IPB UNIVERSITY
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
DEPARTEMEN KIMIA

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SYLLABUS

KIM 1236
FUNDAMENTAL ANALITYCAL CHEMISTRY
3(2-1)

Pengesahan		Persetujuan		Penyusunan	
Tanggal	DD/MM/YYYY	Tanggal	DD/MM/YYYY	Tanggal	DD/MM/YYYY
Ketua Departemen (……..)		Kepala Divisi (……..)		Koordinator Mata Kuliah (……..)	

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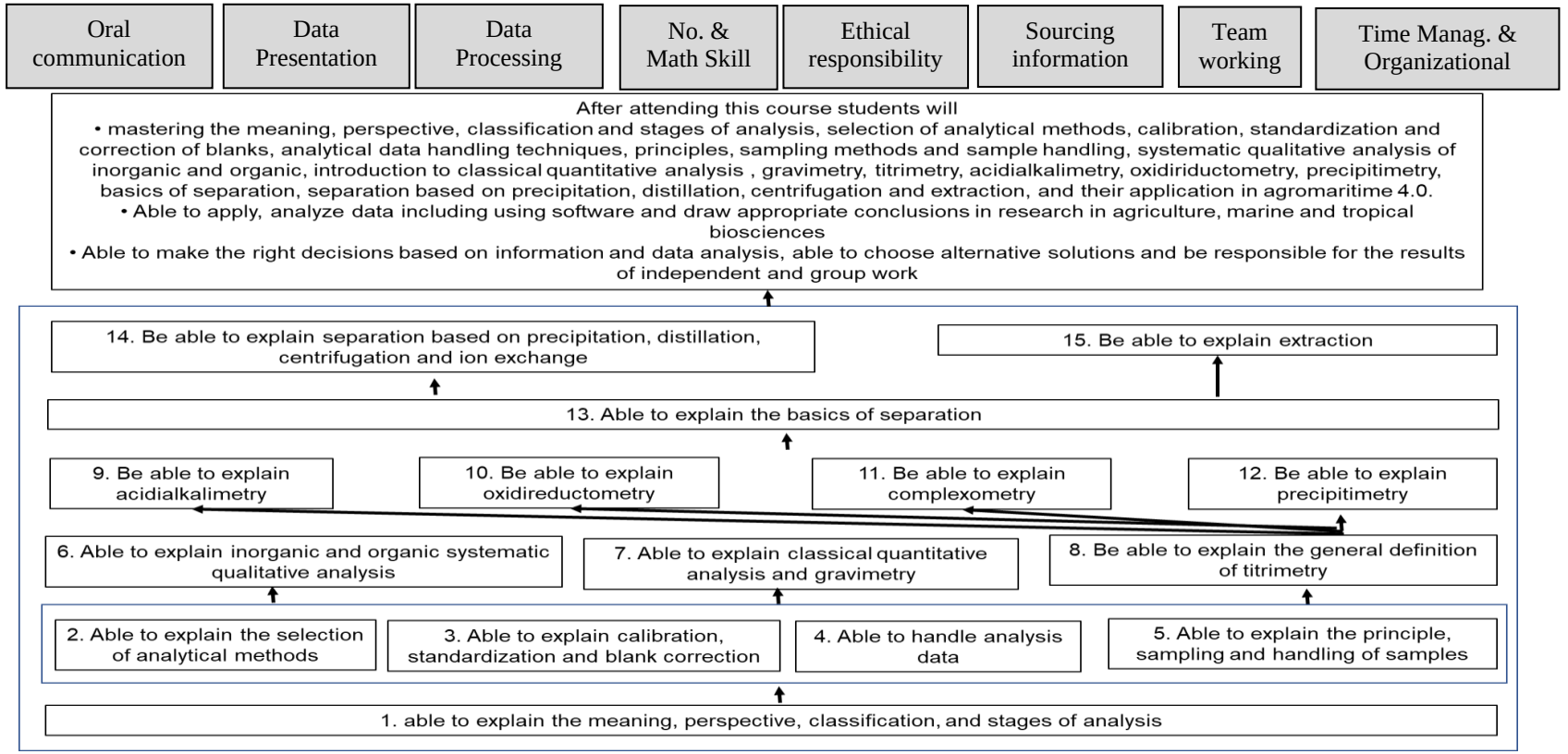
INSTRUCTIONAL ANALYSIS



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Course Name	:	Fundamental Analitycal Chemistry
Code/Credit	:	KIM 1236/3(2-2)
Semester	:	3
Description	:	Fundamental analytical chemistry course explains the meaning, perspective, classification, and stages of analysis, selection of analytical methods, calibration, standardization and correction of blanks, techniques for handling analytical data, principles, methods of sampling and handling of samples, systematic qualitative analysis of inorganic and organic, introduction to classical quantitative analysis, gravimetry, titrimetry, acidial-kalimetry, oxydireductometry, precipitimetry, the basics of separation, separation based on precipitation, distillation, centrifugation and extraction, and their application in agromaritime 4.0.
Prerequisite course	:	-
Learning outcomes	:	After attending this course students will • mastering the meaning, perspective, classification and stages of analysis, selection of analytical methods, calibration, standardization and correction of blanks, analytical data handling techniques, principles, sampling methods and sample handling, systematic qualitative analysis of inorganic and organic, introduction to classical quantitative analysis , gravimetry, titrimetry, acidialkalimetry, oxidiriductometry, precipitimetry, basics of separation, separation based on precipitation, distillation, centrifugation and extraction, and their application in agromaritime 4.0. • Able to apply, analyze data including using software and draw appropriate conclusions in research in agriculture, marine and tropical biosciences • Able to make the right decisions based on information and data analysis, able to choose alternative solutions and be responsible for the results of independent and group work
Scope and Curriculum Map of Royal Society of Chemistry (RSC)	:	
Division/Field	:	Analytical Chemistry
Lecturer	:	Prof. Dr. Irmanida Batubara, SSi., MSi (coordinator) Dr. Dra. Eti Rohaeti, MS Dr. Drs. Deden Saprudin, Msi Rudi Heryanto, SSi., MSi

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Table 1. Plan for Study

WEEK	LEARNING OUTCOME	TOPIC	METHOD	DURATION	STUDY EXPERIENCE	ASSESSMENT			REFERENCE
						CRITERIA	INDICATOR	%	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	able to explain the meaning, perspective, classification, and stages of analysis	Definition, perspective, classification, and stages of analysis	Lectures, interactive discussions. Set a real example in society	100 min	Explain the meaning, perspective, classification, and stages of analysis	The truth about understanding, perspective, classification and stages of analysis	Midterm exam	4	1-3
2	Able to select the analytical method	Selection of analytical method	Lectures, interactive discussions including discussions in real examples	50 min	Describes the stage of choosing an analytical method	Correctness in choosing the method of analysis	Midterm exam, poster presentation	3	1-3, 7
2-3	Able to explain about calibration, standardization and blank correction	Calibration, standardization and blank correction	Lectures, interactive discussions including discussions in real examples	150 min	Understand and calculate various methods of calibration, standardization, and blank correction	Correctness in selecting, distinguishing, and calculating calibration, standardization, and blank corrections	Midterm exam, poster presentation	6	1-3, 6,7
4	Able to handle the data analysis	Analysis data handling techniques	Lectures, interactive discussions including discussions in real examples	100 min	Handle multiple analysis data like calculating mean, stdev, etc	Correct handling data analysis	Midterm exam, poster presentation	4	1-3, 6,7
5	Able to explain principles, methods of sampling and sample handling	Principles, methods of sampling and sample handling	Lectures, interactive discussions including discussions in real examples	100 min	Explain the principles, sampling and handling of samples	Correctness in explaining the principles, methods of sampling and handling of samples	Midterm exam, poster presentation	4	1-3, 7

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6	Able to explain about Inorganic systematic qualitative analysis	Inorganic systematic qualitative analysis	Lectures, interactive discussions including discussions in real examples	50 min	explain about Inorganic systematic qualitative analysis	Correctness in Inorganic systematic qualitative analysis	Midterm exam, poster presentation	3	1-3
6	Able to explain classical quantitative analysis and gravimetry	Introduction to classical and gravimetric quantitative analysis	Lectures, interactive discussions including discussions in real examples	100 min	Describes classical quantitative analysis and gravimetry	Correctness in Describes classical quantitative analysis and gravimetry	Midterm exam, poster presentation	4	1-3
7	Be able to explain the general definition of titrimetry	Introduction to titrimetry	Lectures, interactive discussions including discussions in real examples	50 min	Explain some terminology in titrimetry	Correctness in Explain some terminology in titrimetry	Midterm exam, poster presentation	3	1-4,7
MIDTERM EXAM									
8	able to explain acidialkalimetry	acidialkalimetry	Lectures, interactive discussions including discussions in real examples	100 min	Explain acid-base reactions and apply them to acidial-kalimetry	Correctness in explaining and calculating analyte levels and acidial-kalimetry equivalence points, especially polyvalent acidial-kalimetry	Final Exam, poster presentation	4	1-4,7
9	able to explain oxidireductometry	oxidireductometry	Lectures, interactive discussions including discussions in real examples	100 min	Explain acid-base reactions and apply them to oxidireductometry	Correctness in explaining and calculating analyte levels and oxidiredductometry equivalence points	Final Exam, poster presentation	4	1-4,7

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10	able to explain complexometric	complexometric	Lectures, interactive discussions including discussions in real examples	100 min	Explain acid-base reactions and apply them to complexometry	Correctness in explaining and calculating analyte levels and complexometry equivalence points	Final Exam, poster presentation	4	1-4,7
11	Able to explain precipitimetric	precipitimetric	Lectures, interactive discussions including discussions in real examples	50 min	Explain acid-base reactions and apply them to precipitimetry	Correctness in explaining and calculating analyte levels and precipitimetry equivalence points	Final Exam, poster presentation	3	1-4,7
11	Able to explain Separation basics	Separation basics	Lectures, interactive discussions including discussions in real examples	50 min	Explain the basis of separation	Correctness in Explain the basis of separation	Final Exam, poster presentation	3	5,7
12-13	Able to explain separation based on precipitation, distillation, centrifugation and ion exchange	Separation based on precipitation, distillation, centrifugation and ion exchange	Lectures, interactive discussions including discussions in real examples	150 min	explain separation based on precipitation, distillation, centrifugation and ion exchange	Correctness in explain separation based on precipitation, distillation, centrifugation and ion exchange	Final Exam, poster presentation	6	5,7
13-14	Able to explain about extraction	Extraction	Lectures, interactive discussions including discussions in real examples	150 min	Explain the phenomenon of extraction in everyday life	Correctness in Explain the phenomenon of extraction in everyday life	Final Exam, poster presentation	6	5,7

Table 2. Plan for Assignment

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WEEK	TOPIC	OBJECTIVE	DESCRIPTION	ASESSEMENT CRITERIA
1	Definition, perspective, classification, and stages of analysis	Orientation for the students, determine the Groups, and practice exercise. Practice exercise in group about definition, perspective, classification, and stages of analysis	Explation about role of the subject, determination of students group, and role of each member.	activity in class and group
2-3	Selection of analytical method, Calibration, standardization and blank correction	Practice exercise in group and individually, poster preparation and presentation about selection of analytical method, Calibration, standardization and blank correction	Discussion, poster preparation and presentation, and practice exercises related to Selection of analytical method, Calibration, standardization and blank correction	poster presentation, activity in class, and assignment
4	Analysis data handling techniques	Practice exercise in group and individually, poster preparation and presentation about handle the data analysis	Discussion, poster preparation and presentation, exercise and practice exercises related to Analysis data handling techniques	poster presentation, activity in class, and assignment
5	Principles, methods of sampling and sample handling	Practice exercise in group and individually, poster preparation and presentation principles, methods of sampling and sample handling	Discussion, poster preparation and presentation, exercise and practice exercises related to Principles, methods of sampling and sample handling	poster presentation, activity in class, and assignment
6-7	Inorganic systematic qualitative analysis Introduction to classical and gravimetric quantitative analysis Introduction to titrimetric	Practice exercise in group and individually, poster preparation and presentation about Inorganic systematic qualitative analysis; classical quantitative analysis and gravimetry; and the general definition of titrimetric	Discussion, poster preparation and presentation, exercise and practice exercises related to Inorganic systematic qualitative analysis, Introduction to classical and gravimetric quantitative analysis, Introduction to titrimetric	poster presentation, activity in class, and assignment
8	Acid-alkalimetry	Practice exercise in group and individually, poster preparation and presentation about acid-alkalimetry	Discussion, poster preparation and presentation, exercise and practice exercises related to acid-alkalimetry	poster presentation, activity in class, and assignment
9	Oxid-reductometric	Practice exercise in group and individually, poster preparation and presentation about oxid-reductometric	Discussion, poster preparation and presentation, exercise and practice exercises related to oxid-reductometry	poster presentation, activity in class, and assignment
10	complexometric	Practice exercise in group and individually, poster preparation and presentation about complexometric	Discussion, poster preparation and presentation, exercise and practice exercises related to	poster presentation, activity in class, and assignment

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11	Precipitimetric and basic of separation	Practice exercise in group and individually, poster preparation and presentation about precipitimetric and basic of separation	Discussion, poster preparation and presentation, exercise and practice exercises related to precipitimetric and bacis of separation	poster presentation, activity in class, and assignment
12-14	Separation based on precipitation, distillation, centrifugation and ion exchange Extraction	Practice exercise in group and individually, poster preparation and presentation about separation based on precipitation, distillation, centrifugation, ion exchange, and extraction	Discussion, poster preparation and presentation, exercise and practice exercises related to Separation based on precipitation, distillation, centrifugation and ion exchange; and extraction	poster presentation, activity in class, and assignment

Table 3. Plan for Assesemeent

Learning Outcomes	**Assignment**	**Exam**			
		Quizzes	**Midterm exam**	**Final term exam**	**Poster presentation**
able to explain the meaning, perspective, classification, and stages of analysis	Practice exercise in group about definition, perspective, classification, and stages of analysis		x		
Able to select the analytical method, Able to explain about calibration, standardization and blank correction	Practice exercise in group and individually, poster preparation and presentation	x	x		x
Able to handle the data analysis	Practice exercise in group and individually, poster preparation and presentation	x	x		x
Able to explain principles, methods of sampling and sample handling	Practice exercise in group and individually, poster preparation and presentation	x	x		x
Able to explain about Inorganic systematic qualitative analysis, classical quantitative analysis and gravimetry, and the general definition of titrimetric	Practice exercise in group and individually, poster preparation and presentation	x		x	x
able to explain acid-alkalimetry	Practice exercise in group and individually, poster preparation and presentation	x		x	x
able to explain oxid-reductometry	Practice exercise in group and individually, poster preparation and presentation	x		x	x

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able to explain complexometric	Practice exercise in group and individually, poster preparation and presentation	x		x	x
Able to explain precipitimetric and basic of separation	Practice exercise in group and individually, poster preparation and presentation	x		x	x
Able to explain separation based on precipitation, distillation, centrifugation and ion exchange Able to explain about extraction	Practice exercise in group and individually, poster preparation and presentation	x		x	x

Table 4. Distribution of Asessement

Assesment Criteria	Range	%	Note
Activity in response class	30, 70 - 100	15	
Assigment in response class	0 - 100	10	Based on score of the assigment
Midterm exam	0 - 100	25	
Final exam	0 - 100	25	
Quizzes	0 - 100	5	4 times
Poster presentation	10 - 100	10	
Activity during discussion	50 - 100	10	

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Table 5. Assesment Criteria

Activity in response class

No	Assesment criteria	score
1	If the student attend the class less than 80%	30
2	If the student attend class more than 80% but not active in class	70
3	If the student attend class more than 80% and not always active in class	80
4	If the student attend class100% but not always active in class	90
5	If the student attend class 100% and always active in class	100

Poster Presentation Rubric

	Assesment Criteria				Percentage	Point
	Exceeded Expectations (EEX) (80-100)	**As Expected (MEX) (60-70)**	**Close to Expectations (APP) (40-50)**	**Need to Improve (NIM) (10-30)**	**(%)**	
Layout/Design	Very easily read, creative, atractive & professional	Easily read, creative, attractive & professional	Readable but less creative and attractive	Hard to read, not creative and not attractive	**40**	
Content	About 80 – 100% content the same with the assignment	About 50 – 80% content the same with the assignment	About 30 - 50% same with the assignment	Only less than 30% same with the assignment	**40**	
Delivery	Very clear voice, fluent, very goodbody languange and confident	Clear voice, fluent, goodbody languange and confident	Clear voice but less fluent, moderate body language and less confident	Clear voice, but not fluent, unsuitable body language and not confident	**20**	

Activeness during discussion rubric

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	Assesment Criteria				Point
	Exceeded Expectations (EEX) (90-100%)	**As Expected (MEX) (76-89%)**	**Close to Expectations (APP) (60-75%)**	**Need to Improve (NIM) (50-60%)**	
Classroom Engagement Rate	Your peers proactively contribute to class by offering ideas and/or asking questions more than once per class and/or working consistently on group projects over time.	Your peers proactively contribute to class by offering ideas and/or asking questions more than once per class and/or working in group projects for most of the allotted time.	Your colleagues rarely contribute to class by offering ideas and asking questions and/or working on group projects for only part of the allotted time.	Your colleagues never contribute to class by offering ideas and asking questions and/or have difficulty staying on task during group project time..	
Comment Quality	Comments are always insightful and constructive. Use the appropriate terminology. Comments are balanced between general impressions, opinions and specific, thoughtful criticisms or contributions.	The comments are mostly insightful and constructive. Most use the right terminology. Sometimes comments are too general or irrelevant to the discussion.	Comments are occasionally constructive with the occasional hint of insight. Your partner doesn't use the right terms. Comments are not always relevant to the discussion.	Uninformative comments, lacking in proper terminology. Strong reliance on personal opinion and taste. Example: “I like it”, “I hate it”, It's bad”, etc.	
Listening Ability	Your partner listens attentively as others present material, perspectives, as indicated by comments that build on others' comments, i.e. Your partner hears what the	Your colleagues mostly pay attention when others present ideas, materials, as shown by comments that reflect and build on the comments of others. Sometimes it takes	Your colleagues are often negligent and need class focus reminders. Occasionally makes distracting comments while others are talking.	Your partner doesn't listen to other people. Regularly talking when others are talking or not paying attention when others are speaking. Change subject. Sleep, and others.	

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	other person has to say and contributes to the dialogue.	encouragement or reminders from the moderator to focus on commenting.			
Behavior	Your colleagues almost never exhibit disruptive behavior during class.	Your colleagues rarely display disruptive behavior during class.	Your colleague sometimes displays disruptive behavior during class.	Your partner consistently exhibits disruptive behavior during class.	
Preparation	Your companion is almost always ready for class with the necessary assignments and class materials.	Your companion is usually ready for class with the necessary assignments and class materials.	Your partner is rarely ready for class with the required class assignments and materials.	Your partner is rarely ready for class with the required class assignments and materials.	
Task Completion	Your partner turns in 80-100% of assigned tasks.	Your partner submits 60-79% of assigned tasks.	Your colleagues turn in 40-59% of assigned tasks.	Your colleagues turn in 10-39% of assigned tasks.	

Reference:

1. Skoog DA, et al. 2003. Fundamental of Analytical Chemistry. 8th Edition
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6. Ortiz MC, Sarabia LA, Sanchez MS, Herrero A. 2009. Quality of Analytical Measurements: Statistical Methods for Internal Validation. Elsevier
7. Others related publications.

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