D.B.F. Dayanand College of Arts and Science, Solapur.

Affiliated to

सोलापूर विद्यापीठ
।। विद्या संपन्नता ।।
NAAC Accredited-2015
'B' Grade (CGPA-2.62)

Punyashlok Ahilyadevi Holkar
Solapur University, Solapur.

Name of Faculty: Science & Technology

(Choice Based Credit System)

Syllabus: Certificate course in Handling of Sophisticated Instruments

Name of Course: M.Sc.-II (Sem.-III) Chemistry

(Syllabus to be implemented from w.e.f. June 2021)

SYLLABUS FOR

M.Sc.-II (Sem.-III) Chemistry

Certificate Course in Handling of Sophisticated Instruments

Structure of the Course:

- Certificate Course in Handling of Sophisticated Instruments will be implemented for M.Sc.-II (Sem.-III) Chemistry.
- There will be one theory paper of **50 marks** and Practical of **50 marks**.
- The theory paper has **40 marks** for university external examination and **10 marks** for internal examination.
- At the end of Semester V, the practical examination will be conducted. The weightage of practical is of **30 marks** for university external practical examination and **20 marks** for project and oral internal examination.

Semester	**Paper**	**Total Lectures**	**Examination**			**Total Credits**
			Univ. Exam.	**Internal Exam.**	**Total Marks**	
M.Sc.-II (Sem.-III)	Theory	30	40	10	50	2
	Practical	15	30	00	30	1
	Project & Oral	15	00	20	20	1
Total		**60**	**70**	**30**	**100**	**4**

- Duration of practical examination is of **one day**. There will be two practical's each of **3.00 hr** duration.
- Theory paper has **10 marks** for internal examination. There will be **05 marks** for unit test and **05 marks** for home assignment.
- **The Project may be on laboratory works/Field work/Industrial visit for 20 marks. Its report should be submitted at the time of university practical examination for 01 credit.**
- **If the course is University Affiliated, then the certificate of completion of course will be issued by University.**
- **If the course is College Affiliated, then the certificate of completion of course will be issued by college and submitted to university for fulfilment of curriculum.**

Syllabus for Theory Paper

(Total Credits: 02 and Contact Hrs. 30)

1. Introduction to spectroscopy **(Contact hrs:10)**

- **1.1** Characterization of electromagnetic radiation.
- **1.2** The quantization of energy
- **1.3** Regions of the spectrum
- **1.4** Signal to noise ration: resolving power
- **1.5** The width and intensity of spectral transitions

2. UV-Vis spectrophotometer: Techniques and instrumentation **(Contact hrs:10)**

- **2.1** Principle of uv-vis light absorption
- **2.2** Practical considerations
- **2.3** Source
- **2.4** optical path and monochromator
- **2.5** Detector and sample
- **2.6** Applications and Spectra analysis

3. Infra-red spectrometer: Techniques and Instrumentation **(Contact hrs:10)**

- **3.1** Practical considerations
- **3.2** Source
- **3.3** optical path and monochromator
- **3.4** Detector and sample and sample preparation
- **3.5** Applications and Spectra analysis

Syllabus for Practical Paper

(Total Credits: 01 and Contact Hrs. 15)

- **Minimum 05 practicals of 3 hrs duration should be conducted.**

1. Verification of Beer's-Lambert law
2. Interpretation of uv-vis absorption spectra
3. Analysis of sample uv-vis spectrum
4. Interpretation of IR absorption spectra
5. Identification of compounds using the fingerprint region
6. Analysis of sample IR spectrum
7. Investigation of chemical bond by using IR spectroscopy
8. Spectrophotometric analysis of mixture
9. Identifying compounds using uv-vis spectroscopy.

Reference Books:

1) Fundamental of molecular spectroscopy by C. N. Banwell Tata McGrewHill.

2) Physical Chemistry by P. W. Atkins,ELBS,1986

3) Molecular Structure and Molecular Spectra by G. Herzberg, VanNostrand.

4) Molecular Spectroscopy by I. N. Levine, Willeyinterscience.

5) Molecular Spectroscopy by G. M. Barrow, McGrawHill.

6) Molecular Structure and Spectroscopy, G. Aruldas, Prentice Hall, 2001.

7) Modern Spectroscopy, J. M. Hollas, JphnWiley.

Question Paper Nature

Certificate course in Handling of sophisticated Instruments

Time: 2 hr **Total Marks: 40**

Q. 1. Choose the **most correct** alternative for the following and rewrite the sentence. 08

1) ----------

a) b) c) d)

2)

3)

4)

5)

6)

7)

8)

Q. 2. Answer ***any four*** of the followings. 08

i)

ii)

iii)

iv)

v)

Q. 3. Answer ***any two*** of the followings. 08

i)

ii)

iii)

Q. 4. Write note on ***any two*** of the following. 08

i)

ii)

iii)

Q. 5. Answer ***any one*** of the followings. 08

i)

ii)