SECOND-YEAR OF BACHELOR OF SCIENCE VOCATIONAL SKILL COURSE RELATED TO DSC REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: LABORATORY SKILLS IN ANALYTICAL CHEMISTRY-1

SEMESTER-III

W.E.F. 2024-2025

RECOMMENDED BY THE BOARD OF STUDIES IN CHEMISTRY
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No:

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Chemistry
Name of the Class	:	Second Year
Semester	:	Third
No. of Credits	:	02
Title of the Course	:	Laboratory Skills in Analytical Chemistry-1
Course Code	:	CHVS201
Name of the Vertical in adherence to NEP 2020	:	Vocational Skill Course (VSC)
Eligibility for Admission	:	Any student admitted to Second Year of B.Sc. Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Summative at the end of semester
Level	:	UG
Pattern of Marks Distribution for SEE	:	100 %
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2024-2025
Ordinances /Regulations (if any)		

Syllabus for Second Year of Bachelor of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-III

Course Title: Laboratory Skills in Analytical Chemistry-1 **No. of Credits - 02**

Type of Vertical: Vocational Skill Course (VSC) **COURSE CODE: CHVS201**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Understand	understand the principle, handling, care and maintenance of the laboratory equipments.
CLO-02	Apply	apply the principles of classical methods of chemical analysis in actual practice.

Syllabus for Second Year of Bachelor of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-III

Course Title: Laboratory Skills in Analytical Chemistry-1 **No. of Credits - 02**

Type of Vertical: Vocational Skill Course (VSC) **COURSE CODE: CHVS201**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Hours**
1	**1. Tools of Analytical Chemistry I:** a) Analytical glass wares like burettes, pipettes, Standard flasks, Separating funnels. b) Weighing tools such as two pan balance and mono pan balance, digital balances. c) Incineration devices: Burners, Electrical Incinerators, Muffle Furnace, d) Drying Devices: Hot Air Oven, Microwave Oven, Desiccators, Vacuum desiccators e) Monochromators, Filters, Sample holders, Prisms, Diffraction Gratings, Photo emissive cells, Photomultiplier tubes *(The learner should draw diagrams and write-ups providing uses, care and maintenance of the items mentioned in (a) and principle, construction and uses of items (b) to (e) in his journal.* **2. Concentration Units:** a) Physical Units: weight/weight, weight/volume, volume/volume b) Chemical Units (on volume basis): Normality, Molarity, Formality c) Chemical Units (on weight basis): Molality, Mole fraction ***(****The learner is expected to aware about various units to measure concentration of solution)* **3. Preparation and Standardization 100 mL of 0.1 M NaOH.** ***(****The learner is expected to know the process of standardization of solutions, primary and secondary standards)*	02	60

	4. Gravimetric estimation of Nickel (II) as Ni-DMG and calculation of % error. *(The learner is expected to know the role of the various reagents/chemicals used. In the estimation, various steps involved. They should write the complete and Balanced chemical reaction for the formation of the $Ni(DMG)_2$ complex.* **5. Colorimetric Determination of Copper Ions in given Solution by using calibration curve method and calculation of % error.** *(The learner is expected to learn the relation between concentration and Absorbance to draw a calibration curve, use the slope of the calibration curve and compare it with the calculated slope. They are also expected to state the error estimate of their results).* **6. Determination of buffer capacity of acid buffer and basic buffer.** *(The learner is expected to learn the use of pH meter, standardization of pH meter, use of Henderson's equation and calculation of buffer capacity)* **7. Estimation of Aspirin from APC Tablets.** **8. Gravimetric estimation of barium ions using K_2CrO_4 as precipitant calculation of % error.** *(The learner is expected to learn the skills of using the counterpoise technique used in this gravimetric estimation; Using counterpoise method Whatman No.42 for filtration. In such a case no incineration or use of silica crucible is required. They are also expected to state the error estimate of their results)*		
	Total	**02**	**60**

Access to the Course

The course is available for all students who have admitted to Second Year of B.Sc. Degree Programme.

Methods of Assessment

Practical Courses, Vocational Skill Courses, Skill Enhancement Courses and the courses having laboratory sessions shall be assessed at the end of each semester.

References:

1. Vogel's textbook of quantitative chemical analysis, Sixth Ed. Mendham, Denny, Barnes, Thomas, Pearson education
2. Standard methods of chemical analysis, F. J. Welcher
3. Standard Instrumental methods of Chemical Analysis, F. J. Welcher
4. W. W. Scott "Standard methods of Chemical Analysis", Vol. I, Van Nostrand Company, Inc.,1939.
5. E. B. Sandell and H. Onishi, "Spectrophotometric Determination of Traces of Metals", Part II, 4th Ed., A Wiley Interscience Publication, New York, 1978.