

**PUNYASHLOK AHILYADEVI HOLKAR SOLAPUR
UNIVERSITY, SOLAPUR**

SKILL DEVELOPMENT CENTRE



**Course Name: Certificate Instrumental Methods of
Chemical Analysis**

Year- 2023

रसायनशास्त्र संकुल
दि. २०/१०/२०२२

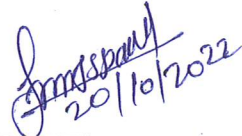
प्रेषक,
समन्वयक
कौशल्य विकास केंद्र
पु.अ.हो.सो.वि.सोलापूर


विषय - सुधारित अभ्यासक्रम विषयी माहिती देणेबाबत.


सदर, वरील विषयानुसार सुधारित अभ्यासक्रमाविषयी माहिती सादर करित आहोत.

सोबत - १) Nature of Question Paper

२) सुधारित अभ्यासक्रम.


समन्वयक
डॉ. पी.एम.पी.साळ
सहाय्यक प्राध्यापक
रसायनशास्त्र संकुल


डॉ.एम.ए.कुलकर्णी
शास्त्रीय उपकरणे तंत्र
शास्त्रीय उपकरणे केंद्र
पु.अ.हो.सो.वि.सोलापूर


संचालक २०/१०/२२
डॉ.ए.एस.लावंड **Director**
School of Chemical Sciences
Punyashlok Ahilyadevi Holkar
Solapur University, Solapur

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

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. (Ext)	Int. (Theory)	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

Abbreviations :

Th.- Theory Evaluation (External)

Int.- Internal Evaluation (Internal)

Pract.- Practical Evaluation.

SKILL DEVELOPMENT CENTRE

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

1)	Paper Title	Principle, Instrumentation, Working of Sophisticated Instruments (Theory)			
2)	Paper No	I			
3)	Objectives of Paper	1. To educate students about theoretical aspects of instruments 2. To train students with instrument handling 3. To understand the use of sophisticated instruments 4. To educate students for standardization & optimization of parameters of concerned instrumental methods of Analysis. 5. To enable students in data interpretation. 6. To make students competent with analytical skills required for jobs in Chemical/pharmaceutical industries. 7. To make awareness about maintenance of instrument, cleanliness and Safety. 8. Enhance Research Interest among students.			
4)	Expected out comes from paper	1. Enhancement in quality with error minimization 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			
5)	Content	Unit-1.	Atomic Absorption Spectroscopy (AAS)	Hour	11
		Unit-2.	X-Ray Diffraction Spectroscopy (XRD)	Hour	12
		Unit-3.	Thermogravimetric Spectroscopy (TGA)	Hour	11
		Unit-4.	Differential scanning calorimetry (DSC)	Hour	11
6)	Reference Book	1) A Text Book of Quantitative Chemical Analysis. AI Vogel. 2) Instrumental Methods of Chemical Analysis. Chatwal and Anand. 3) Instrumental Methods of Analysis. Willard Dean Meritt. 4) Basic Concepts of Analytical Chemistry. S M Khopkar. 5) Practical Chemistry. VK Ahluwalia, Dhingra, Gulati.			

		6) Introduction to Spectroscopy. Donald L. Pavia 7) Spectrometric Identification of Organic Compounds. R.M.Silverstein
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1)	Paper Title	Principle, Instrumentation, Working of Sophisticated Instruments (Theory)			
2)	Paper No	IV			
3)	Objectives of Paper	1. To educate students about theoretical aspects of instruments			
		2. To train students with instrument handling			
		3. To understand the use of sophisticated instruments			
		4. To educate students of standardization & optimization of parameters			
		5. To enable students in data interpretation.			
		6. To make students competent with analytical skills required for jobs in Chemical/pharmaceutical industries.			
		7. To make awareness about maintenance of instrument, cleanliness and Safety.			
		8. Enhance Research Interest among students.			
4)	Expected out comes from paper	1. Enhancement in quality with error minimization 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 Resonance Spectroscopy (NMR)	Hour	12
		Unit-2.	Infrared Spectroscopy (IR)	Hour	11
		Unit-3.	High-performance liquid chromatography (HPLC)	Hour	11
		Unit-4.	Gas chromatography–mass spectrometry (GCMS)	Hour	11
6)	Reference Book	1) A Text Book of Quantitative Chemical Analysis. AI Vogel. 2) Instrumental Methods of Chemical Analysis. Chatwal and Anand. 3) Instrumental Methods of Analysis. Willard Dean Meritt. 4) Basic Concepts of Analytical Chemistry. S M Khopkar. 5) Practical Chemistry. VK Ahluwalia, Dhingra, Gulati. 6) Introduction to Spectroscopy. Donald L. Pavia 7) Spectrometric Identification of Organic Compounds. R.M.Silverstein			

1)	Paper Title	Instrumentation, working, sample analysis and data interpretation (Lab. Training)			
3)	Paper No	II			
4)	Objectives of Paper	1. To educate students about theoretical aspects of instruments 2. To train students with instrument handling 3. To understand the use of sophisticated instruments 4. To educate students of standardization & optimization of parameters 5. To enable students in data interpretation. 6. To make students competent with analytical skills required for jobs in Chemical/pharmaceutical industries. 7. To make awareness about maintenance of instrument, cleanliness and Safety. 8. Enhance Research Interest among students.			
5)	Expected out comes from paper	1. Enhancement in quality with error minimization 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			
6)	Content	Unit-1.	Atomic Absorption Spectroscopy (AAS)	Hour	11
		Unit-2.	X-Ray Diffraction Spectroscopy (XRD)	Hour	12
		Unit-3.	Thermogravimetric Spectroscopy (TGA)	Hour	11
		Unit-4.	Differential scanning calorimetry (DSC)	Hour	11
7)	Reference Book	1) A Text Book of Quantitative Chemical Analysis. AI Vogel. 2) Instrumental Methods of Chemical Analysis. Chatwal and Anand. 3) Instrumental Methods of Analysis. Willard Dean Meritt. 4) Basic Concepts of Analytical Chemistry. S M Khopkar. 5) Practical Chemistry. VK Ahluwalia, Dhingra, Gulati. 6) Introduction to Spectroscopy. Donald L. Pavia 7) Spectrometric Identification of Organic Compounds. R.M.Silverstein			

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 instruments 2. To train students with instrument handling 3. To understand the use of sophisticated instruments 4. To educate students of standardization & optimization of parameters 5. To enable students in data interpretation. 6. To make students competent with analytical skills required for jobs in Chemical/pharmaceutical industries. 7. To make awareness about maintenance of instrument, cleanliness and Safety. 8. Enhance Research Interest among students.			
5)	Expected out comes from paper	1. Enhancement in quality with error minimization 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 Resonance Spectroscopy (NMR)	Hour	12
		Unit-2.	Infrared Spectroscopy (IR)	Hour	11
		Unit-3.	High-performance liquid chromatography (HPLC)	Hour	11
		Unit-4.	Gas chromatography–mass spectrometry (GCMS)	Hour	11
7)	Reference Book	1) A Text Book of Quantitative Chemical Analysis. AI Vogel. 2) Instrumental Methods of Chemical Analysis. Chatwal and Anand. 3) Instrumental Methods of Analysis. Willard Dean Meritt. 4) Basic Concepts of Analytical Chemistry. S M Khopkar. 5) Practical Chemistry. VK Ahluwalia, Dhingra, Gulati. 6) Introduction to Spectroscopy. Donald L. Pavia 7) Spectrometric Identification of Organic Compounds. R.M.Silverstein			

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SKILL DEVELOPMENT CENTRE

Nature of Theory Question Paper

"Course Title : "Certificate Course in Instrumental
methods of Chemical Analysis"

Time: 3 Hrs.

Total Marks:80

Instructions:

1. All questions are compulsory.
2. The figure to the right indicates **full marks**.
3. Use of logarithmic table and calculator is allowed.

Q.No.1) Multiple choice questions.

(10)

1. _____

a) b) c) d)

2.

3.

4.

5.

6.

7.

8.

9.

10.

Q.No.2) Write Short Note (any Four)

(16)

1.

2.

3.

Amssury

4.

5.

~~6.~~

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

(14)

1.

2.

3.

Q.No.4) Write Long Answer (any ~~one~~ ^{two}).

(15) 20

1.

2.

³

Q.No.5) Write Long Answer. (any ~~one~~ ^{two}).

(15) 20

1.

²

³

Internal Examinations of Total Marks: 20

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.

Amssing

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

SKILL DEVELOPMENT CENTRE

Nature of Practical Question Paper

"Course Title : "certificate course in, Instrumental
methods of chemical Analysis"

Time: 3 Hrs.

Total Marks:100

Instructions:

1. Solve any two questions from section-I.
2. Solve any one questions from section-II.
3. 20 marks for viva.

Section-I

Each question has 20 marks.

- 1.
- 2.
- 3.

Section-II

Each question has 40 marks.

- 1.
- 2.

Section-II

Viva 20 Marks