Anan College			Year 2024			Course Title	Ins	trumental Analysis				
Course Information												
Course Code 5496Z01			1			Course Catego	egory AC / Electi		ve			
Class Forr	ass Format Lecture					Credits	Acade	Academic Credit: 2				
Department Course of			of Civi	Civil Engineering		Student Grade	Adv. 1st					
Term	erm First Semester						Classes per Week  前期:2					
Teaching	Materials	エキスバ	ニート応	応用化学テキス	トシリーズ 機器分	分析 大谷肇 編	講談社(ISBN	978-4-	06-156807-5)			
Instructor  Yamada Yohei												
Course Objectives												
After taking this course, you will be able to 1. explain the interaction between electromagnetic waves and materials. 2. explain the measurement principles of the analytical instruments covered in the lecture. 3. discuss and devise analytical methods according to the sample to be measured and the information to be obtained. 4. explain to others the principles of the instruments used in one's own research and the information obtained.												
Rubric						Standard Loval	1					
				ear Lever	use the							
1. Explain the interaction between electromagnetic waves and matter			eq fre ele acc es ex be an tra tra	You are equations relating wavelength, frequency, and energy of electromagnetic waves, accurately. You are able to explain at least three specific examples of interactions between electromagnetic waves and matter (electronic transitions, vibrational transitions, etc.).		You are able to equations relat frequency, and electromagneti able to explain specific exampl between electr and matter (ele transitions, vib transitions, etc	ou are able to use the quations relating wavelength, requency, and energy of lectromagnetic waves. You are ble to explain at least two pecific examples of interactions etween electromagnetic waves nd matter (electronic ransitions, vibrational ransitions, etc.).		you read textbooks, you are oble to use the equations elating wavelength, frequency, and energy of electromagnetic aves. You are able to explain eleast two specific examples of teractions between ectromagnetic waves and atter (electronic transitions, brational transitions, etc.).			
2. To be able to explain the measurement principles of the analytical instruments covered in the lecture.			Yo six va co l are ch ins the	bu are able to k measureme irious analytic vered in the e able to exp laracteristics strument and em.	explain at least nt principles of al instruments textbook. You lain the of each how to use	You are able to explain at least four measurement principles of various analytical instruments covered in the textbook. You are able to explain the characteristics of each instrument and how to use them.		ast of sof cof co co ar ch ins th	you read textbooks, you are ole to explain at least four easurement principles of arious analytical instruments overed in the textbook. You re able to explain the aracteristics of each strument and how to use em.			
3. Discuss and devise analytical methods according to the sample to be measured and the information to be obtained.			al an the to Yo	bu are able to halytical meth e sample and be obtained. bu are able to eparation.	suggest ods according to the information image sample	You are able to suggest analytical methods according to the sample and the information to be obtained.		to ion be	you read textbooks, You are ble to suggest analytical ethods according to the ample and the information to bobtained.			
4. Be able to explain to others the principles of the equipment used in his/her research and the information obtained.			t Yo of an yo ab res pa	You are able to do presentation of your research and explain analytical instruments using in your research. Also, you are able to ask question for research of others, at good pace.		do presentation th and explain uments using in Also, you are estion for hers.		ou are able to do presentation your research and explain nalytical instruments using in our research.				
Assigne	d Depar	tment Ol	bject	ives								
D-1												
Teachin	g Metho	d										
Outline Analytical chemistry is the study of the composition and content of samples and the analystate and existence. Instrumental analysis plays a central role in analytical chemistry and all human activities, including substance development, quality control, environmental inverse medical care. In general, analytical instruments are classified based on their principles int analysis, electrical analysis, separation analysis, and others (thermal analysis, mass spect students will learn about the principles and equipment configuration of these analytical instruments.							the analysis of their chemical histry and is indispensable in hental investigation, and hciples into electromagnetic hass spectrometry). First, alytical instruments. Students analytical					
Style		Basically	/ class	sroom learnir	ig, but there are a	also laboratory e	exercises.					
Charact	oristics		/ Div/	icion in Lor	arning							
		JI CIASS /							Instructor Professionally			
☐ Active Learning				Aided by ICT			o Remote Class Experienced					
Course	Plan		There	20			Coole					
1st Semeste r	1st Quarter	1st	Introduction to Instrumental Analys			s, Interaction You are able to equipment, ho		to expl	explain the principles of the w to prepare samples, and how to			
		2nd	Inter	action of elec	tromagnetic wave	es with matter,	view the data obtained. You are able to explain the principles of the equipment, how to prepare samples, and how to					
		3rd	fluor	luorospectrophotometer			view the data obtained. You are able to explain the principles of the equipment, how to prepare samples, and how to					
							view the data obtained.					

		4th	AAS		You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		5th	ICP-AES, ICP-MS		You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		6th	experimental design f by using ICP-AES	or analysis of mineral water	experimental design for analysis of mineral water by using ICP-AES.		
		7th	Experiment		preparation of standard solution for analysis of mineral water.		
		8th	Experiment	ICP-AES measurement			
	2nd Quarter	9th	Data handling of the experiment by	Excel	Data handling of the experiment by Excel		
		10th	FT-IR		You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		11th	FT-IR, Raman spectro	ometry	You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		12th	XRD, XRF		You are able to explain the principles of the equipment, how to prepare samples, and how to view the data obtained.		
		13th	Presentation of the st	udents	Students will present their own research and the analytical instruments they use.		
		14th	Presentation of the st	udents	Students will present their own research and the analytical instruments they use.		
		15th	Presentation of the st	udents	Students will present their own research and the analytical instruments they use.		
		16th	final exam		final exam		
Evaluati	on Meth	od ar	nd Weight (%)				
E			Examination	Presentation	reports	Total	
Subtotal			50	20	30	100	
Basic Proficiency			50	20	30	100	
Specialized Proficiency			0	0	0	0	
Cross Area Proficiency			0	0	0	0	