



(Bachelor of Science)(Undergraduate)
B. Sc. (UG) Semester -IV

Course Code	US04SCHE51	Title of the Course	POLYMER SCIENCE – II
Total Credits of the Course	2	Hours per Week	2
Course Objectives:	To make students familiar with: 1. Polymer science as a subject 2. Application of polymer science in development of chemical science as subject. 3. Basic concepts related to Co-polymerisation, Mechanism and kinetics of copolymerization, Polymer Degradation etc.		

Course Content		
Unit	Description	Weightage* (%)
1.	Co-polymerisation, Mechanism and kinetics of copolymerization, polymer processing techniques: Die Casting, Injection Moulding, Blow Moulding, Extrusion Moulding, Foaming, Reinforcing, Fiber spinning technique.	25%
2.	Polymer Degradation: Introduction, Types of degradation, thermal degradation and factors affecting it, mechanical degradation, degradation by ultrasonic waves, photo degradation, oxidative degradation.	25%
3.	Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene and styrene copolymers, poly(vinyl chloride) and related polymers, poly(vinyl acetate), acrylic polymers.	25%
4.	Brief introduction to preparation, structure, properties and application of the following polymers Phenol formaldehyde resins (Bakelite, Novalac), polyurethanes, silicone polymers, polydienes, Polycarbonates, Conducting Polymers, polyacetylene.	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops,
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	models).
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100 %

Course Outcomes: Having completed this course, the learner will be able to	
1.	From the study of this paper, student will learnt about basic concept of Co-polymerisation, Mechanism and kinetics of copolymerization, Polymer Degradation. This study will helpful them in further studies and in industries.
2.	Apply this knowledge in further studies of third year B.Sc. chemistry course.
Suggested References:	
Sr. No.	References
1.	Principles of polymers Science by P. Bahadur and N. V. Sastry. (Second Edition)
2.	Polymer Science by V. R. Gowariker, N. V. Vashwanathan and Jaydev Shreedhar.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science)(Undergraduate)
B. Sc. (UG) Semester -IV

Course Code	US04SCHE52	Title of the Course	MEDICINAL CHEMISTRY: FUNDAMENTALS
Total Credits of the Course	2	Hours per Week	2
Course Objectives:	To make students familiar with: 1. Medicinal chemistry 2. Application of medicinal chemistry in development of chemical science as subject. 3. Basic concepts related to medicinal chemistry, SAR of drugs, synthesis and use of some drugs.		

Course Content		
Unit	Description	Weightage* (%)
1.	Basic Principles of Medicinal Chemistry: basic terminology, Physico-chemical aspects (Optical, geometric and bioisosterism) of drug molecules and its biological action, Drug receptor interaction including transduction mechanisms.	25%
2.	Principles of Drug Design : Basic concept , Traditional analog (QSAR) and mechanism based approaches, applications of quantum mechanics, Computer Aided Drug Designing (CADD) and molecular modeling.	25%
3.	Mode of action and SAR of following class of drugs: Antibacterial agents and Antibiotics, Sulphonamides and Antineoplastic Agents, Anti – mycobacterial and Antimalarial agents, Antifungal agents, Antiviral agents.	25%
4.	Synthetic procedures and uses of selected drugs: Methicillin, Oxacillin, Cloxacillin, Trimethoprim, Melphalan, 6-mercaptopurine, Methotrexate, Thiotepa, Isoniazid, paraamino salicylic acid, pyrazinamide, ethambutol, Dapsone, Mefloquine, Amodiaquine, pyrimethamine.	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that
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	accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).
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Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	---
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to

1.	From the study of this paper, student will learnt about basic concept of Basic Principles of Medicinal Chemistry: basic terminology, Principles of Drug Design, Mode of action and SAR of class of drugs, Synthetic procedures and uses of selected drugs. This study will helpful them in further studies and in industries.
2.	Apply this knowledge in further studies of third year B.Sc. chemistry course.

Suggested References:

Sr. No.	References
1.	Ashutosh Kar, Medicinal Chemistry, New age international publisher. 2018
2.	Harkishan Singh, V. K. Kapoor, Medicinal and Pharmaceutical chemistry, Delhi – Vallabh Prakashan, 2nd edition, reprint (2008).

On-line resources to be used if available as reference material

On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science)(Undergraduate)
B. Sc. (UG) Semester -IV

Course Code	US04SCHE53	Title of the Course	GREEN CHEMISTRY: FUNDAMENTALS
Total Credits of the Course	2	Hours per Week	2
Course Objectives:	To make students familiar with: 1. Various concept of green Chemistry. 2. Application of green chemistry in development of chemical science as subject. 3. Basic concepts related to new trends in green chemistry, green reagents and catalysts, bio catalyst in organic synthesis, organic synthesis in solid state and green analytical.		

Course Content		
Unit	Description	Weightage* (%)
1.	NEW TRENDS IN GREEN CHEMISTRY: Introduction and basic Principles of Green Chemistry: Prevention of waste/By products, Maximum incorporation of reactants into the final product., Prevention or minimization of hazardous products, Designing safer chemicals, Energy required for synthesis, Selection of appropriate solvents, selection of starting materials, Use of protecting groups, Use of catalyst, Products design should be bio-degradable, Designing of manufacturing plants, Strengthening of analytical techniques. Green Chemistry in day-to-day life: Dry cleaning of cloths, Versatile bleaching agents.	25%
2.	GREEN REAGENTS AND CATALYSTS : Introduction, Designing a Green Synthesis, Choice of starting materials, Choice of reagents, Choice of catalyst, Choice of Solvents. Environmental Pollution, Green Reagent, Dimethyl Carbonate, Polymer supported reagents, Green Catalysts, Acid Catalysts. Oxidation Catalyst, Basic Catalyst, Polymer Supported Catalyst.	25%
3.	BIO CATALYST IN ORGANIC SYNTHESIS: Introduction, Biochemical (Microbial) Oxidations, Biochemical (Microbial) Reductions, Enzymes, Catalyzed Hydrolytic Processes. Green Chemistry Using Bio Catalytic Reactions – Introduction - Fermentation and Biotransformations - Production of Bulk and fine chemicals by microbial fermentation-Antibiotics – Vitamins - Bio catalyses synthesis of industrial chemicals by bacterial constructs - Future Tends.	25%





4.	ORGANIC SYNTHESIS IN SOLID STATE AND GREEN ANALYTICAL METHODS : Introduction, Solid phase organic synthesis without using any solvent, Solid supported organic synthesis. Future trends in Green Chemistry - Green analytical methods, Redox reagents, Green catalysts; Green nano-synthesis, Green polymer chemistry, Exploring nature, Biomimetic, Proliferation of solvent-less reactions; Non-covalent derivatization, Biomass conversion, emission control.	25%
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Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	---
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	From the study of this paper, student will learnt about basic concept of new trends in green chemistry, green reagents and catalysts, bio catalyst in organic synthesis, organic synthesis in solid state and green analytical. This study will helpful them in further studies and in industries.
2.	Apply this knowledge in further studies of third year B.Sc. chemistry course.
Suggested References:	
Sr. No.	References





1.	New Trends in Green Chemistry by V. K. Ahluwalia, M. Kidwai. Springer Science & Business Media. 2004.
2.	V. Kumar, "An Introduction to Green Chemistry" Vishal publishing Co. Reprint Ed., 2010.
3.	Rashmi Sanghi, M.M Srivastava "Green Chemistry" Fourth Reprint – 2009.

On-line resources to be used if available as reference material

On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science)(Undergraduate) (Industrial Chemistry Vocational)
B. Sc. (UG) Semester –IV (Effective from JUNE 2022)

Course Code	US04SICV51	Title of the Course	Speciality Chemicals
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Basic of Oil, Fat & Wax. 2. Concepts of Soaps, Detergents and fertilizer. 3. Introduction to catalysis.
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Course Content		
Unit	Description	Weightage* (%)
1.	Oil, Fat & Wax : Introduction, Distinction between oils and fats, Manufacturing of cotton seed oil by expression, Solvent extraction, Refining of vegetable oil.	25%
2.	Soaps & Detergents: Shops Manufacture of soaps, Toilet & transparent soap, Cleansing action of soaps. Detergents- Classification of surface active agent, Anionic detergent, Alkyl sulphate, Alkyl aryl sulphonates, Cationic detergents, Amphoteric detergents, Non- ionic detergent, Detrimental effect of detergents.	25%
3.	Fertilizer: Introduction, Classification of fertilizer, Nitrogenous fertilizer, Ammonium nitrate, Ammonium sulphate, Ammonium sulphate nitrate, Urea, Calcium ammonium nitrate, Super phosphate, Single Super phosphate, Triple Super phosphate, Ammonium phosphate, NPK fertilizers.	25%
4.	Catalysis: Introduction, type of catalysts, basic principles, mechanism and factors affecting the performance, Enzyme catalyzed reactions and industrially important catalytic reactions.	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Industrial Chemistry Vocational programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to ---	
1.	Learn about basic concepts of Oil, Fat & Wax, Soaps, Detergents, fertilizer and catalysis.
2.	Apply knowledge in further studies of third year B.Sc. Industrial Chemistry Vocational course.

Suggested References:	
Sr. No.	References Books
1.	Industrial Chemistry by B. K. Sharma.
2	Chemical process industries by Shreve R. N., McGraw Hill.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science)(Undergraduate) (Industrial Chemistry Vocational)
B. Sc. (UG) Semester –IV (Effective from JUNE 2022)

Course Code	US04SICV52	Title of the Course	Green Chemistry
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	To make students familiar with: 1. Basic of concepts of Green Chemistry. 2. Concepts of Green Catalyst. 3. Introduction to concepts of Green techniques.
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Course Content		
Unit	Description	Weightage* (%)
1.	Introduction to the concepts of Green Chemistry, Principles of Green Chemistry, tips to Design Green synthesis, Choice of starting material, reagents, catalyst, solvents for green synthesis, Concept of Atom economy.	25%
2.	Study of Green Catalyst (Viz. Acidic, Basic, Polymer supported catalyst Biocatalyst), Introduction, application of Phase transfer catalyst, Crown ethers.	25%
3.	Introduction and Application to various green techniques of Green Synthesis viz. Electrochemical, Photochemical, Microwave, Ultrasound. Aqueous phase reaction and solid phase reaction.	25%
4.	Synthesis of: Adipic Acid, Catechol, Methyl Methacrylate, Urethane, Furfural from biomass, Ibuprofen, Paracetamol. Application of Green Chemistry in day to day life. Dry cleaning of clothes, versatile bleaching agent, Ionic liquids as versatile green solvent.	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Industrial Chemistry Vocational programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to ---	
1.	Learn about basic concepts of Green Chemistry, Green Catalyst, Green techniques.
2.	Apply knowledge in further studies of third year B.Sc. Industrial Chemistry Vocational course.

Suggested References:	
Sr. No.	References Books
1.	Basic principles of Green Chemistry by V. K. Ahluwalia.
2.	Principles of Green Chemistry by Paul T. Anastas.

On-line resources to be used if available as reference material
On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science)(Undergraduate)
B. Sc. (UG) Semester –IV

Course Code	US04SICH51	Title of the Course	Introduction to Green Chemistry
Total Credits of the Course	2	Hours per Week	2
Course Objectives:	To make students familiar with: 1. Basic of Green Chemistry and its principles. 2. Concepts of Green Catalyst and green techniques. 3. Introduction to application of Green Chemistry in day to day life..		

Course Content		
Unit	Description	Weightage* (%)
1.	Introduction to the concepts of Green Chemistry, Principles of Green Chemistry, Steps to Design Green synthesis, Choice of starting material, reagents, catalyst, solvents for green synthesis, Concept of Atom economy.	25%
2.	Study of Green Catalyst (Viz. Acidic, Basic, Polymer supported catalyst, Biocatalyst), Introduction, application Phase transfer catalyst, Crown ethers.	25%
3.	Introduction and Application to various green techniques of Green Synthesis viz. Electrochemical, Photochemical, Microwave, Ultrasound. Aqueous phase reaction and solid phase reaction.	25%
4.	Synthesis of: Adipic Acid, Catechol, Methyl Methacrylate, Urethane, Furfural from biomass, Ibuprofen, Paracetamol. Application of Green Chemistry in day to day life. Dry cleaning of clothes, versatile bleaching agent, Ionic liquids as versatile green solvent.	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Industrial Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models).
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Evaluation Pattern





SARDAR PATEL UNIVERSITY
VallabhVidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25))
Syllabus with effect from the Academic Year 2022-2023

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	--
3.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to ---

1.	Learn Concepts of Green Chemistry and its Applications in day to day life.
2.	Apply knowledge in further studies of third year B.Sc. Industrial chemistry course.

Suggested References:

Sr. No.	References Books
1.	Green Chemistry by V.K. Ahluwalia.
2.	Principles of Green Chemistry by V.K. Ahluwalia and M. Kidwai.

On-line resources to be used if available as reference material

On-line Resources: Google books, INFLIBNET, Google Web





(Bachelor of Science in Statistics) (Bachelor of Science)
(B. Sc.) (Statistics) Semester (IV)

Course Code	US04SSTA51	Title of the Course	FOUNDATION OF STATISTICS - II
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	<ol style="list-style-type: none">1. To study causal relationship between two related variables and measure the strength of relationship between two variables.2. Understand the line of best fit as a tool for summarizing a linear relationship and predicting for the future.3. To study an association between two attributes and various measures4. To study normal distribution and its applications in various fields.
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Course Content		
Unit	Description	Weightage* (%)
1.	Correlation and regression: Meaning, Types of correlation, Methods of studying correlation, Scatter diagram(plot) method, Karl-Pearson's correlation coefficient method, Spearman's rank correlation coefficient method, Properties of correlation coefficients (without proof), Examples, Regression: Meaning, Properties of regression coefficients (without proof), Examples	25
2.	Association of Attributes: Theory of attributes, Consistency of data, Independence and association of attributes, Measures of association and contingency	25
3.	Discrete probability distributions: Binomial and Poisson and its applications	25
4.	Continuous probability distribution: Normal distribution and its applications	25





Teaching-Learning Methodology	
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	learn how to apply linear regression models in practice
2.	understand and interpret the correlation between two variables
3.	differentiate between coefficient of correlation coefficients of association.
4.	understand the applications of normal distribution in real life problems.

Suggested References:	
Sr. No.	References
1.	Gupta S.C. and Kapoor V.K. : Fundamentals of applied statistics
2.	Gupta S.C.: Fundamentals of statistics
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On-line resources to be used if available as reference material

On-line Resources





(Bachelor of Science in Statistics) (Bachelor of Science)
(B. Sc.) (Statistics) Semester (IV)

Course Code	US04SSTA52	Title of the Course	OPERATIONS RESEARCH - II
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	<ol style="list-style-type: none">1. Be able to identify the special features of assignment problem.2. Be familiar with the types of problems that can be solved by applying an assignment model.3. Be familiar with basics of game theory4. Be able to understand the basic concepts of network analysis.
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Course Content		
Unit	Description	Weightage* (%)
1.	Assignment Problem: Introduction, Mathematical formulation of Assignment problem, Hungarian Assignment method, Unbalanced Assignment Problem, Maximal Assignment Problem	25
2.	Elements of Game theory: Introduction, Two person zero sum game, Games with saddle point: Maximin-Minimax principle, Strictly determinable game, Fair Game	25
3.	Game theory: Games without saddle point:, Solution of 2×2 game (Without proof), Graphical method of solving $m \times 2$ and $2 \times n$ games, Dominance property	25
4.	Network analysis: Network scheduling, Introduction, Network & Basic components, Rules of network construction, CPM Technique (Critical path in Network Analysis), Float of an activity and even, Event Float, Activity float, (i) Total float, (ii) Free float, (iii) Independent float, Determination of the critical path, Determination of float	25





Teaching-Learning Methodology	
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the usage of game theory and network analysis.
2.	understand the use of assignment problems
3.	understand selected models and concepts of game theory
4.	understand the concept and importance of network analysis.

Suggested References:	
Sr. No.	References
1.	Sharma S.D. : Operations Research
2.	Sharma J.K. : Operations Research
3.	Taha Hamdy A. : Operations Research





On-line resources to be used if available as reference material

On-line Resources





(Bachelor of Science in Statistics) (Bachelor of Science)
(B. Sc.) (Statistics) Semester (IV)

Course Code	US04SSTA53	Title of the Course	BIOSTATISTICS - II
Total Credits of the Course	02	Hours per Week	02

Course Objectives:	<ol style="list-style-type: none">1. To study causal relationship between two related variables and measure the strength of relationship between two variables.2. Understand the line of best fit as a tool for summarizing a linear relationship and predicting for the future.3. To learn the basic concepts in testing of hypotheses4. To learn large and small sample test and its applications in biosciences or medical sciences.
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Course Content		
Unit	Description	Weightage* (%)
1.	Correlation and regression: Meaning, Types of correlation, Methods of studying correlation, Scatter diagram(plot) method, Karl-Pearson's correlation coefficient method, Spearman's rank correlation coefficient method, Properties of correlation coefficients (without proof), Applications, Regression: Meaning, Properties of regression coefficients (without proof), Applications	25
2.	Continuous Probability distribution: Normal distribution, Definition, Properties (without proof), Area under normal curve, Applications	25
3.	Test of Significance – I: Test of independence, Large sample test: test for population proportion, test for difference between two population proportions, test for population mean, test for difference between two population means	25
4.	Test of Significance – II: Small sample test: test for population mean, test for difference between two population means (Unpaired t - test),	25





	test for difference between two population means (Paired t - test)	
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Teaching- Learning Methodology	
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	learn how to apply linear regression models in practice
2.	understand and interpret the correlation between two variables
3.	understand and use of normal distribution in real life.
4.	use the concepts of testing of hypotheses, large and small sample test.

Suggested References:	
Sr. No.	References
1.	Gupta S.C. : Mathematical Statistics
2.	Mahajan B.K. : Methods in Biostatistics





3	Sancheti D.C. and Kapoor V.K. : Statistics
4	Wayne W. Daniel: Biostatistics - A foundation for analysis in the health sciences

On-line resources to be used if available as reference material
On-line Resources





(Bachelor of Science) (Mathematics)
 (B.Sc.) (Mathematics) Semester (IV)

Course Code	US04SMTH51	Title of the Course	NUMBER THEORY - 2
Total Credits of the Course	2	Hours per Week	2

PREREQUISITE : Prerequisite to opt for this course is that the student must have opted the course US03SMTH51 (NUMBER THEORY-1) in Sem - 3

Course Objectives:	<ol style="list-style-type: none"> 1. To teach students Elementary Number Theory. 2. To teach students types of fundamental operations and functions in Elementary Number Theory. 3. To teach students various properties of Congruences and their applications.
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Course Content		
Unit	Description	Weightage* (%)
1.	Linear indeterminate equations and its solution ,General solution of Linear indeterminate equation with three unknown , Pythagoras (Shang-gao indeterminate) equation and its solution.	25%
2.	Congruences : Definition and examples , Properties of congruences ,Necessary and sufficient condition for a positive integer can be divided by 3,9,4,7,11 or 13 .	25%
3.	Complete residue system(mod m) and its properties , Reduced residue system(mod m) and its properties , Euler's theorem, Fermat's theorem , Properties of Euler's function .	25%
4.	Congruence in one unknown , Solution of Linear congruence in one unknown and two unknown, Chinese theorem ,Solution of system of congruences.	25%

Teaching-Learning Methodology	Classroom teaching, Presentation by students, Use of ICT whenever required.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage





1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	---
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100% (50 Marks)

Course Outcomes: Having completed this course, the learner will be able to

1.	understand elementary concepts of Number Theory.
2.	use various operations and functions in Elementary Number Theory to solve problems.
3.	take up an Intermediate course in Number Theory

Suggested References:

Sr. No.	References
1.	C.Y.Hsiung, Elementary Theory of numbers, Allied publishers Ltd.(1992)
2.	D.Burton , elementary Number Theory, 6th Ed , Tata McGraw-Hill Edition,Indian reprint.
3.	I.Niven And H.Zuckermar , An Introduction to the theory of Numbers, Wiley-Eastern Publication.
4.	Neville Robinns, Beginning Number Theory , 2nd Ed.,Narosa Publishing House Pvt.Ltd. Delhi,2007

On-line resources to be used if available as reference material

On-line Resources





(Bachelor of Science) (Mathematics)
 (B.Sc.) (Mathematics) Semester (IV)

Course Code	US04SMTH52	Title of the Course	GRAPH THEORY – 2
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To teach students Elementary Graph Theory. 2. To teach students certain advanced operations on graphs. 3. To teach students fundamental properties of various types of graphs.
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PREREQUISITE : Prerequisite to opt for this course is that the student must have opted the course US03SMTH52 (GRAPH THEORY-1) in Sem – 3

Course Content		
Unit	Description	Weightage* (%)
1.	Planer graphs, Kuratowski's Two graphs, Different representations of a planar graphs, Detection of Planarity geometric and combinatorial dual.	25%
2.	Matrix representation of graphs, Incidence matrix, Sub matrices, Circuit matrix, Fundamental circuit matrix.	25%
3.	Cut set matrix , Path matrix , Adjancency matrix , Relation amongs A_f ; B_f ; and C_f	25%
4.	Directed graph, Some types of digraphs, Digraphs and Binary relations.	25%

Teaching-Learning Methodology	Classroom teaching, Presentation by students, Use of ICT whenever required.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	---
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100%





	(50 Marks)
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Course Outcomes: Having completed this course, the learner will be able to

1.	understand elementary concepts of Graph Theory.
2.	identify types of graphs and use various operations on graphs to solve problems.
3.	take up an advanced course in Graph Theory

Suggested References:

Sr. No.	References
1.	Narsingh Deo, Graph theory with application to engineering and Computer science, Fourth printing, prentice Hall of India, 1987. chapter 5 (except 5.1,5.8,5.9), chapter 7 (except 7.5,7.7), chapter 8 (only 8.1,8.4,8.6), chapter 9 (only 9.1 to 9.6)
2.	J.Clark and A.D.Holton, A first look at Graph Theory, First Indian Reprint. Allied Publishers,1995
3.	D.B.West, Introduction to graph theory, Prentice Hall of India, New Delhi, 1999.

On-line resources to be used if available as reference material

On-line Resources





(Bachelor of Science) (Mathematics)
(B.Sc.) (Mathematics) Semester (IV)

Course Code	US04SMTH53	Title of the Course	MECHANICS - 2
Total Credits of the Course	2	Hours per Week	2

PREREQUISITE : Prerequisite to opt for this course is that the student must have opted the course US03SMTH53 (MECHANICS - 1) in Sem - 3

Course Objectives:	<ol style="list-style-type: none">1. To introduce students to intermediate concepts of mechanics.2. To teach students some intermediate laws and results of motion of particles.3. To teach students how to study how to apply laws and results of mechanics in specific situations in science and real life.
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Course Content		
Unit	Description	Weightage* (%)
1.	Methods of plane dynamics, Motion of a particle, Motion of a system of particles.	25%
2.	Applications in plane dynamics projectile with and without resistance, Motion under central force, Planetary orbits.	25%
3.	Kinetic energy of rigid body, Angular momentum of rigid body, Moment of inertia of a rigid body.	25%
4.	Rotational motion about a fixed line, Impulsive motion, General theory of plane, Collision.	25%

Teaching-Learning Methodology	Classroom teaching, Presentation by students, Use of ICT whenever required.
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	---
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100%





		(50 Marks)
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Course Outcomes: Having completed this course, the learner will be able to

1.	understand intermediate concepts of Mechanics.
2.	analyse and apply results of mechanics in specific situations.
3.	take up an advanced course in Mechanics.

Suggested References:

Sr. No.	References
1.	J.L.Synge and B.A.Griffith , Principles of Mechanics. Chapter 5 (5.1,5.2),Chapter 6(6.1,6.2,6.4, 6.5), Chapter 7(7.1,7.2),Chapter 8(8.1,8.2)
2.	P.N.Chaterjee, Statics and Dynamics

On-line resources to be used if available as reference material

On-line Resources



SARDAR PATEL UNIVERSITY

B. Sc. Computer Science

IV Semester

US04SICT51 Information and Communication Technology - II

Effective from June-2022-23

Credits: 2

Lectures per week : 2

Course Objectives:	To study the
	1. Internet and communication technology
	2. Basics of HTML
	3. Concepts of E-commerce
	4. Concepts of IT & ICT

Unit	Description	Weightage* (%)
Unit 1	Introduction to Internet and Communication technology <ul style="list-style-type: none">- Introduction to Internet and web browser- Search Engine, uploading and downloading files- Email: writing and sending to single and multiple users- Concept of CC and BCC, attachment to email- Fax and Mobile communication	25
Unit 2	Introduction to HTML <ul style="list-style-type: none">- Basics of HTML, HTML tags, Structure of HTML document- Text and paragraph formatting, Hyperlink- Ordered and Unordered lists- HTML table- Image tag	25
Unit 3	Introduction to E-Commerce <ul style="list-style-type: none">- Definition, communication perspective, business process perspective, service perspective- Classification by nature of transaction: B2B, B2C, C2C, C2B, Non business EC, Intra-business EC- Benefits to organization, consumers and society- Limitations and future of EC	25
Unit 4	Effects of Using IT <ul style="list-style-type: none">- Computer virus and Anti-virus- Effect of ICT: Increasing and Decreasing Employment- Capabilities and Limitations of IT- Issues related to Information found on net: unreliability, undesirability, security of data transfer- Potential health problems: Repetitive Strain Injury (RSI), Neck and Back problems, Eye problems- Simple strategies for preventing health problems.	25

REFERENCE BOOKS:

- Ivan Bay ross, "Web Enabled Commercial Applications Development using HTML, DHTML, Java script, Perl CGI", BPB, 2004
- Introduction to Internet and HTML scripting 2nd edition, Bhaumik Shroff.
- Douglas E Comer: The Internet, PHI, Second Edition, May 2000
- E-Commerce – Business, Technology, Society Kenneth C Laudon, Carol Guercio Traver (Pearson Education)

SARDAR PATEL UNIVERSITY
B.Sc. (Semester-4) Skills Enhancement
US04SSPN51 : Soil & Plant Nutrition

- Unit -I** importance and Soil Characteristic
- Importance, origin, classification and characteristics of soil
- Unit -II** Soil testing and amendments
- Soil sampling, analysis and fertility, Fertilizers, chemical- organic, conservation
- Unit -III** Plant nutrition
- Essential elements, deficiency symptoms, soil-root-microbe interaction, biological nitrogen fixation
- Unit -IV** Modern approaches
- Soil-less cultures, nutrient solution, mycorrhiza, plant assimilation, tillage and sustainable agriculture

Suggested Reading :

1. E J Plaster Soil Science, Cengage publication New Delhi (2009)
 2. L Taiz and Zeiger E, Plant Phycology, Sinaure Association, Malrsachusetts (1998)
 3. Noggle G. R. and Fritz G. J. introductory Plant Physiology, Prentice-Hall of India, New Delhi (1992)
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SARDAR PATEL UNIVERSITY (Bachelor of Science) (Undergraduate)

B. Sc. (UG) Semester -IV

Course Code	US06HFP51	Title of the Course	FOOD, NUTRITION & DIETETICS
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	<p>To make students familiar with:</p> <ol style="list-style-type: none"> 1. General Concept of Nutrition 2. Application of Food and Nutrition in the improvement of health of Individual as well as Society 3. Basic concepts related to Principals of Nutrition and Dietetics
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Course Content		
Unit	Description	Weightage* (%)
1.	<p>Outline of Food & Nutrition Different Types of nutrients & importance of it. Classification & Function of food Outline of digestion & used of food in body.</p>	25%
2.	<p>Energy yielding, Body building, protective & Regulatory food. Balanced diet Description of proximate principles of food.</p>	25%
3.	<p>Assessment of Nutritional status Importance of vitamins & minerals in nutrition</p>	25%
4.	<p>Definition: Dietetics Diet in obesity & underweight Diet in tuberculosis Diet in malnutrition Diet in Diabetes Diet in anemia Protein Calary Malnutrition Diet in bone diseases Diet in liver diseases Diet in Cancer</p>	25%

Teaching-Learning Methodology	Conventional method (classroom blackboard teaching), ICT. Courses for B. Sc. Chemistry programme are delivered through classroom, laboratory work in a challenging, engaging, and inclusive manner that accommodates a variety of learning styles and tools (PowerPoint presentations, audio visual resources, e-resources, seminars, workshops, models)
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Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	--
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	---
3.	University Examination	100 %

Course Outcomes: Having completed this course, the learner will be able to	
1.	From the study of this paper, student will learnt about basic concept of Nutrition, Community Diseases and Environmental issues. This study will helpful to students in their awareness about nutrition and awareness about definciency diseases
2.	Apply this knowledge in further studies of semester 5 B.Sc. course.
Suggested References:	
Sr. No.	References
1.	Applied Nutrition by R Rajlakshmi [Oxford & IBH pub.co 1981]
2.	Dietetics 5th edition by B shreelaxmi Food & nutrition by R Rajlakshmi
3.	Food & nutrition by R Rajlakshmi

4.	Nutritional value & Indian food by G C Ramasastri & B Balasubramanyan S.
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On-line resources to be used if available as reference material

On-line Resources: Google books, INFLIBNET, Google Web
