Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Empowered Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for the T.Y.B.Sc.

Program: B.Sc (Chemistry)

Program Code: RJSUCHE

(NEP 2020)

Level 5.5

(CBCS 2025-2026)

T.Y.B.Sc. CHEMISTRY SEMESTER V

Vocational Skill Course (VSC) Theory and Practical Based

Vocational Skill Course (III) – Theory

Course Code	Unit	Topic Headings	Credits	Duration
RJVSCCHE351	Paper Title: Vocational skill course - III (Chemistry of Soil & Water)		02	30 hours
	I & II	Chemistry of Soil & Water		30 hours

Vocational Skill Course (III) – Practical

Course Code	Topic Headings	Credits	Duration
RJVSCCHEP351	Chemistry of Soil & Water	02	30 hours

T.Y.B.Sc. CHEMISTRY SEMESTER VI

Vocational Skill Course (VSC) Only Practical Based

Vocational Skill Course (IV) – Practical

Course Code	Topic Headings	Credits	Duration
RJVSCCHEP361	Cosmetics and Perfume Chemistry	02	60 hours

SEM V SYLLABUS

VSC-THEORY

VSC - III

SEMESTER		**SEM – V**
TITLE OF THE SUBJECT / COURSE		**CHEMISTRY OF WATER & SOIL**
COURSE CODE		**RJVSCCHE351**
CEDITS		**02**
DURATION		**30 Hrs.**

LEARNING OBJECTIVE	
1.	Understand the chemistry of water, its availability, conservation, quality parameters, COD, BOD, acidity, alkalinity, hardness, dissolved impurities, pollutants, its impact on human health and waste water treatment.
2.	Understand the chemistry of soil, its formation, composition, sources of essential elements in it, sources of pollution such as from industries, domestic waste, radioactive waste etc.

COURSE OUTCOME NUMBER	**ON COMPLETION OF THE COURSE, STUDENT WILL BE ABLE TO:**	**PSO ADDRESSED**	**BLOOMS LEVEL**
CO1	Understand the chemistry of water, its availability, conservation, quality parameters, COD, BOD, acidity, alkalinity, hardness, dissolved impurities, pollutants, its impact on human health and waste water treatment.	PSO1, PSO2, PSO3, PSO4.	remember, understand, apply and analyze (L1,2,3,4.)
CO2	Understand the chemistry of soil, its formation, composition, sources of essential elements in it, sources of pollution such as from industries, domestic waste, radioactive waste etc.	PSO1, PSO2, PSO3.	remember, understand, apply (L1,2,3)

T.Y.B.Sc.	**SEMESTER V THEORY**
COURSE CODE **RJVSCCHE351** VSC -III CHEMISTRY OF WATER & SOIL	**COURSE OUTCOME:** ON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS WILL BE ABLE TO: 1. Understand the chemistry of water, its availability, conservation, quality parameters, , its impact on human health and waste water treatment. 2. Understand the chemistry of soil, its formation, composition, sources of essential elements in it, sources of pollution such as from industries, domestic waste, radioactivewaste etc. **LEARNING OUTCOME:** ON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS WILL BE ABLE TO: 1. Understand the chemistry of water, its availability, conservation, quality parameters, , its impact on human health and waste water treatment. 2. Understand the chemistry of soil, its formation, composition, sources of essential elements in it, sources of pollution such as from industries, domestic waste, radioactive waste etc.

SEMESTER V (VSC – III)		Hrs.	Cr.
VSC -III: CHEMISTRY OF WATER & SOIL	PAPER CODE: RJVSCCHE351	30	02

Unit No.	Name of the topic	No. of Hrs.	Credits
I	**1. Chemistry of water** **1.1** Introduction, Availability and sources: Ground water, Desalination of sea water, Conservation of water. **1.2** Characteristics of water, Quality Parameters: Dissolved oxygen,Biochemical oxygen Demand, Chemical oxygen demand, Alkalinity, Most Probable number, Total solids, oxidation state, Transparency, silica content, Hardness, Dissolved inorganic impurities, Toxic metals, Microbial contaminants. **1.3** Types of water pollutants: Biological, Chemical and Physical agents, Types and sources of water pollution and its impact on Human health, Wastewater treatment and Eutrophication.	15	01
II	**2. Chemistry of Soil** **2.1** Introduction, Formation of soil, characteristics of soil, Soil Profile, Composition of soil, Macro and Micronutrients in soil, sources of essential elements in soil. **2.2** Indicators of soil pollution: Plants and microorganisms, Sources of soil pollution, Harmful effects of soil pollutants from Chemical industries, Agro chemicals, Urban and domestic wastes, Radioactive substances. Soil erosion: causes and effects. **2.3** Treatment and control of soil pollutants, Reclamation of soil, control of soil erosion.	15	01

REFERENCE

1. Girard J, Principles of Environmental Chemistry, Jones Bartlett Learning, 2014
2. Glasson, J., Therivel, R., Chadwick, A. 1994. Introduction to Environmental Impact Assessment. London, Research Press, UK.
3. H.S. Peavy, D.R. Rowe & G. Tchobanoglous, "Environmental Engineering". McGraw Hill International Edition.
4. Jacob D. J, Introduction to Atmospheric Chemistry, Princeton, 2004
5. JH Seinfeld and SN Pandis, Atmospheric Chemistry and Physics. Wiley 2006
6. Jördening, H.J. and Winter, J. eds., 2005. Environmental biotechnology: concepts and applications. John Wiley & Sons.
7. Karia GL (3013) Wastewater Treatment: Concepts and Design Approach, PHI 19. Kiang, Y.H., 1981. Waste energy utilization technology. United States.

VSC-PRACTICALS

SEMESTER V (VSC-III PRACTICAL)		Hrs.	Cr.
VSC PRACTICAL: CHEMISTRY OF SOIL AND WATER	PAPER CODE: RJVSCCHEP351	60	02

Unit No.	Name of the topic	No. of Hrs.	Credits
I	1. Estimation of Alkalinity of the given water sample. 2. Estimation of Acidity of the given water sample. 3. Determination of chemical oxygen demand (COD) of water samples. 4. Determination of salinity of water by Mohr's method. 5. Determination of Manganese in the given water sample by colorimetery. 6. Estimation of calcium in the given water sample 7. Estimation of iron in the water sample. 8. Estimation of dissolved oxygen in the water sample. 9. Estimation of nitrite in the water sample. 10. Determination of Fluoride in water sample by colorimetry. 11. Determination of organic carbon in soil sample.	60	02

REFERENCES:

1. Quantitative Inorganic Analysis including Elementary Instrumental Analysis by A. I. Vogels, 3rdEd. ELBS (1964)
2. Vogel's textbook of quantitative chemical analysis, Sixth Ed. Mendham, Denny, Barnes, Thomas, Pearson education.

SEM VI SYLLABUS

VSC-PRACTICALS

SEMESTER VI (VSC – IV PRACTICAL)		Hrs.	Cr.
VSC PRACTICAL: COSMETICS AND PERFUME CHEMISTRY	PAPER CODE: RJVSCCHEP361	60	02

Unit No.	Name of the topic	No. of Hrs.	Credits
I	1. Estimation of magnesium in talcum powder by complexometric titration. 2. Estimation of boric acid content in a given powder sample 3. Estimation of fluoride in tooth paste by colorimetry. 4. Estimation of zinc present in a given sample of anti-perspirants. 5. Estimation of vitamin-C by redox titration. 6. Estimation of Saponification value of oil. 7. Estimation of Iodine value of oil. 8. Estimation of hydrogen peroxide using potassium permanganate. 9. Analysis of lipstick ash for the presence of various anions. 10. Estimation of lead in the sample of hair dye. 11. Estimation of curcumin in herbal face wash. 12. Determination of acidity and moisture content in honey. 13. Determination of viscosity for glycine/ Honey using Ostwald viscometer. 14. Determination of TFM in soap sample. 15. Estimation of reducing sugar in honey by inversion.	60	02

REFERENCES:

1. Quantitative Inorganic Analysis including Elementary Instrumental Analysis by A. I. Vogels, 3rdEd. ELBS (1964)
2. Vogel's textbook of quantitative chemical analysis, Sixth Ed. Mendham, Denny, Barnes, Thomas, Pearson education.