

# PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR UNIVERSITY, SOLAPUR

## SKILL DEVELOPMENT CENTRE



Course Name: Certificate Instrumental Methods of Chemical Analysis

Year- 2023

प्रेषक, समन्वयक कौशल्य विकास केंद्र पु.अ.हो.सो.वि.सोलापूर

विषय - सुधारित आभ्यासक्रम विषयी माहिती देणेबाबत.

सदर, वरील विषयानुसार सुधारित अभ्यासक्रमाविषयी माहिती सादर करित आहोत.

सोबत - १) Nature of Question Papar

२) सुधारित अभ्यासक्रम.

समन्वयक डॉ. पी.एम.पीसाळ

सहाय्यक प्राध्यापक

रसायनशास्त्र संकुल

डॉ.एम.ए.कुलकर्णी

भास्त्रीय उपकरणे तंज्ञ शास्त्रीय उपकरणे केंद्र

पु.अ.हो.सो.वि.सोलापूर

संचालक

20/10/22

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रसायनशस्त्रि (सकुलि Chemical Sciences Punyashlok Ahilyadevi Holka: Solapur University, Solapur

#### SKILL DEVELOPMENT CENTRE

#### Syllabus Structure

Course Title: "Certificate Course in Instrumental Methods of Chemical Analysis."

**Course Duration: 6 Months** 

Tentative Fees: Rs.1000 per Student

Minimum Admission Eligibility for Student: Science Graduate

Minimum Teaching Eligibility for Teacher: M.Sc. Chemistry with SET/NET/Ph.D.

#### **Need of Course:**

- 1) Achieve task in less time with more results.
- 2) Increase in analysis performance level.
- 3) Grow skill sets and instrumental proficiency.
- 4)It comes up to be an important part of any individual career.
- 5) Increase productivity.

#### **Employment and Entrepreneurship Opportunities From Course:**

- 1)The employability skills consist of: time management, ability to self-manage, working as a part of team, adaptability to different roles, the potential to lead by influence and ability to understand the business environment.
- 2)Provide Industry-specific training to unemployed and underemployed youth.
- 3) Enhance an individual's employability to adapt changing technologies and labour market demands.
- 4)Improve productivity and living standards of the people.
- 5) Create job opportunities for trained students.

# Punyashlok Ahilyadevi Holkar Solapur University, Solapur SKILL DEVELOPMENT CENTRE

#### **Syllabus Structure**

Course Title: "Certificate Course in Instrumental Methods of Chemical

Analysis."

Course Duration: 6 Months

Name of Skill Course	Duration	Name of Paper	Paper	Hours Per Paper	Th.	Int.	Pract.	Credits
Certificate Course in	6 Months	Theory	I	45	80	20	0	3 Credits
			II	45			100	3 Credits
			III	45			100	3 Credits
* *-			IV	45	80	20	0	3 Credits
	] ; ; ;	Total		180	160	40	200	12 Credits

#### Abbrevations:

Th.- Theory Evaluation (External)

Int.- Internal Evalution (Internal)

Pract.- Practical Evalution.

### SKILL DEVELOPMENT CENTRE

## Course Title: "Certificate Course in Instrumental Methods of Chemical Analysis."

1)	Paper Title								
	Tapor Title	Principle, Instrumentation, Working of							
		Sophisticated Instruments (Theory)							
2)	Paper No	1. To educate students about theoretical aspects of							
3)	Objectives of Paper	<b>I</b>		ar aspects	01				
			instruments  2. To train students with instrument handling						
	15 mg/s								
			lerstand the use of sophistic	ateu					
		instrumer	cate students for standardiz	ation &					
	두 경		ion of parameters of concer						
			ntal methods of Analysis.	nea	1				
	- 1 p		ble students in data interpre	tation.					
	1								
		6. To ma	ke students competent with	analytical	skills				
			for jobs in Chemical/pharma	aceutical	1				
	distribution of the state of th	industrie		c					
			ke awareness about mainten	ance of					
	7.5		nt, cleanliness and Safety.	ctudents					
	10.25		ce Research Interest among						
4)	Expected out comes from	1. Enhancement in quality with error minimization							
	paper	in sample testing							
		<ul><li>2. Skill development in instrument handling</li><li>3. Expertise in sample analysis &amp; data interpretation</li></ul>							
		4. Skilled human resource generation							
		5. Generation of skilled manpower to cater the need							
		of chemical & pharmaceutical industries							
5)	Content	Unit-1.	Atomic Absorption	Hour	11				
",	Confont		Spectroscopy (AAS)	ļ					
		Unit-2.	X-Ray Diffraction	Hour	12				
			Spectroscopy (XRD)						
		Unit-3.	Thermogravimetric	Hour	11				
!	19 H		Spectroscopy (TGA						
		Unit-4.	Differential scanning	Hour	11				
			calorimetry (DSC	1 1 4	1 .				
6)	Reference Book	1) A Text Book of Quantitative Chemical Analysis.							
	i ner	AI Vogel.							
	· · ·	2) Instrumental Methods of Chemical Analysis.							
		Chatwal and Anand. 3) Instrumental Methods of Analysis. Willard Dean							
		Meritt.							
		4) Basic Concepts of Analystical Chemistry. S M							
	عينات	Khopkar.							
	150	5) Practical Chemistry. VK Ahluwalia, Dhingra,							
		Gulati.							

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	6) Introduction to Spectroscopy. Donald L. Pavia	
	7) Spectrometric Identification of Organic	
発表   1987	Compounds. R.M. Silverstein	

1)	Paper Title	Paper Title Principle, Instrumentation, Working of							
ŕ			Sophisticated Instruments (Theory)						
2)	Paper No	IV							
3)	Objectives of Paper	1. To educate students about theoretical aspects of							
		instruments							
		2. To train	n students with instrument ha	ndling					
		3. To und	lerstand the use of sophisticate	ed	-				
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	THE STATE OF THE S		cate students of standardization	on &					
		optimizat	ion of parameters						
		5. To ena	ble students in data interpreta	tion.					
		6 To ma	ke students competent with ar	nalytical	skills				
		required:	for jobs in Chemical/pharmac	eutical	DILITIO				
	comparison	industries							
	· · ·		ke awareness about maintena	nce of					
	**************************************		nt, cleanliness and Safety.						
		8. Enhan	8. Enhance Research Interest among students.						
4)	Expected out comes from	1. Enhancement in quality with error minimization							
•,	paper	in sample testing							
		2. Skill development in instrument handling							
		3. Expertise in sample analysis & data interpretation							
		4. Skilled human resource generation							
	+	5. Generation of skilled manpower to cater the need							
		of chemical & pharmaceutical industries							
		Unit-1.	Nuclear Magnetic	Hour	12				
		ļ	Resonance Spectroscopy						
			(NMR)		11				
		Unit-2.	Infrared Spectroscopy (IR)	Hour	11				
		Unit-3.	High-performance liquid	Hour	11				
	2000 A - A - A - A - A - A - A - A - A -	TT 11 A	chromatography (HPLC)	IIaaa	11				
		Unit-4.	Gas chromatography—	Hour	11				
			mass spectrometry						
	D. C. Land	1) A Tox	(GCMS) kt Book of Quantitative Chem	ical Ana	lveie				
6)	Reference Book			iioai 7 iiia	1,510.				
		AI Vogel. 2) Instrumental Methods of Chemical Analysis.							
·			and Anand.	1 may bi					
			mental Methods of Analysis.	Willard	Dean				
		Meritt.		mental wounds of Analysis. Willard Doan					
			Concepts of Analystical Che	mistry. S	M				
		Khopka		•					
			ical Chemistry. VK Ahluwali	a, Dhing	ra,				
	;	Gulati.	•						
		6) Introduction to Spectroscopy. Donald L. Pavia							
	. 4	7) Spect	trometric Identification of Org						
		Compou	ınds. R.M.Silverstein						

1)	Paper Title	Instrumentation, working, sample analysis and data interpretation (Lab. Training)						
3)	Paper No	П						
4)	Objectives of Paper	1. To educate student	s about theoretic	cal aspects	of			
		instruments						
		2. To train students w	ith instrument h	andling				
		3. To understand the	use of sophistica	ated				
		instruments						
		4. To educate student	s of standardiza	tion &				
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		5. To enable students	in data interpre	tation.				
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		required for jobs in C	themical/pharma	aceutical				
		industries.	F		!			
		7. To make awarenes	s about mainten	ance of				
	4€T	instrument, cleanline						
		8. Enhance Research Interest among students.						
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5)	Expected out comes from	in sample testing	adility with offor	,	22011			
	paper	Skill development in instrument handling						
		3. Expertise in sample analysis & data interpretation						
İ		4. Skilled human resource generation						
		5. Generation of skilled manpower to cater the need						
		of chemical & pharmaceutical industries						
6)	Content	Unit-1. Atomic Al		Hour	11			
0)	Content	Spectrosco	-					
		Unit-2. X-Ray Dif		Hour	12			
	:		opy (XRD)					
		Unit-3. Thermogra	avimetric	Hour	11			
	- -	Spectrosco						
			al scanning	Hour	11			
		calorimetr	y (DSC					
7)	Reference Book	1) A Text Book of C	Quantitative Che	mical Ana	lysis.			
′	36%	AI Vogel.						
		2) Instrumental Met		al Analysis	S.			
		Chatwal and Anand.						
		3) Instrumental Methods of Analysis. Willard Dean						
		Meritt.						
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	- in the state of	Khopkar.						
		5) Practical Chemistry. VK Ahluwalia, Dhingra,						
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		6) Introduction to Spectroscopy. Donald L. Pavia						
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1)	Paper Title	Instrumentation, working, sample analysis and data interpretation (Lab. Training)							
3)	Paper No	III							
4)	Objectives of Paper	1. To educate students about theoretical aspects of							
.,		instrument							
		2. To train	2. To train students with instrument handling						
		instrument	3. To understand the use of sophisticated instruments						
			4. To educate students of standardization &						
			on of parameters	on a					
			le students in data interpreta	ition.					
		6. To make	e students competent with a	nalytical	skills				
			or jobs in Chemical/pharmac						
		industries.							
		7. To make	e awareness about maintena	nce of					
	· ·	instrument	instrument, cleanliness and Safety.						
		8. Enhance	e Research Interest among st	tudents.					
5)	Expected out comes from	1. Enhance	1. Enhancement in quality with error minimization						
	paper	in sample testing							
		2. Skill development in instrument handling							
		3. Expertise in sample analysis & data interpretation							
		4. Skilled human resource generation							
		5. Generation of skilled manpower to cater the need							
		of chemical & pharmaceutical industries							
		Unit-1.	Nuclear Magnetic	Hour	12				
		1	Resonance Spectroscopy (NMR)						
	i i		Infrared Spectroscopy (IR)	Hour	11				
			High-performance liquid	Hour	11				
		1	chromatography (HPLC)						
			Gas chromatography—	Hour	11				
			mass spectrometry						
	3A.10		(GCMS)						
7)	Reference Book	1) A Text	1) A Text Book of Quantitative Chemical Analysis.						
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		3) Instrumental Methods of Analysis. Willard Dean							
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		l. '	Concepts of Analystical Che	mistry. S	M				
		Khopkar.							
			al Chemistry. VK Ahluwalia	ı, Dhingr	a,				
	19 1,4	Gulati.							
		6) Introduction to Spectroscopy. Donald L. Pavia							
			metric Identification of Org	anic					
		Compound	Compounds. R.M.Silverstein						

### SKILL DEVELOPMENT CENTRE

**Nature of Theory Question Paper** 

"Course Title: "Cestificate Course jas Instrumental

	Tin	ne: 3 Hrs.	to-ef	hools o	f chea	micoul A		l Marks:80
In	struction	18:						
		2. The fig	gure to the	compulsory right indica ic table and	tes full ma			
Q.	No.1) M	ultiple ch	oice questi	ions.				(30)
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	a)		b)		c)		d)	
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	10.							
Q.	No.2) Wr	rite Short	Note (any	Four)				(16)
	1.							
	2.					grott	wil	
	3.					gmodi		

4.
5.

Q.No.3.) Write Answer in Details. (Any Two)

1.
2.
3.
Q.No.4) Write Long Answer (any one). (15) 20

1.
2.
3.
Q.No.5) Write Long Answer. (any ane). (15) 20

2 Internal Examinations of Total Marks: 20

1.

Pattern / Examination nature may be as follows(Any Two of Following):

Written test/ Seminar/ PPT Presentation/ Open book examination / Field Work report / Project Report etc.

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SKILL DEV	ELOPMENT CENT	RE	
Nature of F	Practical Question Pape	r	
"Course Title: 11 Ceshficat	e course in	Instayor	neryal
"Course Title: " cestificat Methods of ch	emical Analysis	1/	
Time: 3 Hrs.		Total Ma	
Instructions:			
1. Solve any two questions from se	ection-I.		
2. Solve any one questions from se	ection-II.		
3. 20 marks for viva.			
	Section-I		
Each question has 20 marks.			
Duen question has 20 marks.			
1.			
2.			
3.			
	Section-II		
Each question has 40 marks.			
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1.			
2.			
	Section-II		
Viva 20 Marks			