



UNIVERSITAS NEGERI SURABAYA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
PROGRAM STUDI (PENDIDIKAN KIMIA ATAU KIMIA)

**Kode
Dokumen**

RENCANA PEMBELAJARAN SEMESTER

MATA KULIAH (MK)	KODE	Rumpun MK	BOBOT (sks)		SEMESTER	Tgl Penyusunan
Kimia Analitik IV: Met Spektroskopi & Kromatografi	MK35 (3074212041)	Kimia Analitik	T= 3	P=0	5	30 Nopember 2019
OTORISASI Kaprosdi Kimia	Pengembang RPS		Koordinator RMK		Ketua PRODI	
	Dr. Nita Kusumawati, M.Sc		Dr. Pirim Setiarso, M.Si		Dr. Sukarmin, M.Pd	
Capaian Pembelajaran (CP)	PLO-PRODI yang dibebankan pada MK					
	PLO 1	Master the theoretical concepts of structure, dynamics and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals				
	PLO 2	Can apply pedagogic knowledge of chemistry in designing, implementing, and evaluating learning;				
	PLO 6	Mastering the basics of the scientific method, designing and carrying out research, compiling scientific reports and communicating them both orally and in writing by utilizing information and communication technology;				
	Capaian Pembelajaran Mata Kuliah (CLO)					
	CLO1	Students have knowledge of chemical analysis qualitatively and quantitatively in terms of chemical structure, energetics and analysis based on the working principles of several spectrophotometer and chromatography instruments.				
	CLO2	Students have the ability to collaborate and are responsible for conducting qualitative and quantitative chemical analysis on several spectrophotometer and chromatography instruments.				
	CLO3	Students have the skills to use the Spectrophotometer and Chromatography instruments in conducting chemical analysis qualitatively and quantitatively.				
	CLO4	Students have the ability to communicate the results of chemical analysis qualitatively and quantitatively on several spectrophotometer and chromatography instruments.				
	Kemampuan akhir tiap tahapan belajar (Sub-CLO)					
	Sub-CLO1	Understand the methods of spectrometry and chromatography analysis				
	Sub-CLO2	Understand UV and UV-Vis spectrometry analysis				

	Sub-CLO3	Understand UV and UV-Vis spectrometry analysis
	Sub-CLO4	Understand atomic absorption and fluorescence spectrometry analysis
	Sub-CLO5	Understand atomic absorption and fluorescence spectrometry analysis
	Sub-CLO6	Understanding infrared (IR) spectrometry analysis
	Sub-CLO7	Understanding infrared (IR) spectrometry analysis
	Sub-CLO8	Understand Nuclear Magnetic Resonance (NMR) spectrometry analysis
	Sub-CLO9	Understand Nuclear Magnetic Resonance (NMR) spectrometry analysis
	Sub-CLO10	Understanding Mass Spectrometry (MS) analysis
	Sub-CLO11	Understanding Mass Spectrometry (MS) analysis
	Sub-CLO12	Understand analysis chromatography: gas chromatography (GC) & high performance liquid chromatography (HPLC)
	Sub-CLO13	Understand analysis chromatography: gas chromatography (GC) & high performance liquid chromatography (HPLC)
	Sub-CLO14	Understand analysis chromatography: gas chromatography (GC) & high performance liquid chromatography (HPLC)
Deskripsi Singkat MK	Qualitative and quantitative chemical analysis studies in terms of chemical structure, energetics and analysis based on the working principles of a number of Spectrophotometer and Chromatography instruments are accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled at using instruments, are able to cooperate and be responsible and can communicate knowledge and scientific skills.	
Bahan Kajian: Materi Pembelajaran	<ol style="list-style-type: none"> 1. Orientation of all analytical chemistry IV; 2. UV & UV-Visible Spectrometry; 3. Atomic Absorption & Fluorescence Spectrometry 4. Infra-red Spectrometry; 5. Nuclear Magnetic Resonance (NMR) spectrometry; 6. Mass Spectrometry (MS); 7. Gas Chromatography (GC); 8. High Performance Liquid Chromatography (HPLC). 	
Pustaka	Main Reference:	
	<ol style="list-style-type: none"> 1. Harvey,D. 2000. <i>Modern Analytical Chemistry</i>. Int. Ed. Singapore: Mc.Graw Hill 2. Sawyer, Heineman, and Beebe,1984, <i>Chemistry Experiments for Instrumental Methods</i>, New York : John Wiley & Sons 	
	Supporting Reference:	
	<ol style="list-style-type: none"> 1. Ewing G.W, 1981, <i>Instrumental Methods Of Chemical Analysis</i>, International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd 2. Skoog, D.A,1980, <i>Principles Of Instrumental Analysis</i>,ed II, Tokyo: Holt- Sounders Japan 	
Dosen Pengampu	Prof. Dr. Titik Taufikurohmah, M.Si Dr. Pirim Setiarso, M.Si	

Matakuliah syarat		Has taken Analytical Chemistry I, II & III					
Mg Ke-	Kemampuan akhir tiap tahapan belajar (Sub-CPMK)	Penilaian		Bentuk Pembelajaran, Metode Pembelajaran, Penugasan Mahasiswa, [Estimasi Waktu]		Materi Pembelajaran [Pustaka]	Bobot Penilaian (%)
		Indikator	Kriteria & Bentuk	Luring (<i>offline</i>)	Daring (<i>online</i>)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Describe the spectrometric and chromatography analysis method	1. Describe the spectrometric analysis method; 2. Describe the chromatographic method.	Able to recognize spectrometric and chromatography analysis instruments /Non-Test	1. Lecture; 2. Question and answer; 3. (3 x 50 min)	-	1. Book; 2. Practical guidance for spectroscopy & chromatography methods.	
2	Describe the UV and Vis spectrometry analysis	Can analyze qualitatively & quantitatively the compounds in the mixture by UV-Vis spectrometry	Able to perform compound analysis by UV-Vis / Test spectrometry	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes).	-	1. Book; 2. Chromatogram; 3. Practical guidance for spectroscopy & chromatography methods; 4. UV & UV-Vis Spectrum.	
3	Describe the UV and Vis spectrometry analysis	Can analyze qualitatively & quantitatively the compounds in the mixture by UV-Vis spectrometry	Able to perform compound analysis by UV-Vis / Test spectrometry	Practicum (3 x 50 minutes)	-	1. Book; 2. Chromatogram; 3. Practical guidance for spectroscopy & chromatography methods; UV & UV-Vis Spectrum	

4	Describe atomic absorption spectrometry analysis and understand fluorescence analysis	<ol style="list-style-type: none"> 1. Can quantitatively analyze the compounds in the mixture by atomic absorption spectrometry; 2. Can explain the principles of fluorescence analysis. 	<ol style="list-style-type: none"> 1. Perform cation analysis in samples by AAS; 2. Perform cation analysis by fluorescence /test. 	<ol style="list-style-type: none"> 1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes). 	-	<ol style="list-style-type: none"> 1. AAS Learning CD; 2. AAS Practical Guidance; 3. AAS Absorbance Data. 	
5	Describe atomic absorption spectrometry analysis and understand fluorescence analysis	<ol style="list-style-type: none"> 1. Can quantitatively analyze the compounds in the mixture by atomic absorption spectrometry; 2. Can explain the principles of fluorescence analysis. 	<ol style="list-style-type: none"> 1. Perform cation analysis in samples by AAS; 2. Perform cation analysis by fluorescence /test. 	Practicum (3 x 50 minutes)	-	<ol style="list-style-type: none"> 1. AAS Learning CD; 2. AAS Practical Guidance; 3. AAS Absorbance Data. 	
6	Describing Infrared (IR) Spectrometric Analysis	Can qualitatively analyze the compounds in the mixture by IR spectrometry based on the IR spectrum.	Able to analyze organic compounds with IR spectrum / Test	<ol style="list-style-type: none"> 1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes) 	-	<ol style="list-style-type: none"> 1. Book; 2. Infra -red Spectrometry Practical Guidance; 3. IR Spectrum. 	
7	Describing Infrared (IR) Spectrometric Analysis	Can qualitatively analyze the compounds in the mixture by IR	Able to analyze organic compounds with	Practicum (3 x 50 minutes)	-	<ol style="list-style-type: none"> 1. Book; 2. Infra -red Spectrometry 	

		spectrometry based on the IR spectrum.	IR spectrum / Test			Practical Guidance; 3. IR Spectrum.	
8	Mid-Semester Evaluation / Mid-Semester Examination						
9	Describe Nuclear Magnetic Resonance (NMR) spectrometry analysis	Can qualitatively analyze the compounds in the mixture by NMR spectrometry based on the NMR spectrum.	Able to read NMR spectrum as a result of organic sample analysis / Non-Test	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes)	-	1. Book; 2. NMR Spectrum.	
10	Describe Nuclear Magnetic Resonance (NMR) spectrometry analysis	Can qualitatively analyze the compounds in the mixture by NMR spectrometry based on the NMR spectrum.	Able to read NMR spectrum as a result of organic sample analysis / Non-Test	NMR Workshop with Chemlab (3 x 50 minutes)	-	1. Book; 2. NMR Spectrum.	
11	Describe the Mass Spectrometry (MS) analysis	Can qualitatively analyze the compounds in the mixture by MS spectrometry based on the MS spectrum.	Able to read MS spectrum as a result of organic sample analysis / Non-Test	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes)	-	1. Book; 2. MS Spectrum.	
12	Describe the Mass Spectrometry (MS) analysis	Can qualitatively analyze the compounds in the mixture by MS spectrometry based on the MS spectrum.	Able to read MS spectrum as a result of organic sample analysis / Non-Test	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes)	-	1. Book; 2. MS Spectrum.	
13	Describe the chromatographic method,	Can explain the principles of	Able to analyze samples based on	1. Lecture;	-	1. Book; 2. Chromatogram.	

	analysis by Gas Chromatography (GC), analysis by High Performance Liquid Chromatography (HPLC)	chromatographic analysis.	chromatogram / Test	2. Questions and answers; 3. Practice questions. (3 x 50 minutes).			
14	Describe the chromatographic method, analysis by Gas Chromatography (GC), analysis by High Performance Liquid Chromatography (HPLC)	Can explain the principles of chromatographic analysis.	Able to analyze samples based on chromatogram / Test	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes).	-	1. Book; 2. Chromatogram.	
15	Describe the chromatographic method, analysis by Gas Chromatography (GC), analysis by High Performance Liquid Chromatography (HPLC)	Can explain the principles of chromatographic analysis.	Able to analyze samples based on chromatogram / Test	1. Lecture; 2. Questions and answers; 3. Practice questions. (3 x 50 minutes).	-	1. Book; 2. Chromatography Practical Guidance; 3. Chromatogram.	
16	Final-Semester Evaluation / Final-Semester Examination						100