</i>, 1112 (2006) 64–77. 4. Dai-Eun Sok, Hui S. Cui, and Mee R. Kim, "Isolation and Bioactivities of Furfuran Type Lignan Compounds from Edible Plants", <i>Recent Patents on Food, Nutrition & Agriculture</i>, (2009), 1, 87-95. 5. Eduardo Tibiriçá, "Cardiovascular Properties of Yangambin, a Lignan Isolated from Brazilian Plants", <i>Cardiovascular Drug Reviews</i>, (2001), Vol. 19, No. 4, pp. 313–328 															

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓			✓			
CLO2	✓	✓			✓			
CLO3	✓	✓			✓			
CLO4	✓	✓			✓			



(KI736) FUNCTIONAL FOOD COMPONENTS

Module name:	Functional Food Components	
Module level, if applicable:	Graduate	
Code:	KI736	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	2 nd	
Module coordinator:	Dr. Florentina Maria Titin Supriyanti, M.Si.	
Lecturer(s):	Dr. Florentina Maria Titin Supriyanti, M.Si.; Dra. Zackiyah, M. Si	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	100 minutes	12
Workload:	Total workload is 90 hours 40 minutes (3.2 ECTS) per semester which consists of 26 hours 40 minutes (0.9 ECTS) lectures, 32 hours (1.1 ECTS) structured activities, and 32 hours (1.1 ECTS) self-study.	
Credit points:	3.2 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CLO1. Understands the lectures and module ● CLO2. Understands application of proximate analysis of biomolecule ● CLO3. Understands application of proximate analysis of food ● CLO4. Understands analysis of vitamin ● CLO5. Understands function of enzyme in food ● CLO6. Understands antioxidants in food ● CLO7. Understands analysis of active compounds in drugs 	
Content:	<ul style="list-style-type: none"> ● Week 1: Introduction ● Week 2: Analysis of water, mineral and biomolecule ● Week 3: Analysis of water, mineral and biomolecule in food ● Week 4: Analysis of vitamin ● Week 5: Analysis of enzyme in food 	



	<ul style="list-style-type: none"> ● Week 6: Analysis of antioxidants in food ● Week 7: Introduction to drug analysis ● Week 8: Midterm exam ● Week 9: Proximate analysis of biomolecule experiment ● Week 10: Proximate analysis of food experiment ● Week 11: Analysis of vitamin experiment ● Week 12-13: Analysis of enzyme in food experiment ● Week 14-15: Analysis of drug experiments ● Week 16: Final exam 																				
Study/exam achievements:	<p>The final mark will be weight as follow:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">No</th> <th style="width: 10%;">CLO</th> <th style="width: 30%;">Assessment Objects</th> <th style="width: 20%;">Assessment Techniques</th> <th style="width: 10%;">Weight</th> </tr> </thead> <tbody> <tr> <td rowspan="3" style="text-align: center;">1</td> <td rowspan="3" style="text-align: center;">1-5</td> <td>- Mid-term exam</td> <td rowspan="2" style="text-align: center;">Written test</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>- Final exam</td> <td style="text-align: center;">30%</td> </tr> <tr> <td>- Experimenta l skill</td> <td style="text-align: center;">Observation</td> <td style="text-align: center;">30%</td> </tr> <tr> <td colspan="4" style="text-align: center;">Total</td> <td style="text-align: center;">100%</td> </tr> </tbody> </table>	No	CLO	Assessment Objects	Assessment Techniques	Weight	1	1-5	- Mid-term exam	Written test	40%	- Final exam	30%	- Experimenta l skill	Observation	30%	Total				100%
No	CLO	Assessment Objects	Assessment Techniques	Weight																	
1	1-5	- Mid-term exam	Written test	40%																	
		- Final exam		30%																	
		- Experimenta l skill	Observation	30%																	
Total				100%																	
Forms of media:	Board, LCD Projector, Laptop/Computer.																				
Literature:	<ol style="list-style-type: none"> 33. Sumantri. A.R., (2007), Analisis Makanan, UGM Press. 34. Rohman.A.(2014), Analisis Obat, UGM Press. 35. Belitz, H.D., Grosch, W & Schieberle (2009), Food Chemistry 4th revised and extended ed, Springer-Verlag, Berlin. 36. De Man, J, (1997), Kimia Makanan, Penerbit ITB, Bandung. 37. Damodaran, S., Parkin, K & Fennema, O.R, edited (1997) Fennema's Food Chemistry, CRC Press, 38. Winarno, FG, (1997), Kimia Pangan dan Gizi, Gramedia, Jakarta. 39. Zhenghong Chen, Henk A. Schols and Alphons G. J. Voragen. 2003. Starch granule size strongly determines starch noodle processing and noodle quality. Journal of Food Science 68: 1584-1589. 40. Lingmin Tian, Harry Gruppen, Henk A. Schols. Characterization of (glucurono)arabinoxylans from oats using enzymatic fingerprinting. Journal of Agricultural and Food Chemistry, 2015, 63:10822-10830. 41. Lingmin Tian, Jan Scholte, Anton J.W. Scheurink, Harry Gruppen, and Henk A. Schols. Fate of non-starch polysaccharides during fermentation and consequent effects on appetite regulation and fat accumulation in rats. Food & Function, Submitted, 2016. 42. Meijerink, M., Rösch, C., Taverne, N., Venema, K., Gruppen, H., Schols, H. A. & Wells J.M. (2016). Structure related 																				



UNIVERSITAS PENDIDIKAN INDONESIA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
DEPARTMENT OF CHEMISTRY EDUCATION
Jalan Setiabudi 229 Bandung 40154
Telepon: (022) 2000579 Fax. (022) 2000579
Laman: kimia.upi.id, E-mail: depdikkim.upi@gmail.com

	<p>immunomodulation by sugar beet arabinans is induced via Syk tyrosine kinase-dependent pathway.</p> <p>43. Winarno, F.G., (1986) Enzim Pangan, M-Brio Press, Bogor.</p> <p>44. Lee.C.Y, et all, (1992), Phenolic Compounds in Food and Their Effects on Health, American Chemical, Society, Washington, USA.</p>
--	--

PLO and CLO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CLO1	✓	✓						
CLO2	✓	✓						
CLO3	✓	✓						
CLO4	✓	✓						
CLO5	✓	✓						
CLO6	✓	✓						
CLO7	✓	✓						



THESIS

(K1799) THESIS

Module name:	Thesis	
Module level, if applicable:	Graduate	
Code:	K1799	
Sub-heading, if applicable:	-	
Classes, if applicable:	-	
Semester:	4 th	
Module coordinator:	Prof. Dr. Agus Setiabudi, M.Si.	
Lecturer(s):	Prof. Dr. Agus Setiabudi, M.Si.	
Language:	Indonesian	
Classification within the curriculum:	Elective course	
Type of Teaching	Contact hours per week during the semester	Class size
Lecture	-	12
Workload:	Total workload is 386 hours 40 minutes (12.8 ECTS) lab work per semester	
Credit points:	12.8 ECTS (2 SKS), 1 SKS = 1.6 ECTS	
Prerequisite course(s):	-	
Course outcomes:	After taking this course the students have ability to: <ul style="list-style-type: none"> ● CO1. Performed supervised independent research ● CO2. Analyzing and evaluating research results ● CO3. Apply chemistry related knowledge in the field of research ● CO4. Present the research results in a scientific work ● CO5. Defend the work in an academic forum ● CO6. Apply scientific and professional ethics in performing scientific research ● CO7. Adapt and response to dynamics of research 	
Content:	<ul style="list-style-type: none"> ● Independent research 	



UNIVERSITAS PENDIDIKAN INDONESIA
 FACULTY OF MATHEMATICS AND NATURAL SCIENCES EDUCATION
 DEPARTMENT OF CHEMISTRY EDUCATION
 Jalan Setiabudi 229 Bandung 40154
 Telepon: (022) 2000579 Fax. (022) 2000579
 Laman: kimia.upi.id, E-mail: depdikim.upi@gmail.com

Study/exam achievements:	The final mark will be weight as follow:				
	No	CO	Assessment Objects	Assessment Techniques	Weight
	1	1-7	- Defense exam	Defense exam	100
Total					100%
Forms of media:	Board, LCD Projector, Laptop/Computer.				
Literature:	<p>45. Coghill, Anne M., L. R. G. E. (Ed.). (2006). The ACS Style Guide, 3rd Ed. American Chemical Society.</p> <p>46. Deb, D., Dey, R., & Balas, V. E. (2013). Engineering Research Methodology; A Practical Insight for Researchers-Springer Singapore (2019).pdf.</p> <p>47. Kotari, C. R. (2004). Research Methodology; Methods & Techniques (2nd ed.).</p> <p>48. Kumar, R. (2011). Research Methodology; a step-by-step guide for beginners.</p> <p>49. Pandey, P., & Pandey, M. M. (2015). Research Methodology; Tools and Techniques</p> <p>50. Setiabudi, A. dan Hardian, R., 2020 Prinsip dan Teknik Menyusun Kajian Literatur dalam Penelitian Sains, UPI Press</p>				

PLO and CO mapping

	MC-1	MC-2	MC-3	MC-4	MC-5	MC-6	MC-7	MC-8
CO1			✓	✓			✓	
CO2			✓	✓			✓	
CO3			✓	✓			✓	
CO4			✓	✓			✓	
CO5			✓	✓			✓	
CO6			✓	✓			✓	
CO7			✓	✓			✓	