



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. I (Drug Chemistry)

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2024-2025

Syllabus for B.Sc. I Drug Chemistry

PREAMBLE:

This updated syllabus is prepared for first year undergraduate students as per NEP 2020. At this level, to develop their interest towards drug chemistry as basic science and also to prepare them for the academic and industrial exposure simultaneously. Introduction of microbial techniques with the regular chemistry exercises will help to enhance rational thinking of the students towards Drug Chemistry. The interdisciplinary approach with vigor and depth is compatible to the syllabi of other universities, at the sametime is not rigid for the students at first year of their graduation. The units in the syllabus are well defined with scope and the number of lectures. The references are mentioned with relevance.

General objectives of the course:

1. To develop the content of the syllabus according to the UGC norms.
2. To inculcate fundamental principles of chemical sciences in students.
3. To establish the link between theory and laboratory practice by conducting laboratory experiments which help students to improve the understanding of the concepts.
4. To enhance student's sense of enthusiasm for chemistry and to involve them in an intellectually stimulating experience of learning in a supportive environment.

PROGRAMME OUTCOMES:

After completing the B.Sc. program, graduates will:

1. Possess a strong foundation of knowledge in Drug Chemistry and related scientific disciplines.
2. Develop a scientific attitude with critical thinking, analytical skills and curiosity, enabling them to pursue research, innovation and lifelong learning.
3. Demonstrate proficiency in laboratory techniques, experimentation, chemical analysis and the safe handling of chemicals and instruments.
4. Be eligible to pursue higher education Drug Chemistry and interdisciplinary sciences in India and abroad.
5. Qualify for competitive examinations and employment opportunities in government, academics, research and industrial sectors.
6. Meet the eligibility requirements for career in chemical, pharmaceutical, food, environment, forensic, agricultural and allied industries.
7. Develop entrepreneurial skills to establish ventures related to chemical products,

analytical laboratories, consultancy and allied fields.

8. Enhance communication, teamwork, leadership, ethical values, scientific temperament and problem-solving abilities for professional and societal development.

PROGRAM SPECIFIC OBJECTIVES:

1. To enable students to understand the fundamental concepts, principles, laws, and modern developments in Drug Chemistry.
2. To integrate practical laboratory work with theoretical knowledge, thereby strengthening the understanding of chemical concepts and experimental techniques.
3. To inspire and promote interest in Drug Chemistry through laboratory learning, scientific inquiry, and innovative thinking.
4. To develop awareness of laboratory safety, environmental responsibility, green chemistry, and sustainable chemical practices.
5. To prepare students for higher education, research, industrial applications, and professional careers in Drug Chemistry.

PROGRAMME SPECIFIC OUTCOMES

After completing the B.Sc. (Drug Chemistry) program, students will:

1. Explain, describe, interpret, and discuss fundamental concepts in Drug Chemistry.
2. Perform qualitative and quantitative chemical experiments using appropriate laboratory techniques and safety practices.
3. Analyze, interpret, and solve chemical problems using scientific reasoning and experimental evidence.
4. Apply chemical knowledge to address challenges in healthcare, agriculture, energy, environmental protection, and industrial development.
5. Demonstrate competency in handling laboratory instruments, preparing standard solutions, carrying out chemical analyses, and interpreting experimental results.
6. Design and execute small laboratory projects while maintaining scientific ethics and laboratory safety.
7. Develop practical skills relevant to chemical, pharmaceutical, food, environmental, forensic, and allied industries through laboratory training and internships.
8. Strengthen research aptitude by participating in research projects, internships, scientific investigations, and innovation activities.
9. Present scientific findings effectively through seminars, posters, project reports,

conferences, and research publications.

10. Demonstrate environmental responsibility by adopting sustainable practices, green chemistry principles, and ethical approaches in professional and social life

1. Title: B. Sc. Drug Chemistry

2. Year of Implementation: 2024-2025

3. Duration: One year

4. Pattern: Semester

5. Medium of Instruction: English

6. Student Eligibility: 12th Science and as per guideline of university

7. Faculty Eligibility: As per guideline of university & UGC guideline

8. Structure of Course:

Level	Sem	Course- 1				Course- 2		Course- 3		VSEC		AEC, VEC, IKS			OE	CEP, FP, OJT			Total
		DSC		DSE						VSC	SEC	AEC	VEC	IKS		CEP	FP	OJT	
		T	P	T	P	T	P	T	P										
4.5	I	4	2	-	-	4	2	4	2	-	-	-	-	2	2	-	-	-	22
	II	4	2	-	-	4	2	4	2	-	-	-	2	-	2	-	-	-	22

**Course Title:
Semester I:**

Sr. No.	Course	Course No. & Course Code	Title of Paper	No. of lectures/ Practical per week	Credits
1.	DSC I	BDCT 111	Introduction to Drug Chemistry	2	2
2.	DSC II	BDCT 112	Fundamentals of Drug	2	2
3	DSCP	BDCP 113	Practical I	1	2
4.	OE	BDCTOE I	Instrumentation & Measurement Studies I	1	2
5.	IKS	BDCTIKS	Introduction to Indian Knowledge System	2	2
Total				6 T + 2 P	10

Semester II

Sr. No.	Course	Course No. & Course Code	Title of Paper	No. of lectures/ Practical per week	Credits
1.	DSC III	BDCT 121	Introduction to Biochemistry	2	2
2.	DSC IV	BDCT 122	Analysis Techniques	2	2
3	DSCP	BDCP 123	Practical II	1	2
3.	OE	BDCTOE II	Instrumentation & Measurement Studies II	1	2
4.	VEC	BDCTVEC	Democracy, Election and Indian Constitution	2	2
Total				6T + 2 P	10



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B.Sc.I

Semester - I

Type: DSC I

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course: BDCT 111: Introduction to Drug Chemistry

Course Objectives: Students should be able to...

- 1) understand the basic concepts in drug chemistry.
- 2) know different natural sources of drugs.
- 3) study the classification of drugs.
- 4) learn chemical communication in human body.

Course Outcomes: By the end of course, students will be able to...

- 1) explain fundamentals of drug chemistry.
- 2) classify natural sources of drugs.
- 3) acquire knowledge to classify drugs.
- 4) describe chemical communication in human body.

Module	Title and Contents	Hrs
Module -1:	Introduction to Drug Chemistry 1.1 Definition, history, scope and development of Pharmacognosy 1.2 Definition of drug, ideal properties of drug, prodrug, soft drug, hard drug 1.3 Basic terms in Drug Chemistry: Pharamacon, Pharamacophore, Prodrug, half-life efficiency, LD₅₀, ED₅₀, Therapeutic Index 1.4 Pharamakinetics: Drug Absorption, Distribution, Metabolism and Excretion 1.5 Nomenclature of drugs 1.6 Routes of Drug Administration and Dosage Forms: Oral and Parental routes with advantages and disadvantages. Formulations, Different dosage forms- emphasis on sustained release formulations. 1.7 Pharmacopoeia, History, Development of pharmacopoeia, study of different pharmacopeia	10
Module -2:	Sources of Drug 2.1 Biological 2.2 Marine 2.3 Mineral 2.4 Synthetic 2.5 Plant tissue cultures as sources of drugs.	5
Module -3:	Classification of Drugs 3.1 Alphabetical, morphological- Doctrine of nature, taxonomical classification of drugs 3.2 Chemical classification of drugs 3.3 Pharmacological classification of drugs 3.4 Classification of drugs based on therapeutic effects and areas	7

Module -4:	Chemical Communication 4.1 Various types of communication systems in body. 4.2 Pituitary gland hormones and their action. 4.3 Adrenal gland hormones and their action.	8
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Reference Books:

1. Gupta, S. K. Textbook of Pharmacognosy. 2nd ed. New Delhi: CBS Publishers & Distributors, 2009
2. Kokate, C.K., A.P. Purohit, and S.B. Gokhale. Pharmacognosy. 50th ed. Pune: Nirali Prakashan, 2014.
3. Lemke, Thomas L., David A. Williams, Victoria F. Roche, and S. William Zito. Foye's Principles of Medicinal Chemistry. 7th ed. Philadelphia: Lippincott Williams & Wilkins, 2013.
4. Mukherjee, Pulok K. Quality Control and Evaluation of Herbal Drugs: Evaluating Natural Products and Traditional Medicine. 2nd ed. Amsterdam: Elsevier, 2019.
5. Patrick, Graham L. An Introduction to Medicinal Chemistry. 7th ed. Oxford: Oxford University Press, 2023
6. Rang, H.P., James M. Ritter, Rod J. Flower, and Graeme Henderson. Rang & Dale's Pharmacology. 9th ed. Edinburgh: Elsevier, 2019.
7. Shah, Biren, and Avinash Seth. Textbook of Pharmacognosy and Phytochemistry. 2nd ed. New Delhi: Elsevier, 2013.

Evaluation Pattern: (60:40)

Total Marks: 50

Continuous Comprehensive Evaluation: (20 M)

- CCE -1 Compulsory Home assignment: 10 M
- CCE -2 Short & long Answer Question Test/ Seminar/Open Book Test/ Book Review//Field Work/ Industry Visit: 10 M
- CCE- 3 Compulsory MCQ test: 10 M

Best two scores will be considered for final internal evaluation.

End Semester Examination: (30 Marks)

- Question-1: Solve the following questions (Five questions of 2 Marks)
- Question- 2: Attempt any two questions (Three questions of 10 Marks)
- Question-3: Attempt any four questions (Six questions of 5 Marks)

Note: 50 Mark converted to 30



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B.Sc.I

Semester - I

Type: DSC II

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course: BDCT 112: Fundamentals of Drug

Course Objectives: Students should be able to...

- 1) study the fundamentals of biological chemistry.
- 2) know about basic biomolecules.
- 3) gain knowledge about amino acids and proteins.
- 4) familiar with the term bioavailability.

Course Outcomes: By the end of course, students will be able to...

- 1) explain different types of bonds present in biomolecules.
- 2) discuss reactions of protein.
- 3) classify carbohydrates based on monomers present in it.
- 4) describe bioavailability and permeability

Module	Title and Contents	Hrs
Module -1:	Fundamentals of Biological Chemistry 1.1 Configuration and Information in 3D structure of biomolecules 1.2 Stereochemistry, chiral interaction, enantiomers etc. 1.3 Interaction between biomolecules, stereo specificity 1.4 Types of bonds in biomolecule [Covalent (glycoside, peptide, phosphodiester), ionic, hydrogen, Van der Waals, hydrophobic, coordinate)] their formation and interaction.	8
Module -2:	Basic Biomolecules 2.1 Carbohydrates: Introduction, biological importance. Definition 2.2 Classification, {glyceraldehyde, Simple Aldose, Simple Ketoses, D-glucose, Conformation of D-glucose} 2.3 Monosaccharides other than glucose, glyosidic bond,disaccharides 2.4 Polysaccharides [starch, glycogen] peptidoglycan, proteoglycan matrix.	6
Module -3:	Amino acids 3.1 Introduction to amino acids, classification, structure and properties of amino acids 3.2 Acid base behavior of amino acid, analysis, reactions, Zwitter ions 3.3 Structure-peptide bond.	6
Module -4:	Bioavailability and Permeability 1.1 Bioavailability: Definition in pharmacology, nutritional science,environmental science, 1.2 Absolute bioavailability, relative bioavailability and bioequivalence 1.3 Factors influencing bioavailability, bioavailability of drugs versus dietary supplements 1.4 Nutritional Science: reliable and universal bioavailability.	9

	1.5 Permeability: Diffusion– Definition, significance, mechanisms, laws and factors affecting diffusion.	
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Reference Books:

1. Donald Voet & Judith Voet, Fundamentals of Biochemistry. 3rd Edition, Inc. John Wiley and Sons, USA 2008.
2. Erice Conn & Paul Stumpf; Outlines of Biochemistry: 5th Edition, John Wiley and Sons USA, 2009.
3. H. D. Kumar, Biodiversity and sustainable conservation, Oxford & IBH, New Delhi, 1999
4. Jeffery Zubey, Principles of Biochemistry, 4th edition McGraw-Hill College USA 1997
5. Jeremy Berg, Lubert Stryer, Biochemistry 7th Edition W. H. Freeman and company, 2012
6. Lehninger David Nelson & Michael Cox, Principles of Biochemistry 5th Edition, W. H. Freeman and company NY 2008.
7. Reginald Garrett and Charles Grisham, Biochemistry. 5th Edition Brook/Cole Boston, USA
8. Shukla And Upadhyaya, Economic Zoology, 4th Edition, Rastogi Publications, 2009

Evaluation Pattern: (60:40)

Total Marks: 50

Continuous Comprehensive Evaluation: (20 M)

- CCE -1 Compulsory Home assignment: 10 M
- CCE -2 Short & long Answer Question Test/ Seminar/Open Book Test/ Book Review//Field Work/ Industry Visit: 10 M
- CCE- 3 Compulsory MCQ test: 10 M

Best two scores will be considered for final internal evaluation.

End Semester Examination: (30 Marks)

- Question-1: Solve the following questions (Five questions of 2 Marks)
- Question- 2: Attempt any two questions (Three questions of 10 Marks)
- Question-3: Attempt any four questions (Six questions of 5 Marks)

Note: 50 Mark converted to 30



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Chemistry

Programme: B.Sc.

Semester - I

Type: DSCP (Major)

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course: BDCP 113: Course I Lab I

Course Objectives: By the end of course, students should be able to...

- 1) study safety measures in laboratory.
- 2) understand purification methods.
- 3) learn functional group detection.
- 4) know estimation technique of protein.

Course Outcomes: By the end of course, students will be able to...

- 1) read MSDS for given chemical
- 2) purify given pharmaceutical compound
- 3) isolate starch from potato
- 4) estimate the protein from given sample.

Title and Contents	Hrs
(Any 15 of the following) 1. Safety symbol and labels on pack of chemicals and its meaning. 2. Details about MSDS and its importance. 3. Purification of organic pharmaceutical compounds (Any 2) i) Paracetamol ii) Aspirin 4. Determination of solubility, MP and BP of drug (Any 4) 5. Detection of elements and functional group (Any 4) i) Acid ii) Base iii) Phenol iv) neutral 6. Estimation of tincture iodine 7. Spot test for carbohydrates & amino acids. 8. Isolation of starch from potato 9. Isolation of protein from plant source 10. Isolation of oil from plant source 11. Estimation of protein by Biuret method 12. Estimation of protein by Lowry method 13. Synthesis of Aspirin	60

Reference Books:

1. Armarego, Wilfred L. F., and Christina Chai. Purification of Laboratory Chemicals 8th ed. Oxford: Butterworth-Heinemann, 2017.
2. Harborne, Jeffrey B. Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis. 3rd ed. London: Chapman & Hall, 1998.
3. NCERT. Laboratory Manual Chemistry: Class XI. New Delhi: National Council of Educational Research and Training, 2022.

4. Separation Methods in Drug Synthesis and Purification. 2nd ed. Handbook of Analytical Separations, Vol. 8. Amsterdam: Elsevier, 2020.
5. Shriner, Ralph L., Christine K. F. Hermann, Terence C. Morrill, David Y. Curtin, and Reynold C. Fuson. The Systematic Identification of Organic Compounds. 8th ed. Hoboken, NJ: John Wiley & Sons, 2004
6. Vogel, Arthur I. Vogel's Textbook of Quantitative Chemical Analysis. 6th ed. Harlow: Pearson Education, 2000.

Evaluation Pattern: (60:40)

Total Marks: 50

Continuous Comprehensive Evaluation: (20 M)

- Journal: 10 Marks
- Student Performance; 05 marks
- Attendance: 05 Marks

End Semester Examination: (30 Marks):

- Q.1 Major Experiment
- Q.2 Minor Experiment



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Board of Studies in Chemistry

Programme: B.Sc. I

Semester - II

Type: DSC III

Marks: 50

Credits: 2

From: A. Y. 2024-25

Name of the Course: BDCT 121: Introduction to Biochemistry

Course Objectives: Students should be able to...

- 1) study fundamentals of the endocrine system.
- 2) know about vitamins in detail and its importance in our life
- 3) gain knowledge about mineral metabolism.
- 4) learn in detail about body fluid and blood.

Course Outcomes: By the end of course, students will be able to...

- 1) explain endocrine system and importance of various hormones
- 2) draw the structures of vitamins.
- 3) discuss mineral metabolism.
- 4) categories body fluid and blood.

Module	Title and Contents	Hrs
Module -1:	Hormones 1.1 Introduction to Endocrine system, Types, Glands 1.2 Hormones, Functions and Diseases related to hormones 1.3 Thyroid hormones and anti-thyroid drugs, parathormone, calcitonin and Vitamin D 1.4 Chemical Messengers, Feedback Mechanism 1.5 Androgens and anabolic steroids, Estrogens, progesterone and oral contraceptives, 1.6 Drugs acting on the uterus	9
Module -2:	Vitamins 2.1 Concept of Vitamins, Types of vitamins- fat soluble and water soluble 2.2 Various vitamins- its solubility, food sources, deficiency diseases, Interaction with other nutrients 2.3 Antagonists and analogues of vitamins	8
Module -3:	Mineral Metabolism 3.1 General definition and history of minerals; causes of macro and micromineral deficiencies in India 3.2 Chronology, chemistry, distribution, functions, absorption transport, metabolism, deficiency manifestations 3.3 Nutritional requirements, methods of assay of all the minerals 3.4 Interactions of minerals with other nutrients, antagonists and analogues of minerals	6
Module -4:	Body Fluid and Blood 4.1 Introduction to Body fluids, composition and functions of blood, hemopoiesis formation of hemoglobin, anemia, mechanisms of coagulation 4.2 Blood grouping, Rh factors, transfusion, its significance and disorders of blood 4.3 Reticulo endothelial system 4.4 Lymphatic system Lymphatic organs and tissues, lymphatic vessels,	7

	lymph,circulation and functions of lymphatic system	
Reference Books: 1. Golan, David E., Armen H. Tashjian Jr., Ehrin J. Armstrong, and April W. Armstrong. Principles of Pharmacology: The Pathophysiologic Basis of Drug Therapy. 5th ed. Philadelphia: Wolters Kluwer, 2022. 2. Guyton, Arthur C., and John E. Hall. Guyton and Hall Textbook of Medical Physiology. 15th ed. Philadelphia: Elsevier, 2021. 3. Hall, John E. Pocket Companion to Guyton and Hall Textbook of Medical Physiology. 15th ed. Philadelphia: Elsevier, 2021. 4. Melmed, Shlomo, Kenneth S. Polonsky, P. Reed Larsen, and Henry M. Kronenberg. Williams Textbook of Endocrinology. 15th ed. Philadelphia: Elsevier, 2024. 5. Ross, Michael H., and Wojciech Pawlina. Histology: A Text and Atlas. 8th ed. Philadelphia: Wolters Kluwer, 2020. 6. Tortora, Gerard J., and Bryan H. Derrickson. Principles of Anatomy and Physiology. 16th ed. Hoboken, NJ: Wiley, 2020.		
Evaluation Pattern: (60:40)		
Total Marks: 50		
Continuous Comprehensive Evaluation: (20 M) • CCE -1 Compulsory Home assignment: 10 M • CCE -2 Short & long Answer Question Test/ Seminar/Open Book Test/ Book Review//Field Work/ Industry Visit: 10 M • CCE- 3 Compulsory MCQ test: 10 M Best two scores will be considered for final internal evaluation.		End Semester Examination: (30 Marks) • Question-1: Solve the following questions (Five questions of 2 Marks) • Question- 2: Attempt any two questions (Three questions of 10 Marks) • Question-3: Attempt any four questions (Six questions of 5 Marks) Note: 50 Mark converted to 30

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	Yashavantrao Chavan Institute of Science, Satara	
	Board of Studies in Chemistry	
	Programme: B.Sc. I	Semester - II
	Type: DSC IV	Marks: 50
	Credits: 2	From: A. Y. 2024-25
Name of the Course: BDCT 122: Analysis Techniques		
Course Objectives: Students should be able to... 1) study fundamentals of titrations. 2) learn acid base titrations. 3) know about oxidation reduction titration. 4) familiar with gravimetric analysis		
Course Outcomes: By the end of course, students will be able to... 1) define titration and know about its type. 2) apply knowledge of titrations in analysis. 3) describe the importance of different analytical techniques. 4) discover importance of thermal methods of analysis.		
Module	Title and Contents	Hrs
Module -1:	Acid Base Titrations 1.1 Acid base concepts, Role of solvent, Relative strengths of acids and bases, Ionization 1.2 Law of mass action, Common Ion effect, Ionic product of water 1.3 pH, Hydrolysis of salts, Henderson-Hasselbach equation, Buffer solutions 1.4 Neutralization curves, Acid-base indicators, Theory of indicators, Choice of indicators, mixed indicators 1.5 Polyprotic system, Polyamine and amino acid systems, Amino acid titration applications in assay of HIO_4 , NaOH , CaCO_3	8
Module -2:	Oxidation Reduction Titrations 2.1 Concepts of oxidation and reduction, Redox reactions, Strengths and equivalent weights of oxidising and reducing agents 2.2 Theory of redox titrations, Redox indicators, Cell representations, 2.3 Measurement of electrode potential, Oxidation-reduction curves 2.4 Iodimetry and Iodometry, Titrations involving ceric sulphate, potassium iodate, potassium bromate, potassium permanganate; titanous chloride and Sodium 2, 6-dichlorophenol indophenol	7
Module -3:	Precipitation Titrations 3.1 Precipitation reactions, Solubility products, Effect of acids, temperature and solvent upon the solubility of a precipitate. 3.2 Argentometric titrations and titrations involving ammonium or potassium thiocyanate, mercuric nitrate, and barium sulphate, Indicators 3.3 Gay-Lussac method; Mohr's method, Volhard's method and Fajan's method.	7
Module -4:	Theory of Gravimetric Analysis 4.1 Precipitation techniques, Solubility products; The colloidal state, Super saturation co-precipitation, Post precipitation 4.2 Digestional washing of the precipitate, Filtration, Filter papers and crucibles, Ignition, Thermo gravimetric curves 4.3 Specific examples like barium sulphate, aluminium as aluminium oxide,	8

	Calcium as calcium oxalate and magnesium as magnesium pyrophosphate, Organic Precipitants.	
Reference Books: 1. Atkins, Peter, and Julio de Paula. Physical Chemistry. 7th ed. Oxford: Oxford University Press, 2006. 2. Burgot, Jean-Louis. "Acid–Base Titrations: Further Theoretical Studies." In Ionic Equilibria in Analytical Chemistry, 381–410. New York: Springer, 2012. 3. Harris, Daniel C. Quantitative Chemical Analysis. 10th ed. New York: W. H. Freeman, 2022. 4. Scholz, Fritz, and Heike Kahlert. "Titrations." In Chemical Equilibria in Analytical Chemistry, 193–220. Cham: Springer International Publishing, 2019. 5. Skoog, Douglas A., Donald M. West, F. James Holler, and Stanley R. Crouch. Fundamentals of Analytical Chemistry. 10th ed. Boston: Cengage Learning, 2023. 6. Vogel, Arthur I. Vogel's Textbook of Quantitative Chemical Analysis. 6th ed. Harlow: Pearson Education, 2000.		
Evaluation Pattern: (60:40)		
Total Marks: 50		
Continuous Comprehensive Evaluation: (20 M) • CCE -1 Compulsory Home assignment: 10 M • CCE -2 Short & long Answer Question Test/ Seminar/Open Book Test/ Book Review//Field Work/ Industry Visit: 10 M • CCE- 3 Compulsory MCQ test: 10 M Best two scores will be considered for final internal evaluation.	End Semester Examination: (30 Marks) • Question-1: Solve the following questions (Five questions of 2 Marks) • Question- 2: Attempt any two questions (Three questions of 10 Marks) • Question-3: Attempt any four questions (Six questions of 5 Marks) Note: 50 Mark converted to 30	

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	Board of Studies in Chemistry	
	Programme: B.Sc.I	Semester - II
	Type: DSCP	Marks: 50
	Credits: 2	From: A. Y. 2024-25
Name of the Course: BDCP 123: Practical II		
Course Objectives: Students should be able to... 1) understand neutralization reactions. 2) learn the oil extraction process. 3) know gravimetric estimation. 4) study detection of food adulteration.		
Course Outcomes: By the end of course, students will be able to... 1) find out the strength of given acid or base sample. 2) separate given mixture of carbohydrates and lipids by chromatographic method 3) determine adulteration in given sample of food materials. 4) categorize oxidizing and reducing agents.		
Title and Contents		Hrs
(Any 15 of the following) 1. Acid-Base titrations (at least 3) i) To determine the normality of given base. ii) Fertilizer Analysis: Determination of Percentage of Nitrogen present in the given sample of nitrogenous fertilizer. iii) Determination of alkali content of antacid tablet using HCl 2. Redox titrations (permanganometry) 3. Redox titration by iodometry method 4. Precipitation titrations (at least 2) 5. Complexometric titration (Calcium /Magnesium). 6. Chromatographic Separation of i) lipid ii) amino acids iii) carbohydrates 7. Determination of adulteration in milk and milk products 8. Determination of adulteration in fats and oil 9. Determination of adulteration in sweetening agents and miscellaneous product.		60
Reference Books: 1. Christian, Gary D. Analytical Chemistry. 7 th ed. New York: John Wiley & Sons, 2014. 2. Meyers, Robert A., Encyclopedia of Analytical Chemistry: Applications, Theory and Instrumentation. Chichester: John Wiley & Sons, 2000. 3. Otto, Matthias, Miguel Valcárcel, Robert Kellner, and Jean-Michel Mermet, eds. Analytical Chemistry. 2 nd ed. Weinheim: Wiley-VCH, 2004. 4. Skoog, Douglas A., and Stanley R. Crouch. Principles of Instrumental Analysis. 7 th ed. Boston: Cengage Learning, 2017. 5. Skoog, Douglas A., F. James Holler, Stanley R. Crouch, and Donald M. West. Fundamentals of Analytical Chemistry. 10 th ed. Boston: Cengage Learning, 2023. 6. Vashishta, Yati. Handbook of Analytical Instruments. New Delhi: Tata McGraw-Hill, 2007		
Evaluation Pattern: (60:40)		
Total Marks: 50		

Continuous Comprehensive Evaluation: (20 M) • Journal: 10 Marks • Student Performance; 05 marks • Attendance: 05 Marks	End Semester Examination: (30 Marks): - Q.1 Major Experiment - Q.2 Minor Experiment
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