

Wilson College

Bachelor of Accounting and Finance (BAF) - Departments

Program Educational Objectives (PEO):

BAF

PEO 1: The program enables learners to understand the basic concepts of Financial Management in decision making related to business.

PEO 2: The course helps aspirants to acquire knowledge in the field of Financial Accounting, Cost accounting, Taxation, Auditing, Risk management, Business economics, Business law and Business communications.

PEO 3: Learners will be able to demonstrate general tax consciousness, including an understanding of the role of taxation in society and the development of skills related to the recognition of the tax problems.

PEO 4: Learners will be able to use the results of analytical procedures to identify accounting procedures and problems.

PEO 5: Learners will be able to apply critical-thinking, ethical decision-making, and analytical problem-solving skills in an accounting environment.

BAF Programme Learning Outcome (PLO)

Learners will be able to

PLO 1: understand the elementary and undertake financial, managerial and operational decisions of business along with the use of available tools for adlibbing.

PLO 2: develop comprehensive knowledge in the field of Financial Accounting, Cost accounting, risk management and financial management for its application to on-going events / transactions.

PLO 3: demonstrate and consider the various allied laws applicable in respect of taxation, business ethics and surrounding economic political milieu.

PLO 4: enhance communication and computer skills along with use the information technology to handle various matters

PLO 5: instigate mathematically problem solving and critical-thinking to arrive at suitable decisions.

PLO 6: encourage to pursue higher studies like Chartered Accountancy, Cost Accountancy, MBA in Finance, Company Secretary, M.Com in Accountancy, etc.

Course Learning Outcome (CLO)

No.	Subjects	Course Outcome
Semester 1		
1	Financial Accounting - Paper I	CLO 1: understand concepts, benefits, procedures for issue of Accounting Standards issued by ICAI and compute the value of Inventory as prescribed under AS 12 under different methodologies CLO 2: analyse and determine nature of revenue and capital expenses, revenue and capital receipts, adjustments and closing

		<p>entries to ultimately prepare final accounts of proprietary manufacturing concerns</p> <p>CLO 3: Prepare Departmental Trading and Profit and Loss Account and Balance Sheet</p> <p>CLO 4: know and prepare the journal entries, ledger accounts and disclosures in the financials of the hirer and vendor in correspondence to hire purchase transaction</p>
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BAF - 1.1 – Financial Accounting - Paper I

CLO	PLO					
	1	2	3	4	5	6
1	H	M	M	M	M	M
2	H	M	M	M	M	M
3	H	M	M	M	M	M
4	H	M	M	M	M	M

Semester 1

2	Cost Accounting Paper I	<p>CLO 1: gain knowledge on factory effected cost and solve practical problems related to them.</p> <p>CLO 2: familiarise with the concepts and practicability of material costing, labour costing and overheads</p>
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BAF 1.2 - Cost Accounting - Paper I

CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	M	M
2	H	H	M	M	M	M

Semester 1		
3	Financial Management Paper I	<p>CLO 1: understand types of financing, leverage, cost of capital, concepts in valuation etc.</p> <p>CLO 2: be informed about the raising of finance from various sources.</p> <p>CLO 3: to apply the knowledge and compute the leverages, cost of capital and value of business</p>

BAF 1.3 - Financial Management - Paper I						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	H	M
2	H	H	M	M	H	M
3	H	H	M	M	H	M

Semester 1		
4	Business Communication Paper I	<p>CLO 1: understanding the important, characteristics and various types of communication and its barriers to overcome it</p> <p>CLO 2: enhance communication skills like writing, listening, reading & speaking considering the industrial / corporate requirements</p> <p>CLO 3: develop interpersonal skills that contribute to effective and satisfying personal, social and professional relationships</p>

BAF 1.4 - Business Communication - Paper I						
CLO	PLO					
	1	2	3	4	5	6

1	M	L	L	H	M	L
2	M	L	L	H	M	H
3	M	L	L	H	M	H

Semester 1		
5	Foundation Course - Commercial Environment Paper I	<p>CLO 1: aware about the diversified Indian Society, inculcate knowledge of the Constitution of India, understanding political process in India</p> <p>CLO 2: learn the fundamental duties and rights provided by the Constitution</p>

BAF 1.5 - Foundation Course - Commercial Environment Paper I						
CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	L
2	M	L	H	L	L	L

Semester 1		
6	Commerce (Business Environment) - I	<p>CLO 1: aware of business, its environment, responsibility of businessmen towards society</p> <p>CLO 2: understand the contemporary issues and international environment.</p>

BAF 1.6 - Commerce (Business Environment) - I						
CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	L

2	M	L	H	L	L	L
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Semester 1		
7	Business Economics – I	<p>CLO 1: get a glimpse of the various branches that economics offers.</p> <p>CLO 2: acquire an analytical mind set in terms of understanding the rationale of consumer buying behaviour.</p> <p>CLO 3: mathematically analyse the costs and revenue details of firms.</p> <p>CLO 4: rationalise the different market structures that prevail world over.</p> <p>CLO 5: relate to the pricing strategies of organisations.</p>

BAF 1.7 - Business Economics – I						
CLO	PLO					
	1	2	3	4	5	6
1	H	L	L	L	L	L
2	H	L	L	L	L	L
3	H	L	L	L	H	L
4	H	L	M	L	L	L
5	H	L	M	L	L	L

Semester 2		
1	Financial Accounting - Paper II	<p>CLO 1: convert the incomplete accounting records into complete final accounts of a Proprietary Trading Concern using conversion method</p> <p>CLO 2: note the consignment transaction and prepare the consignment accounts that performs valuation of stock, invoicing of goods at higher price and determination of profit/ loss on</p>

		<p>consignment</p> <p>CLO 3: do the accounting for dependent branch under two methods – (a) debtors (b) Stock and Debtors Method for determining the profit / loss thereon</p> <p>CLO 4: aware about the new concept of loss of Stock by Fire and ascertain the amount of Claim as per the Insurance Policy</p>
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BAF 2.1 – Financial Accounting - Paper II

CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	L	L	M
2	H	H	M	L	L	M
3	H	H	M	L	L	M
4	H	H	M	L	L	M

Semester 2

2	Auditing - Paper I	<p>CLO 1: understand about the ground rules of Auditing, audit plan, audit programme, audit working papers and audit note book</p> <p>CLO 2: demonstrate and use the audit techniques to find errors and frauds while performing the audit and also perform internal checks and control in business</p> <p>CLO 3: understand the need and benefits of internal auditing</p>
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BAF 2.2 – Auditing Paper – I

CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	H	M	M
2	H	H	M	H	M	M

3	H	H	M	H	M	M
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Semester 2		
3	Foundation Course	<p>CLO 1: understand the globalization and its impact on diversified Indian Society.</p> <p>CLO 2: understand the concept of Human Rights, its evolution and role in current times.</p> <p>CLO 3: understand the rights given to Indian Citizens by The Indian Constitution</p> <p>CLO 4: understand the concept of Ecology, environmental degradation and its effect.</p> <p>CLO 5: understand Stress and Conflict and its impact on the work life balance of human beings.</p> <p>CLO 6: aware of importance and various ways of Managing Stress and Conflict in Contemporary Society.</p>

BAF 2.3 - Foundation Course						
CLO	PLO					
	1	2	3	4	5	6
1	L	L	H	L	L	L
2	L	L	H	L	L	L
3	L	L	H	L	L	L
4	L	L	H	L	L	L
5	L	L	H	L	L	M
6	L	L	H	L	L	M

Semester 2		
4	Innovative Financial Services	<p>CLO 1: understand Basic concepts, functions, process, techniques of financial services.</p> <p>CLO 2: familiarize the students with the nature and scope of various types of financial services</p> <p>CLO 3: know the emerging financial services in the light of globalization.</p> <p>CLO 4: familiarize with fundamental aspects of various issues associated with various financial services.</p> <p>CLO 5: examine Financial Services management as an important and contemporary area of financial management.</p>

BAF 2.4 - Innovative Financial Services						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	L	L	M
2	H	H	M	L	L	M
3	H	H	M	L	L	M
4	H	H	M	L	L	M
5	H	H	M	L	L	M

Semester 2		
5	Business Law Paper I	<p>CLO 1: get acquainted with the legal framework and legal environment of business in India.</p> <p>CLO 2: identify the fundamental legal principles behind contractual agreements</p> <p>CLO 3: apply basic legal knowledge to business transactions</p> <p>CLO 4: communicate effectively using standard business and legal</p>

	terminology CLO 5: know the relevance of business law to individuals and businesses and the role of law in a political and social context Law of Contract 1872, Sale of Goods Act 1930, Negotiable Instrument Act 1881, Consumer Protection Act 1986.
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BAF 2.5 - Business Law - Paper I

CLO	PLO					
	1	2	3	4	5	6
1	H	L	H	L	L	L
2	H	L	H	L	L	L
3	H	L	H	L	L	L
4	H	L	H	H	L	L
5	H	L	H	L	L	L

Semester 2

6	Business Mathematics	CLO 1: appreciate Business Mathematics concept that are encountered in the real world, understand & be able to communicate the underlying business concepts CLO 2: work with simple and compound interest, annuities, trade discount, cash discount in various situations and understand the correct mathematical terminology of business calculate ratios, proportion and percentage, profit & loss, interest and annuity for shares and mutual fund.
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BAF 2.6 - Business Mathematics

CLO	PLO
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	1	2	3	4	5	6
1	L	M	L	L	H	L
2	H	M	L	L	H	L

Semester 2		
7	Business Communication Paper II	<p>CLO 1: understand the principles of effective presentation tools such as tables, power point presentation, etc</p> <p>CLO 2: get a better understanding in writing aspects of various formal business documents such as reports, notices, agenda, resolutions and letters of trade, inquiry, complaints, sales, RTI letter, grievance letter, etc</p> <p>CLO 3: get exposure to Group discussions and various types of mock interviews.</p> <p>CLO 4: able to analyze and understand summarisation of content and data.</p>

BAF 2.7 - Business Communication - Paper II						
CLO	PLO					
	1	2	3	4	5	6
1	H	L	L	H	L	H
2	L	L	L	H	L	H
3	L	L	L	H	L	H
4	H	L	L	H	L	H

Semester 3		
1	Financial Accounting	CLO 1: understand and demonstrate the effect of admission , retirement or death of a partner in a partnership final accounts

(Special Accounting Areas) – III	<p>CLO 2: understand the concept of Piecemeal Distribution of Cash</p> <p>CLO 3: know about the introduction, accounting entries and adjustments in case of Amalgamation of firms and Conversion of partnership firm into a company</p> <p>CLO 4: get knowledge about accounting of transactions of foreign trade and exchange fluctuations</p>
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BAF 3.1 – Financial Accounting (Special Accounting Areas) – III

CLO	PLO					
	1	2	3	4	5	6
1	L	H	L	L	L	H
2	L	H	L	L	L	H
3	L	H	L	L	L	H
4	L	H	L	L	L	H

Semester 3

2	Cost Accounting (Methods of Costing) – II	<p>CLO 1: solve cost sheet problems and acquired skill of application of cost sheet in order to determine the prices</p> <p>CLO 2: find reasons of distinction between financial accounting and cost accounting and to solve practical problems</p> <p>CLO 3: apply calculation of pricing of large size contract by contract costing and to solve practical problems.</p> <p>CLO 4: apply technique of determination of price at the time of running manufacturing process by process costing in practical manner.</p>
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BAF 3.2 – Cost Accounting (Methods of Costing) – II

CLO	PLO
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	1	2	3	4	5	6
1	M	M	M	L	M	H
2	M	M	M	L	M	H
3	M	M	M	L	M	H
4	M	M	M	L	M	H

Semester 3

3	Direct Taxation - I	<p>CLO 1: acquaint with the basic knowledge of direct tax law – Income tax Act, 1961 i.e definition, basis of charge and exclusion from income</p> <p>CLO 2: gain insight about the different heads of income and deduction available under Chapter VI-A of the Income-tax Act, 1961</p> <p>CLO 3: calculate the total taxable income in the hands of Individual and HUF applying the above provisions</p>
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BAF 3.3 – Direct Taxation – I

CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	M	M
2	M	L	H	L	M	M
3	M	L	H	L	M	M

Semester 3

4	Information Technology in Accountancy – I	<p>CLO 1: basic concepts and understanding of various terminology in Information Technology</p> <p>CLO 2: understand and usage of various Hardware (Infrastructure) and software (Licence /Open source) to enhance the productivity</p>
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	<p>CLO 3: practically use the office automation software of Microsoft Office</p> <p>CLO 4: aware about Internet technology and digitally presence such as Downloading information, creating e-mail ID and sending, receiving emails.</p> <p>CLO 5: learn legal issues of internet, importance of electronic data interchange and concept of e-commerce in business</p>
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BAF 3.4 - Information Technology in Accountancy – I

CLO	PLO					
	1	2	3	4	5	6
1	L	L	L	H	L	H
2	L	L	L	H	L	H
3	L	L	L	H	L	H
4	L	L	L	H	L	H
5	H	L	L	H	L	H

Semester 3

5	Foundation Course in Commerce (Financial Market Operations) – III	<p>CLO 1: get proper guidance about investment, inflation and difference about banking and non-banking financial services.</p> <p>CLO 2: obtain knowledge regarding Sensex, IPO shares, methods of raising finance by company through various financial instruments.</p> <p>CLO 3: understand classification and characteristics of various types of financial instruments.</p> <p>CLO 4: get helpful knowledge about consumer finance, plastic money, features of financial services and underwriter.</p>
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BAF 3.5 - Foundation Course in Commerce (Financial Market Operations) – III

CLO	PLO					
	1	2	3	4	5	6
1	M	L	M	L	H	M
2	M	L	M	L	H	M
3	M	L	M	L	H	M
4	M	L	M	L	H	M

Semester 3

6	Business Law (Business Regulatory Framework) – II	<p>CLO 1: get knowledge of the characteristics of partnership firm such as types of firms, rights and liabilities of partners, registration and consequences of non-registration of firm, Incorporation and dissolution of firm, etc with regards to the Indian Partnership Act 1932</p> <p>CLO 2: understand the characteristics of Limited Liability of Partnership ('LLP')entity, merits of LLP, process of winding up of LLP, etc.</p> <p>CLO 3: obtain information about the definition and key provisions of Health safety and welfare measures for workers and its inspection under the factories Act, 1948</p>
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BAF 3.6 - Business Law (Business Regulatory Framework) – II

CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	M
2	M	L	H	L	L	M
3	M	M	H	L	L	L

Semester 3		
7	Business Economics – II	<p>CLO 1: understand the concept of Macroeconomics and various circular flows of income.</p> <p>CLO 2: analyse the monetary policies of the Government.</p> <p>CLO 3: acquire an overview of both the Classical and Keynesian versions of economics.</p> <p>CLO 4: gain insights into public finance and understand the features of the Government budget.</p> <p>CLO 5: understand fiscal management and financial administration i.e. concept of money, prices and inflation.</p> <p>Realise the importance of international trade and its role towards economic development of the country.</p>

BAF 3.7 - Business Economics – II						
CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	L
2	M	L	H	L	L	L
3	M	L	H	L	L	L
4	M	L	H	L	L	L
5	M	L	H	L	L	L

Semester 4		
1	Research Methodology In Accounting And Finance	<p>CLO 1: familiarize with basis of research, research design, research techniques and the research process</p> <p>CLO 2: understand the meaning and need of good research design and the hypothesis</p> <p>CLO 3: identify and discuss the concepts and procedures of</p>

	<p>primary data collection and secondary data collection, factors affecting the method for data collection, sampling, presentation, processing and statistically analysing with various tools and techniques</p> <p>CLO 4: conduct research report writing based on the techniques of interpretation</p>
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BAF 4.1 – Research Methodology In Accounting And Finance

CLO	PLO					
	1	2	3	4	5	6
1	M	L	L	L	L	L
2	M	L	L	L	L	L
3	M	L	L	L	M	L
4	H	L	L	L	L	L

Semester 4		
2	Financial Accounting - IV	<p>CLO 1: prepare and analyse the final account for a Company in accordance with the Companies Act, 2013 along with the notes to accounts.</p> <p>CLO 2: understand the provisions of Redemption of Preference Shares and debentures under the Companies Act, 2013 that enables to interpret and analyze business decisions</p> <p>CLO 3: understand and apply the Accounting policies for Foreign currency Transactions of Foreign Branches</p> <p>CLO 4: understand the relevance and practical application of Profit Prior to Incorporation</p>

BAF 4.2 - Financial Accounting – IV						
CLO	PLO					
	1	2	3	4	5	6
1	M	H	L	L	L	L
2	H	H	L	L	L	L
3	H	H	L	L	L	L
4	H	H	L	L	L	L

Semester 4		
3	Management Accounting	<p>CLO 1: introduce to features, scope, functions, framework and role of management accounting and financial accounting</p> <p>CLO 2: analysis and interpret vertical form of Balance Sheet and Profit and Loss Account, trend analysis, comparative statement and common size statement along with practical problems.</p> <p>CLO 3: analyse and interpret the financial statement by performing ratio analysis</p> <p>CLO 4: prepare Cash Flow Statement with reference to AS 3 as per the indirect method</p> <p>CLO 5: investigate and conclude on planning, projection and solving practical problems on working capital</p>

BAF 4.3 - Management Accounting						
CLO	PLO					
	1	2	3	4	5	6
1	M	H	L	L	L	L
2	H	H	L	L	L	L
3	H	H	L	L	L	L
4	H	H	L	L	L	L

5	H	L	L	M	H	M
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Semester 4		
4	Information Technology In Accountancy - II	<p>CLO 1: understand business processes and tools used to implement / re-engineer</p> <p>CLO 2: understand the need, importance and softwares used for computerized accounting</p> <p>CLO 3: know overall concept of Management Information system reports in computer environment</p> <p>CLO 4: aware of the need and importance of Information Technology in auditing</p>

BAF 4.4 - Information Technology In Accountancy - II						
CLO	PLO					
	1	2	3	4	5	6
1	L	L	L	L	L	L
2	L	L	L	H	L	L
3	M	L	L	H	L	L
4	L	L	M	H	L	L

Semester 4		
5	Business Law – III	<p>CLO 1: understand the legal framework with regards to the incorporation of companies, public offer, private placement, share capital and debentures</p> <p>CLO 2: demonstrate and understand the Legal Environment of the Company</p>

		<p>CLO 3: identify the fundamental legal principles behind contractual agreements</p> <p>CLO 4: apply basic legal knowledge to incorporation of Company and fundamental documents</p> <p>CLO 5: communicate effectively using standard business and legal terminology</p>
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BAF 4.5 - Business Law – III						
CLO	PLO					
	1	2	3	4	5	6
1	L	M	H	L	L	L
2	L	M	H	L	L	L
3	M	M	H	L	L	L
4	M	M	H	L	L	L
5	L	M	H	L	L	L

Semester 4		
6	Foundation Course in Management (Introduction to Management) - IV	<p>CLO 1: identify the traits and styles of leadership.</p> <p>CLO 2: compare formal organization with informal organization.</p> <p>CLO 3: categorize Recruitment and Selection processes.</p> <p>CLO 4: discuss the Employment tests and types of Interview.</p> <p>develop the practice the process of management's four functions: planning, organizing, leading, and controlling.</p>

BAF 4.6 - Foundation Course in Management (Introduction to Management) - IV						
CLO	PLO					
	1	2	3	4	5	6

1	H	L	L	L	L	L
2	H	L	L	L	L	L
3	H	L	L	L	L	L
4	H	L	L	L	L	L

Semester 4		
7	Taxation – III	<p>CLO 1: interpret using the clubbing and set-off provisions to determine the taxability of an income.</p> <p>CLO 2: obtain knowledge that helps determining the tax liability in the hands of an Individual and Firm</p> <p>CLO 3: determine the amount of advance tax liability and interest payable thereon</p> <p>CLO 4: aware and apply the due dates and procedures for filing the varied return of income and to payments eligible for tax deduction at source</p> <p>CLO 5: understand fundamentals of Double taxation avoidance agreements and compute amount of credit available in case of income being double taxed</p>

BAF 4.7 - Taxation - III						
CLO	PLO					
	1	2	3	4	5	6
1	L	M	H	M	M	L
2	L	M	H	M	M	L
3	L	M	H	M	M	L
4	L	M	H	M	M	L
5	L	M	H	M	M	L

Semester 5

1	Cost Accounting – III	<p>CLO 1: understand the concepts of costing and accounting procedures and compare with inter-firm for further evaluation</p> <p>CLO 2: familiarize with meaning, features, advantages and disadvantages of integrated system and non-integrated system of cost accounting; also learn journal entries and solve the practical problems on accounting</p> <p>CLO 3: get the concept of operating costing and solve practical problems applicable to various bodies i.e. hospitals, hotels, goods and passengers transport service</p> <p>CLO 4: value the work in progress and production as per FIFO method and weighted average method and do computation of problems in inter process transfer at Profit</p> <p>CLO 5: acquaint about ABC based costing system such as characteristics, advantages and limitation; distinguish between traditional and ABC approach costing</p>
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BAF 5.1 – Cost Accounting – III

CLO	PLO					
	1	2	3	4	5	6
1	M	H	L	L	M	L
2	M	H	L	L	M	L
3	M	H	L	L	M	L
4	M	H	L	M	M	L
5	M	H	L	L	M	L

Semester 5

2	Financial	CLO 1: understand the need and importance of strategic financial
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Management -II	<p>management in a business environment</p> <p>CLO 2: introduce with overall concepts of capital budgeting & capital Rationing and subsequently apply its different techniques / models for further interpretation</p> <p>CLO 3: introduce with the background, assumptions, definitions and taxation of capital structure theories, understand its types and dividend decision models.</p> <p>CLO 4: understand the overall structure of Mutual Fund industry and accounting principles applicable to Mutual Fund entities in consort with the applicable SEBI Regulations; know the concept of bond valuation and determine the value of the bond returns</p> <p>CLO 5: introduce with the background and characteristics of credit management</p> <p>Design credit policies and interpret credit evaluation for receivables management</p> <p>Understand the strategy at different hierarchy levels, Financial Planning, and strategic management.</p>
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BAF 5.2 - Financial Management -II						
CLO	PLO					
	1	2	3	4	5	6
1	L	H	L	L	L	L
2	L	M	L	L	L	L
3	L	M	M	L	L	L
4	L	M	H	L	L	L
5	L	M	L	L	L	L

Semester 5

3	Taxation – IV (Indirect Taxes – II)	<p>CLO 1: understand the basis of indirect taxes such as scope, features, advantages, disadvantages, definitions, authorities and sources of Goods and Service Tax (GST)</p> <p>CLO 2: understand the computation methodology under GST provisions</p> <p>CLO 3: get knowledge of documentation under the GST provisions</p> <p>CLO 4: apply step by step procedure and compute the amount of credits under the GST provisions</p> <p>CLO 5: acquaint with the requirements and condition of registration under the laws of GST</p>
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BAF 5.3 - Taxation – IV (Indirect Taxes – II)

CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	L
2	M	L	H	L	L	L
3	M	L	H	L	L	L
4	M	L	H	L	L	L
5	M	L	H	L	L	L

Semester 5

4	International Finance	<p>CLO 1: understand about the characteristics of hedging through derivative contracts – futures and options and functional strategies in the foreign exchange market</p> <p>CLO 2: comprehend with the characteristics and features of international market with the understanding of exchange rate theories and risk management.</p>
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BAF 5.4 - International Finance						
CLO	PLO					
	1	2	3	4	5	6
1	M	M	H	L	L	L
2	M	M	H	L	L	L

Semester 5

5	Financial accounting - V	CLO 1: understand the laws and accounting guidelines applicable to underw of shares & debentures, buy back of shares, amalgamation, absorption & ex reconstruction and liquidation of companies that can help solving the pra problems thereon
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BAF 5.5 - Financial accounting - V						
CLO	PLO					
	1	2	3	4	5	6
1	M	L	H	L	L	L

Semester 5

6	Financial accounting - VI	<p>CLO 1: learn about laws and accounting policies and procedures applicable to banking company, insurance company and non-banking financial company and subsequently prepare financial accounts in the prescribed format</p> <p>CLO 2: perform computation of the value of goodwill and shares under various methods</p> <p>CLO 3: introduce with the new concept accounting for Limited Liability partnership</p>
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BAF 5.6 - Financial accounting - VI						
CLO	PLO					
	1	2	3	4	5	6
1	M	H	L	L	L	L
2	M	H	L	L	L	L
3	M	H	L	L	L	L

Semester 6	
1	<p>Cost Accounting - IV</p> <p>CLO 1: prepare various types of budgets depending upon the types of activities.</p> <p>CLO 2: understand the concepts of absorption costing, marginal costing, and cost volume and profit analysis and later solve the practical problems thereon</p> <p>CLO 3: take managerial decision like make or buy, appropriate sales mix on the basis of analytical costing methods.</p> <p>CLO 4: familiarise with the concept and techniques of standard costing that eventually enables to find material, labour, sales and overhead variances.</p>

BAF 6.1 – Cost Accounting - IV						
CLO	PLO					
	1	2	3	4	5	6
1	H	L	L	M	H	L
2	H	M	L	M	H	L
3	H	L	L	M	H	L
4	H	L	L	M	H	L

Semester 6		
2	Financial Management – III	<p>CLO 1: show case knowledge relating to legal, accounting, & practical implication of corporate restructuring like Mergers, Acquisitions etc.</p> <p>CLO 2: understand various theories of business valuation</p> <p>CLO 3: understand short term financing mediums of companies such as Factoring, Hire Purchase, Leasing etc.</p> <p>CLO 4: apply possessed knowledge of various theories, concepts & methods in calculating the value of a business such as earnings basis, cash flow basis, etc.</p>

BAF 6.2 - Financial Management – III						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	H	L	H	L
2	H	M	M	L	L	L
3	H	M	H	L	H	L
4	H	M	L	L	H	L

Semester 6		
3	Taxation – IV	<p>CLO 1: get to know the rules and regulations on filing of TDS & TCS returns, payment of taxes, refunds & account credits, audits and assessments</p> <p>CLO 2: understand the ground rules and regulations of customs act and foreign trade policy and its implementation in the business</p>

BAF 6.3 - Taxation – IV						
CLO	PLO					
	1	2	3	4	5	6
1	M	M	H	L	L	L
2	H	M	H	H	L	L

Semester 6		
4	Security analysis and Portfolio management	<p>CLO 1: develop an understanding of the changing domestic and Indian capital market in particular with reference to availability of various financial products</p> <p>CLO 2: provide an in-depth knowledge of the theory and practice of portfolio management for further interpretation and analysis of the performance of a portfolio of investments</p> <p>CLO 3: demonstrate their knowledge in valuation of equity instruments</p> <p>CLO 4: understand how to measure and evaluate the portfolio performances</p>

BAF 6.4 - Security analysis and Portfolio management						
CLO	PLO					
	1	2	3	4	5	6
1	M	L	L	L	H	L
2	H	L	L	L	H	L
3	M	L	M	L	H	L
4	H	H	L	L	H	L

Semester 6		
5	Financial	CLO 1: prepare Final Account for Electricity Company in accordance

Accounting - VII	<p>with the new legislation i.e. The Electricity Act, 2003 including accounting for depreciation, accounting for security deposit, treatment for grant from government and applicable format for financial statements.</p> <p>CLO 2: understand the laws applicable to Co-Operative Housing Society & Consumer Co-Operative Society and prepare final accounts as per the format prescribed therein.</p> <p>CLO 3: solve the problems of accounting of Investments with application of AS 13 in respect of diverse instruments such as debentures, equity and also assess under scenarios for instance bonus shares, rights shares, etc.</p> <p>CLO 4: understand the overall structure of Mutual Fund industry and accounting principles applicable to Mutual Fund entities in consort with the applicable SEBI Regulations.</p> <p>CLO 5: obtain the knowledge of IFRS its Purpose & Objective of financial statement, its Framework, its assumption, characteristics, element, recognition & measurement; and the status and harmony of Ind AS with IFRS.</p>
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BAF 6.5 - Financial Accounting – VII						
CLO	PLO					
	1	2	3	4	5	6
1	M	H	H	L	L	L
2	M	H	H	L	L	L
3	M	H	L	L	M	L
4	M	H	H	L	L	L
5	M	H	H	L	M	L

Semester 6

6	Project Work	<p>A) Internship Based Projects:</p> <p>CO1: Develop understanding of the Industry and organisation and its impact through SWOT and PESTLE analysis.</p> <p>CO2: To understand the professional roles and responsibilities as a Management Professional.</p> <p>CO3: Develop understanding of organisational structure and work culture of organisations.</p> <p>CO4: Relate theories learnt in class to real time situations in the organisations.</p> <p>CO5: Have clarity on organisational policies and procedures relevant to a department and function.</p> <p>B) Research based projects:</p> <p>CO1: To Identify the problem and research objectives through review of literature.</p> <p>CO2: To develop hypothesis based on the objectives of the study.</p> <p>CO3: To undertake sampling of the universe through statistical tools and techniques.</p> <p>CO4: To analyse & interpret the findings of the topic under study.</p> <p>CO5: To understand the conduct and significance of Research.</p>
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BAF 6.6 - Project Work – (A) Internship Based Projects						
CLO	PLO					
	1	2	3	4	5	6
1	H	L	L	L	M	M
2	H	L	L	L	L	L
3	M	L	L	L	L	L
4	M	L	L	L	H	H
5	M	L	L	L	L	L

BAF 6.6 - Project Work – (B) Research based projects

CLO	PLO					
	1	2	3	4	5	6
1	M	L	L	L	L	L
2	M	L	L	L	L	L
3	L	L	L	L	M	L
4	M	L	L	M	M	M
5	H	L	L	M	L	M

WILSON COLLEGE

BMM-BAMC DEPARTMENT

PROGRAM EDUCATION OBJECTIVES (PEO):

PEO1: The Communication and Media Studies major prepares students for a wide variety of careers in business and industry, public relations with specialization in journalism and advertising.

PEO2: To introduce students to the history, evolution, and the development of Mass Communication in the world with special reference to India.

PEO3: To study the evolution of Mass Media as an important social institution.

PEO4: To develop a critical understanding of Mass Media and mass communication models.

PEO5: Understand rhetorical principles in a variety of creative, cinematic, organizational, professional, advertising, and journalistic venues.

PEO6: Learners would develop a global awareness of political, social, and corporate issues influenced by communication sensitivity and skills.

PEO7: Understand mass media as a system of interrelated forces, including historical foundations, technological advances, economic dynamics, regulatory constraints, and ethical concerns.

Program Learning Outcomes

Developing individuals to complete all work in a professional, ethical, and timely manner and become credible mediators.

PROGRAMME SPECIFIC OUTCOMES:

PSO1: Better understanding of the communication process in different aspects, such as communities, current events, current affairs, publications, and productions.

PSO2: Ability to write, edit, publish, and broadcast content for the designated media platforms

PSO3: Ability to do research and analysis of target audience and preferential content, respectively.

PSO4: Develop a communication strategy and campaign, by performing a market segmentation analysis.

SEMESTER IV	
COURSE NAME	COURSE OUTCOME
4.3 ORGANISATIONAL BEHAVIOUR	<p>CO1: To describe and assess the basic design elements of organizational structure and evaluate their impact on employees.</p> <p>CO2: Define, explain, and illustrate a range of organizational behaviour theories.</p> <p>CO3: Identify different motivational theories and evaluate motivational strategies used in a variety of organizational settings.</p> <p>CO4: Explain how organizational change and culture affect working relationships within organizations.</p> <p>CO5: Apply organizational behaviour concepts, models, and theories to real life management situations through case analysis</p> <p>CO6: Evaluate the appropriateness of various leadership styles and conflict management strategies used in organizations.</p> <p>CO7: Analyse individual and group behaviour, and understand the implications of organizational behaviour on the process of management</p>

4.3 ORGANISATIONAL BEHAVIOUR MAPPING TABLE							
CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	H	H	H	H	H	H	H
2	-	-	-	H	H	H	-
3	H	H	H	H	H	H	H
4	H	H	H	-	L	-	M
5	L	-	-	-	L	L	H
6	L	L	M	M	L	H	L
7	H	L	-	-	H	H	M

SEMESTER IV

COURSE NAME	COURSE OUTCOME
4.4 MASS MEDIA RESEARCH	<p>CO1: To understand the scope and techniques of media research, their utility, and limitations</p> <p>CO2: Demonstrate knowledge of research literacy and sound knowledge of basic research methods</p> <p>CO3: Demonstrate a working knowledge of the theories and frameworks through which media are analysed and understood</p> <p>CO4: Demonstrate familiarity with research into media audiences and users</p> <p>CO5: Develop an understanding of media industries and institutions, particularly the role that research plays within the knowledge economy and future career development</p> <p>CO6: Describe the relationship between mass communication, journalism & research</p> <p>CO7: Explain the process, concepts and techniques of research infer the impact of research in mass communication</p> <p>CO8: This course provides students with a general background in strategic communication research methodologies, including qualitative (e.g., interviewing, focus groups) and quantitative (surveys, experiments) methods.</p> <p>CO9: The course will introduce students to practical considerations in study design, data collection, analysis, and reporting</p>

4.4 MASS MEDIA RESEARCH MAPPING TABLE

CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	H	H	H	H	H	H	H
2	M	M	H	H	H	H	L
3	H	M	H	M	M	M	L
4	M	M	M	M	M	M	-
5	H	-	-	H	H	H	H
6	M	M	-	L	L	L	-
7	H	H	L	H	H	M	-
8	H	M	M	-	-	M	-
9	L	L	H	H	H	M	L

SEMESTER V ADVERTISING	
COURSE NAME	COURSE OUTCOME
5.1 ADVERTISING IN CONTEMPORARY SOCIETY	CO1: To understand the environment in Contemporary Society CO2: To understand Liberalization and its impact on the economy CO3: To study contemporary advertising and society CO4: Understand the advertising and promotional techniques through the analysis of market situations. CO5: Analyse environmental variables that influence international advertising. CO6: Appreciate the increasingly international nature of advertising. CO7: Describe strategies and tactics that can lead to successful international advertising given those environmental constraints CO8: To understand the current developments and problems concerning advertising as an economic and social force.

5.1 ADVERTISING IN CONTEMPORARY SOCIETY MAPPING TABLE							
CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	M	M	M	M	M	M	-
2	L	L	M	M	M	M	-
3	M	M	H	H	H	H	M
4	M	M	H	H	H	H	M
5	H	H	M	M	H	H	M
6	H	M	M	H	H	H	M
7	M	M	M	M	M	M	M
8	H	M	M	H	H	H	-

SEMESTER V Journalism

COURSE NAME	COURSE OUTCOME
5.7 EDITING	<p>CO1: As an important segment of newspaper production, editing is a vital function. The syllabus lays stress on language skill improvement.</p> <p>CO2: It aims at orienting students to gain more practical knowledge in the print media scenario.</p> <p>CO3: The syllabus encompasses the current trends of digital media as well as writing for e-editions of papers.</p> <p>CO4: The syllabus tackles editing from various beats points of view.</p> <p>CO5: Editing of editorials, columns, etc. is included to acquaint the students about responsible journalism.</p> <p>CO6: With global media and changing advertising concepts, layouts in modern times can be imparted.</p>

5.7 EDITING MAPPING TABLE

CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	H	H	L	M	M	M	M
2	H	H	L	M	M	M	M
3	M	M	L	M	M	M	M
4	M	M	L	M	M	H	L
5	L	H	M	H	M	M	M
6	-	H	H	H	H	H	M

SEMESTER V JOURNALISM	
COURSE NAME	COURSE OUTCOME
5.8 REPORTING	<p>CO1: To enable students to become Reporters, which is supposed to be a prerequisite while entering the field of Journalism.</p> <p>CO2: To make them understand the basic ethos of the news and newsgathering. To prepare them to write or present the copy in the format of news.</p> <p>CO3: To develop nose for news.</p> <p>CO4: To train them to acquire the skills of newsgathering with traditional as well as modern tools.</p> <p>CO5: To inculcate the skills for investigative journalism.</p> <p>CO6: To make them understand the basic structure/ essential knowledge for various beats.</p> <p>CO7: To make them responsible reporters and the face of media</p>

5.8 REPORTING MAPPING TABLE							
CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	H	H	M	M	M	H	H
2	M	H	M	H	H	H	M
3	H	M	H	H	H	H	M
4	M	H	M	M	M	M	H
5	M	H	M	M	M	M	H
6	H	M	M	M	M	H	H
7	M	M	M	M	M	H	M

SEMESTER VI JOURNALISM	
COURSE NAME	COURSE OUTCOME
6.9 BROADCAST JOURNALISM	CO1: To Introduce the importance of Regional Journalism CO2: To learn to write in Broadcast Style conforming to the ethical and practical principles that guides it. CO3: To learn the skills and techniques to investigate, produce and deliver news stories for various media outlets. CO4: To learn the use of camera & sound in broadcast formats. CO5: To develop reading habits that keeps them aware of current affairs, local, national, and world. CO6: To introduce Social Media; Convergence; Multimedia; Online Journalism

6.9 BROADCAST JOURNALISM MAPPING TABLE							
CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	-	-	M	-	M	M	-
2	M	M	M	M	M	-	L
3	H	H	H	L	L	M	L
4	M	H	M	M	L	L	H
5	H	H	H	L	L	H	H
6	H	H	H	H	-	H	H

SEMESTER VI JOURNALISM MAPPING TABLE	
COURSE NAME	COURSE OUTCOME
6.10 BUSINESS & MAGAZINE JOURNALISM	<p>CO1: The overall objective of this course is to provide students with the background, knowledge, and skills necessary to be business and financial journalists.</p> <p>CO2: To create awareness about the importance of business & financial news and its role in coverage, reporting and editing</p> <p>CO3: Acquire the skills to write different kinds of Business and Financial leads.</p> <p>CO4: Acquire the skill to convert Business news releases into Business & financial reports</p> <p>CO5: To improve skills in reporting and writing basic and complex business and financial stories in different beats</p> <p>CO6: Provide a basic understanding of the world of business and finance by localizing financial and economic data effectively</p>

6.10 BUSINESS & MAGAZINE JOURNALISM							
CLO'S	PLO'S						
	1	2	3	4	5	6	7
1	H	H	H	M	M	H	H
2	M	H	L	-	-	M	H
3	M	H	M	-	-	M	H
4	M	H	M	-	-	M	H
5	M	H	M	-	-	M	H
6	M	H	M	-	-	M	H

WILSON COLLEGE
BACHELOR OF MANAGEMENT STUDIES DEPARTMENT

PROGRAM EDUCATION OBJECTIVES (PEO)

After completing a three years Degree Course – Bachelor of Management Studies (BMS) program;

PO1: Learners will develop awareness and understanding of teamwork, leadership and organizational management.

PO2: Learners will enhance their knowledge, professional & communication skills needed to be future managers.

PO3: Learners will develop awareness of local, national and global management principles and practices while also taking into account ethical considerations.

PO4: Learners will enhance their employability and entrepreneurial skills.

PO5: The BMS program aims to prepare learners with the business acumen to develop management skills in the field of Marketing and Finance.

BMS DEPARTMENT PROGRAMME LEARNING OUTCOMES(PLO)

After completing 3 years BMS Graduation Programme, students will be able to;

PSO1: **Establish** themselves as professionals by solving real time problems through the use of management and scientific knowledge and with attention to teamwork, effective communication, critical thinking and problem-solving skills.

PSO2: **Able to analyze** a problem, identify, formulate and use the appropriate managerial skills for obtaining its solution.

PSO3: **Utilize** qualitative and quantitative methods to investigate and solve critical business problems.

PSO4: **Evaluate** and integrate ethical considerations while making business decisions.

PSO5: **Possess** the skills required to integrate concepts from various disciplines to identify and develop business strategies.

PSO6: **Integrate tools** and concepts from multiple functional areas (i.e. finance, marketing, operations, etc.) to solve business problems.

BMS SEMESTER I	
COURSE NAME	COURSE OUTCOME
1.1 INTRODUCTION TO FINANCIAL ACCOUNTS	<p>CO1: To Understand & interpret the preparation of basic financial data such as trading, Profit & loss account & balance sheet.</p> <p>CO2: To Have a basic knowledge of Indian accounting standard.</p> <p>CO3: To understand proper identification, recording, classification and summarization of business transactions.</p> <p>CO4: Basic understanding and calculation of depreciation and it's methods.</p> <p>CO5: To understand how to classify the expenditures and receipts.</p>

BMS 1.1 INTRODUCTION TO FINANCIAL ACCOUNTS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	M	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	M	H
5	H	H	H	M	H	H

1.2 BUSINESS LAW	<p>CO1: To Understand Business Law.</p> <p>CO2: To Analyse and understand various Acts and its applicability in real life.</p> <p>CO3: To Analyse the relevance of business law and the role of law in an economic, political and social framework.</p> <p>CO4: To Identify the fundamental legal principles behind contractual agreements.</p> <p>CO5: To manage how businesses can be held liable for the actions of their employees.</p> <p>CO6: To understand the legal and economic structure of different forms of business organizations and their responsibilities as an employer.</p>
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	CO7: Understand the power of collective bargaining of employees when it comes to their rights and duty of employer towards employees.
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BMS 1.2 BUSINESS LAW MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	H	M	H	H
3	H	H	H	H	H	H
4	H	M	M	M	H	H
5	H	H	H	H	H	H
6	H	H	H	H	H	H
7	H	M	M	H	H	H

<p>1.3 BUSINESS STATISTICS</p>	<p>CO1: To familiarize the students with fundamental statistical tools, this can help them in analysing the business data.</p> <p>CO2: To provide students with hands on experience to use statistical tools in order to make scientific decisions even in uncertain business environment.</p> <p>CO3: Students will gain confidence while taking strategic financial decisions in business due to knowledge of statistical tools.</p> <p>CO4: Students will be equipped with the knowledge related to forecasting and researching and will be capable of applying it to business situations.</p> <p>CO5: Learn practical application of various concepts of Statistics such as Variation, Mean, Median, Mode etc</p> <p>CO6: Organize, present and interpret statistical data, both numerically and graphically.</p> <p>CO7: Use various methods to compute the probabilities of events, the meaning of bivariate data and the concept of correlation between two variables.</p> <p>CO8: Be familiar with index numbers methods and their applications.</p>
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BMS 1.3 BUSINESS STATISTICS MAPPING TABLE

CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	L	H	H
2	H	H	H	L	H	H
3	H	H	H	L	H	H
4	H	H	H	L	H	H
5	H	H	H	L	H	H
6	H	H	H	L	H	H
7	M	M	H	L	H	H
8	M	M	H	L	M	H

<p>1.4 BUSINESS COMMUNICATION I</p>	<p>CO1: To understand the theory of communication, its concepts, channels and objectives</p> <p>CO2: To analyse problems or barriers in communication and importance of listening skills</p> <p>CO3: To use business correspondence like mails, letters</p> <p>CO4: To practise & master language and writing skills</p> <p>CO5: To exhibit interpersonal skills that contributes to effective and satisfying personal, social and professional relationships.</p> <p>CO6: To use the methods of oral presentation both in a formal and informal environment</p> <p>CO7: To prepare the student with the communication tools-verbal, non-verbal and written along with the practical applications inherent in each.</p>
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BMS 1.4 BUSINESS COMMUNICATION I MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	L	H	H
3	H	H	H	L	H	H
4	H	H	H	L	M	H
5	H	H	H	M	H	H
6	H	H	H	L	H	H
7	H	H	H	L	H	H

1.5 FOUNDATION OF HUMAN SKILLS	<p>CO1: To understand the basic behaviour pattern of human, which is the most important resource of a business and to deal with them in an apt manner.</p> <p>CO2: To practice, deal & negotiate with different kinds of human nature with greater awareness of the human behaviour.</p> <p>CO3: To understand and discover our skills and abilities and understand each other in the process.</p> <p>CO4: To analyse the basics of human psychology and provides insight into the reasons why we do certain things as individuals or in a group.</p>
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BMS 1.5 FOUNDATION OF HUMAN SKILLS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	H	H
2	H	H	H	M	H	H
3	M	H	H	M	H	H
4	H	H	H	M	M	M

1.6 BUSINESS ECONOMICS I	<p>CO1: Students will get a glimpse of the various branches that economics offers.</p> <p>CO2: Will acquire an analytical mind set in terms of understanding the rationale of consumer buying behaviour.</p> <p>CO3: Mathematically analyse the costs and revenue details of firms.</p> <p>CO4: Rationalise the different market structures that prevail world over.</p> <p>CO5: Relate to the pricing strategies of organisations.</p>
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BMS 1.6 BUSINESS ECONOMICS I MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	M	M	H	L	H	H
2	H	H	H	M	H	H
3	M	M	H	L	H	H
4	M	M	M	L	M	M
5	H	H	H	M	H	H

1.7 FOUNDATION COURSE I	<p>CO1: To make students capable of understanding and studying the vibrant Indian culture classify the general characteristic of Indians.</p> <p>CO2: To impart the students a thorough knowledge on social stratification of Indian population, its religions, problems faced due to multi-cultural, multi religious and multi lingual status and measures to overcome.</p> <p>CO3: To understand the general characteristics on local self-government and its implication on every Indian citizen.</p> <p>CO4: To apply diverse learning opportunities to develop analytical and soft skills.</p> <p>CO5: To study the Indian Constitution, Preamble with clarity of the terms in it. Take a review the duties and rights of Indian citizens.</p>
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BMS 1.7 FOUNDATION COURSE I MAPPING TABLE	
CLO	PLO

	1	2	3	4	5	6
1	M	H	H	M	M	M
2	M	M	M	M	M	M
3	M	H	H	M	M	H
4	H	H	H	M	H	H
5	L	M	M	L	L	M

BMS SEMESTER II	
COURSE NAME	COURSE OUTCOME
2.1 PRINCIPLES OF MARKETING	<p>CO1: To Analyse the marketing theories & concepts and understand the relevance in perspective to current business scenario in India</p> <p>CO2: To develop basic marketing skills among students in order to cater to the marketing industries.</p> <p>CO3: To Understand key terms, topics and concepts in marketing.</p> <p>CO4: To Understand and apply marketing concepts to real life situations from consumer and managerial perspectives.</p>

BMS 2.1 PRINCIPLES OF MARKETING MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	H	H
2	H	H	H	M	H	H
3	M	H	H	M	M	M
4	H	H	H	M	H	H

2.2 INDUSTRIAL LAW	<p>CO1: To Know the development and the judicial setup of Labour Laws.</p> <p>CO2: To Learn the salient features of welfare and wage Legislations.</p> <p>CO3: To Learn the laws relating to Industrial Relations, Social Security and Working conditions.</p>
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	CO4: To Understand the laws related to working conditions in different settings.
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BMS 2.2 INDUSTRIAL LAW MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	M	M	M	L	M	M
2	M	M	M	M	M	M
3	H	M	H	M	M	M
4	M	M	M	L	M	L

<p>2.3 BUSINESS MATHEMATICS</p>	<p>CO1: To Demonstrate understanding of basic mathematics concepts.</p> <p>CO2: To Demonstrate basic knowledge and skill in business mathematics and elementary statistics by accurately performing common business computations, statistical data presentation and analysis.</p> <p>CO3: To Apply graphs, equations, ratio and proportion, percentage, and measurement systems to solve typical business problems viz calculation of budget, cash discounts, taxes etc.</p> <p>CO4: Students will find themselves capable of understanding financial calculations with more ease.</p> <p>CO5: Students will be able to apply concepts related to factorial notation, probability, permutation, combination etc.</p> <p>CO6: Students will be capable of forecasting risk and taking calculated decisions.</p> <p>CO7: Apply the concept of interest and related term, computation of interest and annuity, present and future value.</p> <p>CO8: Learn applications of Derivatives and Matrices.</p>
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BMS 2.3 BUSINESS MATHEMATICS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6

1	M	H	H	L	H	H
2	H	H	H	L	H	H
3	H	H	H	L	H	H
4	M	H	H	L	H	H
5	M	H	H	L	M	M
6	H	H	H	L	H	H
7	M	H	H	L	M	H
8	M	M	H	L	M	M

<p>2.4 BUSINESS ENVIRONMENT</p>	<p>CO1: To Analyse the environment of a business from the legal I & regulatory, macroeconomic, cultural, political, technological and natural perspectives.</p> <p>CO2: To Critically assess the business environment of an organization using selected strategic tools.</p> <p>CO3: To Conduct an in-depth analysis of a specific component of the business environment and relate it to your own organization.</p> <p>CO4: To Construct and present scenarios that synthesize business environment information.</p> <p>CO5: The learner will be able to understand how different factors in the environment – micro as well as macro, affect businesses.</p> <p>CO6: The course will help the learner understand how a business needs to adapt to changes in its environment by taking right decisions in a timely way.</p>
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BMS 2.4 BUSINESS ENVIRONMENT MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	L	H	H
4	M	M	M	L	M	M
5	H	H	H	M	H	H
6	H	H	H	M	H	H

2.5 PRINCIPLES OF MANAGEMENT	<p>CO1: Study of the basic managerial functions of planning, organizing, staffing, directing and controlling resources to accomplish organizational goals.</p> <p>CO2: To distinguish the characteristics and skills of proper management by identifying what successful managers do and how they do it.</p> <p>CO3: To analyse the business decisions made by organisations using various tools and techniques to remain competitive.</p> <p>CO4: To Offer diverse learning opportunities to develop analytical and soft skills.</p> <p>CO5: Upon completion, students should be able to work as contributing members of a team utilizing these functions of management.</p> <p>CO6: To Appreciate seamless functioning of companies</p>
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BMS 2.5 PRINCIPLES OF MANAGEMENT MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	H	H	H
3	H	H	H	M	H	H
4	H	H	H	L	H	H
5	H	H	H	M	H	H

2.6 BUSINESS COMMUNICATION II	<p>CO1: To Have clear understanding of different principles of effective presentation tools.</p> <p>CO2: To Get a better understanding of various aspects of business letter writing.</p> <p>CO3: To Get exposure to Group discussions and various types of mock interviews.</p> <p>CO4: To Be able to analyse and understand summarization of content.</p> <p>CO5: Enable them in learning group dynamics.</p>
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BMS 2.6 BUSINESS COMMUNICATION II MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	M	H	H	L	M	M
3	M	M	M	L	M	M
4	H	H	H	L	M	H
5	H	H	H	M	M	M

2.7 FOUNDATION COURSE II	<p>CO1: To get aware about the Indian society, human rights & the environment</p> <p>CO2: To Understand the meaning of stress & conflict, its effects on humans & how can we manage & overcome them</p> <p>CO3: It will help students socially aware of the societal problems and their personality.</p>
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BMS 2.7 FOUNDATION COURSE II MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	H	H	M	M
3	M	M	M	H	M	M

BMS SEMESTER III	
COURSE NAME	COURSE OUTCOME

3.1 INFORMATION TECHNOLOGY IN BUSINESS MANAGEMENT I	<p>CO1: Familiarize the basic concepts and its applications in managing business.</p> <p>CO2: To Reproduce a working knowledge of concepts and terminology related to information technology in open source. Appraise the knowledge previously acquired of Microsoft Office.</p> <p>CO3: To understand basic concept of Email, Internet and website domains and security therein to learn basic concepts of information technology its support and role in management for managers comprises of practical hands-on training required for office automation.</p> <p>CO4: To Learn basic concept of information technology its support and role in management for mangers.</p>
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BMS 3.1 INFORMATION TECHNOLOGY IN BUSINESS MANAGEMENT-I MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	L	H	H
4	H	H	H	M	H	H

3.2 ACCOUNTING FOR MANAGERIAL DECISIONS	<p>CO1: To acquaint management learners with basic accounting fundamentals.</p> <p>CO2: To develop financial analysis skills among learners.</p> <p>CO3: To apply or analyse different techniques to various domains concerned with Accounting based applications and solutions.</p> <p>CO4: To Calculate ratios based on Financial Statements and income statements.</p> <p>CO5: To Classify Financial Statements to evaluate organizations performance effectively.</p>
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BMS 3.2 ACCOUNTING FOR MANAGERIAL DECISIONS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	L	H	H

3	H	H	H	L	H	H
4	H	H	H	L	M	H
5	H	H	H	L	H	H

<p>3.3 BUSINESS PLANNING & ENTREPRENEURSHIP MANAGEMENT</p>	<p>CO1: Understand areas of discipline of management & entrepreneurship</p> <p>CO2: Develop responsibility of full line of management function of a company with special reference to SME sector.</p> <p>CO3: Entrepreneurship is one of the major focus areas of the discipline of Management. This course introduces Entrepreneurship to budding managers.</p> <p>CO4: To develop entrepreneurs & to prepare students to take the responsibility of full line of management function of a company with special reference to SME sector.</p> <p>CO5: Design new trends in entrepreneurship –E Entrepreneurship.</p>
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BMS 3.3 BUSINESS PLANNING & ENTREPRENEURSHIP MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	M	M
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	M	H
5	H	H	H	M	H	H

<p>3.4 STRATEGIC MANAGEMENT</p>	<p>CO1: To Know, understand, and apply the strategic management process to analyse and improve organizational performance.</p> <p>CO2: To Understand the impact of social, economic and political forces on the design, planning and implementation of organization's policy.</p> <p>CO3: To Critically examine the management of the entire enterprise from the top management viewpoints.</p> <p>CO4: The objective of this course is to learn the management policies and strategies at every Level to develop conceptual skills in this area as well as their application in the corporate world.</p>
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	CO5: Apply tools and techniques for Strategy evaluation and control.
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BMS 3.4 STRATEGIC MANAGEMENT MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	H	H	H
3	H	H	H	L	H	H
4	H	H	H	M	H	H
5	H	H	H	M	H	H

3.5 FOUNDATION COURSE III	<p>CO1: Equips students with knowledge of Human Rights violation and redressal, dealing with Environmental issues and interpersonal communication.</p> <p>CO2: Solve the problems of SC, ST, PWD's, women by implementing various legal rights.</p> <p>CO3: Learn how to effectively deal with environmental concern.</p>
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BMS 3.5 FOUNDATION COURSE III MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	M	H
2	M	H	H	M	M	M
3	H	H	H	L	M	M

3.6 INTRODUCTION TO COST ACCOUNTING (Finance)	<p>CO1: Exposes the students to the basic concepts and the tools used in Cost Accounting.</p> <p>CO2: To enable the students to understand the principles and procedure of cost accounting and to apply them to different practical situation.</p> <p>CO3: To identify various elements of Cost Accounting viz. Material, Labour and Overheads costing.</p>
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	<p>CO4: To analyse cost projection through preparation of Cost Sheet and Cost Reconciliation.</p> <p>CO5: Understand and explain the conceptual framework of Cost Accounting.</p>
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BMS 3.6 INTRODUCTION TO COST ACCOUNTING (Finance)MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	L	M	H
2	H	H	H	M	H	H
3	M	H	H	L	H	H
4	H	H	H	L	M	M
5	H	H	H	L	H	H

3.7 EQUITY & DEBT MARKET (Finance)	<p>CO1: Understand the operations and structure of different financial institutions.</p> <p>CO2: Learn functioning of capital and money market.</p> <p>CO3: Identify various financial instruments and their applications.</p> <p>CO4: Understand the concept of equity markets and debt markets in details and its importance in the Indian Economy.</p> <p>CO5: Gain knowledge of the statistical analysis of share price movement and valuation of equities and debt.</p> <p>CO6: The students get a conceptual understanding of venture capital and private equity, strategies used in private equity exit and structure and valuation approaches.</p> <p>CO7: Develop good understanding of the various fixed income securities and their risk return parameters.</p>
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BMS 3.7 EQUITY & DEBT MARKET (Finance)MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	L	M	H
3	H	H	H	L	H	H

4	H	H	H	M	H	H
5	H	H	H	L	H	H
6	H	H	H	M	H	H
7	H	H	H	L	H	H

<p>3.8 CONSUMER BEHAVIOUR (Marketing)</p>	<p>CO1: To develop an understanding about the consumer decision making process and its application to the marketing function of a firm.</p> <p>CO2: To Have basic knowledge about the issues & dimensions of consumer behaviour. Students are expected to develop the skill of understanding & analysing consumer information and using it to create marketing-oriented strategies.</p> <p>CO3: To Identify different consumer decision making models.</p> <p>CO4: To Discuss individual determinants of consumer behaviour with reference to consumer needs and motivation, personality, self-concept, consumer perception, learning and attitude.</p>
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BMS 3.8 CONSUMER BEHAVIOUR (Marketing)MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	H	H

<p>3.9 SOCIAL MARKETING (Marketing)</p>	<p>CO1: To Understand the concept of social marketing, compare and contrast marketing in a profit-oriented corporate and a non-profit social environment.</p> <p>CO2: To analyse the impact of environment on social marketing & study the various behaviour models/frameworks/theories for social change.</p> <p>CO3: Learner will understand the basis of Segmentation, Targeting and Positioning and identify marketing mix of social marketing.</p>
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BMS 3.9 SOCIAL MARKETING (Marketing)MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6

1	H	H	H	M	H	H
2	H	H	H	H	H	H
3	H	H	H	M	H	H

BMS SEMESTER IV	
COURSE	COURSE OUTCOME
4.1 INFORMATION TECHNOLOGY IN BUSINESS MANAGEMENT-II	<p>CO1: To Interpret how to use information technology to solve business problems.</p> <p>CO2: To Describe the role of information technology and information systems in business.</p> <p>CO3: To Draw comparisons between various security threats to a computer.</p> <p>CO4: The students learn the necessary skills to enable them to design and implement business information systems.</p>

BMS 4.1 INFORMATION TECHNOLOGY IN BUSINESS MANAGEMENT-II MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	L	H	H
2	H	H	H	L	H	H
3	H	H	H	M	M	H
4	H	H	H	L	M	H

4.2 BUSINESS RESEARCH METHODS	<p>CO1: To apply a range of quantitative and / or qualitative research techniques to business and management problems / issues.</p> <p>CO2: To Understand and apply research approaches, techniques and strategies in the appropriate manner for managerial decision making.</p> <p>CO3: To empower and develop research methods and strategies in Research projects for enhanced Career Options.</p>
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	<p>CO4: To offer diverse learning opportunities to develop analytical and soft skill.</p> <p>CO5: To inculcate the analytical abilities and research skills among the students and give hands on experience and learning in Business Research.</p>
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BMS 4.2 BUSINESS RESEARCH METHODS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	L	H	H
4	H	H	H	L	H	H
5	H	H	H	M	H	H

4.3 PRODUCTION & TOTAL QUALITY MANAGEMENT	<p>CO1: To Gain basic knowledge in total quality management relevant to both manufacturing and service industry including IT sector.</p> <p>CO2: To Implement the basic principles of TQM in manufacturing and service-based organization.</p> <p>CO3: To Demonstrate the tools and techniques of quality management to manufacturing and services processes</p> <p>CO4: The students will understand the production systems -its functions and maintenance of quality at different production stages.</p> <p>CO5: The students will understand the designing aspect of production systems.</p>
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BMS 4.3 PRODUCTION & TOTAL QUALITY MANAGEMENT MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	H	H
5	H	H	H	L	H	H

4.4 BUSINESS ECONOMICS II	<p>CO1: Acquire an overview of both the Classical and Keynesian versions of economics.</p> <p>CO2: Gain insights into public finance and understand the features of the Government budget.</p> <p>CO3: Realize the importance of international trade and the role it plays towards economic development of the country.</p> <p>CO4: Understand the various concepts relating to macroeconomics.</p> <p>CO5: Analyse the monetary policies of the Government.</p>
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BMS 4.4 BUSINESS ECONOMICS II MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	L	H	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	H	H
5	H	H	H	M	H	H

4.5 FOUNDATION COURSE IV	<p>CO1: To Describe various Consumer rights provisions in order to protect consumer violations.</p> <p>CO2: To Develop Communications skills effectively in both verbal & written forms.</p> <p>CO3: To Demonstrate various modern technologies, tools and software in their day to life.</p>
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BMS 4.5 FOUNDATION COURSE IV MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	H	H	M	H
2	H	H	H	M	H	H
3	H	H	H	L	H	H

4.6 CORPORATE RESTRUCTURING (Finance)	<p>CO1: To show case knowledge of relating to legal, accounting, & practical implication of corporate restructuring.</p> <p>CO2: To comprehend the process of internal & external restructuring of business.</p> <p>CO3: To distinguish between the processes of internal & external reconstruction.</p> <p>CO4: To solve various problems in respect to various methods of reconstruction.</p> <p>CO5: To explain the impact of reorganization on the company.</p>
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BMS 4.6 CORPORATE RESTRUCTURING (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	L	H	H
4	H	H	H	M	H	H
5	H	H	H	M	H	H

4.7 STRATEGIC COST MANAGEMENT(Finance)	<p>CO1: To Develop skills of analysis in cost and management accounting.</p> <p>CO2: To Understands the theory of strategic cost management performance assessments.</p> <p>CO3: Understands complex modern industrial organizations within which the various facets of decision-making and controlling operations take place.</p> <p>CO4: Identify and understand different present-day issues that have been observed in strategic cost management.</p> <p>CO5: Study a number of topics relating to the design and implementation of cost management models in modern organizations.</p>
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BMS 4.7 STRATEGIC COST MANAGEMENT(Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6

1	H	H	H	L	M	H
2	H	H	H	L	H	H
3	H	H	H	M	H	H
4	H	H	H	M	H	H
5	H	H	H	M	H	H

4.8 MARKETING (Marketing)	EVENT	CO1: Understanding the basic concepts of event marketing, its categories and challenges.
		CO2: To Exhibit the skills of organizing events.
		CO3: To Solve the barriers/problems in event marketing.
		CO4: Understanding segmenting, targeting and positioning in event marketing.

BMS 4.8 EVENT MARKETING (Marketing)MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H
4	H	H	H	M	H	H

4.9 MARKETING(Marketing)	RURAL	CO1: To Know the agriculture & rural marketing environment so that they understand consumer & marketing characteristics.
		CO2: To Understand the emerging challenges in upcoming global economic scenario.
		CO3: To Distinguish the marketing strategies adopted for rural and urban consumers.

BMS 4.9 RURAL MARKETING(MARKETING) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	H
2	H	H	H	M	H	H
3	H	H	H	M	H	H

BMS SEMESTER V	
COURSE NAME	COURSE OUTCOME
5.1 LOGISTICS & SUPPLY CHAIN MANAGEMENT	<p>CO1: To demonstrate a clear understanding of the key concepts applied in logistics and supply chain management.</p> <p>CO2: To understand global trends in logistics and supply chain management.</p> <p>CO3: To highlight the importance of all activities of the supply chain and an understanding of concepts like inbound and outbound logistics, offshore and inshore logistics.</p> <p>CO4: To develop skills for planning, designing the operational facilities of supply chain with the analytical and critical understanding.</p> <p>CO5: To understand how logistics play an important role in redefining value chain.</p>

BMS 5.1 LOGISTICS & SUPPLY CHAIN MANAGEMENT MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	H	H
2	M	M	L	L	L	H
3	M	H	M	M	M	M
4	H	H	L	L	H	H
5	M	M	L	M	L	M

5.2 CORPORATE COMMUNICATIONS & PUBLIC RELATIONS	<p>CO1: To Provide the students with basic understanding of the history, concepts and theories of corporate communication and public relations.</p> <p>CO2: To develop critical understanding of the different organisational practices associated with corporate communication and public relations.</p> <p>CO3: To Understand operational modes of employee engagement, crisis management, corporate reputational value, news, media.</p>
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	<p>CO4: To critically examine the importance of corporate communications and public relations on the future brand reputation and goodwill of organisations.</p> <p>CO5: To Develop understanding of the national and global impact of effective CCPR practices on various stakeholders.</p> <p>CO6: To understand the global benchmarks, critical methods and policies followed by global companies during PR crisis.</p>
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BMS 5.2 CORPORATE COMMUNICATIONS & PUBLIC RELATIONS MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	L	M	M	H
2	H	H	M	M	M	H
3	H	H	M	M	L	M
4	M	M	M	L	L	H
5	M	M	L	H	M	M
6	H	M	L	H	M	M

5.3 E-COMMERCE & DIGITAL MARKETING (Marketing)	<p>CO1: To understand the increasing significance of e-commerce and its application in various business sectors.</p> <p>CO2: To get an insight on digital marketing activities on various social media platforms and its emerging significance in business.</p> <p>CO3: To understand latest trends and practices in e-commerce and digital marketing.</p> <p>CO4: To Solve Challenges and grab opportunities in E-commerce and Digital marketing.</p> <p>CO5: To Understand Electronic Payment System.</p>
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BMS 5.3 E-COMMERCE & DIGITAL MARKETING (MARKETING) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	L	M	H	M
2	H	M	M	L	M	L
3	H	M	L	M	L	M
4	H	H	M	L	M	M

5	H	M	L	L	L	L
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5.4 SALES & DISTRIBUTION MANAGEMENT (Marketing)	<p>CO1: The students understand the Sales & Distribution functions as an integral part of marketing functions in a business firm.</p> <p>CO2: To Gain knowledge on market analysis and method of sales forecasting.</p> <p>CO3: To understand distribution channel management with its effective distribution strategy and channel designing.</p> <p>CO4: To understand ethics and trends in sales and distribution management.</p>
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BMS 5.4 SALES & DISTRIBUTION MANAGEMENT (MARKETING) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	L	L	H	M
2	H	M	M	M	M	M
3	H	M	L	M	M	L
4	M	M	M	H	M	L

5.5 STRATEGIC MARKETING MANAGEMENT (Marketing)	<p>CO1: To analyse marketing opportunities and threats.</p> <p>CO2: To Discuss strategic concepts and theories and their application in marketing environments.</p> <p>CO3: To Develop and critically assess marketing strategies.</p> <p>CO4: Research and analyse marketing strategies in different contexts.</p>
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BMS 5.5 STRATEGIC MARKETING MANAGEMENT (MARKETING) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	L	M	L	M
2	H	M	M	L	M	M
3	M	M	L	M	M	M
4	H	H	M	L	M	L

5.6 CUSTOMER RELATIONSHIP MANAGEMENT (Marketing)	<p>CO1: To Study role of customer's in today's marketing Scenario. Campaigning, CRM Software's used in various firms' tools used for data mining of customers and many more.</p> <p>CO2: To Understand how customer relationship management (CRM) systems can help organizations manage and gain customer insights from marketing information.</p> <p>CO3: To Exhibit CRM marketing initiatives, customer service and design CRM strategy.</p> <p>CO4: To Study new trends in CRM, challenges and opportunities for organizations.</p>
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BMS 5.6 CUSTOMER RELATIONSHIP MANAGEMENT (MARKETING) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	L	M	M	H
2	H	M	M	L	M	M
3	H	M	M	M	M	M
4	H	M	L	L	L	M

5.7 INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT (Finance)	<p>CO1: To understand the term, which are often confronted while reading the newspaper, magazine such as beta & capital assets pricing model for better correlation practical world.</p> <p>CO2: To Calculate & Analyse concept of risk & return associated with various investments avenues.</p> <p>CO3: To develop a strong foundation in portfolio management process and portfolio management theory.</p> <p>CO4: To explain the basics of fundamental analysis, technical analysis and portfolio performance measurement.</p> <p>CO5: To introduce students to various investment avenues available.</p>
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BMS 5.7 INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6

1	H	M	L	L	H	H
2	H	H	H	L	H	M
3	H	H	H	M	M	M
4	H	H	H	M	H	M
5	M	M	H	L	H	H

<p>5.8 WEALTH MANAGEMENT (Finance)</p>	<p>CO1: To Effectively design, manage and evaluate the performance of alternative investment portfolios in wealth management by assessing financial goals taking into consideration risk profile.</p> <p>CO2: To Improve students' understanding of the time value of money concept and the role of a financial manager / Planner in the current competitive business scenario.</p> <p>CO3: To understand asset allocation and long-term investment strategies.</p> <p>CO4: To Understand the valuation and selection criteria of major investment products and financial securities in order to implement a financial plan.</p> <p>CO5: To Create and assess the effectiveness of retirement strategies such as superannuation funds and self-managed superannuation funds.</p> <p>CO6: To Select appropriate insurance products to cover financial risks.</p> <p>CO7: To Arrange for the creation of instruments to distribute estate and non-estate assets.</p>
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BMS 5.8 WEALTH MANAGEMENT (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	H	M	H	M
2	H	M	M	M	M	H
3	H	H	M	L	M	M
4	M	M	M	L	M	M
5	H	L	H	M	H	M
6	M	M	H	M	H	L
7	M	L	M	L	M	L

5.9 DIRECT TAXES (Finance)	<p>CO1: To understands the basic concepts and definitions of Income Tax Act 1961.</p> <p>CO2: To understand various heads of income.</p> <p>CO3: To compute income from various heads like salary, business & profession, house property etc. and tax liability.</p> <p>CO4: To describe how the provisions in the direct tax laws can be used for tax planning.</p> <p>CO5: To Demonstrate the filing of income tax return.</p> <p>CO6: To state the use of various deductions & exemptions to reduce the taxable income.</p>
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BMS 5.9 DIRECT TAXES (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	H	M	M	H
2	H	M	M	L	L	M
3	M	L	H	L	M	M
4	M	L	H	M	L	M
5	M	M	H	M	M	M
6	M	L	M	M	L	L

5.10 FINANCIAL ACCOUNTING (Finance)	<p>CO1: To equip the students with the skill of preparing accounts and financial statements as per the format prescribed in IFRS/AS.</p> <p>CO2: To state the application of important Accounting Standards.</p> <p>CO3: To Exhibit various ethics of business in corporate world.</p> <p>CO4: To Develop knowledge on underwriting of shares & debentures.</p> <p>CO5: To Employ critical thinking skills in analysing the financial data.</p>
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BMS 5.10 FINANCIAL ACCOUNTING (Finance) MAPPING TABLE	
CLO	PLO

	1	2	3	4	5	6
1	H	M	H	M	M	H
2	H	L	H	L	M	M
3	M	L	L	H	L	L
4	M	M	M	M	M	M
5	H	M	M	L	M	M

SEMESTER VI	
COURSE	COURSE OUTCOME
6.1 Project Work	<p style="text-align: center;">A) Internship Based Projects:</p> <p>CO1: Develop understanding of the Industry and organisation and its impact through SWOT and PESTLE analysis.</p> <p>CO2: To understand the professional roles and responsibilities as a Management Professional.</p> <p>CO3: Develop understanding of organisational structure and work culture of organisations.</p> <p>CO4: Relate theories learnt in class to real time situations in the organisations.</p> <p>CO5: Have clarity on organisational policies and procedures relevant to a department and function.</p> <p style="text-align: center;">B) Research based projects:</p> <p>CO1: To Identify the problem and research objectives through review of literature.</p> <p>CO2: To develop hypothesis based on the objectives of the study.</p> <p>CO3: To undertake sampling of the universe through statistical tools and techniques.</p> <p>CO4: To analyse & interpret the findings of the topic under study.</p> <p>CO5: To understand the conduct and significance of Research.</p>

BMS 6.1 Project Work (A) Internship Based Projects: MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	M	L	H	H
2	H	H	M	L	M	H
3	H	H	M	M	M	H
4	M	H	H	M	L	M
5	M	M	M	L	H	M

BMS 6.1 Project Work (B) Research Based Projects: MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	M	M
2	M	M	M	L	M	M
3	H	M	H	L	M	L
4	H	H	L	M	L	L
5	M	L	L	L	M	M

6.2 Operation Research	<p>CO1: Interpret and apply the results of an operations research model to an organisation.</p> <p>CO2: Identify and develop operational research models from the verbal description of the real system. Understand the mathematical tools that are needed to solve optimisation problems.</p> <p>CO3: Be able to understand the application of OR and frame a LP Problem with solution.</p> <p>CO4: Be able to build and solve Transportation and Assignment problems using appropriate method.</p> <p>CO5: Be able to design and solve models of CPM and queuing to improve decision making and develop critical thinking and objective analysis of decision problems.</p> <p>CO6: Be able to solve problems of replacement and implement practical cases of decision making under different business environments.</p>
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	<p>CO7: To Enables to take best course of action out of several alternative courses for the purpose of achieving objectives by applying game theory and sequencing models.</p> <p>CO8: Helps in determining the extreme values of some real-world objective: the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost).</p>
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BMS 6.2 Operation Research MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	-	M	M
2	H	M	L	L	M	H
3	H	H	L	L	M	M
4	H	H	M	-	H	H
5	H	H	M	L	H	H
6	H	H	H	M	H	H
7	H	M	H	M	H	H
8	H	M	H	M	H	M

6.3 BRAND MANAGEMENT (Marketing)	<p>CO1: To understand the meaning and significance of brand management.</p> <p>CO2: To learn how to build, sustain and grow brands.</p> <p>CO3: Define and examine brand concepts used by Companies by discussing the rationale for the application.</p> <p>CO4: Provide the appropriate theories, models, and other tools to make better branding decisions.</p> <p>CO5: Formulate effective branding strategies for both consumer and business products/services.</p> <p>CO6: Offer diverse learning opportunities to develop analytical and soft skills.</p>
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BMS 6.3 BRAND MANAGEMENT (Marketing) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	-	-	M	M
2	H	M	-	M	M	M

3	H	H	L	-	M	L
4	M	H	L	M	H	H
5	H	H	M	L	H	H
6	M	L	M	L	M	M

<p>6.4 RETAIL MANAGEMENT (Marketing)</p>	<p>CO1: To familiarize students with details retail management concepts & operations.</p> <p>CO2: To Learn to understand various trends in Retail sector.</p> <p>CO3: Aware of the various legal & ethical aspects of retail management.</p> <p>CO4: To Understand the Retail management terminology, its operations, pricing strategies, Stores management and Merchandise management.</p> <p>CO5: They understand career options in Retail sector.</p>
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BMS 6.4 RETAIL MANAGEMENT (Marketing) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	L	M	H
2	H	H	L	-	M	M
3	M	M	L	H	M	M
4	H	M	-	L	L	M
5	M	-	-	-	-	L

<p>6.5 INTERNATIONAL MARKETING (Marketing)</p>	<p>CO1: Understand International Marketing, its Advantages and Challenges.</p> <p>CO2: To get an insight on the dynamics of International Marketing Environment.</p> <p>CO3: To understand the relevance of International Marketing Mix decisions and recent developments in Global Market.</p> <p>CO4: Interpret implications of international marketing on services all over the world.</p> <p>CO5: The exposure to the subject will equip the students to better understand the nuances of International Marketing and the Global environment.</p>
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BMS 6.5 INTERNATIONAL MARKETING (Marketing) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	L	M	L	M
2	M	H	M	M	L	M
3	M	M	L	L	M	H
4	M	M	M	L	M	H
5	H	H	M	M	M	H

<p>6.6 MARKETING OF NON-PROFIT ORGANISATION (Marketing)</p>	<p>CO1: To apply various Marketing tools & techniques for Non-profit organisations and design various sources for fundraising.</p> <p>CO2: To learn the role and application of marketing to promote social change and to achieve social goals for non-profits organizations including social and cause related marketing, fundraising.</p> <p>CO3: To apply marketing in a diverse range of non-profit environments including charities, social programs and ideas, health, education, arts, as well as goods and services.</p> <p>CO4 – To understand the advocacy v/s lobbying and the concept of CSR and the policy framework of CSR under the Companies Act of 2013.</p> <p>CO5: To solve the challenges of marketing in the non-profit sector.</p>
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BMS 6.6 MARKETING OF NON-PROFIT ORGANISATION (Marketing) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	M	M	M
2	H	H	M	H	M	L
3	H	H	M	M	M	M
4	M	M	L	H	L	L
5	H	H	H	L	L	M

6.7 International Finance (Finance)	<p>CO1: To Understand the evolution of money, its journey through different phases and standards from barter to metal - fiat currency.</p> <p>CO2: To introduce various aspects pertaining to international finance such as balance of payments and international monetary systems.</p> <p>CO3: To develop an understanding of international capital budgeting and foreign exchange risk management.</p> <p>CO4: Explore methods used to manage risk in the global markets.</p> <p>CO5: Equip students with the ability to Analyse and make managerial decisions relating to foreign exchange investment.</p>
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BMS 6.7 International Finance (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	L	L	L	L
2	H	M	L	M	M	M
3	H	H	M	-	H	M
4	H	H	H	L	H	H
5	M	H	H	M	H	H

6.8 Strategic Financial Management (Finance)	<p>CO1: To introduce learners to strategic financial decision making.</p> <p>CO2: To impart knowledge of dividend decision with the help of various theories, risk adjusted capital budgeting and capital rationing.</p> <p>CO3: To Comprehend fundamental aspects of corporate finance management.</p> <p>CO4: To provide an overview of financial management in banking sector with special reference to NPA's and capital adequacy ratio (CAR) and working capital financing.</p>
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BMS 6.8 Strategic Financial Management (Finance) MAPPING TABLE	
CLO	PLO

	1	2	3	4	5	6
1	H	M	L	-	M	H
2	H	M	M	L	M	H
3	H	H	L	L	M	M
4	M	H	L	M	H	M

6.9 Innovative Financial Services (Finance)	<p>CO1: To familiarize with fundamental aspects of various issues associated with various financial services.</p> <p>CO2: To give comprehensive overview of financial services.</p> <p>CO3: Emerging financial services in the light of globalization.</p> <p>CO4: To understand Basic concept, functions, process, techniques of financial services</p>
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BMS 6.9 Innovative Financial Services (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	H	M	L	H	H
2	M	M	-	-	L	H
3	M	M	-	L	L	M
4	H	M	L	M	M	M

6.10 Indirect Taxes (Finance)	<p>CO1: To distinguish the earlier indirect tax system & present indirect tax system.</p> <p>CO2: To analyse the benefits of GST.</p> <p>CO3: Explain the concept of time, place and value of supply.</p> <p>CO4: Explain the importance and benefits of Input Tax Credit.</p> <p>CO5: To understand the appeals, offences and penalties with respect to GST.</p> <p>CO6: Describe the functions, powers and structure of GST Council and GSTN.</p> <p>CO7: To understand the procedure for registration, payment and refund of GST.</p>
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	CO8: To create employability to the students in the commercial tax practices.
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BMS 6.10 Indirect Taxes (Finance) MAPPING TABLE						
CLO	PLO					
	1	2	3	4	5	6
1	H	M	L	-	H	H
2	M	M	M	-	M	M
3	M	L	L	L	L	L
4	M	L	L	M	L	L
5	H	M	M	L	M	M
6	H	M	L	-	M	M
7	M	M	M	M	M	M
8	M	L	L	L	M	M

Wilson College
Department of Botany
Undergraduate Courses
(F.Y., S.Y. and T.Y. B.Sc.)

Program: B.Sc.

Program Objectives (POs)

- PO1. To consolidate the disciplinary knowledge through classroom and field studies.
- PO2. To enhance critical thinking skills via debates, essays, group discussions, reviews etc.
- PO3. To upgrade communication skills and self directed learning via curricular, co-curricular and extra-curricular activities.
- PO4. To promote employability and entrepreneurship skills by providing hands on training.
- PO5. To endeavor towards holistic development of the learners.

Specific Program: B.Sc. Botany

Program Specific Outcomes (PSOs)

The Learners (Graduates) will be able to -

- PSO1. Apply the knowledge acquired for exploring different facets of plant sciences.
- PSO2. Solve the environment related issues/concerns.
- PSO3. Practice the techniques and apply principles learnt in routine and professional life.
- PSO4. Analyze information/data and use statistical tools to arrive at a judicious conclusion.
- PSO5. Use knowledge of medicinal plants for therapeutic benefits.
- PSO6. Acquire entrepreneurial skills required in small scale industries related to plant sciences.
- PSO7. Develop an aptitude towards research in plant sciences and allied fields.

Course Outcomes (COs)

Class: F. Y. B. Sc. Semester: I

Course-I (Paper -I) Plant Diversity-I (Course Code - USB0101)

The Learners (Graduates) will be able to -

Unit-I Algae

CO1- Use economically and ecologically important algae in human welfare.

CO2- Apply *Nostoc* as biofertilizer in cultivated fields to reduce the use and harmful impacts of nitrogenous fertilizers.

CO3- Apply the knowledge of algae to understand the evolutionary process.

Unit-II Fungi

CO4- Apply knowledge of Phycomycetes for general mycological studies and the significance of fungi in human life.

CO5- Differentiate between Phycomycetes and Ascomycetes through the life cycles of one fungus each from the respective class.

CO6- Differentiate between the categories of heterotrophs based on their modes of nutrition.

Unit-III Bryophyta

CO7- Discuss Bryophyte characters.

CO8- Examine / compare Bryophytes with allied plant groups.

CO9- Discuss various Bryophytes under a single class.

CO10- Examine various stages in the life cycle of the Bryophytes studied.

Course Outcomes (COs)

Class: F. Y. B. Sc. Semester: I

Course-II (Paper -II) Form and Function - I (Course Code - USB0102)

The Learners (Graduates) will be able to -

Unit-I Cell Biology

CO1- Apply the knowledge of cell biology for understanding the basis of life.

CO2- Differentiate between prokaryotic and eukaryotic life forms.

CO3- Use the knowledge of chloroplast as an organelle in the process of photosynthesis.

Unit-II Ecology

CO4- Characterize ecosystems on the basis of ecological factors.

CO5- Evaluate functions and overall performance of the ecosystems.

CO6- Manage ecological equilibrium with respect to conservation of environment.

Unit-III Genetics

CO7- Analyze the heritable traits and the pedigree charts.

CO8- Differentiate the cellular and molecular mechanisms of genetics.

CO9- Apply the knowledge of Genetics for understanding consequences of gene interactions.

Course Outcomes (COs)

Class: F. Y. B. Sc. Semester: II

Course-I (Paper -I) Plant Diversity -I (Course Code - USBO201)

The Learners (Graduates) will be able to -

Unit-I Pteridophytes

CO1- Use knowledge of Pteridophytic characters for comparative studies with allied plant groups

CO2- Differentiate the types of stele found in Pteridophytes.

CO3- Apply the knowledge of types of steles in understanding the evolution of vascular tissues in plants.

Unit-II Gymnosperms

CO4 - Use of economically important Gymnosperms in human welfare.

CO5 - Apply knowledge of medicinal use of Gymnosperms as potential therapy.

CO6 - Use knowledge of Cycas as a Cycad for comparative studies with allied plant groups.

Unit-III Angiosperms

CO7 - Establish the premise of Angiospermic studies via morphology.

CO8 - Apply the knowledge of morphology in Taxonomy assignments.

CO9 - Appreciate floristic diversity during field studies.

Course Outcomes (COs)

Class: F. Y. B. Sc. Semester: II

Course-II (Paper -II) Form and Function -I (Course Code - USB0202)

The Learners (Graduates) will be able to -

Unit-I Anatomy

CO1- Analyse the relationship between Anatomy, Physiology, Paleobotany and Ecology.

CO2- Develop skills with section cutting and microscopic work.

CO3- Discriminate between various plant tissues and their respective functions.

CO4- Analyze anatomical characters with respect to their habitats.

CO5- Correlate anatomy with the timber industry.

Unit-II Physiology

CO6- Apply the knowledge of photosynthesis in Agriculture for enhancement of food production and weed eradication.

CO7- Analyze and apply various physiological principles in the field of research.

CO8- Correlate the stimuli of physiology with the respective responses to the environment.

CO9- Manage green-house gases and ozone layer repair through the process of photosynthesis.

Unit-III Medicinal Botany

CO10- Identify primary and secondary metabolites and their role in plant metabolism.

CO11- Apply the knowledge of drugs procured from herbal plants in combating relevant diseases.

CO12- Formulating ayurvedic drugs on the basis of knowledge of phyto-constituents.

Course Outcomes (COs)

Class: S. Y. B. Sc. Semester: III

Course-I (Paper -I) Plant Diversity-II (Course Code - USB0301)

The Learners (Graduates) will be able to -

Unit -I Thallophyta (Algae and Bryophyta)

- CO1- Apply the uses of economically important algae.
- CO2- Discriminate between Algae/Bryophytes occurring within the respective class.
- CO3- Correlate Algae with Bryophytes.
- CO4- Identify Algae and Bryophytes on field trips and analyse their impact on the environment.
- CO5- Analyze the role of Algae and Bryophytes in Horticulture.

Unit -II Angiosperms

- CO6- Apply knowledge of plant systematics in studies of Angiosperms.
- CO7- Use tools of taxonomy in specific and relevant areas of Angiosperms.
- CO8- Implement techniques learned on plant preservation.

Unit-III Modern Techniques to study Plant Diversity

- CO9- Apply the knowledge and skills of various techniques learned for plant preservation.
- CO10- Analyse the principles of microscopy and implement the same for examining microscopic structures.
- CO11- Identify and characterise the components of a mixture through relevant chromatographic techniques.
- CO12- Practice skills for separation of different bio-molecules and their subsequent identification through technique of electrophoresis.

Course Outcomes (COs)

Class: S. Y. B. Sc. Semester: III

Course-II (Paper -II) Form and Functions - II (Course Code USBO302)

The Learners (Graduates) will be able to -

Unit-I Cell Biology

CO1- Analyse the concepts of heredity and genetic variation via knowledge of cell division.

CO2- Use the knowledge of chromosomes, DNA and RNA in the fields of biochemistry, genetics and molecular biology.

CO3- Analyse growth, reproduction, regeneration and cohesive development of plants via knowledge of cell cycle.

CO4- Examine and analyse the role of ribosomes and DNA sequences in coding of amino acids and synthesis of proteins.

Unit-II Cytogenetics

CO5- Apply knowledge of structural and numerical aberrations of chromosomes in genetic disorders.

CO6- Analyse the principles of sex determination and pattern of Inheritance in plants.

CO7- Analyse the principles of extra nuclear genetics with respect to the chloroplast and the mitochondrion.

Unit-III Molecular Biology

CO8- Analyse the autocatalytic and heterocatalytic functions of DNA with respect to their significance in vital life processes.

CO9- Correlate the functions of various enzymes to the process of DNA replication at molecular level.

CO10- Differentiate between DNA replication and DNA transcription in eukaryotic and prokaryotic organisms.

CO11- Identify the product of transcription based on the post transcriptional changes occurring in eukaryotes before translation.

Course Outcomes (COs)

Class: S. Y. B. Sc. Semester: III

Course-III (Paper -III) Current Trends in Plant Sciences - I (Course Code - USBO303)

The Learners (Graduates) will be able to -

Unit-I Pharmacognosy and Phytochemistry

CO1- Use standards of quality mentioned in the Pharmacopoeia for drug development.

CO2- Analyze and characterise medicinal plants by using guidelines mentioned in the relevant monographs.

CO3- Design schemes to control pests and pathogens using secondary metabolites.

CO4- Apply the knowledge of using traditional medicinal plants to cure common ailments.

Unit-II Forestry and Economic Botany

CO5- Identify and differentiate between forest types.

CO6- Apply knowledge of applied forestry for socio-ecological benefits.

CO7- Materialize knowledge of Economic Botany into commercial prospects.

Unit-III Industry Based on Plant Products

CO8- Apply the knowledge of uses of essential oils in herbal industries.

CO9- Differentiate between carrier oil and essential oils and use their blends.

CO10- Create the nutraceutical products from herbal sources.

CO11- Explore efficient bio-fuel plants as alternative eco friendly energy sources.

CO12- Analyze the commercial enzymes obtained from plants and their specific role in the biological system of humans.

Course Outcomes (COs)

Class: S. Y. B. Sc. Semester: IV

Course-I (Paper -I) Plant Diversity - II (Course Code - USB0401)

The Learners (Graduates) will be able to -

Unit -I Thallophyta: Fungi, Plant Pathology and Lichens Fungi

CO1- Use Ascomycetous fungi as decomposers in agriculture.

CO2- Identify and characterise diverse pathogenic symptoms of *Erysiphe* which occur on crops.

CO3- Use lichens for their ecological characteristics and economic attributes.

CO4- Adopt control measures to safeguard the potato crop from late blight disease.

Unit -II Pteridophyta and Paleobotany Pteridophyta

CO5- Compare general characters of living Pteridophytes with those of their fossil forms.

CO6- Differentiate between the anatomical features of fossil Pteridophytes.

CO7- Analyse evolutionary patterns of fossil Pteridophytes in different geological eras.

Unit -III Gymnosperms

CO8- Analyze and evaluate characteristics of conifers for their floristic exploration.

CO9- Apply the knowledge of economic importance of Gymnosperms in Commerce and conservation.

CO10- Appreciate and use the knowledge of plant fossils in study of evolution.

Course Outcomes (COs)

Class: S. Y. B. Sc., Semester: IV

Course-II (Paper -II) Form and Functions - II (Course Code - USB0402)

The Learners (Graduates) will be able to -

Unit-I Anatomy

- CO1- Characterise secondary growth in Dicots and the anatomical structures that develop subsequently.
- CO2- Differentiate between secondary growth in Dicot stem and Dicot root.
- CO3- Analyse the anatomical properties imparted by specific distribution of the mechanical tissues in plant organs.
- CO4- Use the knowledge of different types of vascular bundles to identify the respective plant organs.

Unit-II Plant Physiology and Plant Biochemistry

- CO5- Apply the knowledge of respiration to understand role of carbon balance in the ecosystem.
- CO6- Analyse photorespiration with respect to environmental stress.
- CO7- Exhibit mechanism of flowering through photoperiodic stimulus.
- CO8- Use the technique of vernalization to impart resistance to cold stress and certain diseases in plants

Unit-III Ecology and Environmental Botany

- CO9- Analyse the role of biogeochemical cycles in ecological studies.
- CO10- Manage soil related issues by applying knowledge of edaphic factors.
- CO11- Apply knowledge of community ecology in conservation and research areas.

Course Outcomes (COs)

Class: S. Y. B. Sc., Semester: IV

Course-III (Paper -III) Current Trends in Plant Sciences -I (Course Code - USB0403)

The Learners (Graduates) will be able to -

Unit-I Horticulture and Gardening

CO1- Apply the principles of garden design in practice.

CO2- Analyse various branches of Horticulture in terms of future career choices.

CO3- Correlate horticulture with other branches of plant sciences and agro-economy.

CO4- Develop entrepreneurial skills in Horticulture.

CO5- Identify horticultural plants and differentiate between them.

Unit-II Biotechnology

CO6- Set up a well-equipped plant tissue culture laboratory and exploit the inherent property of plant cell totipotency in tissue culture techniques.

CO7- Modify the nutrient media for maintaining cell lines under controlled aseptic conditions.

CO8- Correlate the functions of the enzymes and cloning vectors to their source of origin.

CO9- Use plant organ culture and genetic engineering techniques in crop improvement.

Unit-III Biostatistics and Bioinformatics

CO10- Collect, compile and analyze the biological data.

CO11- Postulate and analyse different hypotheses as per the data.

CO12- Interpret statistical results correctly and efficiently.

CO13- Apply basic principles of Computer Sciences and Mathematics in interpreting biological data.

CO14- Compare different complex biological sequences with the help of modern tools/programs.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: V

Course-I (Paper -I) Plant Diversity III (Course code- USB0501)

The Learners (Graduates) will be able to -

Unit -I Microbiology

CO1- Apply the knowledge of Microbiology to identify microbes and control the relevant diseases.

CO2- Use microbiological techniques in media preparations and monitoring the microbial growth.

CO3- Manage to reduce environmental pollution through microbiological principles and techniques.

CO4- Isolate pure cultures from the contaminated culture.

Unit - II Algae

CO5- Characterize and identify red and brown algae which are the essential components of Marine ecosystem.

CO6- Explore, identify and use Rhodophytes which are economically important.

CO7- Differentiate, identify and harvest Kelps for industrial uses.

CO8- Enumerate the uses of diatoms in applications like manufacturing of filters, insulations, varnishes, dynamites etc.

Unit -III Fungi

CO9- Apply the knowledge of Ascomycetes and Basidiomycetes for their identification and uses.

CO10- Differentiate between the parasitic and saprophytic fungi with respect to their morphological and reproductive features.

CO11- Analyse the significance of pathogenic fungi in plant pathology and crop productivity.

CO12- Explore the commercially viable uses of Ascomycetes and Basidiomycetes.

Unit -IV Plant Pathology

CO13- Discern between life cycles of pathogens.

CO14- Differentiate between seemingly similar pathogens.

CO15- Examine the causes of pathogenicity.

CO16- Apply methods learned to control pathogenicity.

CO17- Correlate plant pathology with other relevant fields.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: V

Course II (Paper-II) Plant Diversity -IV (Course code - USB0502)

The learners will be able to-

Unit - I Palaeobotany

- CO1- Use the knowledge of fossil Pteridophytes to establish their links with the modern day vegetation.
- CO2- Correlate the geological events in the past with the extinction of Pteridophytes.
- CO3- Refer to the resources of the Birbal Sahni Institute of Paleobotany and contributions of Prof. Birbal Sahni to pursue research in Paleobotany.
- CO4- Differentiate between various fossil forms.

Unit - II - Angiosperms- I

- CO5- Use knowledge of plant morphology in assessing the taxonomic characters of plants.
- CO6- Apply knowledge of taxonomic keys and floristic literature for identification of unidentified plants
- CO7- Deal with elementary laboratory level research in Plant Taxonomy
- CO8- Evaluate and appreciate the merits and demerits of classification systems.

Unit III: Anatomy I

- CO9- Relate the anomalous anatomical structures in the plant stems to their respective functions.
- CO10- Differentiate between the structural development in plant stems due to normal and abnormal secondary growth in the same.
- CO11- Analyse the process of root-stem transition responsible for the variation in the orientation and arrangement of primary vascular tissues.
- CO12- Use the knowledge of different types of stomata as a taxonomic tool.

Unit-IV Palynology

- CO13- The graduates (Learners) will be able to -
- CO14- Compare the morphology of pollen grains of different plants.
- CO15- Apply the knowledge of Palynology in allied fields.
- CO16- Identify the pollen grains based on their ultra-structure variations.
- CO17- Differentiate between the pollens grains and the spores responsible for causing air borne allergies and diseases.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: V

Course-III (Paper-III) Form and Functions-III (Course Code - USB0503)

The Learners (Graduates) will be able to -

Unit-I Cytology and Molecular Biology

CO1- Illustrate cytological, molecular and physiological aspects of plant cell.

CO2- Analyse the impact of gene functions in the plant cell.

CO3- Identify and compare the protein sequence of prokaryotic and eukaryotic cells.

CO4- Analyse the role of enzymes and factors associated with Central Dogma.

Unit -II Plant physiology- I

CO5- Apply the knowledge of osmosis in food preservation.

CO6- Analyze micro and macro nutrients with respect to their quantitative and qualitative aspects in plants.

CO7- Evaluate mineral deficiencies in plants and provide respective supplements for their recovery.

CO8- Characterize pollutants harmful for plants.

Unit - III Environmental Botany

CO9- Apply knowledge of bioremediation in solving issues related with general pollution.

CO10- Manage contamination of heavy metals by phytoremediation

CO11- Design appropriate bioremediation models.

CO12- Communicate knowledge of succession in Conservation Ecology

Unit IV Plant Tissue Culture

CO13- Use various plant tissue culture techniques for conservation of plant species.

CO14- Exploit the technique of suspension culture for production of important secondary metabolites.

CO15- Produce synthetic seeds from novel and exotic germplasm.

CO16- Apply the principles of protoplast culture in crop improvement.

CO17- Explore the possibilities of entrepreneurship in Floriculture.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: V

Course-IV (Paper-IV) Current Trends in Plant Sciences-II (Course Code - USB0504)

The Learners (Graduates) will be able to -

Unit-I Ethnobotany and Mushroom Industry

CO1- Differentiate between various medicines used in Ethnobotany.

CO2- Use the knowledge of Ethnobotany in development of medical and agriculture fields.

CO3- Practice healthy life style with ethnic food and ethnic therapies.

CO4- Apply the principles and techniques of Mushroom cultivation in setting small scale commercial units of the same.

Unit-II Plant Biotechnology -I

CO5- Use fundamental molecular events in the field of Genetic Engineering.

CO6- Apply knowledge of genomic libraries in development of disease resistant varieties.

CO7- Analyse the molecular events of a living cell.

CO8- Examine the causes of plant diseases at molecular level.

Unit -III Instrumentation

CO9- Analyze various foods and beverages on qualitative parameters.

CO10- Quantify bio-molecules and compounds using appropriate instruments and techniques.

CO11- Purify and analyse bioactive and beneficial compounds.

CO12- Use and operate different laboratory instruments.

Unit-IV: Pharmacognosy and Medicinal Botany

CO13- Summarise the medicinal herbs on the basis of their habit attributes and phytoconstituents.

CO14- Distinguish between the macro and microscopic characters of medicinal plants.

CO15- Analyse the specific role of principle phytochemical and other trace elements present in plants.

CO16- Identify and separate the adulterants from the pure drug source.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: V

Course-AC-I (Paper AC-I) Horticulture and Gardening-I (Course Code - USACHO501)

The Learners (Graduates) will be able to -

Unit - I Introduction to Horticulture

- CO1- Offer consultancy in various branches of Horticulture via knowledge acquired.
- CO2- Initiate small enterprises related to allied branches of Horticulture
- CO3- Communicate discoveries and schemes of different Horticultural Institutes to the CO4-horticulturists.
- CO4- Exhibit and sale of pots, horticultural implements and media for general awareness in gardening

Unit - II Propagation Practices

- CO5- Use artificial propagation techniques in Horticulture.
- CO6- Manage Horticulture nursery as a small scale enterprise.
- CO7- Contribute towards the development of plant varieties designated to suit climatic and commercial needs.
- CO8- Practice conservation of plant propagules in a comprehensive and advanced manner.

Unit -III Manures, Fertilizers & Diseases

- CO9- Apply the knowledge of various fertilizers and manures in Horticulture.
- CO10- Identify and distinguish between various plant diseases.
- CO11- Correlate different factors that contribute to plant diseases.
- CO12- Analyse the impact of plant diseases on horticultural produce.
- CO13- Use of biofertilizers, green manures and other useful organisms in plant cultivation.
- CO14- Designate techniques to decimate plant pests and rodents.
- CO15- Use available resources to promote sustainable agriculture.

Unit - IV Garden Operations for Horticulture

- CO16- Apply techniques of various garden operations as a hobby and in profession.
- CO17- Develop practices that encourage organic farming.
- CO18- Examine principles and resources that help conserve water.
- CO19- Experiment with various soil types for plantations.
- CO20- Organise tree festivals and participate actively in them.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: VI

Course-I (Paper -I) Plant Diversity- III (Course Code - USB0601)

The Learners (Graduates) will be able to-

Unit -I Bryophyta

CO1- Use the knowledge of Bryophytes to characterise them.

CO2- Differentiate between the plants belonging to Hepaticae and Musci based on morphology.

CO3- Compare the reproductive structures in Bryophytes.

CO4 - Analyse the distribution patterns of Bryophytes based on their habitats

Unit -II Pteridophyta

CO5- Characterise the Pteridophytes belonging to Lepidophyta, Calamophyta and Pterophyta.

CO6- Differentiate between the life cycles in the Pteridophytes studied.

CO7- Use the characteristic features of Pteridophytes to differentiate them from other plant groups.

CO8- Classify the Pteridophytes on the basis of distinguishing features of the same.

Unit -III Applied Aspects of Bryophytes and Pteridophytes

CO9- Examine the existing diversity of Bryophytes and Pteridophytes.

CO10- Correlate the role of Bryophytes and Pteridophytes with that of the economy.

CO11- Design ameliorating measures towards the environment by using Bryophytes.

CO12- Apply knowledge of Bryophytes & Pteridophytes for human welfare.

Unit -IV Gymnosperms

CO13- Use knowledge of economic importance of Gymnosperms in industry.

CO14- Harvest the medicinal properties of Gymnosperms in health care.

CO15- Compare the life cycles of *Thuja*, *Gnetum* and *Ephedra* .

CO16- Classify Gymnosperms on the basis of their characteristic features.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: VI

Course-II (Paper -II) Plant Diversity IV (Course Code USB0602)

The Learners (Graduates) will be able to -

Unit -I Angiosperms -II

CO1- Evaluate the contribution of botanical gardens in plant sciences.

CO2- Appreciate the role of Botanical Survey of India.

CO3- Analyze the morphological studies for solving taxonomic assignments

CO4- Examine the importance and limitations of classification systems of Angiosperms

Unit -II Anatomy II

CO5- Use knowledge of the internal structure of plants to characterise them in relation to their habitats.

CO6- Compare the tissues present in different organs of the given plant.

CO7- Differentiate plants based on their ecological anatomy.

CO8- Analyse the categorization of the plants on the basis of their moisture requirements.

Unit-III Embryology

CO9- The graduates (Learners) will be able to –

CO10- Analyse the embryological development in plants.

CO11- Differentiate between micro and megasporogenesis.

CO12- Correlate the embryonic tissues with their consequent morphological development.

CO13- Summarise the process and significance of fertilization in Angiosperms.

Unit - IV Plant Geography

CO14- Use knowledge of Phytogeography in management of phytogeographical regions.

CO15- Analyse levels of biodiversity and their importance in the ecosystem.

CO16- Contribute towards conservation of biodiversity by means of communication, awareness and research.

CO17- Analyse plant evolution via molecular studies.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: VI

Course-III (Paper -III) Form and Functions-III Course Code -USBO603)

The Learners (Graduates) will be able to -

Unit - I Plant Biochemistry

CO1- Differentiate between carbohydrates, proteins and lipids.

CO2- Use knowledge of biomolecules in food and cosmetic industries.

CO3- Analyse metabolisms of plant cells.

CO4- Identify and characterize different types of enzymes found in living organisms.

Unit - II Plant physiology II

CO5- Use the knowledge of nitrogen metabolism in research and agriculture.

CO6- Manage soil fertility through nitrogen fixing organisms and symbionts.

CO7- Apply plant growth regulators (PGRs) in crop improvement.

CO8- Use growth hormones in the fields of tissue culture, horticulture, agriculture..

Unit-III Genetics

CO9- The graduates (Learners) will be able to –

CO10- Use knowledge of linkage, crossing over and recombination in gene mapping.

CO11- Identify the genetic disorders caused by mutagens and apply their significance in the present era.

CO12- Analyse the genetic disorders by applying molecular tests.

CO13- Correlate heritable genetic diseases to their respective genotypes.

Unit-IV Biostatistics

CO14- The graduates (Learners) will be able to –

CO15- Analyse the scaffolding of statistical data.

CO16- Calculate and interpret biological data judiciously.

CO17- Apply the fundamentals of Mathematics and summarise their significance in scientific data.

CO18- Develop the ability to apply the methods of Statistics.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: VI

Course-IV (Paper -IV) Current Trends in Plant Sciences-II (Course Code – USBO604)

The Learners (Graduates) will be able to -

Unit -I Plant Biotechnology II

CO1- Differentiate between different methods of DNA sequencing.

CO2- Apply knowledge of DNA sequencing to study the composition of DNA

CO3- Use knowledge of PCR in scientific and forensic investigations.

CO4- Identify and authenticate the plants precisely by using DNA barcoding technique.

CO5- Contribute to the databases via adding new barcodes.

Unit-II Bioinformatics

CO6- Apply the basic principles and fundamentals of biological science, computer science and mathematics in identification of unknown sequences.

CO7- Interpret the biological sequence through computational analysis.

CO8- Establish the evolutionary relationships of organisms through sequence analysis.

CO9- Identify pattern matching in sequence analysis through modern technologies.

Unit -III Economic Botany

CO10- Use the knowledge of essential oils in perfumery and cosmetic industries.

CO11- Analyse the qualities of essential oils.

CO12- Differentiate between drying-oils, semi-drying oils and non-drying oils.

CO13- Use knowledge of vegetable oils in food industry.

Unit -IV Post Harvest Technology

CO14- Use post harvest management skills for long term storage of processed and unprocessed plant products.

CO15- Apply the principles of preserving fruits and vegetables to enhance their shelf life.

CO16- Use natural preservatives like antioxidants, salt and sugar for preventing the deterioration of processed foods.

CO17- Explore the opportunities of entrepreneurship in food processing sector.

Course Outcomes (COs)

Class: T. Y. B. Sc. Semester: VI

Course-AC-II (Paper AC-II) Horticulture and Gardening - II (Course Code – USACHO601)

The Learners (Graduates) will be able to -

Unit -I Landscape gardening

CO1- Apply the principles of garden design to draft plans for landscaping.

CO2- Harvest career opportunities in landscaping

CO3- Amend and rectify soil related issues.

CO4- Transform skills and techniques of indoor gardening into career avenues.

Unit -II Horticultural Produce

CO5- Apply principles of greenhouse technology in green house management.

CO6- Design space gardens using appropriate models.

CO7- Practise skills and techniques of Floristry for self employment.

CO8- Discriminate between different techniques of plant propagation and their subsequent applications.

CO9- Analyse various irrigation systems adopted for green houses.

CO10- Design cold frames and hot beds to be used in green houses.

CO11- Analyse entrepreneurial skills required for Floriculture.

Unit - III Commercial production

CO12- Plan and establish schemes of commercial plantations.

CO13- Communicate and apply knowledge of plant cultivation via horticultural consultancies.

CO14- Analyze factors related to marketing of horticultural produce.

CO15- Practice post-harvest management principles and techniques in Horticulture.

Unit - IV Post Harvest Technology and Entrepreneurship in Horticulture

CO16- Analyse factors impacting post harvest technology.

CO17- Design techniques for promoting shelf life of preserved foods.

CO18- Analyse schemes for entrepreneurship in food preservation.

CO19- Develop optimum standards of food safety in food preservation.

CO20- Analyse marketing strategies in post harvest technology.

CO21- Practise various methods of food preservation using organoleptic principles.

CO22- Use resources available in setting up small scale industries in food processing and preservation.

Chemistry-Outcome Based Education and Assessment

Programme Educational Objectives (POs)

- PO 1.** To enable learners to have comprehensive knowledge and understanding of major and basic concepts in chemistry, theoretical principles, etc.
- PO 2.** enable learners to develop critical thinking and efficient problem-solving skills in all chemistry disciplines.
- PO 3.** To develop scientific temper and research-based skill
- PO 4.** To train the students to get equipped with ICT and digital literacy.
- PO 5.** To enable learners to have ethical awareness in usage of chemicals, procedures, research and impact on the environment.
- PO 6.** To develop global competencies , professional skills and leadership qualities.

Program Specific Outcome (PSO): At the end of the BSc Chemistry program the graduate will be able to:

- PSO 1.**Apply the basic knowledge of chemistry to perform various tasks assigned at the workplace in industry and academia to meet the global standards.
- PSO 2.** Undertake research activities and use modern scientific tools to analyse and solve various topics in the research field.

- PSO 3.** Design system reactions with appropriate considerations in industries and laboratories with respect to safety, economy, health and environment.
- PSO 4.** Use the subject knowledge, communication and ICT skills to be an effective team leader/team member in the interdisciplinary fields.
- PSO 5.** Understand, Manage and contribute to solve basic societal issues and environmental concerns ethically based on principles of scientific knowledge gained.
- PSO 6.** Exhibit professional work ethics and norms of scientific development.
- PSO 7.** Practice the art of scientific approach and analytical reasoning to become lifelong learners.

FYBSc USCH101

Course Learning Outcomes (CO) of FYBSc Chemistry (Paper I, SEM-I)

1. The learners will be aware of different terms used in thermodynamics and learn the first law of thermodynamics.
2. The learners will be able to understand and prepare solution of different concentration (normality, molality, molarity, formality, mole fraction, ppm, ppb etc)
3. The learner will be able to understand the physical significance of the mathematical statements/expression of the models used for description of the Atomic structure.
4. The learner will be able to give the distribution of the electrons in various shells of an atom by Aufbau's principle and calculate the electronegativity, effective nuclear charge etc.
5. The learners will be able to understand Common and IUPAC nomenclature of different types of organic compounds.
6. The learners will be able to explain the bonding and structure of various organic compounds.
7. The learners will be able to understand various fundamentals of organic reaction mechanisms (electronic effects, cleavage of bonds, structure and stability of organic intermediates) and common types of organic reactions.

Mapping of PSOs and COs (FYBSc, Paper I, Chemistry, SEM I)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✗	✓	✓	✗	✓
4	✓	✓	✓	✗	✗	✗	✓
5	✓	✓	✗	✗	✓	✗	✓
6	✓	✓	✓	✓	✓	✗	✓
7	✓	✓	✓	✓	✓	✗	✓

FYBSc USCH102

Course Learning Outcomes (CO) of Organic Chemistry (Paper II, SEM- I)

1. Learners will be able to understand the basic aspects of chemical kinetics such as rates, molecularity, rate constants and order of reactions.
2. Learners will be able to determine the order of reaction from a given data using integration, graphical, Ostwald's isolation and half-time method.
3. Learners will understand the concepts of surface tension, viscosity and refractive index of liquids thoroughly along with expertise in quantitative analysis from numerical data.
4. Learners will understand the fundamentals of liquid crystal display, classification and its applications.
5. Learners will be able to distinguish between metals and nonmetals. Learners will also get along with the concepts of catenation, allotropy, diagonal relationship, electronegativity, etc. with periodic trends.
6. By the end of the course, learners will get aware of oxides and oxyacids of N and S with their environmental aspects.
7. They will be introduced to various terms of stereochemistry (stereogenic centre/asymmetric carbon, chirality, etc.) and will learn drawing and interconversion of various projection formulae.
8. Learners will also learn to find out absolute configuration and to distinguish between enantiomers and diastereomers.

9. More importantly, by the end of the course, learners will understand the effect of strain on relative stability of conformations and basis of resolution of racemic mixture.

Mapping of PSOs and COs (FYBSc, Paper II, Chemistry, SEM I)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✗	✓	✗	✓	✓
3	✓	✓	✗	✓	✗	✓	✓
4	✓	✓	✓	✓	✗	✓	✓
5	✓	✓	✓	✓	✓	✗	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✗	✓	✗	✓	✓

8	✓	✓	✗	✓	✗	✓	✓
9	✓	✓	✓	✓	✗	✓	✓

USCHP1

COs for FYBSc SEM I Practical

1. Learners will be able to prepare solutions of different concentrations and standardize the given solutions.
2. Learners will be able to determine heat of solution and rate constant of a reaction.
3. Learners will be able to perform quantitative commercial analysis of compounds by volumetric titration method.
4. Learners will be able to calculate the percent purity of samples by gravimetric method.
5. Learners will be able to purify various organic compounds by recrystallization technique.
6. Learners will be able to calibrate the thermometer and determine physical constants such as m.p. and b.p.
7. Learners will be able to perform the technique of thin layer and paper chromatography for separation of components in the mixture.

Mapping of PSOs and COs (FYBSc SEM I Practical)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓

2	✓	✓	✓	✓	✓	✗	✓
3	✓	✓	✓	✓	✓	✗	✓
4	✓	✓	✓	✓	✓	✗	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓

FYBSc USCH201

Course Learning Outcomes (CO) of FYBSc Chemistry (Paper I, SEM-II)

1. The learners will be able to distinguish between real gas and ideal gas along with understanding of different Gas laws.
2. The learners will be able to derive Ideal gas law, understand the reason for deviation of real gas from ideal behaviour and understand the Joule Thomson effect.
3. The learners will be able to distinguish between reversible and irreversible reactions, understand Le Chatelier's principle along with understanding the second law of thermodynamics and different terms involved in it.
4. The learner will be able to distinguish between the acids and bases on the basis of the various theories involved and apply the knowledge in understanding the organic reactions and volumetric analysis involving acid base reactions.
5. The learner will be able to perform the qualitative test for the testing of analyte ions and calculate the solubility and solubility product of sparingly soluble salts or weak electrolytes.
6. The learners will be able to understand various preparations and reactions of alkanes, alkenes and alkynes.

7. The learners will be able to learn some important name reactions in organic chemistry (oxymercuration-demercuration, hydroboration-oxidation and Diels-Alder reaction).
8. The learners will be able to understand Mechanism of E1, E2, E1cb reactions.

Mapping of PSOs and COs (FYBSc, Paper-I, Chemistry, SEM II)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✗	✓	✗	✓	✓
3	✓	✓	✗	✓	✗	✓	✓
4	✓	✓	✓	✓	✗	✓	✓
5	✓	✓	✓	✓	✓	✗	✓
6	✓	✓	✓	✓	✓	✓	✓

7	✓	✓	✗	✓	✗	✓	✓
8	✓	✓	✗	✓	✗	✓	✓

FYBSc USCH202

Course Learning Outcomes (CO) of Organic Chemistry (Paper II, SEM- II)

1. Learners will be able to understand the terms involved in chemical equilibria of different electrolytes thoroughly along with expertise in quantitative analysis from numerical data.
2. Learners will be able to understand the types of buffer solution and will be able to prepare the buffer solution using Henderson's equation.
3. Learners will be able to understand the concept of spectroscopy and different types of interaction such as electronic, vibrational and rotational transitions
4. Learners will be able to understand phenomena such as absorption, emission, scattering and fluorescence.
5. Learners will be able to understand different types of solids and the terms involved such as crystal lattice, lattice points, unit cell, space lattice and lattice plane,
6. Learners will be able to understand the laws of crystallography such as constancy of interfacial angle, symmetry and rational indices.
7. Learners will understand the basic concepts under reduction potential such as half reactions, balancing redox reactions and net reaction.
8. Learners will be able to interpret the Latimer and Frost diagrams and the understanding of the effect of pH on redox potential.

9. Learners will also be able to interpret and plot titration curves for single and multi electron systems.
10. Learners will also gain knowledge of the extraction of elements and the role of redox reagents in volumetric analysis.
11. Learners will be able to draw and compare the relative stabilities of various conformations of cycloalkanes and cyclohexane (in details).
12. Learners will get knowledge of Baeyer strain theory and their applications.
13. Learners will be able to apply the concepts of aromaticity in finding out nature (aromatic/nonaromatic/antiaromatic) of a given new molecule.
14. Learners will also understand the mechanism of various electrophilic aromatic substitution reactions along with related concepts.

Mapping of PSOs and COs (FYBSc, Paper II, Chemistry, SEM II)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✗	✓	✓	✗	✓
2	✓	✓	✗	✓	✗	✗	✓
3	✓	✓	✗	✓	✗	✓	✓

4	✓	✓	✓	✓	✓	✓	✗
5	✓	✓	✗	✓	✗	✗	✓
6	✓	✓	✗	✓	✗	✗	✓
7	✓	✓	✗	✓	✗	✗	✓
8	✓	✓	✗	✓	✗	✗	✓
9	✓	✓	✗	✓	✗	✗	✓
10	✓	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓
12	✓	✓	✓	✓	✓	✓	✓
13	✓	✓	✓	✓	✓	✓	✓
14	✓	✓	✓	✓	✓	✓	✓

USCHP2

COs for FYBSc SEM II Practical

1. Learners will be able to perform kinetic investigation for saponification reactions.
2. Learners will understand principle and working of pH-meter and determine the dissociation constant of any given acid pH-metrically.
3. Learners will understand principle, working and operation of colorimeter and verify Beer-Lambert's law colorimetrically.
4. Learners will be able to perform standardization of the given acid sample and learn safety measures for various chemicals.
5. Learners will be able to analyse cations and anions in a given mixture qualitatively.
6. Learners will be able to understand the principle of redox titration and estimate copper in a given sample quantitatively by iodometric method.
7. Learners will be able to identify an unknown organic compound by analysing its chemical nature, elements, functional group and physical constant.

Mapping of PSOs and COs (FYBSc SEM II Practical)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✗	✓
6	✓	✓	✓	✓	✓	✗	✓
7	✓	✓	✓	✓	✓	✓	✓

SYBSc: USCH301,

Course Learning Outcomes (CO) of Paper I, SEM-III

At the end of the course the learner will be able to

1. Apply the laws of thermodynamics to a chemical reaction by studying the spontaneous nature of a chemical process, changes in its free energy and variation in chemical potential and partial molal quantities with respect to temperature and pressure.
2. Learn about the interrelation of chemical and electrical changes by studying the conductivity of different electrolytes with its application to determine ionization constant, solubility, solubility product and ionic product of water.
3. Apply the knowledge of chemical bonding in calculating the lattice energy of the ionic crystals.
4. Predict the nature of magnetism and calculate the bond order of homonuclear diatomic molecules.
5. write a mechanism of nucleophilic substitution reaction.
6. know the method of preparation of organomagnesium and organolithium compounds and their reaction with organic compounds.
7. know the method of preparation of alcohol, phenol and epoxide and their reaction.

Mapping of PSOs and CLOs (SEM III Paper-I USCH301)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓

4	✓	✓	✓	✓	✓	✗	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓

USCH302: Course Learning Outcomes (CO) of Paper II, SEM-III

At the end of the course the learner will be able to

1. Apply the knowledge of collision and transition state theories of elementary and composite reactions to calculate energy.
2. Differentiate between different liquid system based on the vapour pressure-composition (and temperature) and critical solution temperature
3. Apply the knowledge of Nernst distribution law to calculate the extraction efficiency of completely immiscible liquids.
4. Understand the chemistry of Boron compounds and the preparation, structure and applications of Boron compounds.
5. Acknowledge the chemistry of Silicon and germanium along with extraction process of Germanium
6. Comment on the structure, occurrence and inert nature of silica and lay out the method for preparation of extra pure Silicon Germanium.
7. Conceptualize the chemical reactivity trends in various hydrides and halides compounds and understand the Bosch - Haber process.
8. Give nomenclature of aliphatic, alicyclic and aromatic carbonyl compounds along with their method of preparation.

9. Write general mechanisms of nucleophilic addition to carbonyl compounds and acid catalyzed nucleophilic addition reactions.

10. Write actions of different reagents on aldehyde and ketone.

11 Write mechanisms of Benzoin condensation, Knoevenagel condensation, Claisen Schmidt and Cannizzaro reaction.

12. know about keto enol tautomerism and active methylene compounds.

Mapping of PSOs and COs (SEM III Paper-II, USCH302)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✓	✓	✓
12	✓	✓	✓	✓	✓	✓	✓

USCH303: Course Learning Outcomes (CO) of Analytical Chemistry (Paper III, SEM-III)

1. The learner will be able to understand the concept, perform calculations and prepare the solutions of different concentrations (Normality, Molarity, Molality, ppm, percentage and interconversions).
2. The learner will be able to differentiate between classical and instrumental methods of analysis.
3. The learners will be able to distinguish between gravimetric and titrimetric analysis along with understanding of associated errors.
4. The learner will understand the principle, construction, working and application of colorimeter/spectrophotometer and also differentiate between the two.
5. The learners will be able to understand the process of sampling, analysis and interpretation of the results.
6. The learners will be aware of the different types of analytical instruments.
7. The learners will be able to identify, choose and apply the appropriate technique that could be used to analyse the given samples.

Mapping of PSOs and COs (Paper III, Analytical Chemistry, SEM III, USCH303)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓

1	✓	✓	✓	✗	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓

SEM-IV:

USCH401 Course Learning Outcomes (CO) of Paper I, SEM-IV

At the end of the course the learner will be able to

1. Apply the knowledge of working of a galvanic cell, with importance of Nernst equations, electrochemical series and calculations of thermodynamic properties like ΔG , ΔH , ΔS , EMF and its applications to pH determinations and various concentration cells.
2. Study the physical equilibria between different states of matter, made up of one or more chemical constituents by means of applying principles of Phase rule.
3. Find the type of hybridization present in the central metal ion/atom in a complex and predict whether the complex will be inner orbital complex or outer orbital complex.

4. Apply the knowledge in performing the qualitative tests for the various transition metal ions.
5. Explain acidity of carboxylic acid and effect of substituent on the strength of aliphatic and aromatic carboxylic acid.
6. Explain different methods of preparation of carboxylic acid and action of different reagents on carboxylic acid.
7. Explain the method of preparation of aromatic sulphonic acid, reaction of sulfonic acid and IPO substitution.

Mapping of PSOs and COs (SEM IV Paper-I: USCH401)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓

USCH402: Course Learning Outcomes (CO) of Paper II, SEM-IV

At the end of the course the learner will be able to

1. Understand the features simple cubic crystal system and predict its type based on interplanar distance in crystal structure
2. Understand the the use of x-rays in Bragg's diffraction method to elucidate the structure of crystals
3. Understand the mechanism acid- base and enzyme catalysis and the factors affecting such as catalytic activity, specificity selectivity, inhibitors, catalyst poisoning and deactivation
4. Understand the nature of ions in aqueous solutions and predict the degree of hydrolysis
5. Classify the cations on the basis of acidity and anions on the basis of basicity
6. Reason the effect of charge and radius on hydration energy and lay out the predominance diagram for various ions
7. Understand the properties of concentrated oxo-acids and suggest the measures to curb their ill effects on the environment
8. Know different methods of preparation of amine and its reaction.
9. Different methods of preparation of diazonium salt and its application.
10. The structure, reactivity, methods of preparation and reaction of heterocyclic compounds such as furan, pyrrole, thiophene and pyridine.

Mapping of PSOs and COs (SEM III Paper-II: USCH402)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓

4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓

USCH403:Course Learning Outcomes (CO) of Analytical Chemistry (Paper III, SEM-IV)

1. The learners will know the different types of techniques of separation.
2. The learners will understand the principle, working and applications as well as be able to distinguish between the techniques of chromatography, centrifugation and solvent extraction.
3. They will learn the principles, construction and working of various types of electrodes, conductometry, potentiometry, pH-metry, colorimetry and viscometry
4. The learners will gain understanding to perform conductometric, potentiometric and photometric titrations.
5. Learners will understand the concept of errors, their types and will be able to distinguish between different types of errors.
6. Learners will know the available statistical tests to validate the data and its application in analysis of the data.
7. The learners will be able to solve the numericals related to statistics w.r.t. mean mode, median, standard deviation, average deviation, variance, range confidence limit and confidence interval.

**Mapping of PSOs and COs (Paper-III, Analytical Chemistry, SEM IV:
USCH403)**

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✗	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✗	✓	✓	✓

SYBSc: SEM-IV USCHP4
COs for SEM IV Practical

1. Learners will be able to identify all the apparatus and instruments used in chemical laboratories.
2. Learners will be able to perform conductometric titration for strong acids and strong bases.
3. Learners will be able to determine the amount of acid and emf of a cell potentiometrically.
4. Learners will be able to prepare various inorganic co-ordination complexes.
5. Learners will be able to characterize given bifunctional organic compounds using chemical methods.
6. Learners will also be able to determine physical constants such as m.p. and b.p.

Mapping of PSOs and CLOs (SEM IV Practical)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓

TYBSC SEM-V

USCH501

Course Learning Outcomes (CO) of Physical Chemistry (SEM-V, Paper I)

CO1. Learners will be able to understand the basic aspects and applications of molecular spectroscopy such as rotational, vibrational, electronic and raman spectroscopy.

CO2. Learners will be able to determine rotational constant, rotational energy, vibrational energy, optical activity and raman shift from the given information.

CO3. Learners will be able to understand the basic aspects of chemical kinetics such as rates, molecularity, rate constants and order of reactions, also to understand the different theories of chemical Kinetics.

CO4. Learners will be able to determine the thermodynamic parameter such like activation of free energy, enthalpy and entropy, also understand the spontaneity of the reaction.

CO5. Learners will be able to understand the concepts of natural radioactivity, artificial radioactivity, G.M. counter and Scintillation counter technique thoroughly along with expertise to their calculation of rate of disintegration, decay constant, Q value and threshold energy from numerical data.

CO6. By the end of the course, learners will get aware about effect of radioactive material and nuclear reactions on environmental aspects.

CO7. Learners will be able to distinguish between physical and chemical adsorption also understand the different types of adsorption. Learners will also get along with the concepts of Langmuir adsorption isotherm, Gibbs adsorption isotherm and BET adsorption isotherm.

CO8. Learners will be able to understand the concept of surfactant, classification of surfactant and Applications of surfactant in daily life and chemical industries.

Mapping of PSOs and COs (SEM V Physical Chemistry)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓

USCH502-Paper II

Course Learning Outcomes (CO) of TYBSc Chemistry (Paper II, SEM-5)

1. The learners will understand the concept of symmetry element, symmetry operation and point groups.
2. The learners will be able to Classify & recognize the symmetry elements and their operations as required to specify molecular symmetry & possible point groups from symmetry elements & be able to find point group of molecule by systematic procedure
3. The learners will understand the concept of molecular orbital theory applied to heteronuclear diatomic molecules and polyatomic species.
4. The learners will learn the Chemistry of Lanthanides with reference to Occurrence, extraction, separation of individual lanthanides, properties and applications.
5. The learners will gain an understanding of solutions which have water as a solvent are called aqueous solutions and those with solvent other than water are called non-aqueous solutions.
6. The learners will be able to compare the Chemistry of Group 16 and group 17 elements and will also learn different properties.
7. They will also learn Chemistry of interhalogens with reference to preparations, properties and structures on the basis of VSEPR theory.
8. The learners will be able to apply the basic concepts of solid state chemistry, such as unit cells, lattice parameters and crystal systems.
9. The learners will learn stoichiometric Point and structure-property correlations of various inorganic solids.
10. The learners will be able to understand the superconductivity phenomenon and classification and application of superconductors

Mapping of PSOs and COs

(TYBSc, Paper II, INORGANIC Chemistry, SEM 5)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✗	✗	✗	✓	✓
2	✓	✓	✓	✓	✗	✓	✓
3	✓	✓	✓	✓	✗	✓	✓
4	✓	✓	✓	✓	✗	✗	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✗	✓	✓	✓
7	✓	✓	✓	✗	✓	✓	✓
8	✓	✓	✓	✓	✗	✓	✓
9	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓

USCH503

Course Learning Outcomes (COs) of Organic Chemistry (Paper III, SEM-V)

1. The learner will understand the basic terms and concepts involved in the study of the mechanism of Organic Reactions and will be able to distinguish between polar, non-polar and pericyclic reactions.
2. The learner will understand the basic principles and types of Photochemical reactions and the fate of photochemically excited states. It will promote the appreciation of the photochemical processes in nature.
3. The learners will be able to apply the concept of chirality without a carbon atom and be able to predict optical activity based on the structural features.
4. The learner will be able to understand the advantages and disadvantages of agrochemicals and the need for environmentally friendly agrochemicals like biopesticides.
5. The learners will be able to synthesize and analyze reactivity of different heterocyclic compounds along with their applications.
6. The learners will be able to grasp the IUPAC Nomenclature and to classify various bicyclic compounds, biphenyls, cumulenes and quinolines. They will be able to create organic compounds using the principles of Green Chemistry.
7. The learners will apply the spectroscopic techniques used to study conjugation. It will enable them to understand and will be able to solve how exact molecular weight and isotopic abundance is determined.
8. The learners will be able to evaluate structural diversity and complexity of naturally occurring organic compounds and the efforts put in by the chemists to decipher their structure.

Mapping of PSOs and COs (Paper III, Organic Chemistry Sem-V)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓

USCH504: Course Learning Outcomes (CO) of Analytical Chemistry (SEM-V, Paper IV)

1. In industry the learner will be able to keep Quality checks using chemical calculations and also able to monitor various parameters involving sampling.
2. The learner will comprehend the origin and processes of optical radiation, as well as its propagation and the phenomena that occur when light interacts with a substance.
3. Select the type of indicator which should be used for performing the redox titrations.
4. Choose the type of EDTA titration for estimating the metal ions and control the factors affecting the titration.
5. The learner will understand the concept of solvent extraction, Craig's counter current extraction, solid-phase extraction and their comparison.
6. The learner will understand the principle, instrumentation and application of High performance liquid chromatography (HPLC).
7. The learner will be able to understand the principle of high performance thin layer chromatography (HPTLC) , different type of detectors used, their advantages, disadvantages and applications

Mapping of PSOs and COs Paper-IV (SEM V Analytical Chemistry)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓

3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓

USACHFC501

Applied Theory SEM-V

After the completion of the course the learner will:

- CO.1. Understand and analyze the various economic aspects of chemical manufacturing processes w.r.t. Location, Raw material, Energy, Capital, Manpower, Ecological aspects.
- CO.2. Gain insight in the area of perfumery w.r.t. composition, raw material and other general consideration and will be able to design the model for perfume manufacturing.
- CO.3. Gain knowledge about various flavors used in food manufacture and can correlate the chemicals with their applications in the food industry.
- CO.4. Understand the concept, classification and structures of natural and few artificial Sweeteners.
- CO.5. Gain knowledge about various industrial manufacturing processes of heavy and fine chemicals w.r.t. location, raw material, energy environmental as well as economical aspects
- CO.6. Understand the construction and working principles of various pumps used in chemicals industries
- CO.7 Know about manufacture and use of different solvents such as ethyl acetate, isopropyl alcohol, acetone, acetic acid and dimethyl formamide.

CO.8 Be able to explain synthesis and use of drug such as ethambutol, Mebendazole, Benadryl, Ibuprofen, Miconazole and Diazepam.

CO.9 Know about Helix and super Helix reactions along with different fluorinating reagents.

Mapping of PSOs and COs of AC Theory Unit 3 Semester 5

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓

Practicals -USCHP5

COs for SEM V Physical Chemistry Practical

CO1. Learners will be able to identify all the apparatus and instruments used in chemical laboratories.

CO2. Learners will be able to perform various experiments and analyze samples using a conductometer, pH meter and potentiometer.

CO3. Learners will be able to do kinetic investigations of various reactions and also able to understand the effect of ionic strength on reactions.

CO4. Learners will be able to investigate the adsorption of acetic acid on activated charcoal and test the validity of Freundlich adsorption isotherm.

CO5. By the end of the course learners will be able to demonstrate the spectrometer to others confidently.

Mapping of PSOs and COs (SEM V Physical Chemistry Practical)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✗	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CO) of TYBSc Chemistry Practical (Paper II, SEM-5)

1. The learners will learn key concepts of inorganic chemistry including those related to synthesis, reaction chemistry, and structure and bonding.
2. The learners will understand the communication of the results of scientific experiments in oral reports, technical graphics, and written reports.
3. The learners will know how to follow chemical literature and to read and understand technical literature related to the qualitative analysis.
4. The learners will be able to perform different types of titrimetric analysis-iodometry titration, redox titration and complexometric titration.
5. The learners will be able to prepare various inorganic coordination complexes.

Mapping of PSOs and COs

(TYBSc, Paper II, Inorganic Chemistry Practical, SEM 5)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✗	✗	✗	✓
4	✓	✓	✓	✓	✓	✗	✓
5	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (COs) of Organic Chemistry Practicals(Sem V)

Practicals Semester V **USCHP5**

CO 1: Students will be able to identify the nature of a solid, binary mixture and will be able to separate it by chemical method.

CO 2: Students will be able to characterize the compounds based on the elemental analysis, functional group detection and confirmation of structure by determination of physical constants.

Mapping of PSOs and COs (Paper III, Organic Chemistry Sem V)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓

CO's for Analytical Chemistry Practical USCHP 504

Sem. 5: After the completion of the course the learner will:

CO 1. Be familiar with laboratory equipment, glass wares and will be competent to perform calculations in preparing solutions of various concentrations and standardize solutions of approximate strengths.

CO 2. Be able to operate and analyze the sample like water and other commercial samples like talcum powder, fertilizers using instruments like, spectrophotometer/ colorimeter,

Turbidimeter, flame photometer and equipment like reflux condenser.

CO 3. Gain competency in performing non instrumental methods of quantitative analysis like acid base titration, redox titration and complexometric titrations.

Mapping of PSOs and COs Analytical Chemistry Practical USCHP 504

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓

USACHFC5P1

COs for SEM V Applied Component Chemistry Practical

After the completion of the course the learners will be able to

CO 1: Synthesize various organic compounds by using conventional and green synthetic routes.

CO 2: Analyse and quantify the organic acids and esters from given unknown samples.

CO 3: Prepare and estimate, inorganic salts and iodine in given samples respectively.

Mapping of PSOs and COs Applied component Chemistry Practical SEM-V

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓

SEM-VI:

USCH601:

Course Learning Outcomes (CO) of Physical Chemistry (SEM-VI, Paper I)

CO1. Learners will be able to understand the basic aspects activity, activity coefficient and able to distinguish between chemical cells and concentration cells along with expertise to their calculation on emf of the cell, activity and activity coefficient.

CO2. Learners will be able to understand the basic aspects and applications of polarization, decomposition potential and overvoltage potential.

CO3. Learners will be able to understand the basic aspects and applications of molar mass of polymers, light emitting polymers, antioxidants and stabilizers.

CO4. Learners will be able to understand the basic aspects of polymers, classification of polymers and method of determining molar masses of polymers.

CO5. Learners will be able to understand the basic aspects and applications of classical mechanics, quantum mechanics, different types of operators and Eigen value equation.

CO6. By the end of the course, learners will get aware about solar cells, photovoltaic effect, silicon solar cell, fuel of the future and advantages of hydrogen as a universal energy medium.

CO7. Learners will be able to understand the basic aspects and applications of chemical shift, spin - spin relaxation, spin-lattice relaxation from NMR spectroscopy and also g- factor, hyperfine splitting and ESR spectrum of hydrogen and deuterium.

CO8. By the end of the course, learners will be able to distinguish between NMR spectroscopy technique and ESR Spectroscopy technique and also learners will interpret the NMR, ESR spectrum of Organic and Inorganic compounds.

Mapping of PSOs and COs (SEM VI Physical Chemistry)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓

3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓

USCH602 - Paper II

Course Learning Outcomes (CO) of TYBSc Chemistry (Paper II, SEM-6)

1. The learners will understand limitations of Valence Bond Theory and Crystal Field Theory and effect of crystal field on central metal valence orbitals in various geometries from linear to octahedral (from coordination number 2 to coordination number 6).
2. They will learn the consequences of crystal field splitting on various properties such as ionic radii, hydration energy and enthalpies of formation of metal complexes and limitations of CFT
3. The learners will gain an understanding of molecular orbital theory for coordination compounds by construction of ligand group orbitals and s-molecular orbitals for an ML_6 complex with various examples.
4. The learners will be able to compare the stability of Metal-Complexes with respect to Thermodynamic and kinetic perspectives of metal complexes with examples.
5. The learners will be able to know reactivity of metal complexes and different types of substitution reaction like SN_1 and SN_2 , and difference between acid hydrolysis & base hydrolysis and anation reactions.

1	✓	✓	✓	✓	✗	✓	✓
2	✓	✓	✗	✓	✓	✓	✓
3	✓	✓	✗	✓	✓	✗	✓
4	✓	✓	✓	✗	✓	✓	✓
5	✓	✓	✓	✓	✗	✓	✓
6	✓	✗	✓	✓	✗	✓	✓
7	✓	✗	✓	✓	✓	✓	✓
8	✓	✓	✓	✗	✓	✓	✓
9	✓	✓	✓	✗	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓
11	✓	✓	✓	✓	✗	✓	✓
12	✓	✓	✓	✓	✗	✓	✓

13	✓	✓	✓	✓	✗	✓	✓
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USCH603

Course Learning Outcomes (COs) of Organic Chemistry(Paper III, SEM-VI)

1. The learners will understand the concept of enantioselectivity, enantiospecificity, diastereoselectivity and diastereospecificity and will also be able to distinguish between enantiotopic and diastereotopic faces of different atoms, groups and faces.
2. The learners will be able to apply the above concepts in understanding the stereochemistry of different substitution, elimination and addition reactions.
3. The learners will be able to explore the general structure of the building blocks of life supporting proteins, their configuration, properties and synthesis.
4. The learners will understand and will be able to identify different types of rearrangement reactions along with their stereochemistry, and synthetic utility of conjugate addition and Wittig reaction.
5. The learners will be able to draw the structure of carbohydrates using the Fischer projection and Haworth formula along with understanding the synthesis, reactions and stereochemistry of carbohydrates.
6. The learners will understand the basic principles and theory of IR and NMR spectroscopy and will be able to elucidate the architecture of an organic compound using UV-Visible, Mass, IR, and NMR Spectroscopic techniques.
7. Learners will be enabled to derive and draw the structure of DNA and the genetic code on a molecular level.

8. The learners will understand the concept of polymers along with their stereochemistry, design the synthesis of eco-friendly polymers based on their classification.
9. The learners will be able to distinguish between the uses and applications of various reagents and catalysts with respect to functional group transformations and their selectivity.

Mapping of PSOs and COs (Paper III, Organic Chemistry Sem VI)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓

**USCH604:Course Learning Outcomes (CO) of Analytical Chemistry
(SEM-VI, Paper IV)**

1. Apply the concept of Polarography in determining the qualitative and quantitative aspects of metal ions.
2. Use the knowledge of polarography in understanding the recent techniques of voltammetry.
3. The learners will be able to understand the principle, instrumentation and applications of gas chromatography(GC).
4. The learners will understand the principle, types and mechanism of Ion exchange chromatography and its applications.
5. Learners would be able to use the concepts for food processing and storage processes in industry.
6. Learners will be able to investigate the sensory properties of cosmetics and their sensory assessment in manufacturing units.
7. The students will be able to analyse solid samples such as inorganic precipitates, glass materials, and ceramics using various techniques of thermal methods in chemical laboratories and industries.

Mapping of PSOs and COs Paper-IV (SEM VI Analytical Chemistry)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓

3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓

USACHFC601

APPLIED COMPONENT SEM-VI

After the completion of the course the learner will:

CO 1. Gain knowledge about various aspects of small scale industries like scope, functioning, rules & regulations

CO 2. Develop the understanding of Research and Development w.r.t. structure, functioning, role and impact.

CO 3. Understand the concept, process, types and application of technology transfer and will develop the understanding of the patent and its importance.

CO 4. Be familiar with the process of manufacturing of soap with emphasis on the raw material w.r.t. oils and fats and other components, reaction and design of plants.

CO 5. Gain knowledge about refrigeration and different sources of energy required in industries

CO 6. Understand various industrial manufacturing processes and its application such as sulphuric acid, ammonia, sodium hydroxide, acetylene and hydrogen.

CO 7. Understand the importance of zeolites, clays, ion exchange resins, glass, composite materials, chemical reactors and storage vessels.

CO 8.Be able to explain the different unit operations used in industry such as filtration, distillation, crystallization and centrifugation.

CO 9 Learner will be able to explain synthesis and use of dyes- Indigo, Alizarin,Eriochrome black T,Auramine O,Procion red and Congo red.

Mapping of PSOs and COs of AC Theory Semester 6

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓

Practicals : USCHP6

SEM-VI: Practical

COs for SEM VI Physical Chemistry Practical

CO1. Learners will be able to identify all the apparatus and instruments used in chemical laboratories

CO2. Learners will be able to perform conductometric titration for acids mixtures and strong bases.

CO3. Learners will be able to determine the amount of halides, emf of a cell and number of electrons involved in a redox reaction by potentiometrically.

CO4. Learners will be able to determine the molecular weight of polymers by using Ostwald's viscometer.

CO5. Learners will understand the calculation of thermodynamic activation parameters with the help of kinetic parameters.

Mapping of PSOs and COs (SEM VI Physical Chemistry Practical)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓

4	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CO) of TYBSc Chemistry Practical (Paper II, SEM-6)

1. The learners will learn key concepts of inorganic chemistry including those related to synthesis, reaction chemistry, and structure and bonding
2. The learners will understand the communication of the results of scientific experiments in oral reports, technical graphics, and written reports
3. The learners will know how to follow chemical literature and to read and understand technical literature related to the qualitative analysis.
4. The learners will be able to perform complexometric titrations by using different indicators and various conditions
5. The learners will be able to prepare various inorganic coordination complexes.
6. The learners will understand and Design a green synthesis using principles of prevention of waste/by-products/toxic products, atom economy.

Mapping of PSOs and COs

(TYBSc, Paper II, Inorganic Chemistry Practical, SEM 6)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✗	✓
2	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✗	✗	✗	✓
4	✓	✓	✓	✓	✓	✗	✓
5	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (COs) of Organic Chemistry Practicals(SemVI)

Practicals Semester VI USCHP6

CO 1: Students will be able to identify the nature of a liquid, binary mixture and will be able to separate it by a physical method.

CO 2: Students will be able to characterize separated solid and volatile liquid based on the elemental analysis, functional group detection and confirmation of structure by determination of physical constants.

Mapping of PSOs and COs (Organic Chemistry Practicals Sem VI)

COs	PSOs						
	1	2	3	4	5	6	7
1	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓

CO's for Analytical Chemistry Practical USCHP 604

Sem. 6: After the completion of the course the learner will:

- CO.1. Gain expertise to operate and analyze the sample like water and other commercial samples like vinegar and cola, using instrumental methods of quantitative analysis like, spectrophotometer/colorimeter, pHmeter and potentiometer .
- CO.2. Be able to perform technique like ion exchange chromatography using exchange resins and carry out separation and quantification..
- CO.3. Be able to analyse sugar content in food sample like honey by titration using iodine and principle of redox reaction such as Wilstatter method.

Mapping of PSOs and COs Analytical Chemistry Practical USCHP 604

1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓

Programme Name: BA Economics

Programme Educational Objectives (PO/PEOs)

PO1: To demonstrate comprehensive knowledge and understanding of major concepts and theoretical principles in Economics and its different subfields.

PO2: To encourage students to think critically on economic and social issues.

PO3: To enable students to express their views and opinions in a clear and concise manner.

PO4: To encourage students to learn from each other by working together as a team.

PO5: To encourage students to acquire research skills.

PO6: To foster the spirit of global citizenship among the students in a rapidly globalized world.

PO7: To motivate students to be lifelong learners.

PO8: To build confidence among the students in their potentials.

PO9: To inculcate within the students moral/ethical values in their day to day lives.

PO10: To demonstrate the ability to use ICT in a variety of learning situations.

Programme Specific Outcomes (PSOs)

At the end of the FYBA Economics programme, the learner will be able to;

PSO1. To define Microeconomic theory and its importance.

PSO2. To discuss the Basic Economic problems.

PSO3. To illustrate Graphs and diagrams, as well as the slopes and Intercepts of lines.

PSO4. To describe a Market and distinguish between the different types of Markets.

PSO5. To examine the behaviours of Consumers and Producers in different circumstances.

PSO6. To construct Indifference curves and Analyse the behaviour of Individual consumers.

PSO7. To derive the Demand curve and Supply curves.

PSO8. To describe the decision-making process of a firm through a recognition of the basic concepts related to production.

PSO9. Recall basic concepts related to production, costs, revenue, distribution of Income.

PSO10. To identify the behaviour of the firm in different time periods and evaluate the firm's behaviour in the market.

PSO11. To critique the behaviour of the firm and develop ideas for the firm to grow more into the economy.

PSO12. To employ different combination of Inputs that can be used in the Production process in different time periods.

PSO13. To recall the different factors of production and the reward to those factors of production, evaluate the contribution of respective factors in production process compare the returns to those factors of production.

FYBA Microeconomics I - Course Learning Outcomes (CLOs)

CO1. To discuss the operation of markets and illustrate their benefits of increased efficiency and welfare.

CO2. Demonstrate the behaviour of human beings in everyday life.

CO3. To evaluate and predict consequences of economic policy.

CO4. To interpret the working or functioning of different sectors of the Economy.

CO5. To develop an appropriate allocation and distribution of scarce resources.

CO6. To interpret the Economic theories in words and also graphically or formulate them mathematically.

CO7. To describe Individual consumer behaviour and level of satisfaction.

CO8. To evaluate the concept of the budget line and analyse the behaviour of consumers with a given budget.

Mapping for FYBA Microeconomics I

	PSO									
CO	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	✓	x	x	x	x
2	x	x	x	x	x	✓	x	x	x	x
3	✓	x	x	x	x	x	x	x	x	x
4	x	x	x	✓	x	x	x	x	x	x
5	✓	✓	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	✓	✓	✓
7	x	x	x	x	✓	✓	x	x	x	x
8	x	x	x	x	✓	✓	✓	x	x	x

FYBA Microeconomics II - Course Learning Outcomes (CLOs)

CO1- To solve the problem of combining various inputs to produce certain level of output.

CO2- To develop a model which will help a producer to maximise profits by minimising cost.

CO3- To schedule the relationship between costs for different levels of output.

CO4- To value a factor of production and the returns to factors used in production process accordingly.

CO-5- To evaluate different forms of markets and examine the levels of profit in different time periods.

CO6- To classify the Revenue and examine the Revenue earned by the firm in different forms of market.

Mapping for FYBA Microeconomics II

CO	PSO											
	1	2	3	4	5	6	7	8	9	10	11	12
1	x	x	x	x	x	x	x	x	x	✓	x	x
2	x	x	x	x	x	x	x	x	x	x	✓	x
3	x	x	x	x	x	x	x	x	✓	x	x	x
4	x	x	x	x	x	x	x	x	x	x	x	✓
5	✓	✓	x	x	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	x	✓	x	x	x

SYBA Economics Programme Specific Outcomes (PSOs)

At the end of the SYBA Economics programme, the learner will be able to;

PSO1- To Define Aggregates in useful manner and to examine how they are related and determined.

PSO2- To illustrate the measures of national income and compare National Income on the basis of different concepts of national income.

PSO3- To examine the role of consumption and Investment, and argue on the role of the state Intervention.

PSO4- To discuss the effects of the Great depression faced by countries all over the world and examine the way through which other countries moved on the path of recovery.

PSO5- To recall the functions of money and constituents of money, velocity of money and effects on economy.

PSO6- To evaluate the demand for money and measures of Money supply.

PSO7- To discuss the process of multiple credit creation, examine the process of deposits and credit multiplier.

PSO8- To describe the instruments of monetary policy, aim at controlling supply of and demand for money.

PSO9- To describe the instruments of fiscal policy, aim at maintaining stability in the long run.

PSO10- To distinguish between Public finance and Private finance and Public good and Public bad.

PSO11- To discuss the concept of Environmental sustainability, design the framework which supports Environmental sustainability.

PSO12- To examine the structural change in the Indian Economy and in the Foreign trade.

PSO13- To describe the process of development since 1951 till before pandemic 2019.

PSO14- To apply mathematical and statistical skills in solving problems.

PSO15- To meaningfully express primary data using tables and graphs.

PSO16- To illustrate slopes and intercepts of lines.

SYBA Sem III Macroeconomics - Course Learning Outcomes (CLOs)

CO1- To argue on the Economic ups and downs at the Aggregate level and their interrelations.

CO2- To evaluate national income and interpret the data.

CO3- To illustrate the Trade cycle or Business cycles and to formulate policies.

CO4- To construct a model on Income generation schemes and policies.

CO5- To compare the behaviour of consumption and Savings at various levels and construct the schedule for the propensity to Consume and save.

CO6- To describe the Income generation process and support policy making and stabilisation of aggregate demand.

CO7- To recognise the Modern measures of money and its velocity in circulation

CO8- To illustrate the Process of multiple credit creation by Commercial bank, examine the process of Deposits or Credit multiplier

Mapping for SYBA Sem III Macroeconomics

CO	PSO												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	✓	x	x	x	x	x	x	x	x	x	x	x	x
2	x	✓	x	x	x	x	x	x	x	x	x	x	x
3	x	x	x	✓	x	x	x	x	x	x	x	x	x
4	x	x	x	x	✓	✓	x	x	x	x	x	x	x
5	x	x	✓	x	x	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	✓	✓	x	x	x	x
7	x	x	x	x	✓	x	x	x	x	x	x	x	x
8	x	x	x	x	x	x	✓	x	x	x	x	x	x

SYBA SEM III APPLIED COMPONENT EQT-I

CO1: To explain the concept, characteristics, functions, limitations and uses of statistics.

CO2: To collect and analyse primary and secondary data.

CO3: To construct tables and graphs in order to express primary and secondary data meaningfully.

CO4: To discuss the advantages and disadvantages of the different methods of sampling.

CO5: To understand and use the different measures of central tendency.

CO6: To understand and use the different measures of dispersion.

CO7: To distinguish between a univariate frequency distribution and a bivariate frequency distribution.

CO8: To understand the concept of correlation and discuss the types of correlation.

CO9: To distinguish between the concepts of correlation and causation.

CO10: To identify and use concepts of elementary probability theory.

CO11: To solve problems on financial statistics such as profit and loss, simple and compound interest and growth and depreciation.

Mapping for SYBA SEM III APPLIED COMPONENT EQT-I

COs	PLOs																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
3	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
4	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
7	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x
8	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
11	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x

SYBA SEM IV APPLIED COMPONENT EQT-II

CO1: To identify the slope and intercept of a linear equation.

CO2: To obtain the equation of a straight line using the slope intercept formula and the two-point formula.

CO3: To recognize the applications of linear equations in business and economics.

CO4: To graph functions using the cartesian coordinate system.

CO5: To identify the different types of functions such as constant, linear, quadratic, cubic, rational and power functions.

CO6: To graph linear and quadratic equations.

CO7: To understand the concept of a limit of a function and to solve sums on limits.

CO8: To examine the relationship between differentiability and continuity.

CO9: To understand and use the rules of differentiation in solving sums on derivatives.

CO10: To represent mathematical equations in a concise manner through the use of matrices and to solve sums on matrices.

CO11: To formulate a linear programming problem and attain a graphical solution.

CO12: To solve sums using special types of sequences such as arithmetic and geometric progressions.

Mapping of SYBA SEM IV APPLIED COMPONENT EQT-II

COs	PLOs															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	✓
2	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	✓
3	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	✓
4	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	✓
5	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
6	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
7	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
8	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
9	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
10	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x
11	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	✓	x
12	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x

TYBA Economics Programme Specific Outcomes (PSOs)

At the end of the TYBA Economics programme, the learner will be able to;

PEO1: Compare the contributions of the classical economists with those of the modern economists.

PEO2: Examine the pressing problems on the path of development such as inequality, poverty and technological advancement.

PEO3: Critically evaluate the role of policy in solving the pressing problems on the path of development such as inequality, poverty and technological advancement.

PEO4: To apply mathematical and statistical skills in solving problems.

PEO5: To formulate an econometric model in order to understand the working of a particular economic system.

PEO6: To appraise models which explain the composition, direction and consequences of international trade and the determinants and effects of trade policy.

PEO7: To classify different forms of markets and illustrate the models given by various Economists.

PEO8: To solve the problems using computer application in research analysis.

PEO9: To discuss sustainable development and evaluate the policy measures for sustainable development.

PEO10: To discuss the Global financial crisis and design measures to tackle such problems.

TYBA SEMESTER 5

Paper VII Microeconomics

CO1- To identify the market and examine the profit maximisation in that particular market.

CO2- To describe game theory and construct the direction through which producer maximises profit.

CO3- To Evaluate the Public policy towards monopoly.

CO4- To examine the General equilibrium and formulate policy to maximise social welfare

CO5- To examine the Partial equilibrium and formulate policy to maximise social welfare.

CO6- To identify oligopoly market on the basis of various oligopoly models.

CO7- To evaluate the pareto optimality conditions and design to achieve the social welfare.

CO8- To design compensation models and use them to maximise social welfare.

CO9: To describe general equilibrium and argue for the social welfare using Edgeworth box diagram.

CO10: To discuss the behaviour the producers in the market and strategies used to maximise profit.

Mapping for Paper VII Microeconomics

CO	PSO									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	✓	x	x	x
2	x	x	x	✓	x	x	✓	x	x	x
3	x	x	x	x	x	x	✓	x	x	x
4	x	✓	x	x	x	x	x	x	x	x
5	x	✓	x	x	x	x	x	x	x	x
6	x	x	x	x	x	✓	✓	x	x	x
7	x	x	✓	✓	x	x	x	x	x	x
8	x	x	✓	✓	x	x	x	x	x	x
9	x	✓	x	x	x	x	x	x	x	x
10	x	x	✓	x	x	x	x	x	x	x

Paper VIII Economics of Development

CO1: To distinguish between the concepts of economic growth and economic development.

CO2: To appraise the Human Development Index (HDI) as it measures economic development in terms of the quality of life of the people.

CO3: To investigate the distribution of benefits of economic growth among different groups within society by using the Gender Development Index (GDI).

CO4: To critically examine the structural changes that take place during the development process through the developmental theories of Rosenstein-Rodan, Joseph Schumpeter, Arthur Lewis and Robert Solow.

CO5: To analyse the role of education, health and nutrition in economic development.

CO6: To evaluate and interpret the extent of poverty through the use of the poverty line, headcount index, poverty gap, Human Poverty Index and Multidimensional Poverty Index.

CO7: To evaluate and interpret the extent of inequality through the use of the Lorenz curve and Gini coefficient.

CO8: To critically examine the role of policy in alleviating poverty and inequality.

CO9: To investigate the role of micro financial institutions and self-help groups in bringing about inclusive growth.

CO10: To assess the role of technology in economic development.

CO11: To appraise the importance of green technology in today's globalized world.

Mapping for Paper VIII Economics of Development

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
2	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗
3	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗
4	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗
5	✗	✓	✓	✗	✓	✗	✗	✗	✓	✗
6	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗
7	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗
8	✗	✓	✓	✗	✓	✗	✗	✗	✗	✗
9	✓	✓	✗	✗	✗	✗	✗	✗	✓	✗
10	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗
11	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗

Paper X Research Methodology

CO1- To recall the steps in the research process.

CO2- To prepare the research design and discuss the ethical issues relating to research.

CO3- To collect and use both Primary and Secondary data

CO4- To solve problems using statistical tools for economic analysis.

CO5- To illustrate socio-economic data through classification, tabulation, graphical representation.

CO6- To classify sampling techniques and examine the methods of sampling.

CO7: To discuss the ethical issues in research.

CO8: To experiment web research in research process and use advanced research techniques.

CO9: To classify the types of data and collection of the data in research process.

CO10: To employ the modern analytical tools and techniques related to economic decision making.

Mapping for Paper X Research Methodology

CO	PSO									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	✓	x	x	x	x	x	x
2	x	x	x	✓	x	x	x	x	x	x
3	x	x	x	✓	x	x	x	x	x	x
4	x	x	x	✓	x	x	x	x	x	x
5	x	x	x	✓	x	x	x	x	x	x
6	x	x	x	✓	x	x	x	x	x	x
7	x	x	x	✓	x	x	x	x	x	x
8	x	x	x	x	x	x	x	✓	x	x
9	x	x	x	x	x	x	x	✓	x	x
10	x	x	x	x	x	x	x	✓	x	x

Paper X Mathematical and Statistical Techniques for Economic Analysis

CO1: To analyse the microeconomic applications of equations and graphs.

CO2: To explain the concept of a derivative and apply the rules of differentiation to various areas of economic analysis.

CO3: To represent mathematical equations in a concise manner through the use of matrices and to solve sums on matrices.

CO4: To formulate a linear programming problem and attain a graphical solution.

CO5: To analyse primary and secondary data.

CO6: To prepare tables and graphs using primary and secondary data.

CO7: To understand and use the different measures of central tendency.

CO8: To understand and use the different measures of dispersion.

CO9: To analyse the different concepts related to elementary probability theory.

CO10: To distinguish between discrete (Binomial distribution) and continuous (Normal distribution) distributions.

CO11: To calculate the area under a standard normal curve.

Mapping for Paper X Mathematical and Statistical Techniques for Economic Analysis

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	✓	x	x	x	✓	x	x
2	x	x	x	✓	✓	x	x	x	x	x
3	x	x	x	✓	✓	x	x	✓	x	x
4	x	x	x	✓	✓	x	x	✓	x	x
5	x	✓	x	✓	✓	x	x	✓	x	x
6	x	✓	x	✓	x	x	x	✓	x	x
7	x	x	x	✓	x	x	x	✓	x	x
8	x	x	x	✓	x	x	x	✓	x	x
9	x	x	x	✓	x	x	x	x	x	x
10	x	x	x	✓	x	x	x	✓	x	x
11	x	x	x	✓	x	x	x	✓	x	x

Paper XI Introduction to Econometrics

CO1: To describe the concept of a random variable.

CO2: To differentiate between discrete and continuous random variables.

CO3: To calculate the mean and variance of a discrete random variable.

CO4: To solve sums on discrete random variables using the Bernoulli distribution, the Binomial distribution and the Poisson distribution.

CO5: To solve sums on continuous random variables using the Normal distribution.

CO6: To construct a table representing jointly distributed random variables.

CO7: To calculate the degree of the relationship existing between the jointly distributed random variables through the use of the concepts of correlation and partial correlation.

CO8: To examine the different types of distributions (Z, t, chi-square and F) and realize their importance in drawing statistical inferences.

CO9: To distinguish between the concepts of correlation and regression.

CO10: To analyse the classical assumptions of a two variable regression model under the method of Least Squares.

CO11: To assess the properties of the OLS estimators under the classical assumptions.

Mapping for Paper XI Introduction to Econometrics

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x	x
3	x	x	x	✓	x	x	x	✓	x	x
4	x	x	x	✓	x	x	x	✓	x	x
5	x	x	x	✓	x	x	x	✓	x	x
6	x	x	x	✓	✓	x	x	✓	x	x
7	x	x	x	✓	✓	x	x	✓	x	x
8	x	x	✓	✓	✓	x	x	✓	x	x
9	x	✓	x	x	✓	x	x	x	x	x
10	x	x	x	x	✓	x	x	x	x	x
11	x	x	x	x	✓	x	x	✓	x	x

Paper XIV International Economics

CO1: To examine the scope and subject matter of international trade.

CO2: To differentiate between domestic and international trade.

CO3: To gain an overview of world trade.

CO4: To distinguish between Adam Smith's theory of Absolute Cost Advantage and David Ricardo's theory of Comparative Cost Advantage.

CO5: To critically examine the modern theories of international trade.

CO6: To appraise the emerging trends/concepts in international trade such as BPOs, global supply chain, monopolistic competition and foreign direct investment.

CO7: To examine the instruments of trade policy such as tariffs and non-tariff barriers used in international trade.

CO8: To critically examine the controversies with respect to labour standards, intellectual property rights and the environment in international trade.

CO9: To appraise the role of the GATT and GATS in international trade.

CO10: To examine the impact of regional trading agreements (ASEAN, SAARC, SAFTA) in international trade.

CO11: To critique protectionist trade policies in international trade.

Mapping for Paper XIV International Economics

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x	x
3	x	x	x	x	x	x	x	x	✓	x
4	✓	x	x	✓	✓	✓	✓	x	x	x
5	✓	x	x	✓	✓	✓	✓	x	x	x
6	x	✓	x	x	x	✓	x	x	✓	x
7	x	x	✓	x	x	✓	x	x	✓	✓
8	x	✓	✓	x	x	✓	x	x	✓	✓
9	x	✓	✓	x	x	✓	x	x	✓	x
10	x	x	x	x	x	✓	x	x	✓	x
11	x	x	✓	x	x	✓	x	x	x	✓

Paper XVI Mathematical and Statistical Techniques for Economic Analysis

CO1: To understand the concept of multivariable functions.

CO2: To utilize the techniques and applications of partial derivatives in the economic analysis of multivariable functions.

CO3: To optimize multivariable functions using partial derivatives.

CO4: To distinguish between the concept of a derivative and an integral.

CO5: To solve sums on integral calculus.

CO6: To apply the rules of integration in solving sums on present value, consumer surplus, producer surplus and the learning curve.

CO7: To distinguish between the concepts of correlation and regression.

CO8: To examine the relationship between correlation coefficients and regression coefficients.

CO9: To evaluate the different methods of studying correlation.

CO10: To appraise the different types of index numbers and their uses.

CO11: To examine the components of a time series.

Mapping for Paper XVI Mathematical and Statistical Techniques for Economic Analysis

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	✓	x	x	x	✓	x	x
2	x	x	x	✓	x	x	x	✓	x	x
3	x	x	x	✓	x	x	x	✓	x	x
4	x	x	x	✓	x	x	x	✓	x	x
5	x	x	x	✓	x	x	x	✓	x	x
6	x	x	x	✓	x	x	x	✓	x	x
7	x	x	x	✓	✓	x	x	✓	x	x
8	x	x	x	✓	✓	x	x	✓	x	x
9	x	x	x	✓	✓	x	x	✓	x	x
10	x	x	x	✓	x	x	x	✓	x	x
11	x	x	x	✓	✓	x	x	✓	x	x

Paper XVI Research Methodology

CO1- To test the correlation between the variables

CO2 – To illustrate graphically the relation between the variables

CO3- To examine the variables and evaluate the data and solve for unknown variables

CO4- To forecast the values for the future date

CO5- To formulate and test the hypothesis

CO6- To recall the steps of writing a research report.

CO7- To write a research report.

CO8- To classify index number and evaluate the data

CO9- To formulate policies and strategies for Aggregate levels

CO10- To illustrate the graphical representation of the data (scatter diagram)

CO11- To predict or estimate one variable knowing the value of another variable.

Mapping for Paper XVI Research Methodology

CO	PSO									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	✓	x	x	x	x	x	x
2	x	x	x	✓	x	x	x	x	x	x
3	x	x	x	x	x	x	x	x	x	x
4	x	x	x	x	x	x	x	x	x	x
5	x	x	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	✓	x	x
7	x	x	x	x	x	x	x	✓	x	x
8	x	✓	x	x	x	x	x	✓	x	x
9	x	x	x	x	x	x	x	✓	x	x
10	x	x	x	x	x	x	x	✓	x	x

Paper XVII Theory and Practice of Econometrics

CO1: To recall the concept of an econometric model.

CO2: To understand the art of model building.

CO3: To construct/build an econometric model and estimate its parameters.

CO4: To forecast future values of the parameters of an econometric model.

CO5: To discuss the failure of the classical assumptions namely multicollinearity, auto-correlation and heteroskedasticity.

CO6: To examine the components of a time series.

CO7: To decompose a time series into its components using the additive and multiplicative models.

CO8: To critically examine the limitations of econometric forecasts.

CO9: To formulate a linear programming problem and attain a graphical solution.

CO10: To obtain an optimum solution to a linear programming problem by using the simplex method.

CO11: To minimize the cost of transporting commodities from their origins to their destinations by using transportation models.

Mapping for Paper XVII Theory and Practice of Econometrics

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	✓	x	x	x	x	x
2	x	x	x	x	✓	x	x	x	x	x
3	x	✓	✓	✓	✓	x	x	✓	x	x
4	x	✓	✓	✓	✓	x	x	✓	x	x
5	x	x	x	✓	✓	x	x	✓	x	x
6	x	x	x	x	x	x	x	x	x	x
7	x	x	x	✓	x	x	x	✓	x	x
8	x	x	x	x	✓	x	x	x	x	x
9	x	x	x	✓	x	x	x	✓	x	x
10	x	x	x	✓	x	x	x	✓	x	x
11	x	x	x	✓	x	x	x	✓	x	x

Paper XVIII International Trade, Policy and Practice

CO1: To distinguish between inter-regional trade and international trade.

CO2: To examine the role of dynamic factors; change in tastes, technology and the role of factor accumulation in international trade.

CO3: To inspect the process of foreign exchange rate determination.

CO4: To critically examine the interrelationship between exchange rates and interest rates.

CO5: To assess the evolution of India's exchange rate regime.

CO6: To distinguish between Regionalism Vs Multilateralism.

CO7: To analyse the emergence of regional free trade agreements.

CO8: To debate on the importance of bilateral investment treaties while investing in emerging markets.

CO9: To discuss the importance of double taxation avoidance agreements in promoting economic trade and investment between countries.

CO10: To investigate the factors that are responsible for determining foreign investment.

CO11: To assess the role of foreign capital flows namely foreign institutional investment, foreign portfolio investment and foreign direct investment.

Mapping for Paper XVIII International Trade, Policy and Practice

COs	PLOs									
	1	2	3	4	5	6	7	8	9	10
1	x	x	x	x	x	✓	x	x	x	
2	x	x	x	x	✓	✓	x	x	✓	✓
3	x	x	x	x	x	✓	x	x	x	✓
4	x	x	x	x	x	✓	x	x	x	✓
5	x	x	x	x	x	✓	x	x	x	✓
6	x	x	x	x	x	✓	x	x	x	x
7	x	x	x	x	x	✓	x	x	x	x
8	x	x	x	x	x	✓	x	x	✓	✓
9	x	x	x	x	x	✓	x	x	✓	✓
10	x	x	x	x	✓	✓	x	x	x	✓
11	x	x	x	x	✓	✓	x	x	✓	✓

"HINDI-Outcome Based Education and Assessment"

शिक्षा और मूल्यांकन पर आधारित परिणाम

Program Objective / Program Education Objective (PO=PEO)___

शिक्षा का अभिप्राय और उद्देश्य

- 1) विद्यार्थियों को हिंदी में बोलने, पढ़ने, लिखने की क्षमता प्रदान करने के साथ-साथ अधिक से अधिक व्यवहार में लाने हेतु प्रोत्साहित करना।
- 2) विद्यार्थियों के मन हिंदी साहित्य और भाषा के साथ ही अपनी मातृभाषा के प्रति सम्मान, प्रेम और आत्मीयता का भाव उत्पन्न करना।
- 3) विद्यार्थियों में हिंदी साहित्य के माध्यम भारत के शहरी और ग्रामीण जीवन की सभ्यता-संस्कृति से अवगत कराते हुए नैतिक एवं मानवीय मूल्यों का विकास करना, शोधपरक गतिविधियों को बढ़ावा देना।
- 4) विद्यार्थियों में हिंदी साहित्य और जनसंचार माध्यम से सर्वधर्म समभाव रखते हुए वैश्विक धरातल पर विभिन्न संस्कृतियों के प्रति "वसुधैव कुटुम्बकम्" की भावना को विकसित करना।
- 5) विभिन्न साहित्यिक गतिविधियों और आयोजनों के माध्यम से विद्यार्थियों में नेतृत्व की क्षमता, आत्मविश्वास और सतत रूप से आत्म-निर्देशन में सीखने हेतु प्रोत्साहित करना।
- 6) हिंदी भाषा में डिजिटल साक्षरता को बढ़ावा देते हुए 'हिंदी और करियर' की संभावनाओं और सीमाओं के प्रति विद्यार्थियों को सजग एवं जागरूक बनाकर भाषायी-कौशल को विकसित कर रोजगारोन्मुख बनाना।
- 7) विद्यार्थियों को हिंदी की मध्यकालीन और आधुनिक कालीन पद्य विधाओं की प्रसिद्ध, प्रचलित रचनाओं एवं परिवेश की जानकारी प्रदान करते हुए दार्शनिक, सामाजिक, राष्ट्रीय, मानवीय और नवीनतम आधुनिक जीवन शैली संबंधी मूल्यों का परिचय कराना।
- 8) हिंदी काव्य के मध्यकाल से लेकर अद्यतन काव्य की प्रवृत्तियों एवं कविता के विकास से अवगत कराते हुए काव्य के सामाजिक, मानवीय सरोकारों के साथ पर्यावरण-चेतना को समृद्ध करना।

- 9) काव्य के अंतर्गत प्रयुक्त विभिन्न शैलियों का परिचय कराते हुए उसकी शिल्पगत बनावट के साथ जीवन के क्षेत्र में काव्य की उपादेयता को दर्शाना।
- 10) जनसंचार माध्यम और प्रयोजनमूलक भाषा की जानकारी देते हुए कार्यालयीन तथा अन्य व्यवहार क्षेत्रों में हिंदी भाषा के व्यवहार एवं प्रयोग हेतु प्रशिक्षित करते हुए लेखन कौशल का विकास कराना।
- 11) विद्यार्थियों में हिंदी साहित्य के माध्यम से लैंगिक समानता और स्त्री को सशक्त बनाने की भावना उत्पन्न करना।

Program Learning Outcome Or Program Specific Outcome (PLO=PSO)

(सीखने के प्रतिफल या परिणाम)

- 1) विद्यार्थी, व्याकरणिक दृष्टि से अपेक्षाकृत शुद्ध हिंदी भाषा को व्यवहार में लाएँगे और रचनात्मक लेखन द्वारा उनकी सृजनात्मक क्षमता समृद्ध होगी।
- 2) विद्यार्थी गद्य-पद्य की विभिन्न शैलियों, शिल्पगत बनावट से परिचित होंगे और जीवन में उसकी उपादेयता का विश्लेषण करने में सक्षम होंगे।
- 3) विद्यार्थियों में हिंदी काव्य, कहानी और उपन्यास साहित्य के माध्यम से वैश्विक धरातल पर सर्वधर्म समभाव रखते हुए "वसुधैव कुटुम्बकम्" की भावना का विकास होगा, नैतिक एवं मानवीय मूल्यों का विकास होगा, जिससे उनके अंदर सोचने, समझने, मूल्यांकन करने और स्वतंत्र निर्णय लेने की क्षमता का विकास होगा।
- 4) विद्यार्थियों में हिंदी साहित्य के माध्यम से लैंगिक समानता और स्त्री सशक्तिकरण की भावना समृद्ध होगी।
- 5) विभिन्न साहित्यिक, रचनात्मक गतिविधियों द्वारा विद्यार्थी आत्म-निर्देशन में सतत रूप से सीखते हुए नेतृत्व करने में सक्षम होंगे जिससे उनका आत्मविश्वास बढ़ेगा।
- 6) विद्यार्थियों में माध्यमोपयोगी लेखन जैसे मीडिया लेखन, फिल्म और पुस्तक समीक्षा, समाचार

लेखन, संवाद लेखन, साक्षात्कार आदि द्वारा शोधपरक गतिविधियों को बढ़ावा मिलेगा।

- 7) विद्यार्थी प्रयोजनमूलक हिंदी में भाषायी-कौशल और डिजिटल साक्षरता में दक्ष होकर हिंदी में उच्च शिक्षा की ओर उन्मुख होंगे तथा हिंदी भाषा और रोजगार की संभावनाओं को अपनाने के मार्ग पर अग्रसर होंगे।
- 8) विद्यार्थियों को हिंदी की मध्यकालीन और आधुनिक कालीन साहित्यिक विधाओं की प्रसिद्ध, प्रचलित रचनाओं एवं उनके परिवेश की जानकारी बढ़ेगी, जिससे उनमें दार्शनिक, सामाजिक, राष्ट्रीय, मानवीय और नवीनतम आधुनिक जीवन शैली संबंधी मूल्यों के बीच तुलनात्मक बौद्धिक-चिंतन उत्पन्न होगा, समृद्ध होगा।
- 9) विद्यार्थी मध्यकाल से लेकर अद्यतन हिंदी साहित्य की परिस्थितियों एवं प्रवृत्तियों से अवगत होंगे, हिंदी साहित्य के माध्यम से उनकी बौद्धिक, सामाजिक, सांस्कृतिक, मानवीय सरोकारों के साथ-साथ पर्यावरण-चेतना समृद्ध होगी।

Name of Program: B.A.

Name of the Course: FYBA Compulsory Hindi

Course code: UAHINCOM101/201

SEMESTER : 1

COURSE LEARNING OUTCOME (CLOs)

(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)

- 1) विद्यार्थियों के मन में हिंदी कविता-कहानी और मुख्य रचनाकारों से संबंधित जानकारी बढ़ेगी।
- 2) पाठ्यक्रम के आधार पर विद्यार्थियों के मन में नैतिक मूल्य, जीवन दर्शन, देश-प्रेम, ईश्वर के प्रति आस्था, धार्मिक वाहयाडंबर-अंध-विश्वास, आत्मविश्वास, क्षमा भाव, आत्मसम्मान, बाल-मनोविज्ञान, स्त्रियों के प्रति सामाजिक सोच और इनसे संबंधित अन्य सामाजिक मुद्दों पर उनके स्वतंत्र विचार विकसित होंगे।
- 3) विद्यार्थियों के मन हिंदी साहित्य और भाषा के प्रति रुचि उत्पन्न होगा।
- 4) विद्यार्थी अनुवाद कौशल की आवश्यकता समझेंगे। इस दिशा में भविष्य में अपने करियर की तलाश कर सकेंगे।

- 5) पत्र लेखन कला की बारीकियों से अवगत होकर व्यावहारिक जीवन में लाभांवित होंगे।
- 6) व्याकरण के माध्यम से विद्यार्थियों की भाषा शुद्ध, परिष्कृत और समृद्ध होगी।
- 7) साहित्यिक गतिविधियों और आयोजनों के माध्यम से विद्यार्थियों में कुशल नेतृत्व की क्षमता, आत्मविश्वास की भावना का विकास होगा। वे आत्म-प्रेरित हो सकेंगे।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✗	✓	✓
2	✗	✓	✓	✓	✓	✓	✗	✓	✓
3	✓	✓	✓	✓	✓	✓	✗	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓	✓	✓

SEMESTER : 2

COURSE LEARNING OUTCOME (CLOs)

(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)

- 1) विद्यार्थी हिंदी के मुख्य साहित्यकारों की कविता और कहानी से परिचित होंगे।
- 2) पाठ्यक्रम के आधार पर विद्यार्थियों में स्वतंत्रता, समानता, देश-प्रेम, प्रकृति-प्रेम, जीवन दर्शन, नैतिकता, आत्मस्वाभिमान, पारिवारिक संबंध, स्त्री का अस्तित्व और अस्मिता, जाति प्रथा, साम्प्रदायिक सौहार्द, मध्यवर्गीय जीवन की आर्थिक चुनौतियाँ और इनसे संबंधित अन्य समसामयिक समस्याओं के प्रति गहन सोच-समझ विकसित होगा।

- 3) विद्यार्थी निबंध लेखन और संवाद लेखन द्वारा अपने भावों एवं विचारों को अभिव्यक्त करने में सक्षम होंगे। इसके माध्यम से उनकी सृजनशीलता समृद्ध होगी।
- 4) निबंध लेखन के माध्यम से विद्यार्थियों में सामाजिक, समसामयिक, शैक्षणिक, वैचारिक, सांस्कृतिक, आत्म-कथात्मक संबंधी विषयों का ज्ञान बढ़ेगा।
- 5) विद्यार्थियों में संवाद लेखन कौशल का विकसित होगा। इस दिशा में वे भविष्य में अपने करियर की तलाश कर सकेंगे।
- 6) मुहावरों और व्याकरण के माध्यम से विद्यार्थियों की भाषा शुद्ध और समृद्ध होगी।
- 7) साहित्यिक गतिविधियों और आयोजनों के माध्यम से विद्यार्थियों में कुशल नेतृत्व की क्षमता, आत्मविश्वास की भावना का विकास होगा। वे आत्म-प्रेरित हो सकेंगे।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✗	✓	✓
2	✗	✓	✓	✓	✓	✓	✗	✓	✓
3	✓	✓	✓	✓	✓	✓	✗	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓	✓	✓

Name of Program: B.A.

Name of the Course: FYBA Ancillary Hindi

Course code: UAHIN101/201

SEMESTER : 2**COURSE LEARNING OUTCOME (CLOs)**
(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)

- 1) विद्यार्थी हिंदी के प्रचलित गद्य विधाओं के अतिरिक्त निबंध, संस्मरण, रेखाचित्र, जीवनी, व्यंग्य, एकांकी, वैज्ञानिक लेख, यात्रावृत आदि नवीनतम विधाओं से परिचित होंगे।
- 2) विद्यार्थी आरंभ से लेकर अद्यतन हिंदी उपन्यास के विकास व प्रवृत्तियों से अवगत होंगे।
- 3) विद्यार्थियों को साहित्य के नये विधाओं के स्वरूप एवं विशेषताओं की जानकारी होगी।
- 4) पाठ्यक्रम के आधार पर विद्यार्थियों में समाज सेवा, नैतिक मूल्य, मानवता, समानता, भारतीय एकता-अखंडता, गरीब स्त्रियों की कारुणिक दशा, पुरानी जर्जर रूढ़ियों से संबंधित समस्याएँ, वर्तमान सामाजिक आर्थिक चुनौतियाँ, सूचना और संचार क्रांति के युग में कंप्यूटर की अनिवार्य शिक्षा, वैज्ञानिक-चेतना और नर्मदा नदी का प्राकृतिक सौंदर्य आदि से जुड़े मुद्दों के प्रति गहरी समझ विकसित होगी। उनकी बौद्धिक क्षमता एवं चिंतनशीलता का विकास होगा।
- 5) विद्यार्थियों में विभिन्न विधाओं में भिन्न-भिन्न विषयों पर सृजनात्मक या रचनात्मक लेखन के प्रति अभिरुचि जागृत होगी।
- 6) साहित्यिक गतिविधियों और आयोजनों के माध्यम से विद्यार्थियों में कुशल नेतृत्व की क्षमता, आत्मविश्वास की भावना का विकास होगा। वे आत्म-प्रेरित हो सकेंगे।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✗	✓	✓
2	✓	✓	✓	✓	✓	✓	✗	✓	✓
3	✓	✓	✓	✓	✓	✓	✗	✓	✓
4	✓	✓	✓	✓	✓	✓	✗	✓	✓

5	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	✓

SYBA HINDI PAPER-2 (MEDIEVAL & MODERN POETRY)
COURSE CODE -UAHIN301 (2019-2020)

SEMESTER-III

COURSE LEARNING OUTCOME (CLOs)
(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)

- 1) विद्यार्थी मध्यकालीन हिंदी काव्य से लेकर अद्यतन काव्य के विभिन्न रूपों पूर्णतः परिचित होंगे।
- 2) विद्यार्थी हिंदी कविताओं के माध्यम से भारतीय सभ्यता-संस्कृति के साथ ही नये वैश्विक-मूल्यों, जीवन के नैतिक मूल्यों का विश्लेषण कर सकेंगे।
- 3) विद्यार्थियों में हिंदी काव्य के माध्यम से मानवीय संवेदना, राष्ट्रियता की भावना, राजनीतिक, सामाजिक, आर्थिक, ऐतिहासिक, सांस्कृतिक बोध का विकास होगा।
- 4) विद्यार्थियों में हिंदी काव्य के माध्यम से वैश्विकरण, औद्योगिकरण, बाजारवाद, उपभोक्तावादी संस्कृति के दौर में पर्यावरण संरक्षण, जल-प्रदूषण के प्रति दायित्व-बोध उत्पन्न होगा। उनके मन में शोध-कार्य के बीज अंकुरित होंगे।
- 5) विद्यार्थियों में काव्य के माध्यम से कलात्मक गुणों की अभिवृद्धि होगी, काव्य के प्रति अभिरुचि जागृत होगी तथा रचनात्मक-कौशल समृद्ध होगा।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✗	✗	✓	✓
2	✓	✓	✓	✓	✓	✗	✗	✓	✓
3	✓	✓	✓	✓	✓	✗	✗	✓	✓
4	✓	✓	✓	✗	✓	✗	✗	✓	✓
5	✓	✓	✓	✓	✓	✗	✗	✓	✓

**SYBA, HINDI PAPER-3, (FUNCTIONAL HINDI)
COURSE CODE -UAHIN302 (2019-2020)**

SEMESTER-III

**COURSE LEARNING OUTCOME (CLOs)
(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)**

1. विद्यार्थी प्रयोजनमूलक हिंदी / कार्यालयीन हिंदी की जानकारी प्राप्त करते हुए प्रयोजनमूलक हिंदी, सामान्य हिंदी और साहित्यिक हिंदी के बीच के अंतर को समझेंगे।
2. विद्यार्थी हिंदी तथा अंग्रेजी की पारिभाषिक शब्दावली से परिचित होकर उसे अपने व्यावहारिक जीवन में प्रयोग में लाएँगे।
3. विद्यार्थी व्यावसायिक / कार्यालयीन हिंदी से अवगत होकर रोजगार की संभावनाओं से परिचित होंगे।
4. विद्यार्थियों का अनुवाद कौशल से संबंधित ज्ञान समृद्ध होगा और वे आत्मनिर्भर बन सकेंगे।
5. विद्यार्थी विज्ञापन का विस्तार से अध्ययन करते हुए अपनी रचनात्मकता से विज्ञापन लिखने की कला का विकास करेंगे।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✗	✗	✗	✓	✓	✓	✗	✗
2	✗	✗	✗	✗	✓	✗	✓	✗	✗
3	✗	✗	✗	✗	✓	✓	✓	✗	✗
4	✗	✗	✗	✗	✓	✓	✓	✗	✗
5	✓	✓	✓	✓	✓	✓	✓	✓	✓

**SYBA, HINDI PAPER-2, (MODERN PROSE)
COURSE CODE -UAHIN401 (2019-2020)**

SEMESTER-IV

**COURSE LEARNING OUTCOME (CLOs)
(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)**

- 1) विद्यार्थी हिंदी गद्य साहित्य के विभिन्न विधाओं के स्वरूप और विशेषताओं को समझने में सक्षम होंगे।
- 2) पाठ्यक्रम में निर्धारित हिंदी उपन्यास के माध्यम से विद्यार्थी भारत के संविधान और प्रजातांत्रिक व्यवस्था को समझेंगे और इनमें व्याप्त विसंगतियों, विद्रुपताओं विडंबनाओं का विश्लेषण करते हुए समानता का अधिकार, एकता, अखंडता, नैतिकता, मानवता के प्रति उन्नत जीवन दृष्टि विकसित करेंगे।
- 3) पाठ्यक्रम में निर्धारित हिंदी नाटक के माध्यम से विद्यार्थी बाल-मनोविज्ञान, मानवीय संवेदना, तरह-तरह के मनोविकार, राजनीतिक-सामाजिक-पौराणिक समझ का विकास होगा। इसके साथ ही मानवीय गुण-अवगुण, नैतिक-अनैतिक मूल्यों के बीच तुलनात्मक दृष्टिकोण विकसित होगा।

- 4) विद्यार्थियों में हिंदी निबंध के माध्यम से जल-संरक्षण के प्रति दायित्व-बोध उत्पन्न होगा। उनके मन में भारत के बदलते जलवायु को ध्यान में रखते हुए तालाबों के अस्तित्व से संबंधित शोध-कार्य के बीज अंकुरित होंगे। उनमें वर्षा जल संरक्षित करने, सोलर पावर को अपनाने तथा प्राकृतिक संसाधनों की बचत करने की भावना उत्पन्न होगी।
- 5) विद्यार्थियों में हिंदी गद्य के माध्यम से कलात्मक गुणों की अभिवृद्धि होगी, गद्यात्मक लेखन के प्रति अभिरुचि जागृत होगी तथा रचनात्मक-कौशल समृद्ध होगा।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✗	✗	✓	✓
2	✓	✓	✓	✓	✓	✗	✗	✓	✓
3	✓	✓	✓	✓	✓	✗	✗	✓	✓
4	✓	✓	✓	✗	✓	✗	✗	✓	✓
5	✓	✓	✓	✓	✓	✗	✗	✓	✓

SYBA HINDI PAPER-3 (MASS COMMUNICATION)

COURSE CODE -UAHIN402 (2019-2020)

SEMESTER-IV

COURSE LEARNING OUTCOME (CLOs)

(पाठ्यक्रम सीखने के प्रतिफल या परिणाम)

1. विद्यार्थी जनसंचार माध्यमों का विस्तार से ज्ञान प्राप्त कर प्रिंट मीडिया और इलेक्ट्रानिक मीडिया में रोजगार के क्षेत्रों से परिचित होंगे।
2. विद्यार्थी जनसंचार माध्यमों के विकास एवं उपयोगिता से परिचित होकर प्रिंट मीडिया और इलेक्ट्रानिक मीडिया को गहराई से समझेंगे। इससे आत्मनिर्भरता की

संभावना बढेगी।

3. विद्यार्थी जनसंचार माध्यमों की भाषा से अवगत होकर अपने रचनात्मकता लेखन को सुधार सकेंगे।
4. विद्यार्थियों में 'संविधान प्रदत्त मौलिक अधिकारों' से संबंधित ज्ञान का विकास होगा।
5. विद्यार्थियों की 'सूचना का अधिकार' से संबंधित जानकारी समृद्ध होगी। आवश्यकतानुसार इसे वे प्रयोग में ला सकेंगे।

CLOs	PLOs								
	1	2	3	4	5	6	7	8	9
1	✓	✗	✗	✗	✓	✓	✓	✗	✗
2	✓	✓	✓	✓	✓	✓	✓	✗	✗
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✗	✓	✓	✓	✓	✓	✓	✓
5	✓	✗	✓	✓	✓	✓	✓	✓	✓

THERE IS NO TYBA IN HINDI

History Dept.- AQAR- POs ,PSOs and COs

B.A in History POs

PO 1. To impart students with holistic knowledge of History.

PO 2. To enable students to develop Contemporary sensibilities, thereby a better understanding of contemporary world.

PO 3. To develop amongst students abilities to analyze, co-relate and link past with present and thus adapt to changing global scenarios.

PO 4. To equip students with required research,communication , presentation skills to enhance their employability.

PO 5. To enable students to learn the rich heritage of different cultures to develop multicultural awareness with a global perspective.

PO 6. To develop in students social consciousness , empathy etc by organizing various activities

PO 7. To provide students experience of field knowledge by arranging visits to various historical sites, monuments , museum etc

PO 8. To enhance students creativity and artistic ability through organizing competitions , workshops etc.

BA in History Programme Specific Outcomes

The Learner -

PSO 1 . Approaches historical facts as a whole , not considering it as a single episode.

PSO 2. Correlates and links past and present events of History to understand the contemporary world.

PSO 3. Analyses historical events , compares contribution of various personalities and interprets history with one's own perspective

PSO 4. Develops research , communication and presentation skills by undertaking projects and assignments.

PSO 5. Values and appreciates rich heritage –built, natural and cultural at local as well as global level.

PSO 6. Cultivates social consciousness ,sensitivity, empathy etc through discussions , watching documentaries etc

PSO 7. Demonstrates ability to interpret , correlate Historical events/facts ,through field visits.

PSO 8. Enhances ones creativity ,artistic ability by participating in presentations ,competitions etc.

Course Learning Outcomes

FYBA Sem I - History of Modern India

The Learner-

CO 1. Gains knowledge of the background and the factors that led to the emergence of Indian National Movement.

CO 2. Assesses the contribution of different groups of leaders- Moderates Extremist and Revolutionaries by comparing their respective methods.

CO.3 Evaluates the role of Gandhian philosophy and methods in achieving Indian

Independence.

CO 4. Explains the process of how India gained Independence through various Missions

and Acts.

CO.5 Empathizes by reflecting upon the tragedy of partition.CO 6. Appreciates the role

played by the government , missionaries and Indians in social reform movements and development of education, press and transport.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓					
2	✓	✓	✓	✓				✓
3	✓	✓	✓	✓			✓	✓
4	✓	✓	✓	✓				
5	✓	✓	✓	✓		✓	✓	✓

FYBA Sem II - History of Modern India

The Learner-

CO 1. Makes an assessment of various socio-religious reform organizations , their contribution and impact on Indian society.

CO 2. Appreciates the work of various social reformers.

CO 3. Evaluates the British policies of education and its effect on current education system.

CO 4. Analyses the real reasons behind introduction of Press and modern means of transport by the British.

CO 5. Forms an opinion regarding various revenue ,agricultural and industrial policies of British .

CO 6. Highlights the adverse effects of British rule on India.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓		✓		
2	✓	✓	✓	✓		✓		✓
3	✓	✓	✓	✓				✓
4	✓	✓	✓	✓				
5	✓	✓	✓	✓				✓
6	✓	✓	✓	✓				✓

SYBA Sem III – Landmarks of World History (PAPER II)

The Learner –

CO1. Elaborates the significance of the emergence of Renaissance and its far reaching and deep impact on Europe and the rest of the world.

CO2. Appreciates the contribution of various writers , scientists and artists to Renaissance

CO3. Establishes the link between Geographical discoveries of explorers and colonization of Asia and Africa.

CO4. Outlines the common factors that led to different revolutions in European countries .

CO5. Explains the concept of Nation –States , nationalism and its impact on European politics.

CO6. Reviews the causes of two World wars , compares their far reaching impact on the world.

CO7. Develops skills like map reading , communication and presentation by paper presentations and map reading sessions.

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓	✓	✓	✓	
2	✓		✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓		✓		✓
4	✓	✓	✓					
5	✓	✓	✓	✓		✓	✓	✓
6	✓	✓	✓	✓		✓		✓

SYBA -SEM III History Paper III Ancient India

The Learner

CO1. Analyses- perception, limitations and range of sources of Ancient India.

CO2. Gains knowledge of the political and social ideas and Institutions of Ancient India.

CO3. Traces the development and dispersal of Buddhism and Jainism.

CO4. Familiarize themselves with the development taking place in the field of polity, society, economy and culture during the major phases of Ancient Indian History like Harappan Civilization, Vedic culture etc.

CO5. Can comprehend our heritage through the cultural aspects of Ancient India

CO6. Can develop analytical thinking in the process of reconstruction of history.

CO	PLO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2			✓					
3		✓						
4	✓							
5					✓			✓
6					✓			

SYBA Sem IV– Landmarks of World History (PAPER II)

The Learner –

CO1) Evaluates by comparing the contribution of leaders of Turkey and Iran in development of their respective countries.

CO2) Draws inspiration from the process of creation of Israel and also identifies the drawbacks of the politics of the process.

CO3) Gives an account of the growth of Dictatorship in Europe and its link with world war II.

CO4) Emphthizes with the victims of the inhuman policies of Dictators for eg. Holocaust and impact of wars on human life for.eg Hiroshima and Nagasaki

CO5) Engages in discussions related to the landmark events of world history.

CO6) Develops skills like map reading , communication and presentation by paper presentations and map reading sessions.

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓				
2	✓	✓	✓	✓				
3	✓	✓	✓					✓
4	✓	✓	✓	✓		✓	✓	
5	✓	✓	✓	✓				✓
6	✓	✓	✓	✓				✓

SEM IV History Paper III Ancient India

The Learner

CO1. Acquires knowledge about the Mauryan and post-Mauryan polities with special reference to development of empire, art, architecture and literature.

CO2. Understands and evaluates historical ideas, arguments and point of view.

CO3. Identifies the contribution of Pallavas and Cholas to art and architecture.

CO4. Illustrates the emergence of Imperial states in Ancient India.

CO5. Gains the basic skills of history writing and research.

CO6. Comprehends the contribution of Guptas in the field of medicine, astronomy and culture.

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2			✓					
3	✓							
4					✓			
5					✓			✓
6	✓							

TYBA SEM V History Paper IV Medieval India

The Learner

CO1. Understands the major social, political, economic, and cultural structures, events and themes shaping the Middle Ages of India.

CO2. Evaluates and analyses different medieval sources and modern historiography.

CO3. Acquires knowledge on the politics and major events in the history of the Slave, Khilji and Tughluq regimes.

CO4. Demonstrates knowledge of the chronology, narrative, major events and personalities of Medieval India.

CO5. Analyses historical processes that shaped individuals and communities, art and architecture during the Sultanate period.

CO6. Identifies significant historic events during the Medieval Age.

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2		✓	✓					
3	✓		✓					✓
4								
5					✓			✓
6	✓							

TYBA Sem V- History of Modern Maharashtra (Paper V)

The Learner-

CO 1. Acquaints oneself with regional history of Modern Maharashtra

CO 2. Establishes a cause-effect relationship between the socio-political conditions of Maharashtra in early 19th century and end of Maratha rule.

CO 3. Evaluates the contribution of various personalities in making of Modern Maharashtra.

CO 4. Explains the significance of Sanyukta Maharashtra movement in establishment of the state of Maharashtra.

CO 5. Acknowledges the importance of the work of various social reformers in 19th century Maharashtra.

CO 6. Cultivates respect and imbibes human values advocated by the reformers.

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓					
2	✓	✓	✓	✓				
3	✓	✓	✓	✓				
4	✓	✓	✓	✓			✓	
5	✓	✓	✓			✓		✓
6	✓	✓		✓		✓		

TYBA SEM V – Introduction to Archaeology- Paper VI

The Learner

CO1.Understands the diversity of archaeological techniques and their role in uncovering information about the past.

CO2.Familiarizes themselves with key field techniques and continue building solid interpretive frameworks.

CO3.Examinesthe legacy of archaeology on modern cultures.

CO4.Comprehends historical development of human culture and apply this information with sensitivity and an appreciation for diversity in pre-historic,historic and modern cultures.

CO5.Acquires the critical skills necessary to the interpretation of the numismatic iconography as an important source for historical and artistic studies.

CO6.Learns the roles and values of epigraphic evidence in the study of Ancient India.

CO	PSO							
	1	2	3	4	5	6	7	8
1			✓	✓				
2			✓					
3				✓				
4					✓			
5			✓					
6	✓							

TYBA SEM V - History of Marathas (Royal Period)- Paper VII

The Learner

CO1.Learns the different sources that shaped the formation of Maratha identity from the 17th century.

CO2.Gains knowledge about regional history within a broad national framework.

CO3.Comprehends socio-economic,cultural and political background of 17th Century Maharashtra.

CO4.Understands the different policies of Chhatrapati Shivaji Maharaj and his attempts to establish Maratha Swaraj.

CO5.Gets acquainted with the nature of Maratha polity.

CO6.Examines the difference between the facts and fictions of Maratha history

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2	✓							
3		✓						
4	✓							
5	✓							
6			✓	✓				

TYBA Sem V- Contemporary World (Paper VIII)

The Learner-

CO 1. Traces the course of events in post world War II , that led to emergence of Cold war.

CO 2. Develops a better understanding of the contemporary world by establishing a link between the events of post World War II with present global scenario .

CO 3. Reviews the process of disintegration of the USSR and its impact.

CO 4. Demonstrates the need to eliminate issues like racism by taking inspiration from anti-Apartheid and Civil Right movements.

CO. 5 Suggests one's own solutions by engaging in discussions on various global challenges related to Globalisation ,Environment and Women's Liberation movement.

CO 6. Cultivates ones own point of view by referring to written and watching audio-visual material .

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓					✓
2	✓	✓	✓					✓
3	✓	✓	✓	✓				✓
4	✓	✓	✓	✓		✓		✓
5	✓	✓	✓	✓		✓		
6	✓	✓	✓	✓		✓		

TYBA Sem V- Introduction to Heritage Tourism (Paper IX)

The Learner –

CO 1. Explains the concept of Heritage Tourism by one's own examples.

CO 2 . Develops multicultural sensibilities by appreciating the value of rich and diverse heritage of India.

CO 3. Classifies heritage into Tangible and Non Tangible or as Built , Natural and Cultural.

CO 4 . Accepts responsibility to spread awareness regarding preservation and conservation of all types of heritage

CO 5. Identifies challenges in conservation of heritage in India by comparing facilities in India and rest of the world

CO 6. Develops research , communication , presentation and artistic skills by preparing presentations .

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓	✓	✓		
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓		✓	✓			✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓			✓

TYBA - SEM VI- Medieval India Mughal Period- Paper IV

The Learner

CO1. Acquires knowledge of Mughal polity, economy, society and culture.

CO2. Understands the administrative reforms and cultural and religious development during Mughal period.

CO3. Establishes the chronology, the location and features of the Mughal rule.

CO4. Conceptualize the developing social changes regarding caste, creed and religion in Medieval times.

CO5. Comprehends the Indo-Islamic culture in context to the tradition, language, literature, art and architecture.

CO6. Demonstrates thinking skills by analysing, synthesizing and evaluating historical information from multiple sources.

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2	✓							
3		✓						
4			✓					
5					✓			
6			✓	✓				

TYBA SEM VI – Introduction to Museology and Archival Science- Paper VI

The Learner

CO1.Acquires knowledge of professional procedure in Museum display, collection, care and preservation.

CO2.Understands the concept of the museum and will be exposed to the basic principles of museum management and administration.

CO3.Applies their knowledge of museology in a practical situation and undertake projects and case studies related to the functioning of the museum.

CO4.Learns the management of archives and techniques to preserve records.

CO5.Comprehends the legal and ethical issues with regard to archives and record administration.

CO6.Gains knowledge of methods and technologies to create, store and organise records.

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓			✓				
2						✓	✓	✓
3		✓					✓	✓
4				✓				
5		✓						
6				✓				

TYBA SEM VI - History of Marathas (Peshwa Period)- Paper VII

The Learner

CO1.Perceives the rise and expansion of Peshwas in Maratha Empire.

CO2.Appreciates the contribution of the Marathas in the national politics of the 18th Century.

CO3.Analyses socio-political and economic changes during the Peshwa period.

CO4.Critically analyses the causes for the decline of Maratha power.

CO5.Acquires knowledge of the society,culture and administration during the Peshwa period.

CO6.Understands the various concepts of historical writing.

CO	PSO							
	1	2	3	4	5	6	7	8
1	✓		✓					
2					✓			
3		✓	✓					
4	✓							
5					✓			
6			✓	✓				

TYBA Sem VI- History of Asia (Paper VIII)

The Learner –

CO 1. Becomes familiar with the major changes that occurred in Asia after World War II

CO 2. Develops a better understanding of the struggle of newly independent Asian nations.

CO 3. Compares economic development of Chinese and Japanese economic policies and its impact.

CO 4. Sensitises oneself with the impact of Cold war on nations of Europe and Asian nations like Vietnam through written material and documentaries.

CO 5. Evaluates the effect of Oil politics on the contemporary world.

CO 6. Develops skill of map reading.

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓	✓					
2	✓	✓	✓					✓
3	✓	✓	✓	✓				✓
4	✓	✓	✓		✓	✓		✓
5	✓	✓	✓	✓		✓		✓
6	✓	✓	✓	✓				✓

TYBA Sem VI- Heritage Tourism in Maharashtra (Paper IX)

The Learner –

CO 1. Gains knowledge of Tangible and Non Tangible Heritage of Maharashtra .

CO 2 . Evaluates the role of MTDC and Public Private Partnership in development of Heritage Tourism in the state.

CO 3. Explores Heritage sites ,monuments ,cultural events through visits and various videos.

CO 4 . Expresses the need for preservation and conservation of all types of heritage and suggests solutions through presentations, discussions.

CO 5. Identifies challenges in conservation of heritage in Maharashtra by reviewing development of infrastructure and facilities in Tourism sector.

CO 6. Develops research , communication , presentation and artistic skills by preparing presentations .

COs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✓		✓	✓		✓	✓
2	✓		✓		✓			✓
3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓		✓	✓

Wilson College IT Department

Program Educational Objectives (PEO)

PEO1: - Provide students with application oriented knowledge of core principles in areas of information technology.

PEO2: - Provide students hands-on experience in problem solving techniques using logical and analytical abilities.

PEO3: - Prepare students to solve real-world problems using modern tools and research inputs.

PEO4: - Train students in industrial requirements through internships.

PEO5: - Prepare students with the technical skills to work professionally as software engineer, system administrator, entrepreneur, and software developer.

Program Specific Outcomes

PSO1: Ability to apply the knowledge of Information Technology with recent trends aligned with research and industry.

PSO2: Ability to apply IT in the field of Computational Research, Soft Computing, Big Data Analytics, Data Science, Image Processing, Artificial Intelligence, Networking and Cloud Computing.

PSO3: Ability to provide socially acceptable technical solutions in the domains of Information

Security, Machine Learning, Internet of Things and Embedded System, Infrastructure Services as specializations.

PSO4: Ability to apply the knowledge of Intellectual Property Rights, Cyber Laws and Cyber Forensics and various standards in interest of National Security and Integrity along with IT Industry.

PSO5: Ability to write effective project reports, research publications and content development

and to work in a multidisciplinary environment in the context of changing technologies.

PSO6: -An ability to analyse problems, design algorithms, identify and define the computing requirements appropriate to its solution and implement the same.

Semester -1

1.1 Course Learning Outcome of Research in computing

CLO1.-Solve the real world with a scientific approach.

CLO2:- Develop analytical skills by applying scientific methods.

CLO3:- Recognize, understand and apply the language, theory and models of the field of business analytics.

CLO4:- Foster an ability to critically analyze, synthesize and solve complex unstructured business problems

CLO5:- Understand and critically apply the concepts and methods of business analytics

CLO6:- Identify model solve decision problems in different settings interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity

CLO7:-Create viable solutions to decision making problems.

Mapping table of Research in Computing

CLO	PSO					
	1	2	3	4	5	6
1	M	M	L	L	L	H
2	H	M	L	L	L	H
3	M	H	L	L	L	M
4	L	L	M	L	L	L
5	L	M	L	L	L	M
6	L	L	M	L	L	L
7	L	L	H	L	L	H

1.2. Course Learning Outcome of Data Science

CLO1:- To understand data science concepts

CLO2:- To understand data science technology

CLO3:-To understand data science algorithms

Mapping table of Data Science

CLO	PSO					
	1	2	3	4	5	6
1	L	M	L	H	L	H
2	H	M	H	L	L	H
3	L	L	L	M	L	H

1.3.Course Learning Outcome of Cloud Computing

CLO1:- To understand cloud concepts

CLO2:- To understand cloud technology and security

CLO3:-To understand virtualization.

Mapping table of Cloud Computing

CLO	PSO					
	1	2	3	4	5	6
1	L	H	L	L	L	M
2	H	H	M	L	M	H
3	L	H	L	L	L	L

1.4.Course Learning Outcome of Soft Computing

CLO1:-Understand soft computing techniques and their role in problem solving.

CLO2:-Conceptualize and parameterize various problems to be solved through basic soft computing techniques.

CLO3:-Analyze and integrate various soft computing techniques in order to solve problems effectively and efficiently.

CLO4:-The primary objective of this course is to provide an introduction to the basic principles, techniques, and applications of soft computing.

CLO5:-Upon successful completion of the course, students will have an understanding of the basic areas of Soft Computing including Artificial Neural Networks, Fuzzy Logic and Genetic Algorithms.

CLO6:-Provide the mathematical background for carrying out the optimization associated with neural network learning.

CLO7:-Aim of this course is to develop some familiarity with current research problems and research methods in Soft Computing by working on a research or design project.

Mapping table of Soft Computing

CLO	PSO					
	1	2	3	4	5	6
1	L	H	M	L	L	H
2	L	H	M	L	L	H
3	L	M	H	L	M	H
4	L	H	L	L	L	M
5	L	M	L	L	L	H
6	L	L	L	L	L	M
7	H	M	L	L	H	L

Semester-2

2.1.Course Learning Outcome of Big Data Analysis

CLO1:- To understand concepts of Hadoop

CLO2:- To explore big data analytics

CLO3:- To understand concepts of big data

Mapping of Big Data Analysis

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	L	L	H
2	L	H	L	L	L	H
3	L	M	L	L	M	H

2.2.Course Learning Outcome of Modern Networking

CLO1:-To understand concepts of modern networking

CLO2:- To explore Software and virtualization based networking

CLO3:-To understand quality networking

Mapping of Modern Networking

CLO	PSO					
	1	2	3	4	5	6
1	L	M	L	L	L	M
2	L	H	L	L	L	H
3	L	L	L	L	M	H

2.3.Course Learning Outcome of Microservices Architecture

CLO1:-Develop web applications using Model View Control.

CLO2:- Create MVC Models and write code that implements business logic within Model methods, properties, and events.

CLO3:-Create Views in an MVC application that display and edit data and interact with Models and Controllers.

CLO4:-Boost your hire ability through innovative and independent learning.

CLO5:- Gaining a thorough understanding of the philosophy and architecture of .NET Core

CLO6:-Understanding packages, metapackages and frameworks

CLO7:- Acquiring a working knowledge of the .NET programming model

CLO8:-Implementing multi-threading effectively in .NET applications.

Mapping of Microservices Architecture

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	L	L	M
2	L	L	L	M	M	H
3	L	L	L	L	L	H
4	L	L	M	L	L	M
5	M	L	L	L	L	H
6	L	L	L	L	L	M
7	M	L	L	L	L	H
8	L	L	L	L	L	H

2.4.Course Learning Outcome of Image Processing

CLO1: Review the fundamental concepts of a digital image processing system.

CLO2 : Analyze images in the frequency domain using various transforms.

CLO3 : Evaluate the techniques for image enhancement and image restoration.

CLO4 : Categorize various compression techniques.

CLO5: Interpret Image compression standards.

CLO6 : Interpret image segmentation and representation techniques.

Mapping of Image Processing

CLO	PSO					
	1	2	3	4	5	6
1	L	H	L	L	L	H
2	L	M	L	L	L	H
3	H	H	L	L	L	H
4	M	H	L	L	L	M
5	L	M	L	L	L	L
6	L	H	L	L	L	M

Semester-3

3.1. Course Learning Outcome Of Technical Writing and Entrepreneurship Development

CLO1:- This course aims to provide conceptual understanding of developing a strong foundation in general writing, including research proposals and reports.

CLO2:-It covers the technological developing skills for writing Article, Blog, E-Book, Commercial web Page design, Business Listing Press Release, E-Listing and Product Description.

CLO3:-This course aims to provide conceptual understanding of innovation and entrepreneurship development.

CLO4: Develop technical documents that meet the requirements with standard guidelines. Understanding the essentials and hands-on learning about effective Website Development.

CO5: Write Better Quality Content Which Ranks faster at Search Engines. Build effective Social Media Pages.

CO6: Evaluate the essentials parameters of effective Social Media Pages.

Mapping table of Technical Writing and Entrepreneurship Development

CLO	PSO					
	1	2	3	4	5	6
1	H	H	M	H	H	H
2	H	M	M	H	H	M
3	H	H	L	H	H	M
4	L	L	H	H	H	L
5	L	L	H	H	H	H
6	L	L	H	M	H	H

3.2.Course Learning Outcome of Security Breaches and Countermeasures

CLO1: The student should be able to identify the different security breaches that can occur. The student should be able to evaluate the security of an organization and identify the loopholes. The student should be able to perform enumeration and network scanning.

CLO2: The student should be able to identify the vulnerability in the systems, breach the security of the system, identify the threats due to malware and sniff the network. The student should be able to do the penetration testing to check the vulnerability of the system towards malware and network sniffing.

CLO3: The student should be able to perform social engineering and educate people to be careful from attacks due to social engineering, understand and launch DoS and DDoS attacks, hijack and active session and evade IDS and Firewalls. This should help the students to make the organization understand the threats in their systems and build robust systems.

CLO4: The student should be able to identify the vulnerabilities in the Web Servers, Web Applications, perform SQL injection and get into the wireless networks. The student should be able to help the organization aware about these vulnerabilities in their systems.

CLO5: The student should be able to identify the vulnerabilities in the newer technologies like mobiles, IoT and cloud computing. The student should be able to use different methods of cryptography

CLO6: Implement the selected countermeasures and review their effectiveness.

Mapping table of Security Breaches and Countermeasures

CLO	PSO					
	1	2	3	4	5	6
1	H	H	M	H	H	H
2	H	H	H	H	M	H
3	M	L	H	H	H	H
4	L	M	M	H	H	H
5	L	M	H	H	H	H
6	H	H	H	H	H	H

3.3.Course Learning Outcome of Machine Learning

CLO1:Students understand the concepts of Machine Learning concepts, classifications of Machine Learning and writing simple programs using python.

CLO2 Students will be able to describe Supervised Learning concepts.

CLO3 Students will understand Support Vector Machine concepts.

CLO4 Student will able to describe unsupervised learning concepts and dimensionality reduction techniques.

CLO5 Students will be able to discuss simple Machine Learning applications in a range of real-world applications using Python programming.

CLO6:-Student will be able to Understand the statistical approach related to machine learning. He will also Apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Mapping table of Machine Learning

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	M	H	M
2	H	L	H	L	H	H
3	M	H	H	M	H	H
4	L	H	H	L	H	H
5	L	H	H	H	H	H
6	L	H	H	H	H	H

3.4.Course Learning Outcome of Offensive Security:-

CLO1: Students will be able to understand basic security issues in cloud, IoT etc.

CLO2: Student will able to understand different security techniques and policies

CLO3: Student will able to use Vulnerability assessment and exploitation tool

CLO4: Student will able to analyze the network perform reconnaissance and enumerate the target to detect vulnerabilities

CLO5: Students able to perform offensive tests using Metasploit on various applications, generating payloads etc.

CLO6:-Student will be able to learn various tools that aid in offensive security testing.

Mapping table of Offensive Security:-

CLO	PSO					
	1	2	3	4	5	6
1	M	H	H	M	H	H
2	H	H	M	H	H	H
3	H	H	L	H	H	M
4	M	M	M	H	M	H
5	L	H	H	H	H	H
6	H	H	H	H	H	H

Semester- 4

4.1.Course Learning Outcome of Blockchain

CLO1:-The students would understand the structure of a blockchain and why/when it is better than a simple distributed database.

CLO2:- Analyze the incentive structure in a blockchain based system and critically assess its functions, benefits and vulnerabilities

CLO3:- Evaluate the setting where a blockchain based structure may be applied, its potential and its limitations

CLO4:- Understand what constitutes a “smart” contract, what are its legal implications and what it can and cannot do, now and in the near future

CLO5:-Develop blockchain DApps.

CLO6:-To cover the technological underpinnings of blockchain operations as distributed data structures and decision-making systems, their functionality and different architecture types.

Mapping table of Blockchain:-

CLO	PSO					
	1	2	3	4	5	6
1	M	H	M	H	H	H
2	M	M	L	M	H	M
3	H	L	M	L	M	M
4	H	H	M	H	M	L
5	M	M	L	M	H	H
6	H	H	H	M	H	H

4.2. Course Learning Outcome of Cyber Forensics

CLO1: Investigate the cyber forensics with standard operating procedures.

CLO2: Recover the data from the hard disk with legal procedure.

CLO3: To recover and analyse the data using forensics tool

CLO4: Acquire the knowledge of network analysis and use it for analysing the internet attacks. CLO5: Able to investigate internet frauds done through various gadgets like mobile, laptops, tablets and become a forensic investigator.

CLO6: To illustrate the concepts of various On-Demand Education and Software Agents.

Mapping table of Cyber Forensics

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	L	H	H	M	L
3	M	H	M	H	H	H
4	H	H	H	H	M	M
5	H	H	H	H	L	M
6	L	M	M	M	M	H

4.3.Course Learning Outcome of Deep Learning

CLO1:- Students will able to present the mathematical, statistical and computational challenges of building neural networks

CLO2:- Students will understand the concepts of deep learning

CLO3:-Students will be able to know deep learning techniques to support real-time applications.

CLO4: Students will be able to describe basics of mathematical foundation that will help the learner to understand the concepts of Deep Learning.

CLO5: Understand and describe model of deep learning

CO6: Design and implement various deep supervised learning architectures for text & image data.

Mapping table of Deep Learning

CLO	PSO					
	1	2	3	4	5	6
1	H	H	L	H	H	H
2	M	M	H	M	M	M
3	H	H	H	H	H	L
4	H	M	M	H	M	M
5	M	M	H	M	M	L
6	H	M	L	L	H	M

4.4.Course Learning Outcome of Information Security and auditing

CLO1: Students will be able to understand various information security policies and process flow, Ethics of an Information Security Auditor.

CLO2: Students will be able to understand various information systems in an organization, their criticality and various governance and management policies associated with them.

CLO3: Students will be able to analyse various operational strategies like asset management, data governance etc. and suggest requisite changes as per organizations requirements with improvements.

CLO4: Students will be able to understand the information flow across the organization and identify the weak spots, and also suggest improvements to strengthen them.

CLO5: Student will come up with strong strategies to protect information assets and come up with an efficient business continuity plan, disaster recovery strategy etc

CLO6:Students will be able to audit the organization across relevant policies and assist the organization in implementing such policies along with suggesting improvements.

Mapping table of Information Security and auditing

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	L	H
2	H	M	H	M	M	H
3	H	M	H	M	H	H
4	H	H	H	L	H	H
5	M	M	M	M	M	H
6	H	H	H	H	H	H

Wilson College
IT Department

Program Educational Objectives (PEO)

After graduation, a learner should be able to:

PEO1: The graduates will become successful professionals by demonstrating logical and analytical thinking abilities in the field of IT.

PEO2: Understand the basic concepts of system software, hardware and computer graphics.

PEO3: Ability to Work in teams as well as an individual to build software systems and to use a range of programming languages and tools to develop computer programs to solve problems effectively.

PEO4: Recognise professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

PEO5: Apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies.

Program Specific Outcomes (PSO)

At the the end of the Program the learner will be able to:

PSO1:- solve the difficult parts of codes in an efficient manner.They should operate on algorithms.

PSO2:-write the constructive logical code that could help them in the various aspects of the organization.

PSO3:-compare the technical aspects of the IT sector to the criteria they have learnt during the program.

PSO4:-They could select after contrasting the field of interest where they could try their hands on new technology .

PSO5:-design the websites on a higher level using the technical skills they have learnt during the course.Technical and logical skills could lead the students to make user-friendly programs/applications.

PSO6:-formulate the systematic approach while applying formulas and procedures in the field of Science(NASA).

Course Learning Outcomes and Mapping Table

Semester-1

1.1 Course Learning Outcome of Imperative Programming

CLO1:-Students should be able to write, compile and debug programs in C language.

CLO2:-Students should be able to use different data types in a computer program.

CLO3:-Students should be able to design software involving decision structures, loops and functions.

CLO4:- Students should be able to use different data structures and create/update basic data files.

CLO5:- Students should be able to explain the difference between call by value and call by reference.

CLO6:- Students should be able to design programs using a variety of data structures such as stacks, queues, hash tables, binary trees, search trees, heaps, graphs, and B-trees.

Mapping table of Imperative Programming:

CLO	PSO					
	1	2	3	4	5	6
1	H	M	L	M	H	H
2	H	L	L	M	H	L
3	L	H	L	M	H	L
4	H	H	M	M	M	L
5	H	M	H	L	L	L
6	H	H	M	M	L	L

1.2 Course Learning Outcome of Digital Electronics

CLO1:- Students will understand fundamental concept techniques using digital electronics.

CLO2:- Students will understand and examine the structure of various number systems and its application in digital design.

CLO3:- Students will understand, analyse and design various combinational and sequential circuits.

CLO4:- Students will identify basic requirements for design applications and purpose of course effective solution.

CLO5:- Students will be able to identify and prevent various hazards and timing problems in digital design.

CLO6:- Students will be able to develop skills to build and troubleshoot digital circuits.

Mapping table of Digital Electronics

CLO	PSO					
	1	2	3	4	5	6
1	L	L	H	H	M	L
2	M	L	H	H	L	H
3	L	L	M	M	L	H
4	H	L	L	H	M	L
5	L	L	M	L	L	L
6	L	L	H	M	L	M

1.3. Course Learning Outcome of Operating System

CLO1:- Students will be able to learn to Describe and explain the fundamental components of a computer operating system.

CLO2:- Students will be able to Define, restate, discuss, and explain the policies for scheduling, deadlocks, memory management, synchronization, system calls, and file systems.

CLO3:- Students will be able to Describe and extrapolate the interactions among the various components of computing systems.

CLO4:- Students will be able to Design and construct the following OS components: System calls, Schedulers, Memory management systems, Virtual Memory and Paging systems.

CLO5:- Students will be able to Illustrate, construct, compose and design solutions via C/C++ programs.

CLO6:- Students will be able to Measure, evaluate, and compare OS components through instrumentation for performance analysis.

Mapping table of Operating System

CLO	PSO					
	1	2	3	4	5	6
1	L	L	H	H	H	L
2	L	M	H	M	H	L
3	L	L	M	L	M	M
4	H	M	H	M	H	H
5	H	H	L	M	H	H
6	M	L	H	H	L	M

1.4.Course Learning Outcome of Discrete Mathematics

CLO1:- Students will be able to understand how to write an argument using logical notation and determine if the argument is or is not valid.

CLO2:- Students will be able to apply Euclidean Algorithm in finding GCD for two integers, Attempt the approach of mathematical induction as demonstrated.

CLO3:- Students will be able to establish the decisive properties of relations in order to compute inverses of functions.

CLO4:- Students will be able to differentiate and select either the direct method or the contradiction method in order to prove a mathematical statement effectively.

CLO5:- Students will be able to discriminate between an Eulerian graph from a Hamiltonian graph for use in solving mathematical problems.

CLO6:- Students will be able to demonstrate different traversal methods for trees and graphs.

Mapping table of Discrete Mathematics

CLO	PSO					
	1	2	3	4	5	6
1	L	L	M	M	L	H
2	M	L	L	L	L	L
3	L	L	L	L	L	L
4	L	L	L	L	L	L
5	L	L	L	L	L	L
6	L	L	M	L	L	H

1.5.Course Learning Outcome Of Communication Skills

CLO1:Student will able to Understand the theory of communication, its concepts, channels and objectives

CLO2: Student will able to Understand problems or barriers in communication and importance of listening skills

CLO3: Student will able to Draft business correspondence like mails, letters

CLO4: Student will able to Master in language and writing skills

CLO5:Students will be able to develop interpersonal skills that contribute to effective and satisfying personal, social and professional relationships.

CLO6:Student will able to demonstrate the methods of oral presentation both in a formal and informal environment

CLO7:Students will be able to prepare the student with the communication tools-verbal, non-verbal and written-and the practical applications inherit for each.

CLO8:Students will get a better understanding of various aspects of business letter writing.

CLO9.Students will be able to analyze the role of body language in interpersonal relations, Interpret the messages of hand and body gestures.

Mapping table of Communication Skills:

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	L	L	L
2	L	L	L	L	L	L
3	L	L	L	L	L	L
4	L	L	L	L	L	L
5	L	L	L	L	L	L
6	L	L	L	L	L	L
7	L	L	L	L	L	L
8	L	L	L	L	L	L
9	L	L	L	L	L	L

Semester-2

2.1.Course Learning Outcome of Object Oriented Programming

CLO1:- Students will be able to explain the steps in creating an executable program including the intermediate representation and their purpose.

CLO2:- Students will be able to design the object oriented solutions for small systems involving multiple objects.

CLO3:- Students will be able to analyse, write, debug and test basic C++ codes using the approaches used in the course.

CLO4:- Students will be able to understand dynamic memory management techniques using pointers, constructors, destructors, etc.

CLO5:- Students will be able to describe the procedural and object oriented paradigm with concepts of streams, functions, class and objects.

CLO6:- Students will be able to demonstrate the use of various OOPs concepts with the help of the programs.

Mapping table of Object Oriented Programming

CLO	PSO					
	1	2	3	4	5	6
1	H	H	L	L	H	L
2	M	M	L	H	H	L
3	H	H	M	H	H	M
4	L	L	M	M	H	L
5	M	L	L	H	M	H
6	H	M	L	M	M	H

2.2.Course Learning Outcome of Web Programming

CLO1:Students will be able to understand the basic web technology concepts that are required for developing web applications.

CLO2:Students will be able to understand HTML tags Javascript and PHP programming language concepts and techniques.

CLO3:Students will understand logically ,plan and develop web pages.

CLO4:Students will be able to learn to write, test and debug web pages using HTML javascript and PHP.

Mapping table of Web Programming

CLO	PSO					
	1	2	3	4	5	6
1	H	L	H	H	H	H
2	M	M	H	H	H	H
3	L	H	L	H	H	L
4	H	H	L	M	H	H

2.3.Course Learning Outcome of Numerical Statistical Methods

CLO1:- Students will be able to learn how to obtain numerical solutions of nonlinear equations using Bisection, Newton – Raphson and fixed-point iteration methods.

CLO2:- Students will be able to solve systems of linear equations numerically using direct and iterative methods.

CLO3:- Students will be able to understand the methods to construct interpolating polynomials with practical exposure.

CLO4:- Students will be able to apply Mathematical Modelling and for Engineering Problem Solving.

CLO5:- Students will be able to write programs for various numerical and statistical methods.

CLO6:- Students will be able to understand the various approaches dealing with the data using probability theory of probability.

Mapping table of Numerical Statistical Methods

CLO	PSO					
	1	2	3	4	5	6
1	M	L	L	M	L	M
2	H	L	H	M	L	H
3	L	L	L	M	L	L
4	L	L	M	H	L	L
5	H	H	H	H	L	H
6	L	L	L	M	L	L

2.4.Course Learning Outcome of Microprocessor Architecture

CLO1: Students will be able to recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer systems.

CLO2:Students will be able to identify a detailed s/w & h/w structure of the Microprocessor.

CLO3: Student will able to describe the architecture of 885

CLO4 : Student will able to Illustrate the organization of registers and memory in microprocessors

CLO5: Identify the addressing mode of an instruction.

CLO6: Develop programming skills in assembly language.

Mapping table of Microprocessor Architecture

CLO	PSO					
	1	2	3	4	5	6
1	L	L	H	H	L	L
2	L	L	H	H	L	L
3	L	L	M	L	L	L
4	L	H	L	M	L	L
5	M	L	L	L	L	L
6	H	M	H	H	M	L

2.5.Course Learning Outcome of Green Computing

CLO1:- Students will be able to describe green agenda and green initiatives in their working environments leading to green movement.

CLO2:- Students will be able to identify IT Infrastructure Management and Green Data Centre.

CLO3:- Students will be able to recognize Objectives of Green Network Protocols for Data communication.

CLO4:- Students will be able to use Green IT Strategies and Illustrate various green IT services and its roles.

CLO5:- Students will be able to understand how we can save our Green Environment.

CLO6:- Students will be able to use new career opportunities available in IT profession, audits and others with special skills such as energy efficiency, ethical IT assets disposal, carbon footprint estimation, reporting and development of green products, applications and services.

Mapping table of Green Computing

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	M	L	L
2	L	L	H	H	L	L
3	L	L	M	M	L	L
4	L	L	H	H	L	M
5	L	L	L	M	L	L
6	L	L	M	H	L	L

Semester-3

3.1.Course Learning Outcome of Python Programming

CLO1:- Students will be able to define and demonstrate the use of built-in data structures lists and dictionaries.

CLO2:- Students will be able to design and implement GUI applications.

CLO3:- Students will be able to make database connectivity in python programming.

CLO4:- Students will be able to implement a program to solve real world problems.

CLO5:- Students will be able to understand the importance of proper software documentation and testing.

CLO6:- Students will be able to work as an entry level python software engineer in an organisation.

Mapping table of Python Programming

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	L	L	L
2	L	L	H	H	H	H
3	L	L	L	H	M	H
4	H	M	L	H	L	M
5	L	L	M	M	L	L
6	L	L	M	H	M	L

3.2.Course Learning Outcome of Data Structure

CLO1:- Students will be able to design and analyze the time and space efficiency of the data structure.

CLO2:- Students will be able to identify the appropriate data structure for a given problem and understand the applications of data structures.

CLO3:- Students will be able to choose the appropriate data structure and algorithm design method for a specified application to understand which algorithm or data structure to use in different scenarios.

CLO4:- Students will be able to understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals.

CLO5:- Students will be able to compare different implementations of data structures and to recognize the advantages and disadvantages of them.

CLO6:- Students will be able to write complex applications using structured programming methods.

Mapping table of Data structure

CLO	PSO					
	1	2	3	4	5	6
1	H	L	L	M	M	H
2	L	L	L	M	L	L
3	M	L	M	H	M	L
4	H	M	H	M	L	M
5	L	L	H	H	L	L
6	H	H	M	M	M	M

3.3.Course Learning Outcome of Computer Networks

CLO1:Students will be able to develop an understanding of computer networking basics.

CLO 2. Students will be able to develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.

CLO3:Students will be able to recognize the technological trends of Computer Networking.

CLO4:Students will discuss the key technological components of the Network.

CLO5:Students will be able to evaluate the challenges in building networks and solutions to those.

Mapping table of Computer Networks

CLO	PSO					
	1	2	3	4	5	6
1	L	L	M	L	L	L
2	L	L	H	L	H	L
3	L	L	M	L	M	L
4	L	L	M	M	L	L
5	L	L	L	L	L	L

3.4. Course Learning Outcome of Database Management Systems

CLO1:Student be able to understand terms related to database design and management

CLO2:Student will able to understand the objectives of data and information management

CLO3:Student will able to understand the database development process

CLO4:Student will able to understand the relational model and relational database management system

CLO5:Students will be able to present the E-R model as a logical model that can be used to capture the structure and much, although not all, of the semantics (meaning) of data.

CLO6:Student able to apply E-R modeling to several practical examples.

CLO7:Student able to describe SQL and summarize its basic operators.

Mapping table of Database Management Systems

CLO	PSO					
	1	2	3	4	5	6
1	L	L	M	H	L	L
2	L	L	M	H	L	L
3	L	L	L	H	L	L
4	L	L	L	M	L	L
5	L	M	L	L	L	L
6	L	L	M	L	L	L
7	M	M	M	M	L	L

3.5.Course Learning Outcome of Applied Mathematics

CLO1:Students will able to develops an intuitive understanding of applied mathematical techniques

CLO2:Students learn how apply differential equations to solve problems

CLO3:Students will learn how to evaluate complex integrals

CLO4:Students understand concepts of vector algebra

CLO5:Students will able to solve linear systems of equations using matrix operations

CLO6:Students will able to develop String intuition of linear algebra.

Mapping table of Applied Mathematics

CLO	PSO					
	1	2	3	4	5	6
1	L	L	L	L	L	M
2	L	L	L	H	L	L
3	L	L	L	M	L	L
4	L	L	L	M	L	L
5	L	L	L	H	L	M
6	L	L	L	M	L	L

Semester- IV

4.1 .Course Learning Outcome of Core Java

CLO1:- Students will be able to evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.

CLO2:- Students will be able to implement object oriented programming concepts using classes and objects, inheritance, etc.

CLO3:- Students will be able to write Java programs to implement error handling techniques using exception handling.

CLO4:- Students will be able to demonstrate the concepts of inheritance and polymorphism.

CLO5:- Students will be able to identify classes, objects, members of a class and relationship among them needed for a specific problem.

CLO6:- Students will be able to develop the ability to solve real-world problems through software development in high-level programming language and large Application Programming Interface (APIs) of Java.

Mapping table of Core Java

CLO	PSO					
	1	2	3	4	5	6
1	H	L	L	L	H	H
2	H	M	L	L	H	M
3	H	M	L	L	H	H
4	L	H	L	M	H	M
5	L	L	M	L	H	M
6	M	H	M	H	H	H

4.2.Course Learning Outcome of Introduction to Embedded System

CLO1: Student will able to understand basic knowledge about fundamentals of microcontrollers

CLO2:Students will be able to understand basic knowledge about programming and system control to perform specific tasks.

CLO3: Student will able to acquire knowledge about devices and buses used in embedded networking

CLO4: Students will be able to develop programming skills in embedded systems for various applications.

CLO5: Students will be able to understand basic concepts of circuit emulators.

CLO6: Students will be able to understand the life cycle of embedded design and its testing.

Mapping table of Introduction to Embedded System

CLO	PSO					
	1	2	3	4	5	6
1	L	H	H	L	M	H
2	M	H	H	M	M	H
3	L	L	H	H	L	H
4	H	H	M	L	H	M
5	L	M	H	H	H	H
6	L	M	M	M	L	M

4.3.Course Learning Outcome of Computer Oriented and Statistical Techniques

CLO1:- Students will be able to learn statistical analysis, define and determine the mean, median, and mode for a set of data.

CLO2:- Students will be able to illustrate the data modelling technique.

CLO3:- Students will be able to draw predictive analysis.

CLO4:- Students will be able to understand the principles underlying sampling as a means of making inferences about a population.

CLO5:- Students will be able to know the complementary relationship of skewness with measures of central tendency and dispersion in describing a set of data.

CLO6:- Students will be able to understand why the regression line is called the “line of best fit” or “least squares regression” and include a description of how the line is calculated.

Mapping table of computer Oriented and Statistical Techniques.

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	H	M	L	L
3	L	M	H	H	H	M
4	H	H	H	M	M	H
5	H	M	H	M	H	L
6	L	H	H	H	M	L

4.4.Course Learning Outcome of Software Engineering

CLO1: Students will have the ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.

CLO2:Students will have the ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

CLO3:Students will have the ability to function effectively on teams to accomplish a common goal.

CLO4:Students will be able to understand professional, ethical, and social responsibilities.

CLO5: Students will have the ability to use current techniques, skills, and tools necessary for computing practice.

CLO6:Students will have the ability to apply design and development principles in the construction of software systems of varying complexity.

Mapping table of Software Engineering

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	M	H	H	H
3	L	M	H	M	L	L
4	M	H	H	H	H	L
5	H	H	H	H	H	H
6	H	H	H	H	H	H

4.5.Course Learning Outcomeof Computer Graphics and Animation

CLO1:- Students will be able to list the basic concept used in computer Graphics.

CLO2:- Students will be able to implement various algorithms to scan, convert the basic geometrical primitives, transformations, Area filling, clipping.

CLO3:- Students will be able to describe the importance of viewing and projections.

CLO4:- Students will be able to define the fundamentals of animation, virtual reality and its related technologies.

CLO5:- Student will able to understand a typical graphics pipeline

CLO6:- Students will be able to design an application with the principles of virtual reality.

Mapping table of Computer Graphics and Animation

CLO	PSO					
	1	2	3	4	5	6
1	M	H	L	L	H	H
2	H	H	H	L	H	H
3	L	M	H	L	L	H
4	L	M	H	H	M	M
5	H	M	H	H	M	M
6	M	H	H	H	H	M

Semester-5

5.1.Course Learning Outcome of Software Project Management

CLO1:- Students will be able to learn project management principles.

CLO2:- Students will be able to implement the software development methodologies.

CLO3:- Students will be able to enhance team management capabilities.

CLO4:- Students will be able to plan a Project activity planning, managing real life projects.

CLO5:- Students will be able to identify and describe the key phases of project management.

CLO6:- Students will be able to determine an appropriate project management approach through an evaluation of the business context and scope of the project.

Mapping table of Software Project Management

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	M	H
2	H	H	H	L	H	H
3	L	L	H	M	H	L
4	H	H	M	H	H	H
5	H	M	H	L	H	H
6	H	H	H	H	H	H

5.2.Course Learning Outcome of Internet of Things

CLO1:Student will able to understand the application area of Internet of things

CLO2:Students will be able to understand the building blocks of the Internet of things and characteristics.

CLO3:Students able to understand and explore the interconnection and integration of the physical world and the cyber space.

CLO4:Students will be able to design and develop Internet of things devices.

CLO5:Student will able to evaluate performance characteristics of different types of sensors

CLO6.Student will be able to locate different types of sensors used in real life applications and paraphrase their importance.

Mapping table of Internet of Things

CLO	PSO					
	1	2	3	4	5	6
1	L	H	H	H	H	H
2	H	H	H	H	M	H
3	H	M	H	H	H	H
4	H	L	H	M	H	M
5	L	H	H	L	M	M
6	L	L	H	M	H	H

5.3.Course Learning Outcome of Advanced Web Programming

CLO1:Students will be able to apply three-tier architecture concepts and advanced database techniques in web applications.

CLO2:Student will able to use object-oriented techniques in Web programming

CLO3:Student will able to develop rich interactive environments for the Web

CLO4:Student will able to create sites that utilize data validation techniques and secure code

CLO5:Students will be able to build sites that use session management.

CLO6:-Students will be able to develop dot net applications.

Mapping table of Advanced Web Programming

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	H	H
2	H	H	H	H	H	H
3	H	H	H	M	H	M
4	H	H	H	H	H	M
5	M	H	H	H	H	H
6	H	H	H	H	H	H

5.4.Course Learning Outcome of Linux Systems Administration

CLO1: Students will be able to make appropriate decisions during the configuration process to create a properly functioning Linux environment.

CLO2: Students will be able to use programs and utilities to administer a Linux machine.

CLO3: Students will be able to explain how a Linux server can be integrated within a multi-platform environment.

CLO4: Students will be able to analyze the need for security measures for a Linux environment.

CLO5: Students will be able to identify the different uses and advantages of Linux in a business environment in order to participate in discussions regarding network servers and services.

CLO6:-Students will be able to write shell script Programming.

Mapping table of Linux Systems Administration

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	L	H
2	L	M	L	M	M	H
3	H	L	M	L	M	H
4	H	H	H	H	H	L
5	M	M	H	L	L	H
6	H	H	H	M	H	H

5.5.Course Learning Outcome of Enterprise Java

CLO1:- Students will be able to learn the Internet Programming, using Java Applets.

CLO2:- Students will be able to create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists.

CLO3:- Students will be able to learn to access databases through Java programs, using Java Database Connectivity (JDBC).

CLO4:- Students will be able to create dynamic web pages, using Servlets and JSP and make a reusable software component, using Java Bean.

CLO5:- Students will be able to understand the multi-tier architecture of web-based enterprise applications using Enterprise JavaBeans (EJB).

CLO6:- Students will be able to develop Stateful, Stateless and Entity Beans

Mapping table of Enterprise Java

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	H	H	H	H
3	M	M	M	H	M	H
4	H	H	H	H	H	H
5	H	H	H	H	H	H
6	H	H	H	H	H	H

Semester-6

6.1.Course Learning Outcome of Software Quality Assurance

CLO1:- Students will be able to understand software testing and quality assurance as a fundamental component of software life cycle

CLO2:- Students will be able to assess a software process to evaluate how effective it is at promoting quality.

CLO3:- Students will be able to differentiate the purposes and applicable techniques among the various levels of testing: unit, integration, system, acceptance, usability, and regression testing.

CLO4:- Students will be able to design comprehensive test plans and create test procedures.

CLO5:- Students will be able to conduct effective and efficient inspections.

CLO6:- Students will be able to differentiate the purposes and applicable techniques among the various levels of testing: unit, integration, system, acceptance, usability, and regression testing.

Mapping table of Software Quality Assurance

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	M	H	H	M	H	M
3	H	H	H	H	H	H
4	M	M	M	H	H	M
5	L	H	H	M	H	H
6	H	H	H	H	H	H

6.2.Course Learning Outcome of Security in Computing

CLO1:-Student will understand the knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.

CLO2:- Students will be able to develop an understanding of security policies (such as confidentiality, integrity, and availability), as well as protocols to implement such policies.

CLO3:- Students will be able to understand connections of different networks.

CLO4:-Students learn to protect infrastructure from malicious attacks

CLO5:-Students will be able to learn the curriculum is focused towards introducing security concepts.

CLO6:- Students will introduce the learner to encryption.

Mapping table of Security in Computing

CLO	PSO					
	1	2	3	4	5	6
1	H	H	H	H	H	H
2	H	H	H	H	H	H
3	H	H	H	H	H	M
4	M	H	M	H	H	M
5	L	H	H	H	H	H
6	M	H	H	H	H	H

6.3.Course Learning Outcome of Business Intelligence

CL01:- Students will be able to identify the major frameworks of computerized decision support decision support systems(DSS),data analytics and business intelligence.

CL02:-Student will be able to demonstrate the impact of business reporting,information visualization,and dashboards.

CL03:-Student will be able to identify the major ethical and legal issues of analytics.

CL04:-Student will be able to understand and implement data mining,neural networks,support vector machines,text analytics,text mining,sentiment analysis,web mining,web analytics,social network analysis.

CL05:-Student will be able to learn the definitions,concepts,and architecture of data warehousing.

CL06:-Student will be able to implement the business intelligence concept and perform the practicals.

Mapping table of Business Intelligence

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	H	M
2	M	L	M	M	M	M
3	L	H	H	H	M	H
4	H	H	H	H	H	H
5	L	M	M	M	L	L
6	H	H	H	H	H	H

6.4.Course Learning Outcome of Principles of Geographic Information Systems

CLO1:- Students will be able to analyze the technology that is driving the geographic information and how the systems work.

CLO2:- Students will be able to compare the difference between geographic information systems and spatial analysis.

CLO3:- Students will be able to discuss geographic information systems as a platform for analysis and explain the meaning of geographic information systems.

CLO4:- Students will be able to explain the meaning of spatial analysis as used in GIS and meaning of remote sensing as used in GIS.

CLO5:- Students will be able to identify the various geographic information system hardware.

CLO6:- Students will be able to list the various steps observed in data investigation and describe how GIS simplifies the real world just as maps.

Mapping table of Principles of Geographic Information Systems

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	H	H
2	L	L	L	M	M	L
3	L	M	M	L	L	L
4	L	H	M	H	L	M
5	H	M	M	L	L	H
6	H	M	L	M	H	H

6.5.Course Learning Outcome of Cyber Laws

CLO1:Students will be able to understand the Social And Intellectual Property Issues Emerging From 'Cyberspace.

CLO2:Students will understand depth Knowledge Of Information Technology Act And Legal Framework Of Right To Privacy, Data Security And Data Protection.

CLO3:Make Study On Various Case Studies On Real Time Crimes.

CLO4:Student will able to determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.

CLO5:Students will be able to perform and troubleshoot cyber security systems.

CLO6:Students will be able to understand how to protect their own systems from outside the world.

Mapping table of Cyber Laws

CLO	PSO					
	1	2	3	4	5	6
1	H	M	H	H	M	H
2	H	M	H	H	M	H
3	H	H	H	M	M	H
4	H	H	H	H	H	H
5	M	H	H	M	H	H
6	H	H	H	H	H	H

Marathi Department

Program Objectives of Marathi (POs) :

- PO1. To enable students to develop effective communication skills.
- PO2. To develop critical and creative approach towards Marathi Literature.
- PO3. To understand the interdependence of literature, society and culture.
- PO4. To understand what is language, standard language and dialect and the importance of the study of the same.
- PO5. To develop multi - cultural competence, spirit of nationality and a sense of Global Citizenship through the study of literature and linguistics.
- PO6. Students will develop moral and ethical awareness and be socially conscious about issues related to women and oppressed classes.
- PO7. Students will be able to do self-directed learning.
- PO8. Students will have linguistic proficiency in Marathi.

Program Specific Outcomes of Marathi (PSOs) :

At the end of the program learner will be able to :

- PSO1. Use communication skills effectively in various curricular and co-curricular activities.
- PSO2. Analyse various forms of Marathi literature like poem, drama, novel, short story, autobiography, travelogue.
- PSO3. Explain the interdependence of literature, society and culture.
- PSO4. Develop multi - cultural competence and a sense of Global Citizenship through the study of literature and linguistics.
- PSO5. Develop moral and ethical awareness, spirit of nationality through the study of literature and practice it and be socially conscious in all the circular and co-curricular activities.
- PSO6. Understand the interdependence of language, culture and society through the study of the linguistics and effects of Globalization on languages.
- PSO7. Explain the terms like language, standard language and dialect and the importance of the study of the same.
- PSO8. Exhibit critical and creative writing in Marathi.
- PSO9. Apply higher linguistic skills in writing news, an application, an advertisement, minutes of meeting, report writing, translation (from English to Marathi) in Marathi.
- PSO10. Develop digital literacy through curricular and co-curricular activities in Marathi.

Course Outcomes of Marathi (COs)

Course Title : COs of FYBA Marathi Compulsory, second language (SEM I)

At the end of the course learner will be able to :

- CO1. Communicate effectively in verbal and written form.
- CO2. Analyze a short story in Marathi.
- CO3. Apply the knowledge of the socio-cultural issues discussed in Marathi short stories to understand contemporary socio-cultural issues in the society.
- CO4. Practice moral and ethical awareness in curricular and co-curricular activities.
- CO5. Explain the relationship between literature and society.
- CO6. Explain and apply rules of writing and punctuation in Marathi.
- CO7. Write a report, a news in Marathi.
- CO8. Manage to translate material from English to Marathi.

Mapping of PSOs and COs :

COs	PSOs									
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
CO1	✓	x	x	x	x	x	x	x	x	x
CO2	x	✓	x	x	x	x	x	x	x	x
CO3	x	x	✓	x	x	x	x	x	x	x
CO4	x	x	x	✓	x	x	x	x	x	x
CO5	x	x	✓	x	x	x	x	x	x	x
CO6	x	x	x	x	x	x	x	x	✓	✓
CO7	x	x	x	x	x	x	x	x	✓	x
CO8	x	x	x	x	x	x	x	x	✓	x

Course Title : COs of FYBA Marathi Compulsory, second language (SEM II)

At the end of the course learner will be able to :

- CO1. Communicate effectively in verbal and written form.
- CO2. Analyze Marathi poems.
- CO3. Understand the socio-cultural, economic and political problems faced by women, dalits, people in rural areas and tribal communities.

CO4. Practice moral and ethical awareness in curricular and co-curricular activities.

CO5. Write an advertisement, minutes of meeting and essay in Marathi.

CO6. Manage to do summary writing & solve questions based on an unseen paragraph in Marathi.

Mapping of PSOs and COs :

COs	PSOs									
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
CO1	✓	x	x	x	x	x	x	x	x	x
CO2	x	✓	x	x	x	x	x	x	x	x
CO3	x	x	✓	x	x	x	x	x	x	x
CO4	x	x	x	✓	x	x	x	x	x	x
CO5	x	x	x	x	x	x	x	x	✓	x
CO6	x	x	x	x	x	x	x	x	✓	x

Course Title : COs of FYBA Marathi ANC - Paper I (SEM I)

At the end of the course learner will be able to :

CO1. Communicate effectively in verbal and written form.

CO2. Explain drama as a form of literature, components of drama, Tragedy and Comedy as significant types of the drama.

CO3. Explain the important stages in the History of Marathi drama.

CO4. Analyse Marathi Drama.

CO5. Apply the knowledge of the form drama to two Marathi plays : a. ' Cigarettes ' and b. ' Satyashodhak '.

CO6. Discuss the socio-cultural and moral-ethical values related to problems faced by the youth in contemporary society while analysing ' Cigarettes '.

CO7. Discuss the women related issues and the status of the oppressed class in the pre-independence period in Maharashtra.

CO8. Explain the work of Mahatma Jyotiba Phule and Savitribai Phule for the upliftment of women and oppressed classes with reference to the drama ' Satyashodhak '.

CO3	x	✓	x	x	x	x	x	x	x	x
CO4	x	✓	x	x	x	x	x	x	x	x
CO5	x	x	x	x	✓	x	x	x	x	x
6	x	x	x	x	✓	x	x	x	x	x

Course Title : COs of SYBA Marathi - Paper II (SEM IV)

At the end of the course learner will be able to :

CO1. Communicate effectively in verbal and written form.

CO2. Explain Atmakathan as a form of literature and important aspects of it.

CO3. Analyse Marathi Atmakathan.

CO4. Applies the knowledge of the form Atmakathan to analyze Marathi Atmakathan : a. ' Man me hai Vishvas ' and b. ' Jasa Ghadla Tasa '.

CO5. Explain the struggle of Mr. Vishvas Nagre-Patil to achieve success in UPSC exam and the importance of values, ethics, positive attitude, self-directed learning in the development of an individual.

CO6. Critically analyse male dominated society while discussing ' Jasa Ghadla Tasa ' with special reference to rural society.

Mapping of PSOs and COs :

COs	PSOs									
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
CO1	✓	x	x	x	x	x	x	x	x	x
CO2	x	✓	x	x	x	x	x	x	x	x
CO3	x	✓	x	x	x	x	x	x	x	x
CO4	x	✓	x	x	x	x	x	x	x	x
CO5	x	x	✓	x	✓	x	x	x	x	x
CO6	x	x	x	x	✓	x	x	x	x	x

Course Title : COs of SYBA Marathi - Paper III (SEM III)

At the end of the course learner will be able to :

CO1. Communicate effectively in verbal and written form.

CO2. Describe the structure and function of the Human Language.

CO3. Explain the interdependence of language, culture and society through the point of view of linguistics.

CO4. Understand the effects of Globalization on languages and define terms like language degradation, language planning, polarization of language and language development.

CO5. Define and compare the terms like language, standard language and dialect.

CO6. Explain the need and importance of study of dialects, usage of the basic research methodologies to study different dialects.

CO7. Apply the basic principles of linguistics in day to day communication and to overcome various misconceptions related to language and dialects.

Mapping of PSOs and COs :

COs	PSOs									
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
CO1	✓	x	x	x	x	x	x	x	x	x
CO2	✓	x	x	x	x	✓	✓	x	x	x
CO3	x	x	x	x	x	✓	x	x	x	x
CO4	x	x	x	x	x	✓	x	x	x	x
CO5	x	x	x	x	x	x	✓	x	x	x
CO6	x	x	x	x	x	x	✓	x	x	x
CO7	✓	x	x	x	x	x	✓	x	x	x

Course Title : COs of SYBA Marathi - Paper III (SEM IV)

At the end of the course learner will be able to :

CO1. Communicate effectively in verbal and written form.

CO2. Explain the grammar, idioms and phrases, the geographical area and other important aspects related to Malvani boli.

CO3. Review the history of Malvani literature.

CO4. Analyse Malvani drama : ' Chakarmani ' with reference to characterization, content, dialogues and the significance of the dialect used.

CO5. Analyse Malvani poems.

CO6. Understand the overall culture related to Malvani boli through the study of this dialect and literature.

Mapping of PSOs and COs :

COs	PSOs									
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
CO1	✓	×	×	✓	×	×	×	×	×	×
CO2	✓	×	×	×	×	✓	✓	×	×	×
CO3	×	×	×	×	×	✓	×	×	×	×
CO4	×	✓	×	×	×	✓	×	×	×	×
CO5	×	✓	×	×	×	×	✓	×	×	×
CO6	×	×	✓	✓	×	×	✓	×	×	×

B.Sc. Mathematics Program Educational Objectives:

- PO 1. To enable the learner to think critically and to encourage them to develop scientific temper.
- PO 2. To enable the learner to acquire basic subject knowledge required for other professional courses.
- PO 3. To enable the learner to apply mathematical concepts to solve real world problems.
- PO 4. To inculcate skills for data collection and data analysis among the learners.
- PO 5. To introduce the learner with basic tools for programming and to enable them to develop mathematical algorithms.
- PO 6. To inculcate communication skills among the learners to express ideas using mathematical language.

B.Sc. Mathematics Program Specific Outcomes:

At the end of the course the learner will be able to:

- PSO 1: Utilize the skills of logical thinking in problem solving and inculcate the habit of self-learning.
- PSO 2: Formulate and use quantitative models arising in social science, business and other context.
- PSO 3: Analyze the mathematical results and apply them in various problems appearing in different branches of mathematics and related fields.
- PSO 4: Recognize patterns and to distinguish between essential and irrelevant aspects of the problems.
- PSO 5: Employ technically oriented skills to solve specific theoretical and applied problems in mathematics and other domains.
- PSO 6: Translate information presented verbally into mathematical form, select and use appropriate mathematical formulae or techniques in order to process the information and draw the relevant conclusion.
- PSO 7: Identify unethical behaviour such as misrepresentation of data, unbiased and truthful actions in all aspects.
- PSO 8: Solve mathematical problems using analytical methods.
- PSO 9: Recognize the relationships between different areas of mathematics and the connections between mathematics and other disciplines.

7	✓	✓	-	-	✓	-	-	-	✓
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SUBJECT NAME : ALGEBRA 1

The course will introduce the following concepts to the students

CO1: Learn about Set Theory, Definition of Set, subset, union and intersection of two sets, empty set, universal set, complement of a set.

CO2: How to apply De Morgan’s laws, Cartesian product of two sets, Permutations and Combinations.

CO3: Concept of Complex Number, Properties of complex Number, Modulus, amplitude and conjugate of a complex number.

CO4: Statements of well-ordering property of non-negative integers, Principle of finite induction (first and second) as a consequence of the Well-Ordering Principle.

CO5: Divisibility of Integers, Division algorithm, Revision of L.C.M. and G.C.D., Euclidean algorithm.

CO6: Introduction of Prime number and Composite Number also the relatively prime number Euclid’s lemma, Fundamental Theorem of arithmetic.

CO7: Definition of relation and function, domain, co-domain and range of a function, composite functions, Direct image and inverse image. injective, surjective, bijective functions, Composite of injective, surjective, bijective functions defined invertible functions, bijective functions are invertible and conversely, examples of functions including constant, identity, projection, inclusion, Binary operation as a function, properties.

CO8: Definition of a polynomial ,degree of polynomial, basic properties. Roots of a polynomial, relation between roots and coefficients, multiplicity of a root.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	-	✓	-	-	-	-	-
2	✓	-	✓	✓	-	✓	-	-	✓
3	✓	-	✓	-	-	-	-	-	✓
4	✓	-	✓	✓	-	-	-	-	-
5	✓	-	✓	-	-	-	-	-	-

6	✓	✓	✓	✓	-	-	-	-	-
7	✓	-	✓	✓	-	-	-	✓	✓
8	✓	✓	✓	-	-	-	-	✓	✓

SEMESTER 2

SUBJECT NAME: CALCULUS II

By the end of this course, the learner will be able to:

CO1: Define limit of a function, continuous, discontinuous functions and differentiable functions.

CO2: Find limits and recognize continuous, discontinuous function.

CO3: Discuss the algebra of limits, continuous functions and differentiable functions, state intermediate value property and apply it in finding solutions of a function.

CO4: Examine the differentiability of functions and evaluate the derivative.

CO5: Apply chain rule and Leibniz rule to find higher order derivatives.

CO6: Discuss the applicability of mean value theorems and L-Hospital rule.

CO7: Determine the Taylor expansion, critical points, local maxima and minima of a function.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	✓	-	-	-	✓	✓
2	✓	-	✓	✓	-	-	-	✓	✓
3	✓	-	✓	✓	-	✓	-	✓	✓
4	✓	-	✓	-	-	-	-	✓	✓
5	✓	-	✓	-	-	-	-	✓	✓
6	✓	-	✓	-	-	-	-	✓	✓
7	✓	-	✓	-	-	✓	-	✓	✓

SUBJECT NAME : DISCRETE MATHEMATICS

The course will introduce the following concepts to the students.

CO1: Identify and classify numbers into sets such as Natural, real, imaginary, rational numbers etc.

CO2: Apply principles of counting such as addition principle, multiplication principle, pigeon hole principle, two way counting for evaluation of permutations and combination problems.

CO3: Principal of inclusion and exclusion, its applications, derangements and Euler's formula

CO4: Basic Concepts of Permutation and combination of sets and multisets, circular permutations.

CO5: Evaluate expressions involving factorials by Binomial theorem. Calculate binomial coefficients. Expand powers of binomials using the binomial theorem.

CO6: Definition of homogeneous, non-homogeneous, linear, non-linear recurrence relation, Fibonacci sequence, etc. in counting problems, solving homogeneous as well as non homogeneous recurrence relations by using iterative methods, solving a homogeneous recurrence relation of second

CO7: Develop recurrence relations which can be solved using algorithms for problems where finding the exhaustive solution is difficult.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	-	✓	-	-	-	-	-
2	✓	-	✓	✓	-	✓	-	✓	✓
3	✓	-	✓	✓	-	-	-	✓	✓
4	✓	✓	✓	✓	-	✓	-	-	✓
5	✓	-	✓	✓	-	-	-	✓	✓
6	✓	✓	✓	✓	-	-	-	✓	✓
7	✓	✓	✓	✓	✓	-	-	✓	✓

SEMESTER III

SUBJECT NAME: CALCULUS III

By the end of this course, the learner will be able to:

CO1: Define and identify inner product spaces, examine the properties of inner product and evaluate the norm.

CO2: Define functions over scalar field and vector field, discuss the limit, continuity and differentiability of functions of several variables.

CO3: Find the directional derivative and gradient of a function.

CO4: Discuss the mean value theorems, chain rule and tangent planes for scalar and vector fields

CO5: Evaluate the partial derivatives of a vector valued function.

CO6: Apply second order Taylor's formula for scalar fields.

CO7: Find Hessian matrix, Jacobian matrix, maxima, minima, critical point and saddle point of a vector valued function and apply the method of Lagrange Multipliers.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	✓	✓
2	✓	-	✓	✓	-	-	-	✓	✓
3	✓	-	✓	-	-	-	-	✓	✓
4	✓	-	✓	-	✓	-	-	✓	✓
5	✓	-	✓	-	✓	-	-	✓	✓
6	✓	-	✓	-	-	-	-	✓	✓
7	✓	-	✓	-	✓	✓	-	✓	✓

SUBJECT NAME :ALGEBRA

The course will enable the students to:

CO1. Analyze the equivalence of the rank of an $m \times n$ matrix and hence the rank of a linear transformation.

CO2. Analyze the solutions of non- homogeneous systems of linear equations.

CO3. Understand the existence and uniqueness of solutions of the system $AX = B$ using determinants.

CO4. Analyze determinant as area and volume.

CO5. Realize the importance of adjoint of a linear transformation and its canonical form

CO6. Learn properties of inner product spaces and determine orthogonality in inner product spaces.

CO7. Apply Cauchy Schwarz inequality with a given Euclidean inner product.

CO8. Obtain orthonormal basis using Gram - Schmidt orthogonalization process.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	✓	-	-	✓	✓
2	✓	✓	✓	✓	✓	✓	-	✓	✓
3	✓	✓	✓	✓	-	✓	-	✓	✓
4	✓	✓	✓	-	✓	-	-	✓	✓
5	✓	-	✓	-	-	-	-	✓	✓
6	✓	-	✓	-	-	-	-	✓	✓
7	✓	-	✓	-	-	-	-	✓	✓
8	✓	-	✓	-	✓	-	-	✓	✓

SUBJECT NAME :DISCRETE MATHEMATICS

Upon completion of this course, students should be able to-

CO1: Apply recursive functions and solve recurrence relations

CO2: Apply basic and advanced principles of counting

CO 3: Apply the Addition Rule and the Principle of Inclusion and Exclusion.

CO 4: Use Pascal's formula and Pascal's Triangle.

CO 5: State the Principle of Mathematical Induction.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	-	-	-	✓	✓
2	✓	-	✓	✓	-	✓	-	✓	✓
3	✓	-	✓	✓	-	✓	-	✓	✓
4	✓	-	✓	✓	-	-	-	✓	✓
5	✓	-	✓	✓	-	-	-	-	✓

SEMESTER IV:**SUBJECT NAME: CALCULUS IV**

By the end of this course, the learner will be able to:

CO1: State the definitions of partitions, upper and lower sum, upper and lower integrals and examine their properties.

CO2: Define Riemann integrable functions and identify Riemann integrable functions using Riemann criteria.

CO3: Construct Riemann integrable functions and explain the properties of Riemann integrable functions.

CO4: Evaluate indefinite and improper integrals and analyze the test for convergence of improper integrals.

CO5: Prove fundamental theorem of calculus and apply it in finding indefinite integrals.

CO6: Recall beta and gamma functions, their properties and apply them in finding integrals.

CO7: Evaluate the areas and volumes using integration.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	✓	✓
2	✓	-	✓	-	-	-	-	✓	✓
3	✓	-	✓	-	-	-	-	✓	✓
4	✓	-	✓	-	--	-	-	✓	✓
5	✓	-	✓	-	-	-	-	✓	✓
6	✓	-	✓	-	-	-	-	✓	✓
7	✓	-	✓	-	✓	✓	-	✓	✓

SUBJECT NAME: DIFFERENTIAL EQUATIONS

Upon completion of this course, students should be able to-

CO1: Obtain solutions of the Homogeneous equation with constant coefficient and Homogeneous equation with analytic co-efficient.

CO2: Comprehend the Euler equation, and Regular singular points at infinity.

CO3 :Study surfaces and curves in three dimension space.

CO4: Analyze the origin of first order partial differential equations.

CO5: Identify the second order equations and solve them using separation of variable methods.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	-	-	-	-	-	✓
2	✓	-	✓	-	-	-	-	✓	✓
3	✓	-	✓	-	✓	-	-	-	✓
4	✓	-	✓	-	-	-	-	✓	✓
5	✓	-	✓	-	-	-	-	✓	✓

SEMESTER 5

SUBJECT NAME: MULTIVARIABLE CALCULUS

Upon completion of this course, students should be able to-

CO1: Calculate and interpret derivatives in up to three dimensions.

CO2: Integrate functions of several variables over curves and surfaces.

CO3: Calculate line integrals and apply the information contained in Green's Theorem and Stokes' Theorem

CO4: Perform a change of variables utilizing polar, cylindrical or spherical coordinates to calculate integrals

CO5: Use double and triple integrals to calculate volumes and solve application problems.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	✓	-	-	-	✓
2	✓	-	✓	-	✓	-	-	-	✓
3	✓	-	✓	-	✓	-	-	-	✓
4	✓	-	✓	-	✓	-	-	-	✓
5	✓	-	✓	-	✓	✓	-	✓	✓

SUBJECT NAME: LINEAR ALGEBRA

The course will enable the students to:

CO1. Understand the concepts of quotient space,orthogonal linear transformation, isometry, and translation.

CO2. Understand the various isomorphism theorems of vector space.

CO3. Find eigenvalues and corresponding eigenvectors of a square matrix and a linear transformation.

CO4. Analyze the consequences of Cayley Hamilton Theorem.

CO5. Find the canonical form of linear transformation.

CO6. Obtain the various variants of diagonalisation of matrices.

CO7. Understand the concepts of quadratic form and analyze various types of conics and quadrics.

CO8. Explain the properties of three dimensional shapes.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	-	✓
2	✓	-	✓	-	-	-	-	-	✓
3	✓	-	✓	-	-	-	-	✓	✓
4	✓	-	✓	-	-	-	-	-	✓
5	✓	-	✓	-	-	-	-	✓	✓
6	✓	-	✓	-	✓	-	-	-	✓
7	✓	-	✓	✓	-	-	-	✓	✓
8	✓	-	✓	-	✓	-	-	-	✓

SUBJECT NAME: TOPOLOGY OF METRIC SPACES

By the end of this course, the learner will be able to:

CO1: Define metric spaces, open balls, closed balls, open sets, closed sets, distance between sets.

CO2: Recognize metric spaces and equivalent metrics.

CO3: Define sequences, convergent and divergent sequences, Cauchy sequences in a metric space.

CO4: Characterize limit points and closure points in terms of sequences.

CO5: Define complete metric spaces and give examples of complete metric spaces.

CO6: Define compact metric spaces and examine their properties.

CO7: Examine union and intersection of compact metric, sequentially compactness property, Heine-Borel property and Bolzano Weierstrass property.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	-	✓
2	✓	-	✓	-	-	-	-	-	✓
3	✓	-	✓	✓	-	-	-	-	✓
4	✓	-	✓	✓	-	✓	-	-	✓
5	✓	-	✓	-	-	-	-	-	✓
6	✓	-	-	-	-	-	-	-	-
7	✓	-	✓	-	-	-	-	-	✓

SUBJECT NAME :GRAPH THEORY

Upon completion of this course, students should be able to learn the following

C01: Concepts of Graph, Degree, Vertex, types of graphs viz. Regular, directed, null, Complete, Complimentary, Subgraph, Connected, Bi-partite etc, concepts of walk, path, circuit and cycle

C02: Learn to construct incidence and adjacency matrix from a given graph

C03: Learn about Handshaking theorem and its applications, Havel Hakimi theorem to predict validity of graphs from their degree sequence, Dijkstra's algorithm to determine shortest path along vertices in a given graph.

C04: Concept of trees, forest, spanning trees, their mathematical properties, use of depth first and breadth first algorithms to find spanning trees

C05: Concepts of binary tree, m-ary tree, Use of Huffman coding and its application in data compression

C06: Minimum spanning tree and Kruskal's algorithm to construct minimum spanning tree

C07: Origin and Significance of Konigsberg bridge problem in graph theory, Euler graph and its properties, Use of Fleury's algorithm to determine Euler path, Chinese Postman problem, Hamiltonian graphs.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	-	-	-	✓
2	✓	-	-	✓	-	-	-	✓	-
3	✓	-	✓	✓	✓	-	-	-	✓
4	✓	-	✓	-	✓	-	-	-	✓
5	✓	-	✓	✓	✓	-	-	-	✓
6	✓	-	-	✓	-	-	-	-	-
7	✓	-	✓	✓	✓	-	-	-	✓

SUBJECT NAME :APPLIED COMPONENT

Upon completion of this course, students should be able to-

CO1:Apply ethical computing concepts and practices to database design and implementation.

CO2:Students can analyze a problem, and identify and define the computing requirements appropriate to its solution.

CO3:Students can design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

CO4:Enhance Programming and Software Engineering skills and techniques using SQL and PL/SQL.

CO5:Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.

CO6: Identify and fix defects and common security issues in code.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	-	✓	-	✓	-	✓
2	✓	✓	✓	-	✓	-	✓	--	✓
3	✓	✓	✓	-	✓	-	✓	-	✓
4	✓	✓	✓	-	✓	-	-	✓	✓
5	✓	-	-	-	✓	-	✓	-	-
6	✓	-	-	-	✓	-	✓	-	-

SEMESTER 6

SUBJECT NAME: COMPLEX ANALYSIS

Upon completion of this course, students should be able to-

CO1: Analyze Analytic functions and exponential functions.

CO2: Apply Cauchy's theorem for disk and the Integral formula.

CO3: Understand Local properties of Analytic functions.

CO4: Study Residue theorem and the argument principle. Differentiate the Taylor's series and Laurent series.

CO5: Determine whether given functions have antiderivatives, logarithms, and nth roots.

CO6: Use conformal mapping to solve the Dirichlet problem in a region

CO7 :Use power series and line integrals to construct differentiable functions.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	✓	✓
2	✓	-	✓	-	-	-	-	✓	✓
3	✓	-	✓	-	-	-	-	-	✓
4	✓	-	✓	-	-	-	-	✓	✓
5	✓	-	✓	-	-	-	-	✓	✓
6	✓	-	-	-	-	-	-	✓	-
7	✓	-	✓	-	-	-	-	✓	✓

SUBJECT NAME: ALGEBRA

The course will enable the students to:

- CO1. Understand the fundamental concepts of normal subgroups and their properties.
- CO2. Understand the various isomorphism theorems of groups.
- CO3. Analyze the classification of cyclic groups upto isomorphism.
- CO4. Analyze the consequences of Cayley’s theorem.
- CO5. Understand the concepts of external direct product and their consequences in finding the order of an element.
- CO6. Analyze the classification of groups of order upto 7.
- CO7. Understand the fundamental concepts in ring theory such as ideals, quotient rings, integral domains and fields.
- CO8. Understand the concepts of polynomials and their prime factorization.
- CO9. Analyze the consequences of Eisentein’s criterion.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	-	✓	-	-	-	-	-
2	✓	-	✓	-	-	-	-	-	✓
3	✓	-	-	-	-	-	-	-	-
4	✓	-	-	-	-	-	-	-	-
5	✓	-	-	-	-	-	-	-	-
6	✓	-	-	✓	-	-	-	-	-
7	✓	-	✓	-	-	-	-	-	✓
8	✓	-	✓	-	-	✓	-	✓	✓
9	✓	-	✓	-	-	✓	-	✓	✓

SUBJECT NAME: TOPOLOGY OF METRIC SPACES

By the end of this course, the learner will be able to:

CO1: Give the characterization of continuous functions using closed and open sets.

CO2: Define uniform continuity, Lipchitz continuity, contraction mapping and fixed point.

CO3: Recognize uniform continuous and Lipchitz continuous functions.

CO4: Define separated sets, connected sets and disconnected sets and give examples of each.

CO5: Characterize connected space using continuous functions.

CO6: Define path connected space and give the relation between path connectedness and connectedness.

CO7: Define sequences and series of function and examine their convergence.

CO8: Define power series and find the radius and interval of convergence of a power series.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	-	-	-	-	-	✓
2	✓	-	✓	-	-	-	-	-	✓
3	✓	-	✓	-	-	-		-	✓
4	✓	-	-	-	-	-	-	-	-
5	✓	-	-	-	-	-	-	-	--
6	✓	-	-	-	-	-	-	-	-
7	✓	-	✓	✓	-	-	-	-	✓
8	✓	-	✓	-	-	-	-	✓	✓

SUBJECT NAME: GRAPH THEORY

The course will introduce the following concepts to the students.

C01: Concept of vertex and edge coloring of graphs, for application in problems such as resource allocation and task scheduling

C02: Evaluation of Chromatic number, chromatic polynomials of graphs

C03: Analyze whether a given graph is a planar graphs, learning special properties of planar graphs

C04: Analyzing networks, evaluating flow and capacity for a given network for applications such as flow through pipes, electrical circuits, information network etc.

C05: Applications of combinatorics principle in graph theory such as inclusion exclusion principle.

C06: Concept of Rook polynomials

C07: Learn to develop recurrence relations and their generating functions for sequential solutions using standard algorithms

C08: Understand Hall's theorem of marriage, Matchings of graph and its applications in matchmaking

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	-	✓	-	-	-	✓
2	✓	✓	✓	-	✓	-	-	-	✓
3	✓	✓	✓	-	✓	-	-	-	✓
4	✓	✓	✓	-	✓	-	-	✓	✓
5	✓	✓	✓	-	✓	-	-	✓	✓
6	✓	-	-	✓	✓	-	-	-	-
7	✓	✓	✓	-	-	-	-	✓	✓
8	✓	✓	✓	-	✓	-	-	-	✓

SUBJECT NAME: APPLIED COMPONENT

Upon completion of this course, students should be able to-

CO1: Define and demonstrate the use of built-in data structures “lists” and “dictionary”.

CO2: Design and implement a program to solve a real world problem.

CO3: Design and implement GUI applications and how to handle exceptions and files.

CO4: Make database connectivity in python programming language.

CO5: Explain what a given program (in Python) does

CO6: Identify and repair coding errors in a program

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	✓	✓	-	-	-	-	✓
2	✓	-	✓	✓	-	-	✓	-	✓
3	✓	-	✓	-	-	-	-	-	✓
4	✓	✓	✓	-	-	-	-	-	-
5	✓	-	-	-	-	-	-	-	-
6	✓	-	✓	✓	-	-	-	-	✓

BSC STATISTICS COURSE OUTCOMES:

SEMESTER 1

SUBJECT NAME: Statistics-1

The course will enable the students to:

CO1. Basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, types of sampling.

CO2. Knowledge of various types of data, their sources, organization and evaluation of summary measures such as measures of central tendency and dispersion.

CO3. Knowledge of other types of data reflecting quality characteristics including concepts of independence and association between two attributes.

CO4. Realize the importance of frequency distribution and their graphical representations.

CO5. Analyze the consequences of moments, skewness and kurtosis.

CO6. Identify outliers by using boxplot.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	-	-	-	-	-	-	-
2	✓	✓	-	-	-	-	-	-	-
3	✓	-	-	-	-	-	-	-	-
4	✓	✓	-	-	✓	-	-	-	-
5	✓	✓	-	-	-	-	-	✓	-
6	✓	✓	-	-	✓	-	-	-	-

SUBJECT NAME :Statistics-2

The course will introduce the following concepts to the students.

CO1: To learn basic concepts of probability, conditional probability and independence, probability distribution of a discrete random variable.

CO2:To learn Probability Mass Function,Discrete Random Variable.

CO3:To learn Cumulative Distribution Function.Basic Concept of Mathematical expectation,Definition and Properties of expectation.Also Concept of the skewness and Kurtosis.

CO4:Basic Concepts of Bivariate Discrete Distribution,Like join Probability of Mass Function,Marginal Probability Distribution,Conditional Probability Distribution

CO5:To Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data as applied to machine intelligence .

CO6:To familiarize students with how various statistics like mean median etc. can be collected for data .

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	✓	-	-	-	-	-	-	-
2	✓	✓	-	-	-	-	-	-	-
3	✓	✓	-	-	-	-	-	-	-
4	✓	✓	-	-	-	-	-	-	-
5	✓	✓	-	-	-	-	-	✓	-
6	✓	✓	-	-	-	-	-	✓	-

SEMESTER 2

SUBJECT NAME: Statistics-1

The course will enable the students to:

- CO1. Insights into preliminary exploration of various types of data.
- CO2. Knowledge of correlation, regression analysis, regression diagnostics.
- CO3. Analyze rank correlation.
- CO4. Insight into fitting of curves by least square method.
- CO5. Insight into time series data, its application to various fields and its various components.
- CO6. Able to fit and plot various growth curves.
- CO7. Knowledge of fitting of trends by various methods and measurement of seasonal indices.
- CO8. Understand the characteristics of index numbers and the various methods of evaluating them.
- CO9. Understand the concept of Cost of Living Index Number and the method of constructing it.

Relating CO with PSO:

CO	PSO								
	1	2	3	4	5	6	7	8	9
1	✓	-	-	-	-	-	-	-	-
2	✓	✓	-	-	-	-	-	✓	-
3	✓	✓	-	-	-	-	-	✓	-
4	✓	✓	-	-	✓	-	-	-	-
5	✓	✓	-	-	-	-	-	-	-
6	✓	✓	-	-	✓	-	-	-	-
7	✓	✓	-	-	✓	-	-	-	-
8	✓	-	-	-	-	-	-	-	-
9	✓	✓	-	-	-	-	-	-	-

Programme education objective (PEO)

M.Sc. MICROBIOLOGY

PO1 The course will provide the students with a broad exposure to various communities, ecological, commercial and health related issues with reference to the field microbiology.

PO2 The course will provide extensive laboratory training in addition to theory-based knowledge; thus, the students will attain competency to qualify for positions in research, industry, or higher/ specialized education programs.

PO3 The learner will be introduced to the significance of professional ethics and motivated to implement the moral values in their future career and individual's holistic development

PO4 The course will instil the students with advanced analytical and logical reasoning skills in order to contribute to the scientific society as responsible individuals.

PO5 To acquire higher order thinking and technical skills to achieve their goals in the research field.

Program Specific Outcome (PSO)

M.Sc. MICROBIOLOGY

The Microbiology Post graduates students will be able to:

PSO1 Understand the advanced knowledge of molecular genetics, microbial biochemistry, medical microbiology and pathogenesis, environmental microbiology and sustainability, food microbiology, pharmaceutical microbiology, biomolecular engineering and concepts of gene therapy. in day-to-day life activities.

PSO2 Apply several Basic and Advanced Microbiology techniques (such as bioinformatics and biostatistical techniques)

PSO3 Appraise and implement theory-based knowledge, analytical approaches, including statistical methods in designing new scientific objectives and execute short term scientific projects.

PSO4 Inculcate ethical and moral values, communicate and discuss scientific outputs by publishing well-structured articles and papers in peer reviewed journals.

PSO5 Interact with some of the renowned scientists and philanthropists and witness their extraordinary achievements for the well being of the society through various scientific symposia and conferences.

PSO6 Enlighten themselves with state of art knowledge and represent themselves as skilled scientific work force in academics, research as well as in industrial set up

PSO7 Inculcate comprehensive knowledge (both theoretical and practical insight) about instruments, techniques that are used in research, quality control, quality assurance and good manufacturing practices.

M.Sc Part I Microbiology Semester I Course Outcomes for Molecular Genetics-1 (PSMB - 101)

At the end of the course, the students will be able to :

CO1 Understand the different genetic events that occur in microorganisms.

CO2 Learn the different mechanisms of gene transfer like the process of conjugation, transformation and recombination in bacteria.

CO3 Comprehend the role of transposable elements in different eukaryotic systems.

CO4 Recognize the role of repair enzymes in the eukaryotic cell.

CO5 Study the molecular basis of cancer formation, the role of oncogenes in causing cancer and action of tumor suppressor genes in cancer.

CO6 Acquainted with the different operon systems present in bacteria like the Lac operon, Gal operon, ara operon, Maltose and trp operon.

CO7 Realize the regulation of nitrogen assimilation, stress response and iron and spore regulation in various microorganisms.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester I Molecular Genetics-1 (PSMB - 101)

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	-	✓	-	✓	-
2	✓	✓	✓	✓	-	✓	-
3	✓		-	✓	-	✓	-
4	✓	✓	✓	✓		✓	
5	✓	✓		✓		✓	
6	✓			✓		✓	
7	✓		✓	✓		✓	

M.Sc Part I Microbiology Semester I Course Outcomes for Paper PSMB-102 (ENVIRONMENTAL MICROBIOLOGY AND SUSTAINABILITY)

At the end of the course, the students will be able to

CO1: Understand the various theories of evolution of life on earth and space .They will have knowledge about molecular clocks which is an extremely useful method for estimating evolutionary timescales.

CO2: Explore the field of astrobiology

CO3: Understand the microbial biodiversity in different habitats .They will also theoretically learn about the different culture dependent and independent methods to study microbes in different habitats.

CO4: Study the molecular mechanisms of adaptations of microorganisms to extreme environmental conditions.Also they will be able to appreciate the different applications of these extremophiles at commercial level.Will be able to design small projects for bioprospecting molecules of importance in pharmaceutical,molecular biology,chemical industries,food industries

CO5: Understand the concepts of waste management, biohazard and biosafety standards.This will help them to shoulder the task of environment sustainability.They will become environment conscious global citizens, consumers and environment protectors.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester I Paper PSMB-102 (ENVIRONMENTAL MICROBIOLOGY AND SUSTAINABILITY)

CO	PSO						
	1	2	3	4	5	6	7
1	✓	-	-	-	-	✓	-
2	✓	-	✓	-	-	✓	-
3	✓		-	-	-	✓	-

4	✓	-	✓	✓		✓	
5	✓	✓		✓		✓	✓

M.Sc Part I Microbiology Semester I Course Outcomes for Paper PSMB-103 (Biochemistry)

At the end of the course, the students will be able to

CO1: Demonstrate preparation of different buffer solution and review the concepts behind buffer preparation

CO2: Discuss the biochemical principles, metabolic pathways and significance of different biomolecules and bioorganic molecules.

CO3: State the importance of biodegradation and transformation of toxic organic molecules into simpler forms in the environment.

CO4: Apply the knowledge of microbial physiology in understanding the mechanism behind growth of aerobes and anaerobes

CO5: Acquire knowledge about the physiology and pathogenesis of microbes that have potential significance in the medical field

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester I Paper PSMB-103 (Biochemistry)

CO	PSO						
	1	2	3	4	5	6	7
1		✓					
2	✓	✓	✓				
3	✓			✓	✓		
4	✓				✓		

5	✓			✓	✓		
---	---	--	--	---	---	--	--

M.Sc Part I Microbiology Semester I Course Outcomes for PSMB-104 (MEDICAL MICROBIOLOGY AND MICROBIAL PATHOGENESIS)

At the end of the course, the students will be able to

CLO1: Compare and contrast knowledge about different molecular mechanisms of virulence expression, regulation and secretion to disease by different pathogens that cause chronic infections, toxin associated,& biofilm mediated infections

CLO2 : Understand the post interventional procedures to biofilm associated infections on implants and prosthetic devices,the different mechanisms underlying antibacterial resistance can create awareness. The importance of human microbiome with focus on gut microbiome ,its significance in health and diseases and can be equipped to research on it

CLO3: Appreciate the role of epidemiological studies in Emerging and re-emerging diseases t prevailing in the country , they will be prepared to use this for their jobs in disease control centres

CLO4: Understand and apply the knowledge of Laboratory Methods for Antimicrobial susceptibility testing, Detection of specific types of Antibiotic Resistance, Quality Control in Medical Microbiology, these areas will help them in their careers in QC laboratories , research centres in hospitals , pharmaceuticals and allied fields .

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester I PSMB-104 (MEDICAL MICROBIOLOGY AND MICROBIAL PATHOGENESIS)

CO	PSO						
	1	2	3	4	5	6	7
1	✓	-	✓	-	-	-	-
2	✓	-	✓	-	-	✓	-
3	✓	-	✓	-	-	✓	-
4	✓	✓	✓	-	-	✓	✓

M.Sc Part I Microbiology Semester I Course Outcomes for Molecular Genetics-1 (PSMBP- 101)

At the end of the course, the students will be able to

CO1: Demonstrate the process of conjugation in bacteria.

CO2: Prepare competent cells and study the process of transformation in bacteria.

CO3: Isolate plasmid DNA from different bacteria and study them using molecular techniques.

CO4: Comprehend the correlation between germination, sporulation and protease activity in *Bacillus subtilis*.

CO5: Understand the response of nutrient stress on bacterial culture.

CO6: Solve problems related to gene transfer mechanisms and regulation.

CO7: Visit laboratories or institutions where Cancer research is carried out.

Mapping for Course Learning Outcomes for M.Sc Part I Microbiology Semester I Molecular Genetics-1 (PSMBP- 101)

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓		✓		✓	
2	✓	✓	✓	✓		✓	
3	✓			✓		✓	✓

1	✓		✓			✓	✓
2	✓						✓
3	✓						✓
4	✓						
5	✓						✓

M.Sc Part I Microbiology Semester I Course Outcomes for PSMBP104 ((MEDICAL MICROBIOLOGY AND MICROBIAL PATHOGENESIS)

At the end of the course, the students will be able to

CO1: Understand the role of virulence factors and quorum sensing in pathogenesis of bacterial infections

CO2: Apply the knowledge of the factors involved in biofilm formation and use of antibiotics to prevent this which is a leading cause of drug resistance

CO3: Understand and use the detection methods for specific types of antibiotic resistant organisms, use antibiotic testing methods to evaluate the efficacy of the chemotherapy and apply it in practise in pharmaceutical laboratories

CO4: Appreciate and apply the knowledge to determine the Quality assurance of laboratory media , reagents which will be very useful to build their basics for choosing a career in quality assurance and quality control.

CO5: Evaluate the causes of emerging diseases, their modes of transmissions, prevention methods and use of various tools of epidemiological studies which is of prime importance in the medical field and use it for disease control studies

**Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology
Semester I PSMBP-104 (MEDICAL MICROBIOLOGY AND MICROBIAL PATHOGENESIS)**

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	-	-	-	-	-
2	✓	✓	✓	-	-	-	-
3	✓	✓		-	-	-	✓
4	✓	✓	-	-	-	-	✓
5	✓	✓	-	-	-	-	✓

M.Sc Part I Microbiology Semester II Course Outcomes for Molecular Genetics-2 (PSMB - 201)

At the end of the course, the students will be able to :

CO1: Study the regulation of gene expression in eukaryotes.

CO2: Understand genetic regulation of the development of Drosophila, mitochondria and chloroplast DNA.population genetics.

CO3: Comprehend the concept of population genetics and understand the factors that change gene frequency in a population.

CO4: Acquire knowledge in the use of various molecular tools for studying genes and gene activity such as PCR, Electrophoresis, hybridization, DNA sequencing and gene knockout.

CO5: Know and understand the concepts of metagenomics and proteomics.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester II Molecular Genetics-2 (PSMB - 201)

CO	PSO						
	1	2	3	4	5	6	7
1	✓					✓	
2	✓					✓	
3	✓					✓	
4	✓	✓	✓			✓	✓
5	✓	✓	✓			✓	

M.Sc Part I Microbiology Semester II Course Outcomes for Paper PSMB-202 Research Methodology , Bioinformatics & Biostatistics

At the end of the course, the students will be able to

CO1: Understand the concept of research, types of research, sampling, data collection, processing of data. They will be able to use these concepts to carry out good quality research.

CO2: Utilize statistics in research .They will understand the concepts of reliability and validity of ideas. Students will apply principles of statistics for collection, organisation ,analysis, interpretation and presentation of the data

CO3: Compare and contrast between different types of scientific documents. Also to understand the general structure of scientific reports, publication process .This will help them to write and publish their research work.

CO4: Use bioinformatic tools in various aspects of research.They will learn structure predictions for proteins,phylogenetic analysis and tree construction.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester II Paper PSMB-202 Research Methodology , Bioinformatics & Biostatistics

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	-	-	-	✓	-
2	✓	✓	✓	-	-	✓	-
3	✓	✓	✓	✓	-	✓	-
4	✓	✓	✓	✓		✓	

M.Sc Part I Microbiology Semester II Course Learning Outcome for Paper 3 (PSMB 203) Applied Biochemistry

At the end of the course, the students will be able to

CO1: Interpret significance and learn various aspects of applied biochemistry such as structural biology, enzymology and metabolism

CO2: Study different theories of enzyme kinetics, molecular mechanism behind enzyme catalysis and importance aspects of enzymology in relation to different diseases

CO3: Comprehend the mechanism behind bacterial cell to cell communication, antimicrobial resistance and behavioural response in presence of temperature, pH, nutrient and chemical and environmental stress.

CO4: Understand the concept and challenges related to proteomics and apply the knowledge in studying the role of protein markers in disease diagnosis.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester II Paper 3 (PSMB 203) Applied Biochemistry

CO	PSO						
1		✓			✓		
2		✓			✓		✓
3		✓			✓		✓
4		✓			✓		✓

M.Sc Part I Microbiology Semester II Course Learning Outcome for PSMB-204 (Applied Immunology)

At the end of the course, the students will be able to

CO1: Understand the details of the adversarial strategies adopted by bacteria and viruses during various infections to overcome the host defence mechanisms .

CO2: Conceptualize the recent advances in vaccines production and difficulties encountered in it., this will also assist them to correlate the difficulties and the solutions in development of vaccines as part of the career in medical fields

CO3: :Correlate the causes, principles involved, examples, control and treatment of immunodeficiency disorders, hypersensitivity reactions and autoimmune diseases.This section will enable the students to apply this knowledge in pharmaceutical fields

CO4: Comment on the organs, tissue transplantation and blood transfusion-principle involved, types of transfusion reactions and their control, tests to be performed for safe transplantation.

CO5: Understand the various mechanisms underlying tumour immunology and apply the knowledge for developing cancer immunotherapy

CO6: Comprehend the causes , mechanism , pathogenic effect of auto antigens and development of autoimmune disorders , this will also help them to evaluate the different

immunotherapies available for treating autoimmune disorders, which will open opportunities in research fields .

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part I Microbiology Semester II Paper 3 (PSMB 204) Applied Immunology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	-	-	-	-	✓
2	✓	✓	✓	-	-	-	-
3	✓	-	✓	-	-	-	-
4	✓	✓	✓	-	-	-	✓
5	✓	✓	-	-	-	-	✓
6	✓	✓	✓	-	-	-	✓

M.Sc Part I Microbiology Semester I Molecular Genetics-2 (PSMBP- 201)

At the end of the course, the students will be able to :

CO1: Understand various molecular techniques like Southern, Northern and Western hybridization.

CO2: Perform restriction digestion and solve problems related to restriction mapping.

CO3: Design primer and also perform Polymerase chain reaction.

CO4: Carry out various electrophoresis techniques for DNA and Protein.

CO5: Solve problems related to population genetics.

CO6: Visit institutes and observe instruments like MALDI-TOF and Microarray.

Mapping for Course Learning Outcomes for M.Sc Part I Microbiology Semester I Molecular Genetics-2 (PSMBP- 201)

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				✓	
2	✓	✓		✓		✓	
3	✓	✓		✓		✓	
4	✓	✓		✓		✓	
5	✓		✓				
6	✓						

M.Sc Part I Microbiology Semester II Course Outcomes for PSMBP-202 Research Methodology , Bioinformatics & Biostatistics

At the end of the course, the students will be able to

CO1: Perform extensive literature review for their research topic

CO2: Solve problems in biostatistics, and also apply it to their own research.

CO3: Visit NCBI and EMBL websites & list services available, software tools available and databases maintained. Trained to visit and use various databases mentioned in syllabus. The students will be able to compare primary biological sequence information, such as the amino-acid sequences of proteins or the nucleotides of DNA and/or RNA sequences. using BLAST and FASTA .

CO4: Perform restriction analysis of given nucleotide sequence

CO5: Perform pairwise alignment and multiple alignment of a given protein sequences

CO6: Design and perform phylogenetic tree analysis

Mapping for Course Learning Outcomes for M.Sc Part II Microbiology PSMBP-202 Research Methodology , Bioinformatics & Biostatistics

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	-	-	-	✓	-
2	✓	✓	✓	-	-	✓	-
3	✓	✓	✓	✓	-	✓	-
4	✓	✓	✓	✓		✓	
5	✓	✓	✓	✓		✓	-
6	✓	✓	✓	✓		✓	-

M.Sc Part I Microbiology Semester II Course Outcomes for PSMBP-203 Applied Biochemistry

At the end of the course, the students will be able to

CO1: Design and understand aspects of buffer preparation, protein structure and function, enzyme kinetics

CO2: Learn the protocol of culturing anaerobic bacteria in a laboratory facility and carry out different biochemical characterization to identify the microbe

CO3: Learn and perform isolation of amylopectin and amylose from potato starch and lycopenes from tomatoes

CO4: Study the importance of lectin derived from plant source

Mapping for Course Learning Outcomes for M.Sc Part I Microbiology Semester II PSMBP-203 Applied Biochemistry

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓					✓
2	✓	✓					✓
3	✓						
4	✓						✓

M.Sc Part I Microbiology Semester II Course Outcomes for PSMBP-204 Applied Immunology

After performing the practicals the students will be able to

CO1: Understand the importance of the specific test for selection of suitable blood donor for safe transfusion, apart from the routine Blood grouping and Compatibility testing /cross matching of blood and use it for the same purpose.

CO2: Apply the knowledge for Determination Of Enzymes Of Oxidative Stress, Serum Lysozyme and Myeloperoxidase Activity (MPO) activity which will help them in medical diagnostic laboratories

CO3: Learn the Principle, Procedure and Significance of autoimmune disorders and use of specific tests to detect commonly encountered autoimmune disorders.

CO4: Understand the various tests used for detection of allergies which can be applied in medical laboratories.

Mapping for Course Learning Outcomes for M.Sc Part I Microbiology Semester II PSMBP-204, Applied Immunology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓	✓	-	-	-	✓
2	✓	✓	✓	-	-	-	-
3	✓	✓	✓	-	-	-	-
4	✓	✓	✓	-	-	-	-

M.Sc Part II Microbiology Semester III Course Outcomes for Paper 1 (PSMB 301), Tools and Techniques : Research Methodology

At the end of the course, the students will be able to

CO1: State the fundamentals of research methodologies

CO2: Understand the connotation of scientific study involving basic, applied, historical, exploratory experiments.

CO3: Define and explain a precise research gap/question and design a hypothesis based available literature surveys, scientific theorems and laws

CO4: Learn different sampling techniques, methods of data collection

CO5: Comprehend the art of data interpretation, data analysis and scientific report writing

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper 1 (PSMB 301), Tools and Techniques : Research Methodology

CO	PSO						
1			✓				✓
2			✓				✓
3			✓				✓
4			✓				✓
5			✓				✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMB302: Food Microbiology

At the end of the course, the students will be able to

CO1: Understand the importance of microbes in the food industry.They will be able to state different sources of microbes and factors affecting microbial growth in foods.

CO2 : Understand the detailed protocol of food fermentation involved in production of cheese,bread,idli,sauerkrau .

CO3: Learn different methods employed to control the access and growth of microbes in food

CO4: Learn conventional methods for microbial analysis in case of food

CO5: Acquaint oneself with codes of GMP, HACCP principles and QC measures in food industry

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMB302: Food Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓					-	
2	✓					-	
3	✓	✓				-	
4	✓	✓	✓			-	✓
5	✓	✓	✓			✓	✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMB303: Advances in Biotechnology

At the end of the course, the students will be able to

CO1: Understand basic fundamentals of plant tissue culture techniques utilised such as organogenesis, micropropagation, protoplast isolation and germplasm conservation for crop improvement

CO2: Decipher the significance of the plant system as bioreactor for production of secondary metabolites and plant-based chemicals.

CO3: Comprehend the basics of plant-based gene cloning, transformation, transgene silencing and develop analytical skills in plant genetic engineering

CO4: Compare and contrast between different biotic and abiotic stress and its implication on plant growth and biosafety

CO5: Instil skills related to animal/plant tissue culture, cryopreservation, stem cell technologies and apply the knowledge in understanding risk, safety and bioethics related to transgenic cloning.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMB303: Advances in Biotechnology

CO	PSO						
	1	2	3	4	5	6	7
1	✓		✓			✓	
2	✓						
3	✓	✓	✓				✓
4	✓						
5		✓				✓	✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMB304: Applied and Environmental Microbiology

At the end of the course, the students will be able to

CLO1: Learn about different environmental habitat and concepts of ecosystem

CLO2: Develop the knowledge about diverse microbial ecosystems such as archaeobacteria, prokaryotes, eukaryotes and the mechanism of ecological succession and adaptation such as biofilm formation and management.

CLO3: Study the significance of biofouling, biocorrosion, bioleaching and bioremediation in environmental niche

CLO4: Understand the value of microbes in biogeochemical cycling of nutrients, sustainable development and bioremediation of toxic products thereby modulating environmental homeostasis and remediation.

CLO5: Comprehend different molecular techniques such as PCR, RFLP, fingerprinting; immunology-based assays, techniques relevant to genomics and proteomics and utilize the knowledge in understanding the dynamics of microbial community, structure and function

CLO6: Familiarise oneself with concepts of biogeochemical cycle, ecosphere, microbial interactions and its implication on gut, soil and marine microbiota.

CLO7: Educate oneself by different sampling standards, use of biosensors, significance of preservatives and food additives.

CLO8: study different government and public policies targeted towards controlling air, water and soil pollution. This includes study of different toxic products, ways of disposal, treatment plants, environmental & natural resources management strategies and some advanced techniques employed to reduce the risk.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMB304: Applied and Environmental Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓				✓		
2	✓	✓	✓				
3	✓			✓	✓		
4				✓			
5		✓	✓				✓
6	✓				✓		
7					✓		
8		✓			✓		✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper 1 (PSMBP 301), Tools and Techniques : Research Methodology

At the end of the course, the students will be able to

CO1: Learn and acquire the skills to carry out literature-based surveys

CO2: Learn and acquire the skills to design and write research project proposal

CO3: Perform and experiment with different statistical methods in order to determine the significance of the samples collected and recorded during literature survey.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper 1 (PSMBP 301), Tools and Techniques : Research Methodology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				-	
2	✓	✓				✓	✓
3	✓	✓				✓	✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMBP302: Food Microbiology

The students will be able to

CO1: Carry out natural fermentations for Idli batter and sauerkraut . They will also study qualitatively and quantitatively the microbial flora associated at different stages

CO2: Study microbiological load in carrot and apple juice, salad, mayonnaise.

CO3: Learn about microbiological quality assessment and analysis of dairy food products

i) Milk (Raw, Packed)

ii) Ice-cream

iii)Yoghurt

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMBP 302: Food Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				-	
2	✓					✓	✓
3	✓	✓				✓	✓

M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMBP 303: Advances in Biotechnology

At the end of the course, the students will be able to

CO1: Design experiments based regarding animal tissue culture

CO2: Learn about preparation of different culture media, significance of sterilization, techniques to culture and inoculate microbes followed by its characterization

CO3: Apply the knowledge of nanotechnology in designing and characterized nanosilver and studying its antimicrobial property.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMB303: Advances in Biotechnology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				✓	✓
2	✓	✓				✓	✓

3	✓	✓				✓	✓
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M.Sc Part II Microbiology Semester III Course Outcomes for Paper2 PSMBP 304: Applied and Environmental Microbiology

At the end of the course, the students will be able to

CO1: Isolate different thermophiles for different ecosystem such as hot springs thereby extract the thermophilic enzyme and determine its specific activity

CO2: Estimate the level of anti-oxidants and anti nutritional factors spectrophotometrically

CO3: Perform soil analysis and enrichment analysis

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester III Paper2 PSMB304: Applied and Environmental Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				-	
2	✓					✓	✓
3	✓	✓				✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for) Paper1 PSMB401: Tools and Techniques: Biomolecular Analysis

At the end of the course, the students will be able to

CO1: Learn the principle, instrumentation and application of different spectroscopy techniques

CO2: Acquire knowledge about operation, calibration, accuracy and applications of Chromatographic Techniques such as Gas Chromatography, High Performance Liquid Chromatography, and so on.

CO3: Study, compare and contrast between several molecular biology techniques such as polymerase chain reaction, hybridization array technology, immunofluorescence, flow cytometry and so on.

CO4: Learn different nanotechnology-based techniques such as X-ray diffraction, Photoluminescence Spectroscopy and relevant microscopic techniques (like SEM, AFM, SNOM and so on).

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV Paper1 PSMB401: Tools and Techniques: Biomolecular Analysis

CO	PSO						
1			✓				✓
2			✓				✓
3			✓				✓
4			✓				✓

M.Sc Part II Microbiology Semester IV Course Outcomes for PSMB402: Pharmaceutical Microbiology

At the end of the course, the student will be able to

CO1: Understand the concept and importance of quality assurance, GMP and QC in the pharmaceutical industry. They will have a background knowledge about the historical events that led to formulation of regulatory bodies for assessing the safety and efficacy of pharmaceutical products.

CO2: Comprehend different aspects of quality management and global regulatory bodies necessary for production, formulation, etc of any medical product.

CO3: Understand the process of modern drug discovery using bioinformatics

CO4: Understand basics of sterility testing, validation methods, microbial load and efficacy of preservative used in case of pharmaceutical and cosmetics.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV PSMB402: Pharmaceutical Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓						
2	✓					-	
3	✓	✓				-	
4	✓	✓	✓			✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for Paper 3 (PSMB403): Advances in Biotechnology

At the end of the course, the students will be able to

CO1: Learn the fundamental concepts of biopharmaceuticals and discuss the principle behind production of pharmaceutical products.

CO2: Understand significance of protein conformation/stability in production of cytokines, therapeutic hormones and enzymes.

CO3: Study about different vaccines and approaches used to design and develop novel therapeutic targets and vaccine

CO4: Compare and contrast different drug discovery tools such as *in silico* modelling, molecular modelling, structure prediction, rational drug designing, drug development, pharmacodynamics and so on.

CO5: inculcate the basics of intellectual property right in different areas of research and development

CO6: Acquire knowledge about different concepts of marine biotechnology such as diversity of marine products, biofouling, bioremediation and apply the analytical knowledge in discovering positions in academic/industrial positions

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV PSMB403: Advances in Biotechnology

CO	PSO						
	1	2	3	4	5	6	7
1	✓						✓
2	✓						
3	✓						
4	✓	✓	✓				✓

5				✓			✓
6	✓					✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for Paper 4 (PSMB 404), Applied and Environmental Monitoring & Management

At the end of the course, the students will be able to

CO1: Understand the significance of waste disposal, bioremediation and biodegradation of hydrocarbons, nitroaromatic carbons

CO2: Utilize the theoretical knowledge of environmental monitoring and management in real time sludge treatment and waste disposal

CO3: Comprehend the importance of biofilm formation and management

CO4: Learn about different types of pollution control measures and monitoring systems utilized against varied pollution sources.

CO5: Understand, compare and contrast different environmental and natural resources management and safety standards, this includes solid waste water management, biohazard risk assessments, management of biomedical waste and so on.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV Paper 4 (PSMB 404), Applied and Environmental Monitoring & Management

CO	PSO						
1	✓		✓				✓
2	✓		✓				✓
3	✓		✓				✓

4	✓		✓				✓
5	✓		✓				✓

M.Sc Part II Microbiology Semester IV Course Outcomes for) Paper1 PSMBP 401: Tools and Techniques: Biomolecular Analysis

At the end of the course, the students will be able to

CO1: Learn and acquire the skills to carry out literature-based surveys

CO2: Learn and acquire the skills to design and write research project proposal

CO3: Perform and experiment with different statistical methods in order to determine the significance of the samples collected and recorded during literature survey.

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV Paper1 PSMBP 401: Tools and Techniques: Biomolecular Analysis

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				-	
2	✓	✓				✓	✓
3	✓	✓				✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for PSMBP 402: Pharmaceutical Microbiology

At the end of the course, the students will be able to

CO 1: Perform sterility testing and reporting for a pharmaceutical product as per Pharmacopia

CO2: Quantitate microbial load in cosmetic products and interpret using the International Standard assist in the assessment of the microbiological quality of the products.

CO3: Deal with efficacy testing of preservatives like parabens.

CO4: Understand the components and their role as they prepare cosmetic product like face cream and carry out its preservation study

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV PSMBP 402: Pharmaceutical Microbiology

CO	PSO						
	1	2	3	4	5	6	7
1	✓	✓				✓	✓
2	✓	✓				✓	✓
3	✓	✓				✓	
4	✓	✓	✓			✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for Paper 3 (PSMBP 403): Advances in Biotechnology

At the end of the course, the students will be able to

CO1: Write and justify case studies based on intellectual property rights

CO2: Write projects/reports on bioethics standards concerning some specific issue of concern

CO3: Learn and acquire the skills to design and write research project proposal

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV PSMBP 403: Advances in Biotechnology

CO	PSO						
	1	2	3	4	5	6	7
1		✓	✓	✓	✓	✓	✓
2		✓	✓	✓	✓	✓	✓
3		✓	✓	✓	✓	✓	✓

M.Sc Part II Microbiology Semester IV Course Outcomes for Paper 4 (PSMBP 404), Applied and Environmental Monitoring & Management

At the end of the course, the students will be able to

CO1: Analyse and visualise biofilm formation in different prosthetic medical devices and

also in different ecological habitats, thereby acquainting the learners with real time scenarios of antimicrobial resistance.

CO2: Learn the importance of sludge and sewage management by analysing the occurrence of heavy metals and other toxic products in the chosen environment.

CO3: learn basic instrumentation related advance biotechnological techniques

CO4: encourage themselves to undertake research activities and execute the research plan in a collaborative manner

CO5: scientifically extrapolate data in the form of a concise dissertation report by reviewing published data, undertaking surveys and employing statistical tools

Mapping of Course Outcome and Programme Learning Outcomes for M.Sc Part II Microbiology Semester IV Paper 4 (PSMBP 404), Applied and Environmental Monitoring & Management

CO	PSO						
	1	2	3	4	5	6	7
1	✓					✓	
2	✓						
3	✓	✓				✓	✓
4			✓			✓	✓
5			✓			✓	✓

2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT PRACTICALS 501

- CO1** Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.
- CO2** Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.
- CO3** Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.
- CO4** Carrying the process of Oyster mushroom cultivation,biopesticide production.
- CO5** Isolating and studying marine microbes.

1. PROGRAMME EDUCATION OBJECTIVE (PEO) FOR B.SC. MICROBIOLOGY

- PO1** To help the students acquire the academic standards and skills to be globally competent in Microbiology and allied sciences.
- PO2** To enable learners to apply the subject knowledge for serving society, as ambassadors to promote health and environmental consciousness.
- PO3** The students will be able to think critically, analyze related problems in scientific research and apply problem solving skills in their day to day life.
- PO4** The graduates will acquire digital competency to apply in their professional life.
- PO5** The co-curricular and extension activities will enable the students to develop and nurture leadership quality, work discipline and team building skills.
- PO6** The learners will be trained to apply their subject knowledge to various interdisciplinary projects/ research.
- PO7** The students can embrace ethical values and comprehend the significance of unbiased or non-plagiarised activities in their career (academia/non-academia research).

2. PROGRAMME SPECIFIC OUTCOME (PSO) FOR B.SC. MICROBIOLOGY

The Microbiology graduates will be able to:

- PSO1** Apply fundamental knowledge of Microbiology to environmental, biotechnology, food, molecular biology and medical fields.
- PSO2** Exhibit skill in laboratory techniques which will help them in their professional life.
- PSO3** Understand the working of different instruments and in silico tools to be used in research and industry.
- PSO4** Develop the quality of reflection and critical thinking in the scientific field thereby pursuing research as their career.

2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT PRACTICALS 501

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

PSO5 Inculcate the ability of addressing a problem by designing new experiments based on fundamental knowledge as an individual or as part of a team.

PSO6 Exhibit holistically professional ethics and norms.

3. F.Y.B.Sc MICROBIOLOGY SEMESTER I COURSE OUTCOMES FOR FUNDAMENTALS OF MICROBIOLOGY (USMB - 101)

At the end of the course, the students will be able to :

CO1 State the significant historical events in Microbiology.

CO2 Apply possessed knowledge of microbiology to solve different problems.

CO3 Describe the structure and function of each component of a bacterial structure (the simplest organism).

CO4 Comprend difference between prokaryotic and eukaryotic structure of cells.

CO5 Manage various biosafety measures in microbiology laboratories. OR Describe concept, methods and pattern of Sterilization and its practical applicability.

CO6 Describe functional groups and biochemical interactions present in biomolecules.

CO7 Detect various molecules like carbohydrates, lipids, amino acids, proteins and nucleic acids in the given sample.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

**Mapping of Course Outcome and Programme Learning Outcomes for F.Y.B.Sc Semester I
Fundamentals Of Microbiology (USMB - 101)**

CO	PSO					
	1	2	3	4	5	6
1						
2	✓	✓			✓	
3	✓					
4	✓				✓	
5		✓				✓
6	✓	✓		✓	✓	

**4. F.Y.B.Sc MICROBIOLOGY SEMESTER I COURSE OUTCOMES FOR BASIC TECHNIQUES IN
MICROBIOLOGY(USMB102)**

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

The students will be able to:

CO1 Learn the basics of microbiology from the point of view of observation, control and growth of microorganisms.

CO2 Understand the importance of microscopes and stains in observation of different microorganisms.

CO3 Comprehend the various techniques to control microorganisms and understand the industrial applications.

CO4 Study the importance of nutrition in the growth of microorganisms and formulate different media for the growth depending on their requirements.

CO5 Apply knowledge of different methods to cultivate and study the microorganisms.

Mapping Course Learning Outcome and Programme outcomes for FYBSc Paper 2 Sem I

CO	PSO					
	1	2	3	4	5	6
1	✓					
2	✓	✓	✓			
3		✓				
4	✓			✓		
5		✓		✓	✓	

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

**5. F.Y.B.Sc MICROBIOLOGY SEMESTER II COURSE OUTCOMES FOR BASICS OF
MICROBIOLOGY (USMB - 201)**

At the end of the course, the students will be able to

CO1 Conceptualize microorganisms and their types, importance and Practical aspects.

CO2 Tabulate microorganisms on the basis of their nutrition.

CO3 Cultivate, observe and perform microscopic identification of bacteria, fungi and other microbes.

CO4 Understand the growth cycle of organisms.

CO5 Use different techniques and instruments to measure the growth of the microorganism.

Mapping of Course Learning Outcome and Programme Learning Outcomes for F.Y.B.Sc Semester II Fundamentals Of Microbiology (USMB - 201)

CO	PSO					
	1	2	3	4	5	6
1	✓	✓		✓	✓	✓

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

2	✓			✓		
3	✓	✓	✓			✓
4	✓			✓		✓
5		✓	✓		✓	✓

**6. F.Y.B.SC. MICROBIOLOGY SEMESTER II COURSE OUTCOMES FOR EXPLORING
MICROBIOLOGY (USMB202)**

The students will be able to:

CO1 Understand the positive and negative interactions that exist between microorganisms and the ecosystem like other plants, the human body and other insects and organisms.

CO2 Comprehend the necessity of these interactions for maintenance of ecological balance.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO3 Learn the factors responsible that can cause infection/ diseases in the human body.

CO4 Study various terminologies related to infection and diseases.

CO5 Appreciate the role of the body and various body cells in preventing an infection.

CO6 Know various advanced microscopic instruments that enable better visualization of microorganisms.

CO7 Be aware of various instruments used in industries and laboratories from the microbiological point of view.

**MAPPING OF : Course Learning Outcome and Programme outcomes for FYBSc Paper 2
(Exploring Microbiology) Sem II**

CO	PSO					
	1	2	3	4	5	6
1	✓					
2	✓					
3	✓					
4						✓
5	✓					
6	✓		✓			
7			✓			

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

7. F.Y.B.Sc MICROBIOLOGY SEMESTER I COURSE OUTCOMES FOR PRACTICALS(USMBP1)

The students will be able to:

CO1 Visualize different bacterial organelles by performing different staining techniques.

CO2 Learn the different ways and means by which pathogenic samples need to be discarded and handled.

CO3 Identify different biomolecules present in the sample by performing qualitative tests.

CO4 Handle the microscope and use it for observation of different bacterial samples.

CO5 Understand the working and functioning of various instruments used in the Microbiology laboratory.

CO6 Study different chemicals that can be used to control the growth of microorganisms.

CO7 Prepare different bacterial growth mediums and study the growth pattern of bacteria.

CO8 Comprehend the concept of asepsis which is a very important requirement of Microbiology.

MAPPING OF :Course Learning Outcome and Programme outcomes for FYBSc Practical Sem I

CO	PSO					
	1	2	3	4	5	6
1		✓				
2	✓					
3		✓		✓		

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

4		✓				
5	✓	✓				
6	✓					
7				✓	✓	
8		✓				

8. F.Y.B.Sc MICROBIOLOGY SEMESTER II COURSE OUTCOMES FOR (USMBP2) PRACTICALS

The students will be able to:

CO1 Visualize the action of bacteriophage on microorganisms.

CO2 Isolate eukaryotic organisms like yeast and fungi and study them in detail.

CO3 Study the growth pattern of organisms.

CO4 Enumerate microorganisms from different organisms/ samples using techniques like hemocytometer, viable count method and Breed's count.

CO5 Interpret the presence of various microorganisms such as normal flora, lichens, Rhizobia and Azotobacter in different ecosystems and also study them.

CO6 Confirm the presence of various virulence factors present in microorganisms enabling them to cause infections.

CO7 Understand the principle of various instruments and handle instruments like the pH meter and colorimeter.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO8 Comprehend the indicators used for instrument validation.

MAPPING OF :Course Learning Outcome and Programme outcomes for FYBSc Practical Sem II

CO	PSO					
	1	2	3	4	5	6
1	✓					
2		✓				
3	✓	✓				
4		✓				
5	✓	✓				
6		✓		✓		
7		✓				
8	✓					

**9. S.Y.B.SC. MICROBIOLOGY SEMESTER III COURSE OUTCOMES FOR
BIOMOLECULES AND MICROBIAL TAXONOMY (USMB301)**

The students will be able

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO1 To learn various methods of estimation of biomolecules.

CO2 To appreciate the contribution of various scientists in the discovery of genetic material.

CO3 To understand the structure and function of DNA and RNA and its application in classification and identification of bacteria.

CO4 To evaluate the role of ATP in the cell.

CO5 To compare and study various methods of identification of microorganisms.

MAPPING OF :Course Learning Outcome and Programme outcomes forBiomolecules and Microbial taxonomy (USMB301)

	PSO					
CO	1	2	3	4	5	6
1		✓				
2					✓	
3	✓					
4	✓		✓			
5		✓				

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

- CO1** Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.
- CO2** Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.
- CO3** Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.
- CO4** Carrying the process of Oyster mushroom cultivation,biopesticide production.
- CO5** Isolating and studying marine microbes.

**10. S.Y.B.SC. MICROBIOLOGY SEMESTER III COURSE OUTCOMES FOR ENVIRONMENTAL
MICROBIOLOGY(USMB302)**

The students will be able to:

- CO1** Understand various positive and negative interactions and influences of microorganisms in the air, water and soil environment.
- CO2** Contribute to the management of the environment using bioremediation techniques.
- CO3** Apply knowledge of conventional and modern techniques for sampling of air, drinking water, sewage water, its analysis and interpretation of the results.
- CO4** Understand the various global and national acceptable standards for a healthy environment with reference to air and water.
- CO5** Learn modern methods for detection of significant microbiota in air, water and soil for different ecological samples .
- CO6** Comprehend the delicate relationship between microbial communities and their interactions.

**MAPPING OF :Course Learning Outcome and Programme outcomes for SYBSc Paper 2
(Environmental Microbiology) Sem 3**

	PSO
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**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO	1	2	3	4	5	6
1	✓					
2	✓				✓	
3	✓	✓			✓	
4					✓	✓
5	✓					
6	✓					

**11. S.Y.B.Sc MICROBIOLOGY SEMESTER III COURSE OUTCOMES FOR INTRODUCTION TO CLINICAL
MICROBIOLOGY (USMB303)**

The students will be able to:

CO1 Learn and apply the different microscopic,cultural methods to study the organisms.

CO2 Understand the basics of the different approaches of classifying and identifying microbes .

CO3 Gain knowledge about clinical significance of microorganisms commonly associated with skin,nervous,respiratory and digestive systems.In continuity it will form a platform for the TYBsc Medical microbiology paper.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO4 Understand the epidemiology of infectious agents including Infection cycle and control of pathogens.The students will be able to relate and apply methods of prevention,sanitary methods to control the spread of diseases thus imparting a lifetime learning experience for day to day healthcare.

CO5 Learn and apply different epidemiological concepts like quarantine,reportable disease, surveillance,immunisation which are important in public health.The students after graduation can enroll in a PG diploma in epidemiology and public health or masters in epidemiology .

CO6 Learn in detail the safety measures to be observed in a clinical lab.This encompasses decontamination methods,disinfection methods, personal protective equipment,lab staff orientation, use of biosafety cabinets and other safety devices.This will help them to imbibe the lab safety disciplinary measures .interdisciplinary research-oriented approach

**MAPPING OF :Course Learning Outcome and Programme outcomes for SYBSc Sem 3 Paper 303
Introduction to Clinical Microbiology**

CO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓			
2	✓	✓	✓	✓	✓	
3	✓	✓			✓	
4	✓	✓	✓	✓	✓	

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

5	✓	✓	✓	✓		
6	✓	✓	✓			✓

**12. S.Y.B.Sc MICROBIOLOGY SEMESTER IV COURSE OUTCOMES FOR METABOLISM AND BASIC
ANALYTICAL TECHNIQUES (USMB401)**

The students will be able

CO1 To understand metabolism and its significance.

CO2 To learn the characteristics of metabolic pathways and its regulation operated through the enzymes catalyzing the biochemical reactions.

CO3 To appreciate the role of ATP in the cell

CO4 To study the enzyme catalyzed biochemical reaction logic and subsequent enzyme kinetics.

CO5 To evaluate the properties of enzymes and classify accordingly.

CO6 To critically understand the enzyme kinetics of various types of enzymes.

CO7 To Compare various analytical techniques for purification of biomolecules

CO8 To compare between different methods of chromatography and Centrifugation.

MAPPING OF :Course Learning Outcome and Programme outcomes for Metabolism and Basic Analytical techniques (USMB401)

	PSO					
CO	1	2	3	4	5	6
1	✓					

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

2	✓					
3	✓					
4				✓		
5				✓		
6				✓		
7		✓	✓			
8		✓	✓			

**13. S.Y.B.SC. MICROBIOLOGY SEMESTER IV COURSE OUTCOMES FOR APPLIED MICROBIOLOGY
(USMB402)**

The students will be able to:

CO1 Understand various applied fields of Microbiology such as Medical microbiology, immunology and Food sciences.

CO2 Identify the various mechanisms present in the human body that helps in combating various infections.

CO3 Be aware of the field of epidemiology and also perceive the different modes of disease transmission.

CO4 Explain various spoilages that are associated with food such as fruits, vegetables, meat and canned products and the organisms associated with conditions like food poisoning.

CO5 Get an idea of various international and national Food control agencies with respect to maintaining proper food standards.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO6 Study application of various mechanisms by which food spoilage can be controlled.

CO7 Have knowledge of commercial preparation of products like condensed milk, dry milk, yoghurt, different types of cheese.

CO8 Learn modern methods and techniques to identify the spoilage organisms associated with food and milk.

MAPPING OF :Course Learning Outcome and Programme outcomes for SYBSc Paper 2 (Applied Microbiology) Sem 4

	PSO					
	1	2	3	4	5	6
1	✓					
2	✓					
3	✓			✓		
4	✓				✓	
5	✓					
6	✓			✓		
7	✓			✓		
8	✓	✓				

14. S.Y.B.Sc MICROBIOLOGY SEMESTER IV COURSE OUTCOMES FOR FERMENTED FOODS ,FOOD SANITATION AND MICROBIAL EVOLUTION AND ECOLOGY (USMB403)

The students will be able to:

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO1 Understand the application and practical approaches in food bioprocessing. It develops a platform for the Fermentation technology course work at Third year for the students such that in future they can enroll into Food fermentation, quality control diplomas and choose their career paths

CO2 Understand the beneficial effects of microbes with context to the food industry.The students learn about the different microbial products and services used in the food industry. Health benefits using probiotics,prebiotics,SCP,and biogenic are imbibed for a lifetime.Students will be able to handle small interdisciplinary research-oriented projects involving traditional biogenic ,prebiotics and probiotic foods.

CO3 Be aware of the harmful impacts of microbes on health wrto food infection and food poisoning.

CO4 Have knowledge of food sanitation , GMP and HACCP in the food industry, following rules and procedures that prevent the contamination,adulteration of food, keeping it safe to eat.The students learn about the various government consumer protection acts and agencies involved in laying down the standards and implementing them.

CO5 to understand the biological evolution and diversification wrto the changing geochemistry of the primitive earth.

CO6 To study the principles of the different in situ and ex situ approaches used to study microbial ecology.

MAPPING OF :Course Learning Outcome and Programme outcomes for SYBSc Sem IV (USMB403) Fermented foods ,Food sanitation and Microbial evolution and Ecology .

	PSO					
CO	1	2	3	4	5	6

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

1	✓	✓	✓	✓		
2	✓	✓	✓	✓	✓	
3	✓	✓		✓	✓	
4	✓	✓	✓	✓	✓	
5	✓	✓	✓	✓		
6	✓	✓	✓			

15. S.Y.B.Sc MICROBIOLOGY SEMESTER III COURSE OUTCOMES FOR SEM III PRACTICALS

The students will be trained

CO1 To carry out quantification of biomolecules at micrograms levels.

CO2 To extract biomolecules from cells i.e proteins, DNA from cells.

CO3 To understand and carry out different biochemical tests used for classification of bacteria.

CO4 To carry out microscopic,cultural and biochemical methods for identification of microorganisms from soil using Bergey's manual of determinative Bacteriology 8th edition.

CO5 To carry out qualitative and quantitative microbial analysis of air,water,soil.

CO6 Will be able to analyse drinking water samples for potability

CO7 Will be able to carry out microbial analyse waste waters and comment on the efficiency of sewage treatment plants .

CO8 Will be able to carry out enrichment procedures using specially designed media to select a particular guild of organisms from the natural environment .The same approach of media design can be used to initiate small projects like enrichment of pesticide degraders, oil component degraders etc.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO9 To set up Winogradsky’s column simulating in situ natural environments like Lake,Wells,Bogs.This will be able to design miniature, enclosed ecosystems in vitro and study the different microbial communities involved.

CO10 To understand and carry out broth dilution assay in case of disinfectant and interpret the tolerance and inhibitory levels .

CO11 Trained for standard antibiotic susceptibility testing using Kirby Bauer method.They will be able to select the appropriate antibiotics for the test and report the response in the course to recommend the line of treatment

CO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓	✓		
2	✓	✓	✓	✓	✓	
3	✓	✓		✓	✓	
4	✓	✓	✓	✓	✓	
5	✓	✓	✓	✓	-	-
6	✓	✓	✓	✓	-	-
7	✓	✓	✓	✓	-	-
8	✓	✓	✓	✓	-	-
9	✓	✓	✓	✓	✓	-

2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT PRACTICALS 501

- CO1** Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.
- CO2** Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.
- CO3** Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.
- CO4** Carrying the process of Oyster mushroom cultivation,biopesticide production.
- CO5** Isolating and studying marine microbes.

10	✓	✓	✓	✓	-	-
11	✓	✓	✓	-	-	

16. S.Y.B.SC. MICROBIOLOGY SEMESTER IV COURSE OUTCOMES FOR SEM 4 PRACTICALS

Students will be able

- CO1** Demonstrate microbial amylase, lipase and protease activity qualitatively
Also understand the design of the media used for the same
- CO2** Study the effect of different parameters like pH temperature on invertase enzyme activity
Understand the concept of K_m , V_{max} with respect to Michalis and Menten equations .
- CO3** Understand the principle of partition chromatography and apply it for separation of amino acids from the mixture
- CO4** Apply the technique of density gradient centrifugation to separate molecules based upon their density for example yeast and E,coli cells mixture seperation
- CO5** Understand the principle of gel electrophoresis and apply it to separation,detection of plasmid
- CO6** Carry out differential staining of the cells in the blood film .They are trained to identify cell types and carry out WBC Count . Different conditions like eosinophilia will be interpreted from the WBC count.
- CO7** Will be trained to isolate,study virulence factors of food borne pathogen S.aureus.
- CO8** To isolate food spoilage causing organisms having lipolytic,proteolytic ,amylolytic activity.
- CO9** The students will understand the use of heat to control food spoilage. They will be aware of TDP and TDT concepts . The students will be equipped with the practical knowledge to determine the TDT, TDP values for a given spoilage causing isolate.
- CO10** To apply the broth dilution assay to determine the inhibitory concentration of natural preservatives like salt,sugar used in the food industry.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO11 To carry out microbiological analysis of dairy products -raw and pasteurised milk,butter,cheese using BIS standards . These include Dye reduction tests,direct microscopic counts,standard plate counts ,coliform counts etc.

CO12 Understand the application of microbial leavening agents used to produce biogenics like bread,idli .

CO13 Will the process of Red Wine fermentation.

CO14 Carry out microscopic,cultural and important biochemical tests to confirm the Lactic acid bacteria.

CO15 Trained to carry out different physical and chemical tests to detect adulteration in food stuff.

Mapping for sem 4 practicals

CO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓	✓		
2	✓	✓	✓	✓	✓	
3	✓	✓		✓	✓	
4	✓	✓	✓	✓	✓	
5	✓	✓	✓	✓	-	-
6	✓	✓	✓	✓	-	-
7	✓	✓	✓	✓	-	-

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

8	✓	✓	✓	✓	-	-
9	✓	✓	✓	✓	✓	-
10	✓	✓	✓	✓	-	-
11	✓	✓	✓	✓	-	-
12	✓	✓	✓	✓	-	-
13	✓	✓	✓	✓	-	-
14	✓	✓	✓	✓	-	-
15	✓	✓	✓	✓	-	✓

**17. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR MICROBIAL GENETICS
(USMB-501)**

The student will be able

CO1 DNA Replication: The learner will understand the sequence of events, mechanism, enzymes and proteins involved in replication of DNA in prokaryotes and eukaryotes.

CO2 Transcription, Genetic Code and Translation: The student will know the central dogma of biology its two-step transcription and translation, maturation of RNA.

CO3 Mutation and DNA repair: The learner will know the concept of mutation, its types , causes and their effects. This module will also make them understand types of mutagens, damage to DNA due to mutagenesis, various mechanisms of DNA repair.

CO4 Genetic exchange: The student shall understand the various mechanisms of gene transfer in bacteria and genetic recombination.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO5 Practicals: The students will acquire skill to perform the laboratory techniques and experiments based on the above topics.

**MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 1
(Molecular Genetics) Sem 5**

CO	PSO					
	1	2	3	4	5	6
1	✓					
2	✓					
3	✓					
4	✓					
5	✓					

**18. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR MEDICAL MICROBIOLOGY &
IMMUNOLOGY: PART-I (USMB-502)**

The students will be be able to

CO1 Apply knowledge of the virulence factors and other features of the pathogen, correlate these virulence factors with the pathogenesis and clinical features of the disease.

CO2 Learn the mode of transmission, and prophylactic measures of these diseases.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO3 Understand and apply the methods of diagnosis for the pathogenic species studied in the course

CO4 Conceptualize how the adaptive immune responses involving the organs and tissue coordinate to fight invading pathogens .

CO5 Discuss the role of antigen in initiating the immune response and correlate the structure & functions of immunoglobulin.

CO6 Correlate the importance of MHC, APCs, Cytokines, and their role in adaptive immunity.

CO7 Practise the various antigen –antibody reactions in serology for diagnostic study.

MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 2 (Medical Microbiology and immunology _I) Sem 5

CO	PSOs					
	1	2	3	4	5	6
1	✓	✓		✓		
2	✓	✓	✓			
3	✓			✓		
4	✓			✓		
5	✓			✓		
6	✓				✓	

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

7	✓			✓		
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**19. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR (USMB503)
MICROBIAL BIOCHEMISTRY: PART - I**

The learner will be able to -

CO1 describe various transport processes taking place in bacteria

CO2 distinguish and analyze energy yielding mechanisms of prokaryotes and eukaryotes.

CO3 compare carbohydrate metabolic pathways occurring in different bacteria.

CO4 recognize different biochemical reactions and enzymes

CO5 apply the concept of free energy change of chemical reactions to biological processes.

CO6 illustrate various types of anaerobic metabolic pathways for glucose by different bacteria found in nature.

CO7 discuss anabolic pathways occurring in bacteria.

CO	PSO					
	1	2	3	4	5	6
1	✓			✓	✓	
2	✓			✓		
3	✓	✓		✓		
4	✓	✓		✓	✓	

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

5	✓			✓	✓	
6	✓			✓	✓	
7	✓			✓		

**20. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR(USMB504) BIOPROCESS
TECHNOLOGY- PART I**

At the end of the course, the students will be able

CO1 To study the industrial process of fermentation.

CO2 To learn techniques to improve the desired properties of industrial microorganisms through various strains improvement methods.

CO3 To understand the methods of culture preservation and its evaluation.

CO4 To learn various upstream processes of industrial fermentation like media formulation and development of incula.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO5 To compare various methods of sterilization employed in industrial microbiology in fermentation plants.

CO6 To compare types of fermentation.

CO7 To compare different designs of fermenters.

CO8 To study the industrial process of fermentation of various desired and products in demand like wine, Beer, Alcohol, Vinegar and amylase.

MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 4 (Bioprocess technology) Sem 5

CLO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓			
2	✓	✓	✓			
3		✓				
4			✓			
5			✓			
6			✓			
7			✓			
8	✓	✓	✓			

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

- CO1** Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.
- CO2** Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.
- CO3** Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.
- CO4** Carrying the process of Oyster mushroom cultivation,biopesticide production.
- CO5** Isolating and studying marine microbes.

21. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR PRACTICALS

Microbiology : Practical based on USMB 501and USMB502 (USMBP05)

At the end of the Practical session the students will be able to

- CO1** Understand UV survival curve ,its importance in UV mutagenesis and use the concept for isolation of mutants .
- CO2** Learn the techniques for isolating auxotrophs using gradient plate technique and Replica plate technique which will be used by them in research lab and strain improvement Programme
- CO3** learn the method of Isolation of PlasmidDNA
- CO4** Apply the special staining method for detection of Mycobacterium tuberculosis and also about the use of specific media for isolation of pathogenic Candida spp.
- CO5** Acquaint and apply the use of special characteristics such as morphology ,biochemical ,serological for diagnosis of a disease , and understand the virulence factors used by pathogens to establish a disease .
- CO6** Practise the knowledge of identification of pathogens from sputum ,blood,CSF, stool and urine samples
- CO7** Prepare Antigen for salmonella spp and learn its application in serological diagnosis of typhoid.

Mapping of CLOs for Practical based on USMB 501and USMB502 (USMBP05)

CLO	PSO					
	1	2	3	4	5	6
1	✓	✓	-	-	✓	-

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

2	✓	✓	-	-	✓	-
3	✓	✓	-	-	-	-
4	✓	✓	-	-	✓	-
5	✓	✓	-	-	✓	-
6	✓	✓	-	-	✓	-
7	✓	✓	-	-	✓	-

T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR PRACTICALS

Microbiology : Practical based on USMB 503and USMB504 (USMBP06)

At the end of the practical curriculum the students will be able to:

CO1: Isolate bioluminescent organisms

CO2 : Understand the oxidative and fermentative biochemical metabolism and apply the knowledge for identification of organisms

CO3: Understand the enzymatic reactions of Phosphatse activity , homo - hetero fermentative reactions and use them for isolation of specific organism .

CO4: Isolation of Mitochondria

CO5: Use the GOD -POD test for detecting diabetes .

CO6: Study the principle and details of alcohol fermentation and its efficiency

CO7: Determine sugar and alcohol tolerance of yeast which can be used in Brewing industry for strain improvement programme

CO8: Learn the methods of Chemical estimation of Sugarand alcohol estimation which are useful in brewing industries

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO9: Learn solid substrate fermentation for production of useful products from cheap agro waste

CO10: Practise Screening methods for antibiotic producers and learn the technique used for determining the antibiotic spectrum of it as part of Screening programmes used in industries.

CO11: Visit Industries which will bridge the gap between academics and industry.

Mapping of CLOs for Practical based on USMB 501and USMB502 (USMBP05)

CLO	PSO					
	1	2	3	4	5	6
1	✓	✓	-	-	-	-
2	✓	✓	-	-	✓	-
3	✓	✓	-	-	✓	-
4	✓	✓	-	-	✓	-
5	✓	✓	-	✓	✓	-
6	✓	✓	-	-	✓	-
7	✓	✓	-	-	✓	-
8	✓	✓	-	✓	✓	-
9	✓	✓	-	✓	✓	-
10	✓	✓	-	✓	✓	-

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

11	-	✓	✓	-	✓	-
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**21. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
BIOTECHNOLOGY (USACBT 501) INTRODUCTION TO BIOTECHNOLOGY**

The students will be able to:

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO1 Orient them to the applicative aspects of microbial,animal based modern recombinant technologies in the field of medicine, environment ,industrial biotechnology.

CO2 Gain both fundamental and practical knowledge of the basic molecular biology techniques with respect to gene cloning and cloning vectors.

CO3 Understand the concept of bioremediation of soil, water and the different methods of using genetically engineered microbes and plants. Understand the current environmental issues and sustainable development.May contribute to the management of the environment by taking up research projects related to bioremediation .

CO4 Have a basic insight into the methods of generating transgenic animals and study their applications.

CO5 Explore the potentials of marine microbiota, study of microorganisms from marine environment and application of marine micro and macro organisms either in whole or part for production of various industrial, medical, environmental and agricultural products and services for human utilization.Students will be able to active research in the field of marine bioprospecting .The students will be thus moulded to take up research in upcoming fields like marine biotechnology as their career

CLO	PSO					
	1	2	3	4	5	6
1	✓	✓	-			
2	✓	✓	✓	✓		
3	✓	✓				
4	✓	✓	✓			

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

5	✓	✓	✓			
---	---	---	---	--	--	--

2

CLO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓	✓		
2	✓	✓	✓			
3	✓	✓				
4	✓	✓	✓			
5	✓	✓	✓			

2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT PRACTICALS 501

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

24. T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR rDNA TECHNOLOGY, BIOINFORMATICS & VIROLOGY (USMB-601)

The learner will be able to:

CO1 DNA technology: This module will make the student understand the methods to construct recombinant DNA molecules, also know the tools required like vectors, restriction enzymes etc.

CO2 Application of rDNA technology and Bioinformatics: The learner will know about applications of r DNA technology, through bioinformatics the student will understand the use of databases and software tools for understanding biological data.

CO3 Gene Regulation and Basic Virology: The student will know about gene expression in prokaryotes, operon as a unit of gene regulation, regulation of gene expression in prokaryotes and bacteriophages. The student will also understand about general structure, life cycle and classification of viruses.

CO4 Advanced Virology: The learner will understand the basic structure and life cycle of different viruses and their cultivation. The student will get basic knowledge on Prions, Viriods and viruses causing cancer.

CO5 Practicals: The students will acquire skill to perform the laboratory techniques and experiments based on the above topics. The students will understand computational biology and insilico analytical techniques.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 1 (rDNA TECHNOLOGY, BIOINFORMATICS & VIROLOGY) Sem 6

CO	PSO					
	1	2	3	4	5	6
1	✓	✓				
2	✓		✓	✓		
3	✓					
4	✓			✓		
5		✓	✓			

25. T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR MEDICAL MICROBIOLOGY & IMMUNOLOGY: PART - II (USMB-602)

The students will be able to :

CO1 Comprehend details of the virulence factors and morphological and cultural features of the pathogen

CO2 Correlate these virulence factors with the pathogenesis and clinical features of the disease

CO3 Comment on the mode of transmission, and methods of prophylaxis of these diseases

CO4 Identify the likely causative agent based on their key clinical features and comment on the methods of diagnosis of the disease.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO5 Understand the structure and role of T and B cells in generating adaptive immunity and thereby study effector responses in both Humoral & Cell Mediated Immunity and complement systems .

CO6 Apply the knowledge of monoclonal antibodies production , and its uses in clinical field within the ethics and norms of the committee

CO7 Use the concept of immunity for prevention of disease and development of vaccines following the ethical norms.

MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 2 (Medical Microbiology and immunology _II) Sem 6

CLO	PSOs					
	1	2	3	4	5	6
1	✓	✓		✓		
2	✓					
3	✓			✓		
4	✓			✓		
5	✓			✓		
6	✓	✓		✓		✓
7	✓			✓	✓	✓

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

**26. T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR MICROBIAL BIOCHEMISTRY:
PART - II (USMB603)**

The learner will be able to -

CO1 explain catabolic and anabolic aspects of lipid metabolism.

CO2 apply the concept of catabolism of lipids to real life examples.

CO3 solve the problems associated with pollution of an environment

CO4 distinguish between aerobic and anaerobic metabolism of proteins

CO5 illustrate nucleic acid metabolism carried out by living cells

CO6 apply the knowledge of nucleic acid metabolism to the disorders of humans

CO7 construct the experiments on photosynthesis

CO8 compare and contrast between mechanism of photosynthesis carried out by different bacteria

CO9 describe use of inorganic nutrients by bacteria

CO10 apply the knowledge of biogeochemical cycles to metabolism of inorganic nutrients

CO11 evaluate various regulatory mechanisms of metabolism

CO12 describe concept underlying the regulatory mechanisms of bacteria

USMB603

CO	PSO					
	1	2	3	4	5	6
1	✓			✓		
2	✓			✓		
3	✓			✓	✓	

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

4	✓			✓		
5	✓			✓		
6	✓			✓		
7				✓	✓	
8	✓					
9	✓			✓		
10	✓			✓	✓	
11	✓			✓	✓	
12	✓			✓	✓	

**27. T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR BIOPROCESS TECHNOLOGY -
PART II (USMB604)**

At the end of the course, the students will be able

CO1 To compare various methods of downstream processing in industrial Microbiology

CO2 To evaluate different methods of effluent treatment.

CO3 To appreciate the role of animal tissue culture in various fields.

CO4 To appreciate the role of plant tissue culture in various fields.

CO5 To compare different methods of immobilization of enzymes

CO6 To appreciate the role of immobilized enzymes in making different biosensors used for wide application.

CO7 To critically understand the importance of QAQC in the pharmaceutical industry and evaluate methods of sterility testing.

CO8 To study various biological assays to quantify the industrially and microbially produced desired molecule.

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

CO9 To appreciate the role of analytical instruments and its role in industrial Microbiology.

CO10 To study the industrial process of fermentation of various desired and products in demand like antibiotics, vitamins, citric acid and glutamic acid.

MAPPING OF :Course Learning Outcome and Programme outcomes for TYBSc Paper 4 (Bioprocess technology- II) Sem 6

	PSO					
	1	2	3	4	5	6
1	✓	✓	✓	✓		
2	✓		✓			
3	✓	✓	✓	✓		
4	✓	✓	✓	✓		
5		✓	✓	✓		
6	✓		✓			
7	✓	✓	✓			✓
8		✓	✓			
9			✓			
10	✓		✓			

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

**28. T.Y.B.Sc MICROBIOLOGY APPLIED COMPONENT BIOTECHNOLOGY SEMESTER VI COURSE
OUTCOMES FOR (USACBT 601)APPLIED BIOTECHNOLOGY**

CO1. Students will be trained to address issues of Bioenergy and Biofuels . They could initiate small projects involving generation of biofuels from biomass.

CO2 They will learn the fundamentals involved in plant tissue culture and genetic engineering in plants.

CO3. The learner will be aware of the recombinant approach of producing biomolecules from microbes,animals and plants

CO4 They will be aware of the Human Genome project and ELSI.Also new fields like IVF technology,genetic counselling,genetic testing,Pharmacogenomics,Forensics are introduced such that the students can take up specific pg courses to increase their employability.

CO5 They will be able to understand the positive impact of recombinant DNA technology in different walks of life .

CO6 They will also be aware of the negative aspects of recombinant biotechnnology like genetic discrimination,biowarfare.

	PSO					
	1	2	3	4	5	6
1	✓	✓	✓	✓	✓	
2	✓	✓	✓			
3	✓	✓	✓	✓		

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

4	✓	✓	✓	✓	✓	
5	✓	✓	✓	✓		
6	✓					

29. T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR PRACTICAL

Microbiology : Practical based on USMB 601and USMB602 (USMBP07)

The students will be able to

CO1 Demonstrate molecular biology techniques like isolation of DNA and restriction digestion of plasmid DNA.

CO2 Enrich coliphage and perform phage assay

CO3 Conceptualise Animal cell culture

CO4 Demonstrate malarial parasite in blood films

CO5 Test the antibiotics using Kirby Bauer method

CO6 Perform various immunological tests used for detection of various diseases

Mapping Practical based on USMB 601and USMB602 (USMBP07)

CO	PSO					
	1	2	3	4	5	6
1	✓	✓	✓			
2		✓	✓			
3		✓	✓			

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

4	✓		✓	✓	✓	
5			✓			
6	✓		✓			

T.Y.B.Sc MICROBIOLOGY SEMESTER VI COURSE OUTCOMES FOR PRACTICAL

Microbiology : Practical based on USMB 603 and USMB604 (USMBP08)

The students will be able to

CO 1 Study catabolite repression by diauxic growth curve

CO2 Qualitatively and quantitatively estimate various biomolecules like proteins, uric acid and enzymes like protease and lipase.

CO3 Conceptualise study of Lithotrophs – Nitrosification and Nitrification

CO4 Detect PHB producing bacteria

CO5 Perform Bioassay of Penicillin and Vitamin B12

CO6 Immobilize enzymes using entrapment method

CO7 Understand the concept of Plant tissue culture

CO8 Perform sterility testing of pharmaceutical products

CO 9 Chemically estimate penicillin and phenol.

Mapping Practical based on USMB 603 and USMB604 (USMBP08)

CO	PSO					
	1	2	3	4	5	6
1	✓					

2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT PRACTICALS 501

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

2	✓	✓				
3	✓					
4	✓					
5	✓	✓	✓			
6			✓			
7	✓				✓	
8		✓	✓			
9	✓	✓	✓			

30. T.Y.B.Sc MICROBIOLOGY APPLIED COMPONENT BIOTECHNOLOGY SEMESTER VI COURSE OUTCOMES FOR PRACTICALS

Students will be able to

CO1 Understand the method for bioethanol production using cellulose as starting materials. They will understand the limitations of conventional yeasts based fermentation.

CO2 Understand the importance of cellulolytic organisms and their role in Saccharification in bioethanol production from cellulose.

CO3 Learn basics of plant tissue culture.

CO4 Understand and carry out entrapment mediated immobilisation of biocatalyst. Also learn to check the success of immobilization by carrying out quantitative cell counts .

CO	PSO					
	1	2	3	4	5	6

**2. T.Y.B.Sc MICROBIOLOGY SEMESTER V COURSE OUTCOMES FOR APPLIED COMPONENT
PRACTICALS 501**

CO1 Trained to carry out molecular biology experiments involving agarose gel electrophoresis for genomic, plasmid DNA separation and detection.

CO2 Able to carry out COD,BOD analysis on domestic raw and treated sewage . Interpret the results based on the permissible limits.Calculate the efficiency of sewage treatment plants.

CO3 Learning technique to produce,extract, detect and quantitate bacterial polysaccharide.

CO4 Carrying the process of Oyster mushroom cultivation,biopesticide production.

CO5 Isolating and studying marine microbes.

1	✓	✓	✓	✓	✓	
2	✓	✓	✓			
3	✓	✓				
4	✓		✓	✓	✓	

PROGRAM : PHILOSOPHY

Program Objectives:

- PO1. Acquaint students with significant philosophical ideas and theories that forms the basis of other disciplines.
- PO2. Equip students with critical, argumentative, logical and analytical skills involved in philosophical reasoning.
- PO3. Encourage a spirit of rationality in philosophizing while appreciating and respecting differing philosophical systems and perspectives.
- PO4. Provide students with an ethical and spiritual framework for assessing moral decisions in different areas of life.
- PO5. Encourage students to engage with philosophical essays and arguments of interdisciplinary nature that include areas of gender, class, caste, cinema, politics and religion.
- PO6. Understand philosophical theories in the context of living ethical concerns such as suicide, punishment, cloning, abortion, environmental ethics, business ethics and media ethics.

Program Specific Outcome

Learners will be able to:

- PSO1. Analyse diverse philosophical perspectives towards different ideologies that leads to acceptance of self and other traditions.
- PSO2. Use the principles of logic and critical thinking skills for competitive exams.
- PSO3. Apply moral and spiritual principles for conflict resolution and social emancipation in an objective manner.
- PSO4. Exhibit aesthetic sensibilities through moral, political, epistemological and ontological engagement with cinematic texts and critical evaluation of philosophical writings on the same.
- PSO5. Develop code of ethics for personal and professional conduct.
- PSO6. Summarize and interpret complex philosophical ideas through writing essays, presentations and research papers.

Course Outcomes:

FYBA Philosophy

Course Title: Moral Philosophy, Paper No. 1

Semester I

Course Outcomes:

The course will enable learners to:

CO1. Gain knowledge of different moral theories and concepts through reading and comprehending Indian and Western philosophical texts on justice, free will, virtues, obligations and actions.

CO2. Identify moral dilemmas and apply different theoretical approaches through deliberation and debate for value creation in society.

CO3. Write explanations on preferred moral positions while appreciating its limitations.

CO4. Demonstrate the moral behaviour based on the moral concepts developed in ancient Indian and Greek Philosophy

CO5. Create their own ethical framework that concerns their daily life.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1			√			
2			√		√	
3	√					
4			√	√		
5			√		√	

FYBA Philosophy**Course Title: Moral Philosophy, Paper No. 1****Semester II****Course Outcomes:**

The course will enable learners to:

CO1. Develop a sense of moral reasoning based on analytical reasoning rather than dogmatic assertion to resolve moral conflicts.

CO2. Appreciate the significant contributions of philosophers from the history of moral philosophy.

CO3. Practice various approaches to moral philosophy such as altruistic, deontological and teleological theories to personal and professional life situations.

CO4. Apply moral principles through interdisciplinary engagement with gender, religion and literary readings of existential texts.

CO5. Apply the theories of punishment to the real life situation to deal with the offenders or wrong doers in the society

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2					√	
3					√	
4			√			
5			√			√

SYBA Philosophy**Course Title: Social Philosophy, Paper No. 2****Semester III****Course Outcomes:**

The course will enable learners to:

CO1. Gain proficiency in philosophical knowledge and its application to social issues such as gender, patriarchy, caste, class, race, wars and societies and engaging with diversity.

CO2. Apply important philosophical texts and theories to analyse the nature of institutions such as family and marriage as well as events such as wars, migration, colonization that inform contemporary social and political challenges.

CO3. Exhibit competence in recognizing and critically engaging with forces that hinder values of democracy, rights and justice through classroom debates and role play.

CO4. Develop a spirit of rationality in philosophizing while appreciating and respecting differing philosophical ideas and perspectives leading to constructing working models of conflict resolution and peace initiatives.

CO5. Equip themselves with argumentative and analytical skills involved in philosophizing social issues through writing critical research essays and oral presentations.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1			√		√	
2	√		√		√	
3	√		√			√
4			√			
5		√				√

Course Title: Political Philosophy, Paper No.2

Semester IV

Course Outcomes:

The course will enable learners to:

CO1. Clarify the basic philosophical questions and issues that are currently discussed in political philosophy.

CO2. Argue with the help of a philosophical approach towards these issues.

CO3. Set standards of judgment and define constructive purposes for the use of public power.

CO4. Appreciate and respect differing philosophical ideas and perspectives concerning political ideologies.

CO5. Critically analyse the political ideologies prevalent since centuries and construct coherent arguments regarding the basic socio-political values like Liberty, Equality and Justice.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2		√				
3					√	
4	√		√			
5			√			√

Course Title: Indian Philosophy, Paper No.3

Semester: III

Course Outcomes:

The course will enable learners to:

CO1. To demonstrate the understanding of the basic philosophical questions that philosophers in India have addressed.

CO2. To apply the argumentative and critical skills involved in philosophical reasoning of Charvakas.

CO3. To trace the development of philosophical ideas in Jainism so as to evaluate its contribution to philosophical knowledge.

CO4. To demonstrate the clear understanding of Buddhist Philosophy and its application in daily life.

CO5. To summarize with clarity some of the arguments, problems and questions central to metaphysics and epistemology in Indian philosophy which have direct impact on the ethical framework.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2		√				
3						√
4			√		√	
5					√	√

Course Title: Western Philosophy, Paper No.3

Semester: IV

Course Outcomes:

The course will enable learners to:

CO1. Gain proficiency in articulating basic philosophical questions in areas of philosophy of science and religion that philosophers in the Greek and Medieval traditions have addressed.

CO2. Engage in inter cultural dialogue developing a spirit of rationality, imagination and respect for diverse philosophical traditions through textual engagement and secondary source readings.

CO3. Practice the Greek and Medieval philosophical methodology of reconciling faith, religion, ethics with reason and scientific temperament in forming frameworks of values of secularism and liberty that forms the basis of Indian as well as world democracies.

CO4. Articulate a code of ethics and life skills derived from a critical understanding of Greek and Medieval traditions of virtue ethics.

CO5. Apply methodologies, argumentative and analytical skills involved in philosophical reasoning to professional and personal life.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√				√	
2	√		√		√	
3	√		√			√
4			√			
5					√	√

SYBA Applied Component

Course Title: Gandhism in the Present Context

Semester III

Course Outcome:

The course will enable learners to:

CO1. Develop the spirit of Sarvadharmā Samābhav which is essential to live in a multi-religious society.

CO2. Apply the principles of simplicity to daily life.

CO3. Appreciate the significance of truthful and non-violence in socio-political spheres of life.

CO4. Address one's own learning needs relating to current and emerging areas of study relating to Gandhian ideology.

CO5. Demonstrate a gender sensitive approach in day to day life.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2					√	
3					√	
4				√		
5			√		√	

SYBA Applied Component

Course Title: Gandhism in the Present Context

Semester IV

Course Outcomes:

The course will enable learners to:

CO1. Demonstrate a systematic and coherent knowledge of various economic and political ideologies of Gandhi.

CO2. Use knowledge and understanding of the novel approach of Gandhi towards education.

CO3. Communicate the results of studies of the Gandhian notion of economic development and the vices of machine culture and large scale industrialization.

CO4. Address the issues of socio-economic inequality with the help of Gandhian model of Sarvodaya.

CO5. Apply the knowledge of various movements led by activists like Vinoba Bhave and Martin Luther King motivated by Gandhian ideology.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1						√
2	√				√	
3	√					√
4			√			
5			√		√	√

SYBA Applied Component
Course Title: Comparative Religions
Semester III

Course Outcomes:

The course will enable learners to:

CO1. Arrive at an informed understanding of the diversity and complexity of Zoroastrianism and Judeo Christian religious traditions within their historical, social, and cultural contexts.

CO2. Explain Religion as a category of analysis in academic contexts, comparative study of the origins, beliefs, interpretations, and practices that shape individual lives, Indian and world societies.

CO3. Develop religious sensitivity necessary to investigate religion driven conflicts in contemporary world necessary for developing frameworks for inter-faith dialogue, peace and harmony in the society.

CO4. Demonstrate the ability to engage in constructive dialogue while exploring tensions between scriptural truths, praxis of religion and urgent challenges of assimilation of religious diversity in contemporary times.

CO5. Demonstrate skills of critical reading of lived religions through effective oral and visual class presentations.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2	√	√				
3	√		√			
4			√			√
5			√			√

SYBA Applied Component

Course Title: Comparative Religions

Semester IV

Course Outcomes:

The course will enable learners to:

CO1. Arrive at an informed understanding of the diversity and complexity of religions believed to have originated in India, i.e. Hinduism, Buddhism, Jainism and Sikhism within their historical, social, and cultural contexts.

CO2. Analyse and compare core beliefs, institutional practices, eschatology, popular beliefs and practices of religions that underlies the spirit of democracy, rights and justice unique to Indian context.

CO3. Develop religious sensitivity through study of syncretic traditions for developing frameworks for inter-faith dialogue, peace and harmony in the society.

CO4. Demonstrate the ability to engage in constructive dialogue while exploring tensions between scriptural truths, praxis of religion and urgent challenges of assimilation of religious diversity in Indian society.

CO5. Demonstrate skills of critical reading of lived religions through effective oral and visual class presentations.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2	√	√				
3	√		√			
4			√			√
5			√			√

TYBA Philosophy

Course Title: Classical Indian Philosophy, Paper No.4

Semester V

Course Outcomes:

The course will enable learners to:

CO1. Demonstrate a deeper understanding of the nature of philosophical questions and thinking present in classical Indian thought.

CO2. Systematically and rationally interpret the issues addressed in the philosophical developments of Nyaya and Vaisesika Schools of Philosophy.

CO3. Trace the development of philosophical ideas in Mimamsa and Vendanta systems so as to evaluate its contribution to philosophical knowledge.

CO4. Demonstrate the clear understanding of Samkhya and Yoga Philosophy and its application in daily life.

CO5. Apply the philosophical knowledge derived from the detailed study of Classical Indian philosophy to moral way of life.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					√
2				√		
3		√				√
4			√		√	
5			√		√	

TYBA Philosophy

Course Title: Western Philosophy, Paper No.4

Semester VI

Course Outcomes:

The course will enable learners to:

CO1. Demonstrate a deeper understanding of the nature of philosophical questions and thinking present in Western Philosophy since the 18th Century.

CO2. Trace the development of philosophical ideas in the philosophy of the Rationalist philosophers

CO3. Use knowledge of the critical philosophy of Emmanuel Kant in gaining the understanding of current philosophical problems

CO4. Gain familiarity with a few philosophers and movements in 20th century western philosophy.

CO5. Summarize with clarity some of the arguments, problems and questions central to metaphysics and epistemology in modern philosophy leading to moral implications.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					√
2						√
3		√				
4	√					
5			√		√	√

TYBA Philosophy

Course Title: , Philosophy of Religion Paper No. 5

Semester V

Course Outcomes:

The course will enable learners to:

CO1. Apply a reasoned and systematic reflection to religious beliefs

CO2. Demonstrate a deeper understanding of the nature of religion and its impact on the moral aspects of human life.

CO3. Think analytically and critically about matters pertaining to the religious aspect of life.

CO4. Demonstrate a deeper understanding of the nature and attributes of God with the arguments by different philosophers for the existence of God.

CO5. Analyse and evaluate the critical approach towards the existence of God done by the thinkers like Karl Marx and Sigmund Freud.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					√
2			√			
3	√	√				
4			√			√
5	√	√	√			

TYBA Philosophy

Course Title: , Philosophy of Religion Paper No. 5

Semester VI

Course Outcomes:

The course will enable learners to:

CO1. Gain familiarity with different approaches towards the religious language to gain clarity on the meaningfulness of language used in religious scriptures.

CO2. Demonstrate a deeper understanding of the meaning and application of Mystical experiences in religious aspects of life.

CO3. Think analytically and critically about the problem of evil confronted by the theists and make an attempt to resolve the issue with the knowledge gained by studying different approaches developed by philosophers

CO4. Use knowledge and understanding of the possibility of afterlife to appreciate the significance of morality in human life.

CO5. Appreciate the relevance of different religious cultures and outlooks in the multi-religious world and develop the spirit of communal harmony

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√					
2			√			
3		√				√
4			√			
5	√					√

TYBA Philosophy

Course Title: Living Ethical Issues, Paper No. 6

Semester V

Course Outcomes:

The course will enable learners to:

CO1. Possess knowledge of major philosophical theories and debates in areas of bioethical, professional and sexual ethics and develop a lens to critically engage with contemporary challenges of rights and justice.

CO2. Reflect and apply moral reasoning in areas of bio medical, professional and sexual issues in an informed way.

CO3. Identify the multiple ethical interests at stake in a real-world situation and practice.

CO4. Recognize, articulate, and apply ethical principles in various social, political and personal contexts by developing a working code of ethics.

CO5. Gain proficiency in written and oral communication, as learners will be able to state and defend different positions through class conversations, presentations and writing research essays.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√		√			
2			√			
3			√		√	
4					√	
5	√					√

TYBA Philosophy

Course Title: Living Ethical Issues, Paper No. 6

Semester VI

Course Outcomes:

The course will enable learners to:

CO1. Possess knowledge of major philosophical and religious theories to develop a lens to critically engage with global challenges of environment crisis, poverty, sustainability and corporate social responsibility.

CO2. Recognise urgency and apply moral reasoning in most urgent areas of environment ethics, corporate and business ethics, economic sustainability in an informed way.

CO3. Identify the multiple ethical interests at stake in a real-world situation and practice.

CO4. Recognize, articulate, and apply ethical principles in socio-economic and personal contexts by developing a working code of ethics.

CO5. Gain proficiency in written and oral communication, as learners will be able to state and defend different positions through class conversations, presentations and writing research essays.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√		√			
2			√			
3			√		√	
4					√	
5	√					√

TYBA Philosophy

Course Title: Plato's Republic, Paper No. 7B

Semester V

Course Outcomes:

The course will enable learners to:

CO1. Possess advanced knowledge of major doctrines of Plato's social, political, and ethical position through a detailed and critical reading of the text.

CO2. Gain practical understanding of the nature of philosophical analysis when applied to the text.

CO3. Identify and analyse key philosophical themes and questions in the text that are relevant to contemporary social and political debates in Indian as well as global context.

CO4. Develop intercultural sensibilities through familiarity and critical appreciation of Greek philosophy and culture most important for a democratic world order.

CO5. Gain proficiency in philosophical research methodology of analyses, translation interpretation and literature review as learners engage with developing a model of their own version of utopian state through class presentations and research essays.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1		√				
2		√				
3			√	√	√	
4					√	
5	√					√

TYBA Philosophy

Course Title: Plato's Republic , Paper No. 7B

Semester VI

Course Outcomes:

The course will enable learners to:

CO1. Possess advanced knowledge of major doctrines of Plato's epistemological and metaphysical philosophy through a detailed and critical reading of the text.

CO2. Gain practical understanding of the nature of philosophical analysis when applied to the text.

CO3. Identify and analyse key philosophical issues in the text that has influenced world philosophies to date.

CO4. Gain proficiency in philosophical research methodology of analyses, translation interpretation, literature review as learners engage with modern and contemporary commentaries on the text.

CO5. Develop intercultural sensibilities through critical appreciation of Greek philosophy important for a democratic world order.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√	√				
2		√				
3			√		√	
4						√
5	√			√		

TYBA Philosophy

Course Title: Logic, Paper No. 8

Semester: V

Course Outcomes

The course will enable learners to:

CO1. Use the formal techniques of evaluating deductive arguments used in different areas of studies and competitive exams.

CO2. Approach any topic with the ability to reason and think critically.

CO3. Define the basic concepts clearly and efficiently by understanding the nature, meaning and scope of definitions

CO4. Analyse different types of proposition and symbolise them giving rise to the development of calculative skills

CO5. Apply appropriate methodologies in order to test the validity of syllogisms with the help of learning rules of syllogistic reasoning.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1						√
2		√				
3	√					
4	√					
5		√				√

TYBA Philosophy

Course Title: Logic, Paper No. 8

Semester: VI

Course Outcomes:

The course will enable learners to:

CO1. Apply their reasoning skills to analyse reasoning in newspaper articles, books and speeches and competitive exams.

CO2. Use the deductive method of reasoning to the arguments developed in various aspects of life

CO3. Identify flaws and fallacies in arguments.

CO4. Recognize and appreciate the importance of logical reasoning and its application in academic, social and legal contexts.

CO5. Demonstrate skills relating to logical analysis of the philosophical ideas and theories.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1		√			√	
2		√				
3	√					√
4		√			√	
5	√	√				

TYBA Philosophy**Course Title: Philosophy and Film, Paper No. 9 B****Semester V**

Course Outcomes:

The course will enable learners to:

CO1. Acquire proficiency in nature, methodology, scope and relevance of new intriguing area in Philosophy, i.e. Philosophy of Film.

CO2. Develop ability to academically engage with the most powerful mass media with an understanding of its pragmatic aspect and axiology.

CO3. Analyse different aspects of Film philosophically as well as understanding philosophical inquiry through films culminating into a lived experience of art and philosophy.

CO4. Gain inter-textual modes of thought that take both written and cinematic texts into consideration

CO5. Construct an aesthetic, ethical, imaginative and cinematic response to social –political concerns of contemporary society, exhibited through oral and written projects, presentations and research essays.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√			√		
2		√		√		
3	√			√		
4				√		√
5	√			√		√

TYBA Philosophy

Course Title: Philosophy and Film, Paper No. 9 B

Semester VI

Course Outcomes:

The course will enable learners to:

CO1. Gain proficiency in philosophical inquiry through films.

CO2. Acquire skills to view and discuss films in conjunction with important philosophical texts

CO3. Analyse films as philosophical statements to create a rubric of analysing films as philosophical texts themselves.

CO4. Create a public forum, i.e. film club to discuss significant philosophical issues through important films.

CO5. Construct an aesthetic, ethical, imaginative and cinematic response to core philosophical questions, exhibited through oral and written projects, presentations and research essays.

COs	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6
1	√			√		
2		√		√		
3	√			√		
4				√		√
5	√			√		√

PHYSICS-OUTCOME BASED EDUCATION AND ASSESSMENT

PROGRAM EDUCATION OBJECTIVES (PO)

To enable students to

- PO1) **Acquire and master disciplinary knowledge** so they can acquire competency in the related field.
- PO2) develop **Communication Skills** through Presentations and encourage them to host department festivals.
- PO3) develop **Analytical reasoning** through problem solving and programming as a part of curriculum and advanced learners' workshop.
- PO4) develop **Scientific reasoning** through reading scientific articles/review articles and answering comprehensive questions on those.
- PO5) attain **Digital literacy** through use of apps for specific learning topics, computer programming and exploring computer simulations.
- PO6) learn **Cooperation and Teamwork** by volunteering in department festival (Event Horizon) and participating in various college level activities like CEP, Ole and NSS.

Program Specific Outcome (Physics) (PSO)

After completion of the program, the student will be able to

- PSO1) Use appropriate and accurate scientific/technical terminology to **communicate** their observations and conclusions.
- PSO2) **communicate** scientific concepts accurately through mathematical and graphical representations.
- PSO3) **comprehend** the scientific articles and research papers.
- PSO4) **analyse and question** the contents of scientific articles and arrive at logical conclusions.
- PSO5) **perform** experiments and explain the results with appropriate scientific models.
- PSO6) **seek clear understanding** of concepts and ideas that shape reasoning through **problem solving**.
- PSO7) **Apply** mathematical constructs to model the natural laws.
- PSO8) Be able to **use** various **simulators and emulators** to solve physics problems.
- PSO9) Be able to **search** for relevant scientific data/information through online sources.
- PSO10) **Identify** sources of error in the data.
- PSO11) work effectively in teams/groups with various **interpersonal skills**.
- PSO12) Appreciates the value of **diversity in teams**.

Course Learning Outcomes (CO)

F. Y. B.Sc.

Course Learning Outcomes (CO) for USPH101: Classical Physics

After doing this course, learner will be able to

- CO1) Apply Newton's Laws to various Problems.
- CO2) Study properties of solids and liquids.
- CO3) Predict the position of an image formed of any given object for an optical system.
- CO4) Use wave theory to understand various phenomena involving light.
- CO5) Analyse systems undergoing various processes using thermodynamics.
- CO6) Understand properties of real gases.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓
2	✓	-	✓	-	✓	-	-	-	✓	✓	-	-
3	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
4	✓	-	✓	✓	✓	✓	✓	-	-	-	-	-
5	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓
6	✓	✓	✓	-	-	-	-	-	✓	✓	-	-

Course Learning Outcomes (CO) for USPH102: Modern Physics

A student will be able to

CO1: understand the historical development of Modern Physics through discoveries of various physical processes at atomic and nuclear level.

CO2: solve numerical problems in radioactivity and energy-matter interaction at atomic and nuclear level.

CO3: read comprehensively scientific review articles and Nobel laureate lectures who have contributed in the development of modern physics.

CO4: understand the schematic and working of modern instruments that produce and detect high energy radiations.

CO5: explain applications of radioactive isotopes in medicine and archaeology.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	✓	✓	✓	✓	-	✓	-	-	✓	-	✓	-
CO2	✓	✓	-	✓	✓	✓	✓	✓	-	✓	-	-
CO3	-	-	✓	✓	-	-	-	-	✓	-	-	-
CO4	✓	-	-	-	-	✓	✓	-	✓		✓	✓
CO5	✓	-	✓	✓	-	-	-	✓	✓	✓	✓	✓

Course Learning Outcomes (CO) for USPHP1: Practical I

After doing this course, learner will be able to:

CO1) demonstrate their practical skills.

CO2) understand and practice the skills while doing physics practical.

CO3) understand the use of apparatus and their use without fear.

CO4) correlate their physics theory concepts through practical.

CO5) Understand the concepts of errors and their estimation.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓
2	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓
3	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
5	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-

Course Learning Outcomes (CO) for USPH202: Electricity and Electronics

A student will be able to

CO1: interpret the complex algebra notations to describe various electrical parameters.

CO2: analyse electrical and electronics circuits.

CO3: design electrical and electronics circuits for mentioned applications.

CO4: calculate electric potential, electric field and magnetic field for given charge/current configuration.

CO5: comprehend special configurations of charge and currents for various applications.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	✓	✓	-	-	✓	✓	✓	✓	✓	✓	-	-
CO2	✓	✓	-	✓	✓	✓	✓	✓	-	-	✓	✓
CO3	✓	✓	✓	✓	-	✓	✓	✓	-	✓	✓	✓
CO4	✓	✓	-	-	-	✓	✓	-	✓	-	-	-
CO5	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓

Course Learning Outcomes (CO) for USPHP2: Practical II

After doing this course, learner will be able to

- CO1) demonstrate their practical skills.
- CO2) understand and practice the skills while doing physics practical.
- CO3) understand the use of apparatus and their use without fear.
- CO4) correlate their physics theory concepts through practical.
- CO5) Understand the concepts of errors and their estimation.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓
2	✓	✓	✓	✓	✓	✓	-	✓	-	-	✓	✓
3	✓	✓	✓	✓	✓	-	-	✓	✓	-	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
5	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-

Course Learning Outcomes (CO) for USPH302: Vector calculus and Analog Electronics

After completion of this course, the learner will be able to:

- CO1) Understand the basic terms and theorems of electrodynamics.
- CO2) Apply the basic concepts of electrodynamics in an intelligent way.
- CO3) Design various basic transistor circuits to use them in real life applications.
- CO4) Based on knowledge mentioned in CO - 4, they will be able to design working amplifiers and oscillators.
- CO5) To understand basic parameters and applications of operational amplifiers.
- CO6) Design operational amplifier based circuits.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	✓	-	✓	-	-	-	-	-	-
2	-	✓	-	-	-	✓	-	✓	-	✓	-	-
3	✓	✓	-	✓	✓	✓	-	-	-	-	✓	-
4	-	✓	-	✓	-	✓	-	✓	-	✓	✓	-
5	✓	✓	-	-	-	✓	-	-	-	-	-	-
6	-	✓	-	-	✓	✓	-	-	✓	✓	-	-

Course Learning Outcomes (CO) for USPH303: Applied Physics -I

A student will be able to

CO1: describe physical principles of light and sound involved in communication systems.

CO2: describe and analyse different types of crystal structures.

CO3: correlate the physical properties of different materials with their crystal structures.

CO4: analyse various physical properties of materials and correlate with various applications.

CO5: solve numerical problems.

CO6: comprehend the scientific research and review articles.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	✓	✓	✓	✓	-	✓	-	-	✓	-	-	-
CO2	✓	✓	✓	✓	-	✓	-	✓	✓	-	✓	✓
CO3	✓	✓	✓	✓	-	✓	✓	✓	✓	-	-	-
CO4	-	-	✓	✓	✓	✓	✓	-	✓	✓	-	-
CO5	✓	-	-	-	-	✓	✓	✓	✓	✓	-	-
CO6	✓	-	✓	✓	-	-	-	-	✓	-	✓	✓

Course Learning Outcomes (CO) for USPHP3: Practical course -3 (Group A,B,C and Skill)

After completion of this course, the learner will be able to:

- CO1) Learn how to develop experimental skills such as, soldering, connection of electronic circuits, use of various laboratory instruments such as, travelling microscope, CRO and Digital Multimeter.
- CO2) Plot graphs in an appropriate way and understand them in their proper perspective.
- CO3) Confirm various principles of mechanics by performing experiments and understand the root of errors in measurements.
- CO4) Design and connect electrical circuits and measure their parameters using electronic instruments such as function generators, DMM and CRO.
- CO5) Plot various input and output signals to demonstrate the correctness of the connected circuit and operation of it.
- CO6) Connect the experiments with theory.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	-	✓	-	-	✓	✓	-	-	-	✓	-	✓
2	✓	-	-	✓	-	-	✓	-	-	✓	✓	-
3	-	✓	-	✓	✓	✓	-	✓	-	✓	-	-
4	✓	✓	-	-	✓	✓	-	-	-	✓	-	-
5	✓	-	-	✓	-	-	✓	-	-	✓	✓	-
6	✓	✓	-	✓	-	✓	-	✓	-	✓	-	-

Course Learning Outcomes (CO) for USPH401: Optics and Digital Electronics

After completion of this course, the learner will be able to:

- CO1) Understand the basic principles of optics such as diffraction and polarization.
- CO2) Use their understanding of mathematical skill to derive expressions of physical concepts in a mathematical way.
- CO3) Understand how things and certain instruments work based on diffraction or polarization.
- CO4) Understand the basic principles of digital electronics.
- CO5) Understand how digital number systems help to solve the mathematical problems using them.
- CO6) Understand and design basic electronic circuits such as flip - flops and registers and how they are useful in designing a microprocessor.

PLO → CLO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	✓	✓	✓	-	✓	-	-	-	-
2	-	✓	-	-	✓	✓	✓	✓	-	✓	-	-
3	✓	-	-	-	-	✓	✓	-	-	✓	-	-
4	✓	✓	-	✓	✓	✓	-	✓	-	-	-	-
5	✓	-	-	-	-	✓	✓	-	-	✓	-	-
6	✓	-	-	-	-	✓	✓	✓	-	✓	-	-

Course Learning Outcomes (CO) for USPH403: Applied Physics-II

A student will be able to

CO1) comprehend the structure of Earth along with various techniques used to know it.

CO2) apply basic physics relations to solve numerical problems in geophysics and geomagnetism.

CO3) write assembly language program for 8085 microprocessor.

CO4) understand the structure and working of microprocessor and its role in computers.

CO5) know various components in the wireless communication systems.

CO6) compare pros and cons of various modulation techniques.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	PSO11	PSO12
CO1	✓	-	✓	-	-	✓	-	✓	✓	-	✓	✓
CO2	✓	✓	-	-	-	✓	✓		✓	✓	-	-
CO3	✓	✓	-	-	✓	✓	-	✓		✓	✓	-
CO4	✓	✓	-	-	✓	-	-	✓	✓	-	✓	✓
CO5	✓	✓	-	-	✓	✓	✓	✓	✓	-	✓	✓
CO6	✓	✓	✓	✓	-	-	-	✓	✓	-	-	-

Course Learning Outcomes (CO) for USPHP4: Practical course -4 (Group A,B,C and Demo)

After completion of this course, the learner will be able to:

- CO1) Carry out error analysis and see that using computer simulations physical principles can be confirmed
- CO2) Understand optical phenomena of diffraction and polarization by performing related experiments and measuring the parameters of the phenomena.
- CO3) Confirm various principles of mechanics by performing experiments and understand the root of errors in measurements.
- CO4) Design and connect digital electronic circuits and confirm their operations.
- CO5) Use and execution of microprocessor program using microprocessor kit.
- CO6) Read and comprehend research articles.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	-	-	-	✓	-	-	✓	-	-
2	✓	✓	-	✓	✓	-	✓	-	-	✓	-	-
3	✓	✓	-	✓	✓	-	✓	-	-	✓	-	-
4	✓	-	-	-	-	✓	✓	✓	-	✓	-	-
5	✓	✓	-	✓	✓	-	✓	-	-	✓	-	-
6	✓	✓	✓	✓	-	-	-	-	✓	-	-	-

Course Learning Outcomes (CO) for USPH502: Solid State Physics

After completion of this course, the learner will be able to:

- CO1) Understand basic concepts of crystallography.
- CO2) Understand how x - ray diffraction technique can be useful to understand and model a crystal structure.
- CO3) Understand concepts of classical and quantum theories of conduction in metals.
- CO4) Learn to correlate mathematical ideas with physical ideas.
- CO5) Understand logical development of physics of solid state and learn how and why classification of materials can be improved using band theory of solids.
- CO6) Applications of theories in real life components such as a diode.
- CO7) Learn about concepts and applications of superconductivity.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	-	✓	✓	-	✓	✓	-	-	-	-	-
2	✓	-	✓	✓	-	✓	✓	✓	-	-	-	-
3	✓	-	✓	✓	-	✓	✓	-	-	-	-	-
4	✓	-	✓	✓	-	✓	✓	-	✓	-	-	-
5	✓	✓	-	✓	✓	✓	✓	-	-	-	-	-
6	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-

Course Learning Outcomes (CO) for USPH503: Atomic and Molecular Physics

Upon successful completion of this course, the student will understand:

- CO 1) the application of quantum mechanics in atomic physics
- CO 2) the importance of electron spin, symmetric and antisymmetric wave functions and vector atom model
- CO 3) Effect of magnetic field on atoms and its application
- CO 4) Learn Molecular physics and its applications.
- CO 5) This course will be useful to get an insight into spectroscopy.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-
5	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓

Course Learning Outcomes (CO) for PRACTICAL COURSE: USPHP05

After doing this course, learner will be able to

- CO1) Learn various skills which are required to analyse experimental results.
- CO2) Handle measuring instruments to perform accurate measurements of different physical quantities.
- CO3) Measure different properties of given materials.
- CO4) Verify theories explaining various physical properties/phenomena.
- CO5) Present results of an experiment in a scientific manner.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	✓
2	-	-	✓	✓	-	✓	-	-	✓	✓	✓	-
3	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓

Course Learning Outcomes (CO) for PRACTICAL COURSE: USPHP06

After doing this course, learner will be able to

CO1) Study different electronic devices.

CO2) Handle measuring instruments to perform accurate measurements of different parameters.

CO3) Design circuits to obtain specified outputs.

CO4) Connect a given circuit by preparing a proper layout.

CO5) Verify the working of a given circuit.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-
2	-	-	✓	✓	✓	✓	-	-	✓	-	-	-
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	-	-	✓	✓	-	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	-

Course Learning Outcomes (CO) for USACEI5P1 (Practicals)

After doing this course, learner will be able to:

CO 1) Understanding relevant concepts. Planning of the experiments.

CO 2) Understanding designing of the experiments Attempts to make the experiments open ended.

CO 3) circuit connections and use of measuring equipments, recording of observations

CO 4) Plotting of graphs, calculation of results and comparison with expected values.

CO 5) Included Hands-on experiments where learners have to prepare reports, PPT and viva voice to enhance their self-confidence and improve competence level.

CO 6) Visit to Hospital/Diagnostic Center/ Bio-medical Research Laboratory and submission of its report.-Real life experience.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	✓	✓	-	-	-	✓	-	✓	✓
2	✓	-	✓	✓	✓	✓	-	-	✓	✓	✓	-
3	✓	✓	-	✓	✓	✓	-	✓	✓	-	✓	-
4	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
6	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓

Course Learning Outcomes (CO) for USPH602: Electronics

After doing this course, learner will be able to:

- CO 1) Understand the basics of semiconductor devices and their applications.
- CO 2) Understand the basic concepts of operational amplifier: its prototype and applications as instrumentation amplifier, active filters, comparators and waveform generation.
- CO 3) Understand the basic concepts of timing pulse generation and regulated power supplies
- CO 4) Understand the basic electronic circuits for universal logic building blocks and basic concepts of digital communication.
- CO 5) Develop quantitative problem solving skills in all the topics covered.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	-	✓	-	✓	-	✓	✓	✓	✓	-	-	✓
2	-	✓	-	✓	✓	✓	-	✓	✓	✓	-	-
3	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-
4	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	-	-
5	✓	✓	✓	✓	-	✓	✓	-	✓	✓	✓	✓

Course Learning Outcomes (CO) for USPH603: Nuclear Physics

After completion of this course, the learner will be able to:

- CO1) Know history of nuclear physics and foundations of nuclear principles
- CO2) Understand how disintegration of heavy nuclei takes place.
- CO3) Understand how nuclear radiation carries information about a nucleus and how to measure this radiation.
- CO4) Theoretically, how the nuclear models help to understand why and how fission can be made possible.
- CO5) Understand the process of controlled fission and what is fusion.
- CO6) Have fundamental knowledge of particle physics which helps them to understand more complex phenomena such as dark matter and relevant research problems

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	-	-	✓	✓	-	-	-	-	-
2	✓	-	✓	✓	-	✓	✓	✓	-	-	-	-
3	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-	-
4	✓	-	✓	-	-	✓	✓	✓	-	-	-	-
5	✓	-	✓	✓	-	✓	✓	✓	✓	-	-	-
6	✓	-	-	✓	-	✓	✓	-	-	-	-	-

Course Learning Outcomes (CO) for USPH604: Special Theory of Relativity

After doing this course, learner will be able to

- CO1) Understand the significance of Michelson Morley experiment and failure of the existing theories to explain the null result.
- CO2) Understand the importance of postulates of special relativity, Lorentz transformation equations and how it changed the way we look at space and time, Absolutism and relativity, Common sense versus Einstein concept of Space and time.
- CO3) Understand the transformation equations for: Space and time, velocity, frequency, mass, momentum, force, Energy, Charge and current density, electric and magnetic fields.
- CO4) Solve problems based on length contraction, time dilation, velocity addition, Doppler effect, mass energy relation and resolve paradoxes in relativity like twin paradox etc.
- CO5) Understand equivalence principle and effects of general relativity.
- CO6) Comprehend research papers in STR and GTR.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	-	✓	-	✓	✓	-	-	-	-	-
2	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-
3	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-
4	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-
5	✓	✓	✓	✓	-	✓	✓	-	-	-	-	-
6	✓	✓	✓	✓	-	✓	✓	-	✓	-	✓	✓

Course Learning Outcomes (CO) for USHP07: PRACTICAL COURSE

After doing this course, learner will be able to

CO1) Study properties of materials.

CO2) Obtain characteristics of semiconductor devices.

CO3) Understand working of modulation circuits.

CO4) Perform experiments of light waves.

CO5) Be exposed to advanced experimental techniques.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	-	-	✓	✓	✓	-	-
3	-	-	✓	✓	✓	-	-	✓	✓	✓	✓	-
4	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓

Course Learning Outcomes (CO) for USPHP08: PRACTICAL COURSE

After doing this course, learner will be able to

- CO1) Study different circuits to measure electronic properties..
- CO2) Understand the detailed working of devices.
- CO3) Design circuits to obtain specified outputs.
- CO4) Be exposed to various parameters that characterize an electronic component.
- CO5) Verify the working of a given circuit.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓	✓	✓	✓			✓	✓	✓		
2		✓	✓	✓	✓	✓			✓			
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	

**Course Learning Outcomes (CO) for USACEI602:
DIGITAL ELECTRONICS, MICROPROCESSOR, MICROCONTROLLER
AND OOP**

After doing this course, learner will be able to:

- CO1) Analyze/design and implement combinational logic circuits.
- CO2) Develop assembly language programming skills and real time applications of microprocessors.
- CO3) Illustrate how to interface the I/O peripheral (PPI) with 8085 microprocessor
- CO4) Understand architecture, silent features, instruction set, programming and interfacing of 8051 microcontroller.
- CO5) To know the terminologies like embedded, CISC and RISC processors.
- CO6) Develop the programming skills in programming Language C++. and test their practical knowledge through lab experiments.

PSO → CO ↓	1	2	3	4	5	6	7	8	9	10	11	12
1	✓	✓		✓	✓	✓	✓	✓	✓	✓		
2	✓	✓			✓	✓		✓	✓	✓		
3	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
4	✓	✓		✓	✓	✓	✓	✓	✓	✓		
5			✓				✓		✓			
6	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓

Wilson College
Dept of Political Science
Objectives and Outcomes Document

Programme Objectives (POs)

Overall objectives of the three-year BA Political Science programme:

PO1: To create politically aware citizens

PO2: To enable them to examine political phenomena, processes, ideas, through multiple perspectives

PO3: To build capacity for logical argumentation and participation in political discourse

PO4: To develop political research skills

PO5: To build capacity for political analysis and political communication

PO6: To create resources and capacity on the interface between politics and mass media

PO7: To develop interdisciplinary modules with Literature, Sociology, Economics, Psychology

PO8: To develop capacity for appearing for competitive examinations, especially Civil Services examinations

Programme-Specific Outcomes (PSOs)

At the end of the programme, the BA Political Science graduate will be able to:

PSO1: Understand and remember the nature of constitutional process, rights, structure and function of government, parliament and judiciary, administration, and local self-government.

PSO2: Understand and apply essential political theories and concepts to analysis of political phenomena, including international relations and foreign policy

PSO3: Write and make political arguments coherently, logically, persuasively.

PSO4: Create textual and audio-visual content on political themes. Eg. Op-ed pieces, short films, documentaries, podcasts, etc.

PSO5: Design and conduct research on political and interdisciplinary topics.

PSO6: Succeed in civil services and other related competitive examinations.

Course Outcomes and Mapping

1. Course Title: Political Science-I: Indian Politics (FYBA) Sem I: The Constitutional Framework

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Comprehensively understand the Constitution

CO2: Understand the nature of fundamental rights and directive principles, be aware of rights, and recognise and respond to violations

CO3: Understand representative government and accountability

CO4: Understand the role of the judiciary as the guardian of rights and constitutionalism, and the significance of PIL and its application as a tool to secure justice

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	x	x	x	x	x
CO2	x	✓	x	x	x	x
CO3	x	✓	x	x	x	x
CO4	x	✓	x	x	x	x

2. Course Title: Political Science-I: Indian Politics (FYBA) Sem II: Indian Political Process

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand contemporary politics through the prism of federalism

CO2: Understand the Indian party system and election process, as well as different political parties and party formation.

CO3: Understand identity politics: language, gender, religion

CO4: Understand different types of insurgencies in terms of ideologies and ethnicities, going beyond issues of law and order.

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	x	x	x	x
CO2	x	✓	x	x	x	x
CO3	x	✓	x	x	x	x
CO4	x	✓	x	x	x	x

3. Course Title: Political Science-II: Political Theory (SYBA) Sem III: Principles and Concepts of Political Theory

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the essentials of Political Theory

CO2: Understand the changing nature of Political Science

CO3: Engage with the idea of the State, Power and Political Obligation

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	x	x	x
CO2	x	✓	✓	x	x	x
CO3	x	✓	✓	x	x	x

4. Course Title: Political Science-II: Political Theory (SYBA) Sem IV: Political Values and Ideologies

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Know about Rights, Liberty, Equality and Justice.

CO2: Understand and evaluate ideologies of the Right and Left

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	x	x	x
CO2	x	✓	✓	x	x	x

**5. Course Title: Political Science-III: Public Administration (SYBA) Sem III:
Introduction to Public Administration**

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the evolution of Public Administration as a discipline and its theories

CO2: Understand the basic principles and theories of Organisation

CO3: Understand contemporary practices in Public Administration such as Public Private Partnerships, Good Governance, and E-Governance.

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	x	x	x	✓
CO2	x	✓	x	x	x	✓
CO3	x	✓	x	x	x	✓

6. Course Title: Political Science-III: Public Administration (SYBA) Sem IV: Indian Administration

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the context, features and evolution of Indian Administration.

CO2: Understand the process of recruitment and training in the Civil Services

CO3: Understand the role of administration in the Budgetary process

CO4: Understand the contemporary issues prevalent in Indian administration, and the measures taken to maintain integrity, accountability, and transparency in administration.

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	x	x	x	x	✓
CO2	x	x	x	x	x	✓
CO3	✓	x	x	x	x	✓
CO4	✓	✓	x	x	x	✓

7. Course Title: Political Science-IV: International Relations (TYBA) Sem V: World Politics

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the Contemporary World order

CO2: Understand and analyse the conceptual and theoretical basis of International Politics

CO3: Understand historical and current Balance of Power constructs

CO4: Understand the issues of Security, Arms Race and Disarmament

CO5: Understand the nature of the Global Political Economy

CO6: Develop competencies as Global Citizens

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	x	x	x	✓
CO2	x	✓	x	x	x	✓
CO3	x	✓	x	x	x	✓
CO4	x	✓	x	x	x	✓
CO5	x	✓	x	x	x	✓
CO6	x	✓	x	x	x	✓

8. Course Title: Political Science-IV: International Relations (TYBA) Sem VI: India in World Politics

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the nature of the world order

CO2: Have conceptual clarity about Nation States, security issues and bases of Foreign Policy

CO3: Have basic understanding of the making and implementation of foreign policy based on internal and external determinants

CO4: Understand India's role in major international and regional organisations

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	x	x	x	✓
CO2	x	✓	x	x	x	✓
CO3	x	✓	x	x	x	✓
CO4	x	✓	x	x	x	✓

9. Course Title: Political Science-V: Political Thought (TYBA) Sem V: Western Political Thought

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Correlate between theoretical and conceptual basis and current political institutions and processes

CO2: Understand the relevance of Western Political Thought

CO3: Understand the development of essential political concepts like Liberty, Rights, Justice, Multicultural Democracy

CO4: Compare and contrast idealised and real political practice

CO5: Critically analyse different idea systems

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	x	x	x
CO2	x	✓	✓	x	x	x
CO3	x	✓	✓	x	x	x
CO4	x	✓	✓	x	x	x
CO5	x	✓	✓	x	x	x

10. Course Title: Political Science-V: Political Thought (TYBA) Sem VI: Indian Political Thought

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Correlate between theoretical and conceptual basis and current political institutions and processes

CO2: Understand the relevance of Indian Political Thought

CO3: Compare and contrast idealised and real political practice

CO4: Critically analyse different idea systems

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	x	x	x
CO2	x	✓	✓	x	x	x
CO3	x	✓	✓	x	x	x
CO4	x	✓	✓	x	x	x

11. Course Title: Political Science-VI: Political Process in Modern Maharashtra (TYBA) Sem V: Politics of Modern Maharashtra

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the Historical and Cultural Context of Maharashtra

CO2: Be familiar with different regions of Maharashtra, regional strengths and disparities

CO3: Analyse the functioning of the Executive, Legislature and Judiciary in Maharashtra

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	✓	x	x	x	✓
CO2	✓	✓	x	x	x	✓
CO3	✓	✓	x	x	x	✓

12. Course Title: Political Science-VI: Politics of Modern Maharashtra (TYBA) Sem VI: Determinants of Politics of Maharashtra

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the social and economic underpinnings of Maharashtra Politics

CO2: Understand and explain the nature of dominant and marginalised communities in Maharashtra including tribals

CO3: Understand the implications of Development on Land relations and Environment

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	✓	x	x	x	✓
CO2	✓	✓	x	x	x	✓
CO3	✓	✓	x	x	x	✓

13. Course Title: Political Science-VII: Understanding Politics Through Films (TYBA) Sem V: Politics and Films

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Demonstrate understanding of the significance and impact of of films on popular culture and as a tool to learn about politics

CO2: Analyse, evaluate, and explain political concepts and phenomena through audio-visual texts such as films

CO3: Understand the evolution of filmmaking including commercial cinema, documentaries, parallel cinema, mainstream Bollywood as well as regional cinema

CO4: Analyse and write about the impact of significant political events such as the Partition of India on filmmaking and vice-versa

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	✓	x	x
CO2	x	✓	✓	✓	x	x
CO3	x	✓		✓	x	x
CO4	x	✓	✓	✓	x	x

14. Course Title: Political Science-VII: Understanding Politics Through Films (TYBA) Sem VI: Learning Indian Politics through Films

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Critically evaluate the process of nation-building in India after independence and its depiction in films

CO2: Critically evaluate the process and debates on development in India through films depicting the same

CO3: Understand people's movements in India through significant documentaries

CO4: Analyse and write about political incidents such as internal security challenges facing India through their depiction in contemporary films

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	x	✓	✓	✓	x	x
CO2	x	✓	✓	✓	x	x
CO3	x	✓	✓	✓	x	x
CO4	x	✓	✓	✓	x	x

**15. Course Title: Political Science-VIII: American Political System (TYBA) Sem V:
American Constitution and Institutions**

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the making, philosophy, and features of the American Constitution

CO2: Understand the nature of American federalism

CO3: Understand the nature and functioning of the American Legislature and Executive

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	✓	x	x	x	x
CO2	✓	✓	x	x	x	x
CO3	✓	✓	x	x	x	x

**16. Course Title: Political Science-VIII: American Political System (TYBA) Sem VI:
Political Process in the United States**

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Understand the nature and functioning of the American Judiciary

CO2: Understand the evolution of political parties and interest groups in the US

CO3: Be familiar with the American Presidential election process and the role of media in elections

CO4: Understand the political history of civil rights and women's movements in the US and their present-day significance

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	✓	x	x	x	x
CO2	x	✓	x	x	x	x
CO3	x	✓	x	x	x	x
CO4	x	✓	x	x	x	x

17. Course Title: Political Science-IX: Local Self-Government with Special Reference to Maharashtra (TYBA) Sem V: Rural Local Self-Government

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Recognise the nature and importance of devolution of power and rural local self government

CO2: Evaluate the nature of specific Local Self Governing bodies such as Gram Sabhas and Gram Panchayats, Panchayat Samitis and Zilla Parishads

CO3: Be familiar with issues of water, sanitation, Education, Housing and Slums, Migration and Transport in rural contexts.

CO4: Evaluate the nature and extent of devolution of Power and Gender equity in local self governing process in Maharashtra

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	x	x	x	x	✓
CO2	✓	x	x	x	x	✓
CO3	x	✓	x	x	x	✓
CO4	x	✓	x	x	x	✓

18. Course Title: Political Science-IX: Local Self-Government with Special Reference to Maharashtra (TYBA) Sem VI: Urban Local Self-Government

Course Outcomes (COs)

At the end of the course, the learner will be able to:

CO1: Recognise the nature and importance of devolution of power and urban local self government

CO2: Evaluate the nature of specific Local Self Governing bodies such as Nagar Panchayats, Municipalities and Municipal Corporations

CO3: Be familiar with issues of water, sanitation, Education, Housing and Slums, Migration and Transport in urban contexts.

CO4: Evaluate the nature and extent of devolution of Power and Gender equity in local self governing process in Maharashtra

Mapping of PSOs with COs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	✓	x	x	x	x	✓
CO2	✓	x	x	x	x	✓
CO3	x	✓	x	x	x	✓
CO4	x	✓	x	x	x	✓

Programme Educational Objectives (PEOs) for BA (Psychology)

PO1: To equip students with knowledge of basic concepts in the field of Psychology.

PO2: To ignite students' interest and passion for Psychology so that the students are motivated for life-long learning in the area of Psychology.

PO3: To enable students to focus on application of psychological principles, knowledge and skills in various fields of psychology.

PO4: To help students develop a scientific temper and acquire research related skills.

PO5: To develop in students, values that ensure and enhance physical and mental well-being.

PO6: To encourage students to develop ethical practices in personal and professional life.

PO7: To encourage a spirit of inquiry amongst the students for understanding the "what, when, why and how" of human behavior.

Programme Specific Outcomes (PSOs) for BA (Psychology)

At the end of the programme, the learner will be able to:

PSO1: Demonstrate knowledge and an understanding of the theoretical basis of the science of Psychology.

PSO2: Employ Information and Communication Technology in Psychology related disciplines and careers.

PSO3: Exhibit professional ethics.

PSO4: Appraise psychological assessment tools like standardized questionnaires.

PSO5: Appraise various fields of theoretical and applied psychology and identify which field they would like to pursue in higher education or as a career.

PSO6: Outline and use research methodology, statistical knowledge and techniques to write a research paper.

PSO7: Identify a variety of theoretical orientations and micro-skills that drive the functioning of an effective mental health professional.

PSO8: Report foundational knowledge and skills required to function in a clinical, counselling or organisational set up.

Course Learning Outcomes (CLOs) for Fundamentals of Psychology, Paper One, Semester I (FYBA)

At the end of the Course, the learner will be able to:

CO 1. Trace the history of psychology and identify the subject of Psychology as a science.

CO 2. Recognize that the human mind and behaviour have biological underpinnings.

CO 3. Compare and contrast the differences between major schools of psychology
Psycho-dynamic, Behaviourism, Cognitive, etc.

CO 4. Recognize the contribution of various psychological principles and theories to
therapeutic applications.

CO 5. Develop an awareness of how different psychological concepts can be applied in everyday
life.

CO 6. Exhibit an awareness and knowledge of research ethics.

CO 7. Explain the principles of learning and memory and their application to disorders
encountered in the clinical setup.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							

2	✓							
3	✓							
4	✓				✓			
5					✓			
6	✓		✓	✓	✓			
7	✓							✓

Course Learning Outcomes (CLOs) for Fundamentals of Psychology, Paper One, Semester II, (FYBA)

At the end of the Course, the learner will be able to:

CO 1. Compare and contrast different theories on the nature of intelligence.

CO 2. State the criteria for diagnosis of developmental delay as well as list the causal factors of the same.

CO 3. Explain the various approaches to understanding motivation.

CO 4. Appreciate the shift in focus recommended by the positive psychology movement from the negative to the positive and apply the same to nurturing mental health, happiness and strength in oneself and others, in daily life.

CO 5. Explain views of personality, proposed by psychologists from differing theoretical perspectives and briefly evaluate the strengths and limitations of a specific viewpoint.

CO 6. Apply simple statistical formulae to calculation of the mean, median and mode from raw data.

CO 7. Understand the importance of data collection and analysis as an essential ingredient of quantitative research methodology in Psychology.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓							✓
3	✓							
4	✓						✓	✓
5	✓							
6	✓					✓		
7	✓					✓		

**Course Learning Outcomes (CLOs) for Social Psychology, Paper II, Semester Three
(SYBA)**

At the end of the Course, the learner will be able to:

CO1. Understand the scientific nature of social psychology and explain the diverse factors that shape social thought and behavior.

CO2. Determine how the five basic nonverbal channels of communication reveal emotional states and help people to communicate.

CO3. Apply attribution theory to depression

CO4 Evaluate alternative strategies for resolving cognitive dissonance

CO5 Appreciate the importance of affiliation in human relationships and express his or her own need for affiliation in interaction.

CO6. Gain insight into the nature of social skills and strive to develop these skills in oneself

CO 7. Write on the main types of close relationships formed by people.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓							
3	✓						✓	✓
4	✓							
5	✓							

6	✓						✓	✓
7	✓							

Course Learning Outcomes (CLOs) for Developmental Psychology, Paper III, Semester Three (SYBA)

At the end of the Course, the learner will be able to:

CO1. Define the field of developmental psychology and describe the areas that are covered by specialists in lifespan development.

CO2 Describe the physical changes that are experienced by adolescents as puberty is reached.

CO3. Write on identity formation during adolescence.

CO4. Write on the nature of family relationships during adolescence.

CO5. Distinguish between different coping strategies as well as understand the relationship between resilience and coping

CO 6. Write on the nature of postformal thought .

CO 7. Compare and contrast the different kinds of love

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓							

3	✓							
4	✓							
5	✓							
6	✓							
7	✓							

**Course Learning Outcomes (CLOs) for Psychology of Adjustment-Applied Component
Semester Three (SYBA)**

At the end of the Course, the learner will be able to:

- CO 1. Describe the self-concept and its components
- CO 2. Discuss the major health hazards of obesity, smoking, drinking and substance abuse
- CO 3. List the components of “I” messages and communicate using ‘I’ messages.
- CO 4. Suggest ways of improving decision making skills.
- CO 5. State factors which lead to successful marriages and tips to improve relationships
- CO 6. Explain how gender stereotypes and the media influence sexuality
- CO 7. Compare and contrast friendship and love.

CLOs	PSOs							
	1	2	3	4	5	6	7	8

1	✓							
2	✓							
3	✓							
4	✓						✓	
5	✓							
6	✓							
7	✓							

Course Learning Outcomes (CLOs) for Social Psychology, Paper II, Semester Four (SYBA)

At the end of the Course, the learner will be able to:

CO1 Compare and contrast the concepts of stereotyping, prejudice and discrimination and evaluate gender stereotypes and their impact on organizational hierarchy.

CO2 Write on various techniques for reducing prejudice.

CO3 Describe the factors that influence conformity

CO4 Describe the types of bullying and suggest measures for reducing bullying.

CO5 Critically evaluate techniques for reducing aggression.

CO6 Assess the factors and motives that contribute to prosocial behaviour.

CO7 Write on the key steps in deciding whether to engage in prosocial behaviour.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓							
3	✓							
4	✓						✓	
5	✓							
6	✓							
7	✓							

Course Learning Outcomes (CLOs) for Developmental Psychology, Paper III, Semester Four (SYBA)

At the end of the Course, the learner will be able to:

CO 1. Define the concept of senescence and outline physical and sensory changes that accompany senescence, as well as emotional reactions to the same.

CO 2. Apply the concept of selective optimization to individuals in middle and late adulthood.

CO 3 Understand phenomena faced by middle-aged adults such as the sandwich generation and the impact of culture on issues created by the same.

CO 4. Gain insight into the cultural roots of domestic violence, the stages of spousal abuse and the cycle of violence. The awareness created will enable the student to understand the need for empowerment of women and contribute to such empowerment, drawing upon his or her unique talents.

CO 5. Acquaint himself or herself with the chronic and debilitating physical and psychological disorders affecting individuals in late adulthood . Working with elderly populations and caregiving will be facilitated through this understanding.

CO 6. Recognize the role played by lifestyle choices in wellness and suggest ways of promoting good health in aged populations.

CO 7. Discuss how learning and education continue in late adulthood, encouraging the same.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓							
3	✓							
4	✓							

1	✓						✓	✓
2	✓						✓	✓
3	✓						✓	✓
4	✓						✓	✓
5	✓						✓	✓
6	✓						✓	✓
7	✓						✓	✓

Course Learning Outcomes (CLOs) for Psychological Testing and Statistics, Paper IV, Semester 5

(TYBA)

At the end of the Course, the learner will be able to:

CO1: Recognize how psychological testing and statistics form a foundation for developing high quality psychological tools and research.

CO2: Distinguish amongst the tools of assessment and appraise what constitutes a “good test”.

CO3: Demonstrate an in-depth understanding of the concepts of Reliability and Validity along with being able to identify its importance in tools of psychological assessment.

CO4: Discuss the different types of reliability and validity estimates as well as illustrate the appropriate use of each in different contexts.

CO5: Compare and contrast the measures of central tendency.

CO6: Apply the appropriate formulae to calculate Mean, Median and Mode.

CO7: Select the appropriate statistical tool of analysis on the basis of scales of measurement and classify examples under each of the four scales.

CO8: Construct frequency distribution curves and other graphical representations (especially histograms, frequency polygons, ogives, cumulative frequency curves and polygons of smoothed frequencies).

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓			✓		✓		
2	✓			✓				
3	✓			✓				
4	✓							
5	✓							
6	✓					✓		

7	✓							
8	✓							

Course Learning Outcomes (CLOs) for Abnormal Psychology, Paper V, Part I, Semester 5

(TYBA)

At the end of the Course, the learner will be able to:

CO1: State the evolution of the concepts of abnormality and abnormal behaviour across time.

CO2: Define the DSM-5 criteria for various psychological disorders (particularly, anxiety and related disorders, somatic symptom and related disorders and dissociative disorders).

CO3: Recognise abnormality with reference to criteria for abnormal behaviour as largely discussed in the field today and supported by the Diagnostic and Statistical Manual of Mental Disorders (DSM).

CO4: Describe the basic elements in assessment of abnormality.

CO5: Explain the diagnosis, etiology, prevalence rates and treatment alternatives available for anxiety disorders as well as obsessive compulsive and related disorders.

CO6: Explain the diagnosis, etiology, prevalence rates and treatment alternatives available for somatic symptom and related disorders as well as dissociative disorders.

CO7: Employ the understanding of various psychological disorders for interpretation of case studies.

CO8: Compare and contrast the biological, psychological and sociocultural viewpoints for understanding abnormality and abnormal behaviour.

CO9: Evaluate the current status of mental health problems and awareness regarding the same in the society at large.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓		✓	✓				✓
2	✓			✓				✓
3	✓		✓		✓		✓	✓
4	✓	✓	✓	✓	✓			✓
5	✓							✓
6	✓			✓				✓
7	✓		✓		✓			✓
8	✓						✓	✓
9	✓	✓	✓		✓			✓

**Course Learning Outcomes (CLOs) for Industrial/Organizational Psychology, Paper VI,
Part I, Semester V (TYBA)**

At the end of the Course, the learner will be able to:

CO1. Define Industrial and Organizational Psychology and trace the history of I/O psychology.

CO2. Identify I/O Psychology as a profession and as a science.

CO3. Define Job analysis and distinguish between the job-oriented approach & the person-oriented approach of job analysis.

CO4. Demonstrate the collection of job analysis information using different approaches of collecting job analysis information.

CO5. Discuss the importance of employee appraisal and compare different methods of assessing job performance.

CO6. Identify and critically evaluate different assessment methods for employee selection and placement.

CO7. Recognize different issues with regards to employee selection and formulate ways to overcome them.

CO8. Schedule a training program using different training designs and methods in given case studies

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓				✓			

3	✓							
4				✓				
5	✓							
6	✓							
7	✓	✓						
8				✓				

Course Learning Outcomes (CLOs) for Cognitive Psychology, Paper VII, Semester 5

(TYBA)

At the end of the Course, the learner will be able to:

CO1: Identify the neurological and brain systems that operate during various cognitive processes (especially, perception, attention and memory).

CO2: Employ the theories of perception and memory in understanding and conducting experiments that are a part of courses on Practicum in Cognitive Processes.

CO3: Demonstrate awareness of how the processes of perception and attention manifest in a learner's day-to-day life.

CO4: Identify the proponents of various memory systems and discuss how sensory memory, short-term memory and working memory differ from one another.

CO5: Discuss, using case examples, the phenomenon of anterograde and retrograde amnesia.

CO6: Distinguish, using illustrations, the difference amongst and between declarative and non-declarative memory systems.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓		✓					
3	✓							
4	✓							
5	✓							
6	✓							

Course Learning Outcomes (CLOs) for Practicals in Cognitive Processes and Psychological Testing, Paper VIII, Part I, SEMESTER V (TYBA)

At the end of the Course, the learner will be able to:

CO1. Define and discuss different statistical and research related concepts like variables, designs, and hypotheses.

CO2. Discuss the design, hypothesis, variables, and Statistical Analysis, in a given experimental situation.

CO3. Design the hypothesis, design, and statistical analysis of given variables.

CO4. Conduct ethical psychological experiments with participants

CO5. Calculate and analyze group data using statistical analysis.

CO6. Write reports on the conducted experiments, including components like the introduction, method, results (Individual and group), discussion, and conclusion.

CO7. Self administer a psychological test and interpret the test results.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2	✓					✓		
3	✓					✓		
4			✓			✓		
5						✓		
6				✓		✓		

7				✓		✓		
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Course Learning Outcomes (CLOs) for Counseling Psychology, Paper IX, Part I- Introduction and Approaches to Counseling, Semester 5 (TYBA)

At the end of the Course, the learner will be able to:

CO1: Identify the counseling needs of diverse groups (in terms of age, gender and sexual orientation) in the society.

CO2: Describe the need for and skill in abuse and addiction counseling.

CO3: Discuss the various theories of individual and group counseling approaches in terms of the view of human nature, role of the counselor and treatment techniques adopted by them.

CO4: Describe the role of a counselor as a formal helper in a therapeutic relationship.

CO5: Appraise the qualities thought of as being essential for playing the role of an effective helper.

CO6: Evaluate the essential ingredients of a successful helping relationship in a counseling set up.

CO7: Appraise the influence of culture and diversity on the helping process and the counselor competencies required for dealing with the same.

CO8: Compare and contrast the effectiveness of adopting a particular theoretical stance in dealing with a variety of clients and their concerns.

CO9: Develop an outlook of social advocacy and justice for working in the area of mental health with diverse populations like the aged or sexual minorities.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓		✓				✓	✓
2	✓			✓			✓	✓
3	✓		✓		✓		✓	✓
4	✓		✓		✓		✓	✓
5	✓		✓		✓		✓	✓
6	✓						✓	✓
7	✓		✓				✓	✓
8	✓				✓		✓	✓
9	✓		✓				✓	✓

Course Learning Outcomes (CLOs) for Psychological Testing and Statistics, Part I, Paper IV,

Semester 6 (TYBA)

At the end of the Course, the learner will be able to:

CO1: Demonstrate a strong foundation for advanced learning in Psychological Testing, Assessment and Statistics.

CO2: Describe the process of constructing psychological tests along with evaluating the importance of each of the stages.

CO3: Exhibit knowledge of correlations as they exist in the real world.

CO4: Trace the history and identify the characteristics of different measures of intelligence.

CO5: Compare and contrast different assessment tools of personality and classify them according to context in which they are used.

CO6: Employ the properties of Normal Probability Curve in understanding the measures of descriptive statistics.

CO7: Apply the appropriate formulae to calculate correlation, measures of variability (Range, Quartile Deviation and Standard Deviation) and percentiles.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓		✓		✓	✓		
2	✓							
3	✓							

4	✓			✓				✓
5	✓			✓				✓
6	✓							
7	✓							

Course Learning Outcomes (CLOs) for Abnormal Psychology, Paper V, Part II, Semester 6

(TYBA)

At the end of the Course, the learner will be able to:

CO1: Define the DSM-5 criteria for various psychological disorders (particularly, psychotic disorders, mood disorders, personality disorders and sexual dysfunctions and paraphilic disorders).

CO2: Explain the diagnosis, etiology, prevalence rates and treatment alternatives available for various psychotic as well as neurotic disorders.

CO3: Identify how sexuality and sexual concerns in terms of normal as well as abnormal sexual urges and behaviours form a pertinent subject matter in Psychology.

CO4: Illustrate the usual diagnostic picture of a person suffering from a particular mental disorder like Schizophrenia, Major Depressive Disorder, Paranoid Personality Disorder, Voyeuristic Disorder, etc.

CO5: Distinguish between the concepts of psychosis and neurosis.

CO6: Distinguish amongst various mental disorders classified under the DSM-5 as a function of the similarities and differences in their symptomology, etiology and treatment.

CO7: Appraise how a given mental disorder is a result of the relative contributions of biological and psychological causal factors.

CO8: Appraise the psychologically as well as societally relevant issue of suicide.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓				✓			✓
2	✓		✓		✓		✓	✓
3	✓		✓		✓			✓
4	✓		✓		✓			✓
5	✓				✓			✓
6	✓				✓			✓
7	✓						✓	✓
8	✓				✓		✓	✓

**Course Learning Outcomes (CLOs) for Industrial/Organizational (I/O) Psychology, Paper VI,
Part II, Semester VI (TYBA)**

At the end of the Course, the learner will be able to:

CO1. Define motivation and discuss different theories of motivation.

CO2. Assess job satisfaction of employees using standardized tests.

CO3. Identify different antecedents of Job satisfaction.

CO4. Recognize different counterproductive work behaviors and develop ways to reduce them.

CO5. Define important work group and work team concepts.

CO6. Distinguish between leadership and power in an organizational context.

CO7. Evaluate and compare different theories of leadership.

CO8. Design an Organizational Development effort using case studies.

CO9. Conduct a research project using ICT on employee variables and write a report using APA guidelines.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓							
2				✓				

3	✓							
4			✓					
5	✓							
6	✓							✓
7	✓							✓
8				✓				
9		✓				✓		

Course Learning Outcomes (CLOs) for Cognitive Psychology, Paper VII, Semester 6

(TYBA)

At the end of the Course, the learner will be able to:

CO1: Employ the theories of problem solving, memory and learning in understanding and conducting experiments that are a part of courses on Practicum in Cognitive Processes.

CO2: Appraise how the field of Cognitive Psychology interacts with other fields such as Neuro-Psychology, Social, Educational, Industrial, Abnormal, Counselling, Sports and Health.

CO3: Discuss the different theories and approaches of Reasoning, Decision Making and Problem Solving.

CO4: Illustrate, in their day-to-day encounters, effective reasoning, decision making and problem solving skills.

CO5: Develop creative solutions for illustrative problems presented in class.

CO6: Recognise the use of problem solving in artificial intelligence.

CO7: Identify how memory functioning facilitates learning and retention of information.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓		✓					
2	✓				✓			
3	✓							
4	✓						✓	✓
5	✓							✓
6	✓							
7	✓							

Course Learning Outcomes (CLOs) for Practicals in Cognitive Processes and Psychological Testing: Part II, Paper VIII SEMESTER VI (TYBA)

At the end of the Course, the learner will be able to:

CO1. Define and discuss inferential statistics like ANOVA and Chi Square.

CO2. Appraise and review a research paper as per the APA 7th edition guidelines.

CO3. Conduct ethical and standardized cognitive psychology based experiments with participants.

CO4. Interpret psychological test results and write a report on the same.

CO5. Operate a Cog Lab software experiment, conduct the experiment, and interpret its results.

CO6. Use Excel to carry out statistical and mathematical procedures.

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓					✓		
2			✓			✓		
3			✓			✓		
4			✓	✓				

5		✓				✓		
6		✓						

Course Learning Outcomes (COs) for Counseling Psychology, Paper IX Part II- Micro skills in Counseling Practice, Semester 6, (TYBA)

At the end of the Course, the learner will be able to:

CO1: Define the stages and tasks of problem management approach highlighted in Egan and Reese’s model of helping.

CO2: Describe the importance of active listening as a key ingredient of successful helping.

CO3: Discuss the importance of helper’s responding skills in order to develop a working alliance with the client.

CO4: Identify ways in which counseling skills of probing, summarizing, challenging, self-disclosure, etc. may be utilised during a therapy session to enable client progress and recovery.

CO5: Demonstrate active listening skill as a means to convey interest in and understanding of what the client is communicating in a helping relationship.

CO6: Employ empathy, perceptiveness and assertiveness as important communication skills in developing and maintaining a working relationship with the client.

CLOs	PSOs
-------------	-------------

	1	2	3	4	5	6	7	8
1	✓		✓		✓		✓	✓
2	✓						✓	✓
3	✓		✓				✓	✓
4	✓		✓				✓	✓
5	✓				✓		✓	✓
6	✓				✓		✓	✓

AQAR 2019-20

Programme - Sociology

Programme Objectives (POs)

PO 1 - To acquaint the learners of Sociology with the theoretical framework of Sociology and Anthropology, to gain complete and comprehensive knowledge on the foundations of both the disciplines.

PO 2 - To train students in the application of these theories to social situations.

PO 3 - To inculcate in them a spirit of inquiry to appreciate interdisciplinary perspectives.

PO 4 - To develop research skills, both qualitative and quantitative to be able to gain first-hand experience on contemporary social phenomena.

PO 5 - To develop enhanced critical thinking skills to analyze contemporary issues using an intersectional lens.

PO 6 - To train students to understand and interpret objectively the role of social processes, social institutions and social interactions in their lives using sociological imagination.

PO 7 - To gain an agency through moral and ethical reasoning/thinking to bring about social change.

PO 8 - To equip students with required soft skills through various co-curricular and extracurricular activities both within and outside college.

PO 9 - To develop knowledge and understanding of related norms and ethics in the field of human resources and the various laws associated with HR functions.

Program Specific Outcomes (PSO) - Sociology

At the end of three-year undergraduate programme in Sociology, the learner will be able to:

PSO 1 - Comprehend the core concepts and theories, both in Sociology and Anthropology.

PSO 2 - Evaluate objectively the role of social and cultural processes, social institutions and social interactions in our lives.

PSO 3 - Analyze contemporary issues both local as well as global using an intersectional lens and **demonstrate** interconnections between these.

PSO 4 - Cope effectively with the socio-cultural and interpersonal processes of a constantly changing complex society.

PSO 5 - Exhibit moral and ethical reasoning/thinking and guide the society towards equality.

PSO 6 - Formulate a research design, both qualitative and quantitative.

PSO 7 - Appraise a spirit of inquiry to appreciate interdisciplinary perspectives.

PSO 8 - Analyze advantages and limitations in using various research tools/techniques.

PSO 9 - Function individually and in group through various co-curricular and extracurricular activities.

Course Outcomes [COs]

I] Course Title - Foundations of Sociology (F.Y.B.A Sociology Semester I, Paper I)

At the end of this course, the learner will be able to:

CO 1 - Explain basic concepts and theories in Sociology.

CO 2 - Choose from the various career options in Sociology.

CO 3 - Demonstrate the ability to introspect the impact of social institutions such as family, religion, and government in their own lives.

CO 4 - Value cultural diversity and judge the biases inherent in their own institutions.

CO 5 - Practice the use of sociological imagination as a tool to **evaluate** contemporary social issues and concerns.

CO 6 - Illustrate the role of New Social Media with reference to social networking, marketing & advertising, and election and politics.

CO 7 - Enhance their soft skills by participating in various class activities.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	✓	×	✓	×	×	×	×
CO2	×	×	×	✓	✓	×	✓	✓	✓
CO3	×	✓	✓	✓	✓	×	×	×	×
CO4	×	✓	✓	✓	✓	×	×	×	×
CO5	×	✓	✓	✓	✓	×	×	×	×
CO6	×	✓	✓	✓	✓	✓	×	×	×
CO7	×	×	×	×	×	×	✓	×	✓

II] Course Title - Fundamentals of Sociology (F.Y.B.A Sociology Semester II, Paper I)

At the end of this course, the learner will be able to:

CO 1 - Explain the concept of 'Socialization' and evaluate the significance of its varied types in their own lives.

CO 2 - Compare and contrast the various perspectives on crime.

CO 3 - Examine the issues of cybercrime and trafficking and **apply** that knowledge to protect themselves from these.

CO 4 - Apply their responsibilities in societal and environmental contexts.

CO 5 - Explore the varied new possibilities for future studies in Sociology.

CO 6 - Develop research skills to explore on newer possibilities and scope in Sociology.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	×	✓	✓	×	×	×	×
CO2	✓	✓	✓	×	✓	×	✓	×	✓
CO3	×	✓	✓	✓	✓	×	✓	×	×
CO4	×	×	×	×	✓	×	✓	×	×
CO5	×	×	×	×	✓	×	✓	×	×
CO6	×	×	×	×	✓	✓	✓	✓	✓

III] Course Title - Anthropology (F.Y.B.A Semester I, Paper I)

At the end of this course, the learner will be able to:

CO 1 - Define and explain the basic concepts and institutions of anthropological significance.

CO 2 - Value cultural diversity and judge the biases inherent in their own culture.

CO 3 - Judge the influence of cultural processes and institutions on the community.

CO 4 - Differentiate between race and culture in the issues of diversity and multiculturalism.

CO 5 - Understand multiple ways in which power (political system), hierarchy and identity shape social interactions and outcomes.

CO 6 - Recognize the multiple ways that anthropologists apply their knowledge and skills as professionals inside and outside the academy.

CO 7 - Appraise the importance of an interdisciplinary approach (natural and social sciences and humanistic; four field) to understand human culture/society/behaviour.

PSO → CO↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	✓	×	×	×	×	×	×
CO2	✓	✓	✓	×	✓	×	✓	×	×
CO3	×	✓	✓	✓	✓	×	×	×	×
CO4	×	×	✓	✓	×	×	×	×	×
CO5	×	✓	×	✓	×	×	×	×	✓
CO6	×	×	×	✓	×	×	×	×	×
CO7	×	×	×	×	×	×	✓	×	×

IV] Course Title - Anthropology (F.Y.B.A Semester II, Paper I)

At the end of this course, the learner will be able to:

CO 1 - Discuss the contribution of scholars towards the growth of Culture and Personality School and recognize its interdisciplinary nature.

CO 2 - Develop a substantial level of understanding of tribal institutions such as family, marriage, and kinship.

CO 3 - Describe the basic theoretical and methodological approaches of linguistic anthropology.

CO 4 - Identify and describe the complex relationship between culture and language in global perspective.

CO 5 - Apply principles of linguistic analysis to deconstruct languages and understand language structure.

CO 6 - Examine the history and theoretical underpinnings of applied anthropology.

CO 7 - Identify the roles of applied anthropologists as practitioners of social science.

CO 8 - Distinguish the processes of culture change and key transitions in history.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	×	×	✓	×	×	×	×
CO2	✓	✓	✓	✓	✓	×	×	×	×
CO3	✓	×	✓	×	×	×	×	×	×
CO4	×	✓	✓	✓	×	×	×	×	×
CO5	×	×	×	×	✓	×	×	×	✓
CO6	×	✓	×	✓	×	×	×	×	×
CO7	×	✓	×	✓	×	×	×	×	×
CO8	×	✓	✓	✓	×	×	×	×	×

V] Course Title - Indian Society: Structure and Change (S.Y.B.A Sociology Semester III, Paper II)

At the end of the course, the learner will be able to:

CO 1- Elaborate on perspectives on Indian society.

CO 2 - Understand and analyze social, economic, and political aspects of Indian society.

CO 3- Demonstrate, how the caste system operates and its importance in Indian society.

CO 4- Know economy, polity and society of ancient, medieval and modern India.

CO 5 -Realize the basic issues of Indian society like unity in diversity, problems of nationalism and principles of Indian Constitution.

CO 6- Analyze the social change in Modern India especially through the processes of Modernization, Sanskritization, Westernization and De- Sanskritization.

CO 7 - Define globalization and analyze its impact on social, economic, political, cultural spheres.

PSO → CO↓	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9
CO 1	✓	✓	×	×	✓	×	×	×	×
CO 2	×	✓	✓	✓	✓	×	×	×	×
CO 3	×	✓	×	✓	✓	×	×	×	×
CO 4	×	✓	✓	×	×	×	×	×	×
CO 5	✓	✓	×	✓	×	×	×	×	×
CO 6	✓	✓	✓	✓	×	×	×	×	×
CO 7	×	✓	✓	×	×	×	×	×	×

VI] Course Title- Sociology of Development - (S.Y.B.A Sociology Semester IV, Paper II)

At the end of the course, the learner will be able to:

CO 1- Explain Conceptual perspective on ‘Development’.

CO 2- Elaborate the concepts of ‘Development’ and ‘Underdevelopment’.

CO -3 Identify paths of ‘Development’.

CO 4- Recognize interrelationship between social structures and ‘Development’.

CO 5- Identify and analyze Development Issues in India.

CO 6 -Describe Development Planning and Policies.

CO 7 - Describe the concepts and indicators of ‘Development’, ‘Human Development’ and ‘Economic Growth’, concepts of ‘Social Development’, ‘Economic Development’, and ‘Sustainable Development’.

CO 8 - Explain the impact of social movements on social policy.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	×	✓	×	×	×	×	×	×
CO2	✓	✓	✓	×	×	×	×	×	×
CO3	×	✓	✓	×	×	×	×	×	×
CO4	×	✓	✓	✓	×	×	×	×	×
CO5	×	✓	✓	✓	×	×	×	×	×
CO6	×	×	×	×	✓	×	✓	×	×
CO7	✓	×	✓	×	✓	×	×	×	×
CO8	×	✓	×	×	×	×	×	×	✓

VII] Course Title - Emerging Issues and Concerns in Indian Contemporary Society (S.Y.B.A Sociology Semester III, Paper III)

At the end of this course, the learner will be able to:

CO 1 - Understand the demographic variables that influence the structure of the society and **analyze** the issue of declining sex ratio in India and elsewhere.

CO 2 - Define 'Migration', **classify** it, and **sketch** the migration pattern in Mumbai.

CO 3 - Examine the grassroots movements in cities from the point of view of the Right to City.

CO 4 - Develop sensitivity and awareness with regards to the health care system, especially for the marginalized groups in society.

CO 5 - Judge issues around surrogacy and other reproduction techniques in India.

CO 6 - Evaluate critically the meaning of justice and the role of the criminal justice system of the country.

CO 7 - Develop effective communication skills, presentation skills and research skills by participating in co-curricular activities.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	✓	✓	✓	×	×	×	×
CO2	✓	✓	✓	✓	✓	×	×	×	×
CO3	✓	✓	×	✓	✓	×	×	×	×
CO4	×	×	✓	✓	✓	×	×	✓	✓
CO5	×	✓	✓	×	✓	×	×	×	×
CO6	✓	✓	×	×	✓	×	✓	×	×
CO 7	×	×	×	×	✓	✓	×	✓	✓

VIII] Course Title - Emerging Fields in Sociology (S.Y.B.A Sociology Semester IV, Paper III)

At the end of this course, the learner will be able to:

CO 1 - Trace the history of Journalism Studies and **identify** various ethical issues and challenges in journalistic practice.

CO 2 - Define 'Entrepreneur' and list down its attributes, challenges faced and opportunities available and **analyze** the same with reference to women entrepreneurs through the two case studies.

CO 3 - Critique the planning and policies of urban governance with special reference to the 'Smart City' program.

CO 4 - Explain the concept of Population Ageing & **analyze** its various determinants.

CO 5 - Understand the growing numbers and concerns of the ageing community and **examine** the governmental and non-governmental initiatives in geriatric care in India.

PSO → CO↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	✓	×	✓	×	✓	×	×
CO2	✓	✓	✓	×	✓	×	×	✓	✓
CO3	×	✓	✓	×	✓	×	×	×	✓
CO4	✓	✓	✓	×	×	×	×	×	×
CO5	×	✓	✓	×	✓	×	✓	×	×

IX] Course Title - Theoretical Sociology (T.Y.B.A Sociology Semester V, Paper IV)

At the end of this course, the learner will be able to:

CO 1 - Locate the foundation and growth of Sociology as a discipline.

CO 2 - Distinguish between macro- & micro-perspectives (theories) in Sociology.

CO 3 - Apply these theories to evaluate contemporary realities.

CO 4 - Develop the ability/skills to appraise all other theories in the discipline life-long.

CO 5 - Read and evaluate sociological text/s.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	×	×	×	×	×	×	×	×
CO2	✓	×	×	×	×	×	×	×	×
CO3	✓	✓	✓	×	✓	×	×	×	×
CO4	✓	×	×	×	✓	×	✓	×	×
CO5	✓	✓	✓	✓	✓	×	✓	×	✓

X] Course Title - Anthropological Thought (T.Y.B.A Sociology Semester VI, Paper IV)

At the end of this course, the learner will be able to:

CO 1 - Discuss the nature, scope and sub-disciplines in Anthropology.

CO 2 - Locate the foundation and growth of Anthropology as a discipline.

CO 3 - Apply anthropological theories to evaluate contemporary cultures.

CO 4 - Develop the ability/skills to appraise all other theories in the discipline life-long.

CO 5 - Select appropriate anthropological tools and techniques for research.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	×	×	×	×	×	×	×	×
CO2	✓	×	×	×	×	×	×	×	×
CO3	✓	✓	✓	×	✓	×	×	×	×
CO4	✓	×	×	×	✓	×	✓	×	×
CO5	✓	✓	✓	✓	✓	×	✓	✓	✓

XI] Course Title - Sociology of Work (T.Y.B.A Sociology Semester V, Paper V)

At the end of this course, the learner will be able to:

CO 1 - Explain the basic concepts in Industrial Sociology.

CO 2 - Develop sociological understandings of the new trends in industry and workplace.

CO 3 - Appraise the emergence of BPOs (Business Process Outsourcing) and KPOs (Knowledge Process Outsourcing) in the global context.

CO 4 - Analyze the impact of globalization on the work processes, workers and their families, and the economy at large.

CO 5 - Describe the Nature and Scope of Industrial Sociology, Growth of Industrialization, Industrial Revolution, and its impact on society.

CO 6 - Elaborate on Changing Structure of modern Industrial enterprises and principles of Organization – Formal and Informal.

CO 7 - Elaborate Human Relations in Industry; Fordism and Post- Fordism.

CO 8 - Analyze how different stages of the production chain are dispersed across the globe which led to the notion of a new global division of labor and new patterns of inequalities.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	×	×	×	×	×	×	×
CO2	×	×	✓	✓	×	×	✓	×	×
CO3	×	✓	✓	✓	✓	×	×	×	×
CO4	×	×	✓	✓	✓	×	×	×	×
CO5	✓	✓	✓	✓	×	×	×	×	×
CO6	✓	✓	✓	✓	×	×	×	×	×
CO7	×	✓	✓	×	×	×	×	×	×
CO8	×	✓	✓	✓	×	×	×	×	×

XII] Course Title - Sociology of Informal Sector (T.Y.B.A Sociology Semester VI, Paper V)

At the end of this course, the learner will be able to:

CO 1 - Distinguish between the formal and the informal sector.

CO 2 - Demonstrate an understanding of the issues related to the informal sector in the global context.

CO 3 - Illustrate the significance of the various safeguards for informal sector workers.

CO 4 - Recognize the contribution of women in the informal economy of the country.

CO 5 - Understand the impact of Globalization on Industry and Labour.

CO 6 - Describe the Labour Problems, Role of ILO, and problems of unionization.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	✓	×	×	×	×	×	×	×
CO2	×	✓	✓	×	✓	×	×	×	×
CO3	×	×	✓	×	✓	✓	✓	✓	✓
CO4	×	✓	×	×	×	×	×	×	×
CO5	×	×	✓	✓	×	×	×	×	×
CO6	×	✓	✓	✓	×	×	×	×	×

XIII] Course Title - Sociology of Gender (T.Y.B.A Sociology Semester V, Paper VI)

At the end of this course, the learner will be able to:

CO 1 - Explain the basic concepts in Sociology of Gender and feminist perspectives therein.

CO 2 - Locate women's movement in India historically.

CO 3 - Apply theoretical understanding to appraise the status and position of women in India.

CO 4 - Use intersectional lens and analyze gender as a social category.

CO 5 - Read and evaluate feminist writings.

CO 6 - Differentiate between sex and gender, define sexual orientation, and understand gender Identity.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	✓	×	×	×	×	×	×	×
CO2	×	✓	✓	✓	✓	×	×	×	×
CO3	✓	✓	✓	×	✓	✓	✓	×	×
CO4	×	✓	✓	✓	✓	×	×	×	×
CO5	✓	×	×	×	✓	×	✓	×	×
CO6	×	✓	✓	✓	✓	×	×	×	×

**XIV] Course Title - Gender and Society in India: Contemporary Debates and Emerging issues
(T.Y.B.A Sociology Semester VI, Paper VI)**

At the end of this course, the learner will be able to:

CO 1 - Describe new and emerging issues in the Indian feminist landscape.

CO 2 - Illustrate sites of violence against women.

CO 3 - Evaluate feminist campaigns in digital spaces.

CO 4 - Develop critical thinking skills to introspect gender issues in their own lives.

CO 5 - Use critical thinking skills to analyze how gender is socially constructed and controlled.

CO 6 - Locate livelihood struggle and legislation around rape and domestic violence.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	×	×	×	×	×	×	×
CO2	×	✓	✓	✓	✓	✓	×	×	×
CO3	×	×	✓	×	✓	✓	×	×	✓
CO4	×	✓	✓	✓	×	×	×	×	×
CO5	✓	×	×	×	✓	×	✓	×	×
CO6	×	✓	✓	✓	✓	×	×	×	×

XV] Course Title - Sociology of Human Resource Development (T.Y.B.A Sociology Semester V Paper VII)

CO 1 - Explaining Nature and Functions of Personality, Factors affecting the personality.

CO 2 - Learning about interpersonal relations, negotiation skills, counseling and intervention strategies, problem solving and conflict management skills, combating different problems arising out of human relations in various organizations and social structures.

CO 3 - Develop necessary skill set for application of various HR issues.

CO 4 - Analyze the strategic issues and strategies required to select and develop manpower resources.

CO 5 - Develop the understanding of the concept of human resource management and to understand its relevance in organizations.

CO 6 - Familiarize students with the basic concepts of organization and management.

CO 7 - Gain insight into maintaining ethics and social responsibility in business settings and corporate governance system.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	✓	✓	×	×	×	×	×	×
CO2	×	×	×	✓	×	×	×	×	✓
CO3	×	×	×	✓	×	×	×	×	×
CO4	×	×	✓	×	×	×	×	×	✓
CO5	✓	✓	×	×	×	×	×	×	×
CO6	✓	×	×	×	×	×	×	×	×
CO7	×	×	×	✓	×	×	×	×	×

XVI] Course Title - Sociology of Organization (T.Y.B.A Sociology Semester VI, Paper VII)

CO 1 - Understand the dynamics of Organization and diverse strategies useful in developing human resources.

CO 2 - Create an Understanding of human resource planning to social development and comprehend the challenges faced by organization in a global context.

CO 3 - Develop necessary skill set for application of various HR issues.

CO 4 - Integrate the knowledge of HR concepts to take correct business decision.

CO 5 - Understand the nature of human behavior in individuals, groups, and the organization.

CO 6 - Apply the concepts of management and organizational behavior in various fields of management

CO 7 - Understand the basics of communication, types, functions, and channels of communication.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	x	x	x	√	x	x	x	x	x
CO2	x	x	√	√	x	x	x	x	x
CO3	x	x	x	√	x	x	x	x	x
CO4	x	x	x	√	x	x	x	x	x
CO5	x	√	x	√	x	x	√	x	x
CO6	x	√	x	x	x	x	x	x	√
CO7	x	x	x	√	x	x	x	x	√

XVII] Course Title - Urban Sociology (T.Y.B.A Sociology Semester V, Paper VIII)

CO 1- Explain Nature and Scope of Urban Sociology, Differentiation and Continuum of Rural urban.

CO 2 - Understand relation between Urbanization and Industrialization.

CO 3 - Analyze major theoretical perspectives in Urban Sociology and Patterns of Urban Growth.

CO 4 - Develop an understanding about trends of urbanization in India and impact of urbanization on Indian society.

CO 5 - Explain the concept of City/Town Planning and Urban Problems

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	×	×	×	×	×	×	×	×
CO2	×	✓	✓	×	×	×	×	×	×
CO3	✓	×	✓	✓	×	×	×	×	×
CO4	×	×	✓	✓	×	×	×	×	×
CO5	×	✓	×	×	×	×	×	×	×

XVIII] Course Title - Urbanization in India: Issues and Concerns (T.Y.B.A Sociology Semester VI, Paper VIII)

CO 1- Describe the growth of cities and the process of urbanization and National Urbanization Policy in India.

CO 2- Understand the development interventions – Role of State, Community based organizations and NGOs in the Development – Various actors implementing these interventions.

CO 3 - Evaluate the Development Project outcomes.

CO 4 - Evaluate the problems faced by the migrants and their inclusion in development programme.

CO 5 - Understand and Distinguish between different types of cities present in 21st century.

CO 6 - Create a need for sustainable development.

CO 7- Develop an understanding about trends of urbanization in India and impact of urbanization on Indian society.

CO 8 - Develop awareness about urban problems and policies adopted to solve such problems.

CO 9 - Elaborate on victims of development, Rehabilitation and Resettlement – Role of Civil society and NGOs. SEZs/AEZs and Development.

PSO → CO↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
C01	x	x	x	✓	x	x	x	x	x
C02	x	✓	✓	✓	x	x	✓	x	x
C03	x	x	x	x	✓	x	✓	x	x
C04	x	✓	✓	✓	x	x	x	x	x
C05	x	✓	x	x	x	x	x	x	x
C06	x	✓	x	✓	x	x	x	x	✓
C07	x	✓	x	✓	x	x	x	x	x
C08	x	x	x	✓	x	x	x	x	x
C09	x	✓	x	x	x	x	✓	x	x

XIX] Course Title - Quantitative Social Research (T.Y.B.A Sociology Semester V, Paper IX)

At the end of this course, the learner will be able to:

CO 1 - Explain concepts, techniques and methods in Quantitative research.

CO 2 - Apply theoretical knowledge of social research to quantitative field study.

CO 3 - Manage univariate quantitative data analysis.

CO 4 - Write (and submit) a project based on original field study.

CO 5 - Exhibit ethics in their research endeavour.

PSO → CO ↓	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO1	✓	×	×	×	×	×	×	×	×
CO2	×	×	✓	×	✓	✓	×	✓	✓
CO3	×	×	×	×	✓	✓	×	✓	×
CO4	×	×	×	×	✓	✓	×	✓	✓
CO5	×	×	×	×	✓	✓	×	✓	✓

XX] Course Title -Qualitative Social Research (T.Y.B.A Sociology Semester VI, Paper IX)

At the end of this course, the learner will be able to:

CO 1 - Discuss concepts, techniques and processes in Qualitative research.

CO 2 - Apply theoretical knowledge of social research to qualitative field study.

CO 3 - Distinguish between Quantitative and Qualitative research.

CO 4 - Write (and submit) a project based on original field study.

CO 5 - Exhibit ethics in their research endeavour.

PSO →	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO↓									
CO1	✓	×	×	×	×	×	×	×	×
CO2	×	×	✓	×	✓	✓	×	✓	✓
CO3	✓	×	×	×	✓	✓	×	✓	×
CO4	×	×	×	×	✓	✓	×	✓	✓
CO5	×	×	×	×	✓	✓	×	✓	✓

Program outcome of M.Sc Zoology-Animal Physiology

- PO1** To introduce the learner to the anatomical and physiological modification of digestive, circulatory, nervous and reproductive systems in chordates and non chordates. To make the learner understand about the evolution of non – chordates and chordates through their phylogeny and fossil records.
- PO2** To introduce the learner to membrane level of nutrition, food capture and processing, nutritive types and their correlation to variety of structures of nutritional apparatus, respiratory pigments, respiratory structures such as gills and trachea, mechanism of operation, patterns of respiration and their relationship to the habitat of invertebrates.
- PO3** To introduce to the learner basic concepts of embryonic development and embryogenesis including mechanism of fertilization in non-chordates, germ layers and coelom formation, cell specification, process of early development in non-chordates, specific gene regulation during development, germ cell migration, physiology of reproduction and interpret applications of stem cells.
- PO4** To familiarize the learner to different dynamics of physiological processes like respiration, circulation and excretion. To introduce to the learners functioning of endocrine systems, interpret biological rhythms and examine various aspects of animal migration.
- PO5** To impart thorough knowledge of evolution at genetic level, molecular genetics, human evolution and fossils. To enable them to comprehend physicochemical processes occurring in the cells and organisms and to observe the ways to harness them for industrial and therapeutic use along with genetic modifications.
- PO6.** To introduce the learner to Biochemical adaptations to some ambient stress factors, instrumentation to study animal physiology, drug designing management and guidelines for ethically based clinical trials and stem cell therapeutics at present and in future.
- PO7** To introduce learners to interdisciplinary scientific fields and aware them about different modern techniques used in the medical field. Learners would also learn about the neurobiology problems associated with emotion and stress. They are also getting aware about climate change and sustainability. Learners also get acquainted with principles of scientific research, data management, data analysis and scientific communication. To introduce learners applications of model organisms in the scientific field.
- PO8** To introduce learner Cellular physiology, Human Immune response and Medical applications, Cancer cell biology, Exercise physiology. Similarly learners are also introduced with different concepts of instrumentations and their applications. They are also going to present scientific data in the form of dissertation.

Program specific outcome for M.Sc. Zoology Sem.1

- PSO1.** The learner will be able to differentiate anatomical and physiological modifications of digestive, respiratory, circulatory and excretory systems of non-chordates like Protostomes and Deuterostomes.
- PSO2.** The learner will be able to differentiate anatomical and physiological modifications of nervous systems, reproductive systems and chemical coordination of non-chordates. They will also be able to understand the evolution of non-chordates and their phylogeny.
- PSO3.** Learners would comprehend basic concepts of developmental biology like mechanism of fertilization, germ layers and coelom formation, fate mapping and cell specification.
- PSO4.** Learners would examine mechanisms of early development in non-chordates, insect metamorphosis, regeneration and integrated pest management.
- PSO5.** Learners would understand genetic processes and genetic basis of evolution.
- PSO6.** Learners would develop in depth understanding of evolution of genes and genomes, its impact on phenotypes and consequent evolution of populations and inherent relatedness between different species.
- PSO7.** Learners would develop interest in interdisciplinary scientific fields. Learners would become aware about the different modern techniques used in medical fields.
- PSO8.** Learners would understand the neural problems associated with emotions and stress.
- PSO9 .** Learners would become aware about the causes of climate change and current environmental situations.

Course Learning Outcome M.Sc., Zoology, Semester 1, Paper 1

- CO 1:** Learner will understand General organization of digestive systems and excretory systems of Protostomes and Deuterostomes.
- CO 2:** Learner will get to know about the general organization of digestive systems and excretory systems with special emphasis on organs and glands.
- CO 3:** The learner will understand anatomical differences and similarities of respiratory and circulatory systems in non-chordates.
- CO 4:** The learner will be able to differentiate anatomical and physiological modifications of nervous systems and chemical coordination of non-chordates.
- CO 5:** The learner will be able to differentiate modifications of reproductive systems of non chordates.
- CO 6:** The learner will be able to understand the evolution of non-chordates and their phylogenetic relationships by means of paleontological evidence.

Course Learning Outcome for Semester 1, Paper 2

PSZO102: Developmental Biology – I

- CO 1.** Learners would understand the types of fertilization, mechanism of fertilization and its molecular events in non-chordates.
- CO 2.** Learners would examine the process of formation of germ layers and coelom in animals and analyze the difference in these processes between Protostomes and Deuterostomes.
- CO 3.** Learners would understand aspects of embryogenesis like fate maps, cell lineages, cell specification, competence and induction.
- CO 4.** Learners would comprehend the mechanism of early development and examine the role of certain genes during early development in the non-chordates *Caenorhabditis elegans* and *Drosophila melanogaster*.
- CO 5.** Learners would understand the diversities in reproduction and development in invertebrates and also examine metamorphosis in insects, parthenogenesis and regeneration in lower animals.
- CO 6.** Learners would interpret the applications of using pheromones in the field of integrated pest management.

Course learning outcome for sem. 1, paper 3 Genetics and Evolution

- CO1.** Learners will describe the structure of molecules like cytochrome c and haemoglobin and the mechanism of their evolution at molecular level. They would describe mechanism of sex determination and evolution of sex chromosomes from the autosomes. They would also describe features and inheritance of non genomic DNA of the eukaryotic system.
- CO2.** Learners will define various types of genes, mapping and cloning of genes and realize flow of genetic information, complex networking of genes to produce various types of phenotypes resulting in variations on populations.
- CO3.** Learners will describe racial distribution of primates and Homo sapiens, importance of genetic diversity in the human population and phenomena like altruism and hybrid evolution.
- CO4.** Learners will describe human evolution, analyse concepts of neutral evolution, molecular clock, geological times scales and major biological events that happened in the past.
- CO5.** Learners will be acquainted with different types of fossils, mechanisms of fossil formation and their dating using traditional and modern methods.
- CO6.** Learners will understand the concept of frozen zoo, biomaterial banking assisted reproductive technologies for conservation of endangered species.

Course learning outcome for sem. 1, paper 4 Frontiers in Zoology

- CO 1.** Learners could learn new fields of science such as Astrobiology.
- CO 2.** Learners could understand the working of biological clocks in human physiology.
- CO 3.** Learners would learn the basic principles of medical imaging techniques, molecular cytogenetics and DNA barcoding.
- CO 4.** Learners would understand the brain regions that form the basis of emotions of stress.
- CO 5.** Learners would understand the health problems associated with the emotion and stress.
- CO 6.** Learners would understand the current challenges of climatic changes and environmental issues.
- CO 7.** Learners would be able to describe the importance of sustainable development.
- CO 8.** Learner would understand various national and international initiatives on climate change.

M.Sc. Zoology PSO - CO mapping for sem 1

	PSO	1	2	3	4	5	6	7	8	9
P A P E R 1	CO1	Yes		-	-	-	-	-	-	
	CO2	Yes	-	-	-	-	-	-	-	
	CO3	Yes	-	-	-	-	-	-	-	
	CO4	-	Yes	-	-	-	-	-	-	
	CO5	-	Yes	-	-	-	-	-	-	
	CO6	-	Yes	-	-	-	-	-	-	
P A P E R 2	CO1	-	-	Yes	-	-	-	-	-	
	CO2	-	-	-	Yes	-	-	-	-	
	CO3	-	-	Yes	Yes	-	-	-	-	
	CO4	-	-	-	Yes	-	-	-	-	
	CO5	-	-	-	Yes	-	-	-	-	
	CO6	-	-	-	Yes	-	-	-	-	
P A P E R 3	CO1	-	-	-	-	YES	YES	-	-	
	CO2	-	-	-	-	YES	YES	-	-	
	CO3	-	-	-	-	YES	YES	-	-	
	CO4	-	-	-	-	YES	YES	-	-	
	CO5	-	-	-	-	YES	YES	-	-	-
	CO6	-	-	-	-	YES	YES	-	-	-

Program specific outcome for M.Sc. Zoology sem.2

- PSO1.** Learners will learn the morphology, phylogeny, evolutionary progression of protochordates and chordates.
- PSO2.** Learners would obtain additional knowledge of diverse characteristics such as Retrogressive metamorphosis, Lateral line sense organ, Migration in Birds and fishes, Dentition, Habitat, Walking gait and Jaw suspension in mammals. They will also get to know the evolutionary significance of Crossopterygians, Placoderms.
- PSO3.** Learners would develop an understanding of anatomy and physiology of chordate reproductive systems. Learners would also study techniques and applications of induced breeding in fish.
- PSO4.** Learners would examine the concept of germ cell migration, stem cells and understand its applications. Learners would also be able to interpret environmental impact on development and evolution of animals.
- PSO5.** Learners would get thorough knowledge of various biomolecules, their metabolism and its regulation, genome organisation and its regulatory processes and certain techniques used in genome studies.
- PSO6.** Learners would develop insight into microbial fermentation at industrial level and its application in production of bioactive compounds. Learners would get knowledge of applications of biotechnology in diagnosis and treatment, agriculture and environment.
- PSO7.** Learners would conceptualize the research problems, developed skills for data management and statistical analysis.
- PSO8.** Learners would acquire insights into scientific communications and documentation. They would also become conversant with scientific journals, become capable of publishing research articles in journals with good impact factors and become aware about plagiarism.
- PSO9.** Learners would become experts in selecting, handling and experimenting with key model organisms in research.

Course Learning Outcome M.Sc., Zoology, Semester 2, Paper 1

- CO 1:** Learners would be equipped with the understanding of morphology and phylogeny of Protochordates.
- CO 2:** Learners get the knowledge of evolutionary progression of Protochordates.
- CO 3:** Learners would understand evolution, morphology and phylogeny of chordates.
- CO 4:** Learners would obtain additional knowledge of diverse characteristics of various chordates such as Retrogressive metamorphosis, Lateral line sense organ and Migration in Birds.
- CO 5:** Learners will also learn about the Dentition, Habitat, Walking gait and Jaw suspension in mammals.
- CO 6:** Learners will also get at insight about the migration in fishes, electric organs and evolutionary significance of Crossopterygians, Placoderms.

Course Learning Outcomes for Semester 2, Paper 2 PSZO202 Developmental Biology- II

- CO 1.** Learners would comprehend anatomy of reproductive systems in chordates.
- CO 2.** Learners would comprehend reproductive physiology in chordates.
- CO 3.** Learners would understand the concept of germ cell migration in Zebrafish, frog, lizard, chick and mouse model systems.
- CO 4.** Learners would understand the basic concept of stem cells and examine the application of stem cells in regeneration therapy.
- CO 5.** Learners would interpret the technique and applications of induced breeding in fish.
- CO 6.** Learners would get acquainted with environmental impact on development and evolution of animals.

Course learning outcome for sem. 2, paper 3 Biochemistry and Biotechnology

Course Code PSZO203

- CO1.** Learners will describe chemical and physical properties of water and its role as basic molecule of life. Learners will describe the complexity and interaction of biomolecules.
- CO2.** Learners will describe metabolism and regulation of metabolism of various biomolecules. They will also describe laws of thermodynamics and biological redox reactions and antioxidant systems.
- CO3.** Learners will describe organization and complexity of genomes, replication, mechanism and control of gene expression in prokaryotic and eukaryotic systems.
- CO4.** Learners will be able describe use of various cloning vectors and associated screening processes. They will also describe techniques like chromosome walking, RAPD, AFLP microarrays and their applications.
- CO5.** Learners will be able to describe microbial fermentation, growth properties and kinetics of microbial culture used in industries, and use of the same for production of antibiotics, vitamins and anti-cancer drugs.
- CO6.** Learners will describe the use of engineered proteins, antisense DNA, ribozymes and monoclonal antibodies in diagnosis and treatment.
- CO7.** Learner describes the use of tissue culture and genetic engineering tools to develop new varieties of food crops resistant to herbicides, pesticides and better able to fix nitrogen, treatment of effluents, bioremediation, phytoremediation and development of biofuels. They will also describe Cartagena protocol on biosafety.

Course learning outcome for sem. 2, paper 4 Research Methodology

Course Code PSZO204

- CO 1.** Learners would be able to conceptualize, formulate, design and execute research problems.
- CO 2.** Learners would be able to develop skills for data management and statistical analysis.
- CO 3.** Learners would be able to choose the correct statistical test and to perform the test on the computer.
- CO 4.** Learners would be able to get an insight into scientific communication and documentation.

- CO 5.** Learners would become familiar with good scientific journals and become aware of plagiarism.
- CO 6.** The learners will be able to understand the special features of different animals that can be used as a model system and their applications in laboratory experiments.
- CO 7.** The learners would be able to appreciate how experimentation with these organisms have enhanced understanding the basis of human diseases.

M.Sc. Zoology PSO - CO mapping for sem 2

	PSO	1	2	3	4	5	6	7	8	9
P A P E R 1	CO1	Yes	-	-	-	-	-	-	-	-
	CO2	Yes	-	-	-	-	-	-	-	-
	CO3	Yes	-	-	-	-	-	-	-	-
	CO4	-	Yes	-	-	-	-	-	-	-
	CO5	-	Yes	-	-	-	-	-	-	-
	CO6	-	Yes	-	-	-	-	-	-	-
P A P E R 2	CO1	-	-	Yes	-	-	-	-	-	-
	CO2	-	-	Yes	-	-	-	-	-	-
	CO3	-	-	-	Yes	-	-	-	-	-
	CO4	-	-	-	Yes	-	-	-	-	-
	CO5	-	-	Yes	-	-	-	-	-	-
	CO6	-	-	-	Yes	-	-	-	-	-
P A P E R 3	CO1	-	-	-	-	YES	-	-	-	-
	CO2	-	-	-	-	YES	-	-	-	-
	CO3	-	-	-	-	YES	-	-	-	-
	CO4	-	-	-	-	YES	-	-	-	-
	CO5	-	-	-	-	-	YES	-	-	-
	CO6	-	-	-	-	-	YES	-	-	-

Program specific outcome for M.Sc. Zoology sem.3

- PSO1.** The learner learns the molecular processes at membrane level of nutrition, food capture and processing, nutritive types and their correlation to a variety of structures of nutritional apparatus in invertebrates. They also learn the respiratory pigments, respiratory structures such as gills and trachea, mechanism of operation, patterns of respiration and their relationship to the habitat of invertebrates.
- PSO2.** The learner studies a variety of circulatory fluids, hearts in invertebrates, structure of excretory systems, the metabolic pathways generating the excretory waste products and the habitat of the invertebrates.
- PSO3.** Learners would examine different feeding patterns, variety of nutritional apparatus, process of digestion in the vertebrates and digestive system disorders in human beings. Learners would also study physiological changes that enable successful transition of vertebrates from aquatic to terrestrial mode of life.
- PSO4.** Learners would comprehend physico-chemical parameters of respiration, functional dynamics of circulatory systems in vertebrates, regulation of circulation and circulatory disorders. Learners would also be familiar with various patterns of nitrogen metabolism, excretion of wastes and compromised renal function in human beings.
- PSO5.** Learners would comprehend homeostasis with respect to environmental stress and physiological adaptations to such stress.
- PSO6.** Learners would comprehend the tools and techniques used to study animal physiology.
- PSO7.** Learners will learn about the processes involved in cellular signalling, communication and actions transport proteins. They will also be able to describe the process of immune response and defence mechanisms in human systems.
- PSO8.** Learners would also understand the development of cancer. They will also be able to describe the effect of exercise on various physiological parameters.

Course Learning Outcome M.Sc., Zoology, Semester 3, Paper 1

- CO 1:** The learner shall comprehend the molecular processes at membrane level and their significance in nutrition, food capture and processing in invertebrates.
- CO 2:** The learner will learn the nutritive types and their correlation to variety of structures of nutritional apparatus in invertebrates.
- CO 3:** The learner shall discern relationship of respiratory pigments, organization of membranes into structures like gills and trachea, mechanism of operation, patterns of respiration and their relationship to the habitat of invertebrates.
- CO 4:** The learner studies a variety of circulatory fluids, patterns of circulation and physiological types of hearts in invertebrates.
- CO 5:** The learner shall learn the relationship between increasing complexity of structure of excretory systems, the metabolic pathways generating the excretory waste products and the habitat of the invertebrates.

Course Learning Outcomes Semester 3, Paper 2: PSZOPHY302

Systems' Physiology (Vertebrates) I

- CO 1.** Learners would understand the comparative and specialized aspects of nutritional type, digestive systems, digestion as a metabolic process and neuro-hormonal regulation of nutrition.
- CO 2.** Learners would examine applied aspects of nutrition such as the role of microbes in digestion, balanced diet and disorders of digestive function .
- CO 3.** Learners would comprehend the basic concepts of the chemistry of respiration and factors affecting respiration.
- CO 4.** Learners would examine the adaptive changes in physiology that occur during transition of vertebrates from aquatic to terrestrial mode of life.
- CO 5.** Learners would interpret the evolutionary adaptations of the circulatory system as they study circulatory patterns in different vertebrates.
- CO 6.** Learners would comprehend the processes involved in the regulation of circulation in vertebrates and examine circulatory disorders in humans.
- CO 7.** Learners would examine variations in metabolic waste products and their relationship to habitat, metabolic pathways of nitrogen metabolism in vertebrates, role of renal functions in electrolyte balance, blood volume, blood pressure and acid-base balance.

CO 8. Learners would understand concepts of kidney diseases and kidney failure and interpret health effects of compromised renal function in humans.

Course learning outcome for sem. 3, paper 3 Biochemical Adaptations and Instrumentation

Course Code PSZOPHY303

- CO1.** Learners would describe basic concepts of environmental stress, types of stress, stress factors like oxygen deficiency, pressure and radiations. They also describe physiological adaptations and metabolic strategies to overcome such environmental stress factors.
- CO2.** Learners describe water, temperatures and pressure as ambient factors. They describe metabolic and physiological strategies to adapt to extremes of temperature, pressure and water.
- CO3.** Learners would describe principles, procedures, and result interpretation of various immunological and chromatographic techniques.
- CO4.** Learners would describe the principle, protocols, handling and safety measures necessary to operate instruments based on biophysical and biomolecular methods.

Course learning outcome of Msc-Sem3 Paper4

Course code: - PSZO304

- CO 1.** Learners would understand the molecular processes involved in cellular signalling, communication and actions transport proteins.
- CO 2.** Learners would get familiarized with immune response and defence mechanisms in human systems.
- CO 3.** Learners would understand the process of cancer cell cycle, development and apoptosis of cancer.
- CO 4.** Learners would comprehend the effect of exercise on various physiological parameters.

Program specific outcome for M.Sc. Zoology sem.4

- PSO1.** The learner learns the functional mechanism, operating mechanism, molecular and supra-molecular structures and processes of various locomotory structures and organs in invertebrates.
- PSO2.** The learner studies the molecular, structural and functional dimensions of neurophysiology in the animal kingdom. They also understand the physiology of effectors along with the organizational aspects of sensory structures at the molecular, membrane and organ level in the animal kingdom.
- PSO3.** Learners would examine various endocrine systems in invertebrates, mechanism of hormone action in vertebrates and endocrine regulation during sex differentiation.
- PSO4.** Learners would develop in depth understanding of various aspects of animal migration and temporal aspects of biological systems.
- PSO5.** Learners would comprehend the fundamental concepts in drug discovery, designing, guidelines and steps involved in clinical trials, ethics and application in health care.
- PSO6.** Learners would be introduced to fundamentals of stem cell physiology and its present and future applications.
- PSO7.** Learners would understand the use of laboratory instruments and operations in scientific research.
- PSO8.** Learners will get insight into data presentation and preparation of research manuscripts. The experience they can use in active research and present it in the form of dissertation.

Course Learning Outcome M.Sc., Zoology, Semester 4, Paper 1

- CO 1:** The learner understands the functional and operating mechanisms of various locomotory structures and organs in invertebrates.
- CO 2:** The learner shall discern molecular and supra-molecular structures and processes responsible for movement and locomotion in the vertebrates.
- CO 3:** The learner shall comprehend molecular, structural and functional dimensions of neurophysiology in the animal kingdom.
- CO 4:** The learner shall understand the organizational aspects of sensory structures at the molecular, membrane and organ level and their functioning as transducers in reception of sensory stimuli.
- CO 5:** The learner shall understand physiology of effectors.

Course Learning Outcomes Semester 3, Paper 2: PSZOPHY402

Systems' Physiology (Vertebrates) IV

- CO 1.** Learners would understand various molecular and structural aspects of invertebrate endocrine systems, the effect of endocrine secretions on various life-processes and development as well as the mechanism of action of hormones in invertebrates.
- CO 2.** Learners would comprehend various types of endocrine systems, mechanism of hormone action, endocrine disorders and effects of hormones on various life processes.
- CO 3.** Learners would understand the various types of rhythms encountered in biological systems.
- CO 4.** Learners would examine various aspects of animal migration and its adaptive value to the migrating animal species.

Course learning outcome for sem. 4, paper 3 Recent Trends in Physiology

Course Code PSZOPHY403

- CO1.** Learners would describe the drug design and development process, drug target, lead identification and modifications, computer aided drug designs and drug delivery systems.
- CO2.** Learners would describe preclinical trial toxicology, design, commercial considerations and use of artificial intelligence in healthcare.

CO3. Learners would describe clinical trial protocols, management and ethical aspects. They would describe guidelines followed during testing of chemicals on animal and human subjects, determination of dose quantity and observation of physical and physiological parameters in the subject.

CO4. Learners will describe differentiation, dedifferentiation and differentiation of stem cells, signalling pathways and their role in physiological and pathophysiological therapeutics and discuss their role in replacing organ transplantation in future.

Course outcome of Msc-Sem4 Paper4

Course code: - PSZO404

CO 1. The learners would understand methods for operation of instruments and its uses in scientific research.

CO 2. Learners would get familiarised with data presentation and preparation of research manuscript.

CO 3. Learners should take active part in research by performing some experiments in the institute and present it in the form of dissertation.

Programme Outcome for B.Sc Zoology :

- PO 1.** To equip the students with knowledge of animal taxonomy, systematics and Phylogeny.
- PO 2.** To enable them to comprehend the concepts and applications of tissue culture , instrumentation , ecology and wildlife conservation .
- PO3.** To enable them to infer the interactions between external and internal environment of living systems upto molecular level.
- PO4.** To develop insights and improve their knowledge of physiology, homeostasis, hematology, immunology, toxicology, parasitology, ethology, pathology , zoopharmacognosy , zoogeography and etiology of diseases .
- PO5.** To understand and apply the mechanisms by which animals develop .
- PO6.** To inculcate critical reasoning , analytical thinking and scientific temperament in learners.
- PO7.** To inculcate ethical values in them.
- PO8 .**To develop entrepreneurial skills in them.
- PO9 .** To develop the concepts of oceanography, aquaculture and farm engineering, marine resources, fish processing, post harvest fish products and aquarium practices.

Program Specific Outcome for F.Y.B.Sc., Zoology, Sem 1, course 1+2

- PSO1.** The learners would be acquainted with the wonders of the animal world and explore some biological phenomena and interesting behaviour shown by some animals.
- PSO2.** The learners would understand about biodiversity, reasons for decline of biodiversity, conservation strategies, the various national and international organizations and their program for biodiversity conservation.
- PSO3.** The learners would examine biographies of few noted scientists, naturalists and entrepreneurs in the field of biological sciences and would understand their life work and contribution to society.
- PSO4.** The learners would become aware of risks involved in handling of different hazardous chemicals, sensitive instruments and infectious biological specimens. Learners should learn the different units of measurements which they can use in chemical preparations.
- PSO5.** The learners would become acquainted to the modern biotechnological developments and their applications for the benefit of human beings.
- PSO6.** The learners can label, identify and describe the use of suitable instruments for the study of different components of biological samples and specimens as well as to use them for research.

Course Outcome of F.Y.B.Sc., Zoology, Sem 1, Paper 1,

Course no. 1, Course code USZO101

- CO1:** The learner would be acquainted with various interesting biological phenomena and adaptations observed in the animal world.
- CO2:** The learner would understand in detail the processes of echolocation, bioluminescence, regeneration, mimicry, parental care and migration and interpret their functions.
- CO3:** The Learner learns in detail about the biodiversity, reasons for decline of biodiversity and ex situ and in situ conservation strategies for biodiversity.
- CO4:** The learner is also introduced with the various national and international organizations and their program that are launched for Biodiversity conservation worldwide.
- CO5:** The learner would learn about the novel work of few scientists, naturalists and entrepreneurs in the field of biological sciences.
- CO6:** The learner would interpret the professional values that enabled the success of the noted personalities and help them develop moral reasoning and critical thinking skills required for their own careers.

Course Outcome of F.Y.B.Sc., Zoology, Sem 1, Paper 2

Course no. 2, Course code USZO102

- CO. 1.** Students would identify and use the knowledge of safety symbols and safe laboratory practices to work safely in the laboratory environment.
- CO. 2.** Learners would apply different units of measurements which he/ she can use in chemical preparations.
- CO. 3.** Learners would understand modern development, concepts and applications of biotechnology and transgenesis. They can consider these applications for the betterment of humans.
- CO. 4.** Learners can label , identify and describe the operation of suitable instruments for the studies of different components of biological samples and specimens and to use these for research.

F.Y.B.Sc. Semester One PSO-CLO Mapping Table:

		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Paper 1	CO1	YES	-	-	-	-	-
	CO2	YES	-	-	-	-	-
	CO3	-	YES	-	-	-	-
	CO4	-	YES	-	-	-	-
	CO5	-	-	YES	-	-	-
	CO6	-	-	YES	-	-	-
Paper 2	CO1	-	-	-	YES	-	-
	CO2	-	-	-	YES	-	-
	CO3	-	-	-	-	YES	-
	CO4	-	-	-	-	-	YES

Program Specific Outcome for F.Y.B.Sc., Zoology, Sem 2, course 3+4

- PSO1.** The learners would comprehend basic concepts of population ecology.
- PSO2.** Learners learn about the ecosystem, its types, the various biogeochemical cycles that operate within the ecosystem and the various types of animal interactions.
- PSO3.** Learners would understand the status of diverse wildlife of India, national parks and examine wildlife conservation strategies that are aimed to protect the vulnerable species.
- PSO4.** To make learners understand the importance of a balanced diet and essential nutrients of food at different stages of life.
- PSO5.** Learners would be able to know the contribution of WHO and the health ministry of India in controlling some of the communicable diseases. Learners will know about sources, quantum and need for conservation of fast depleting water resources and essentials of maintaining proper sanitation, hygiene and optimizing use of electronic gadgets. They should be able to use the knowledge of blood preservation in blood banks.
- PSO6.** Learners can identify and describe stress related disorders and diseases which can be either communicable or noncommunicable with respect to etiology, causative agent, modes of transmission, prevention and treatment.

Course Outcome of F.Y.B.Sc., Zoology, Sem 2, Paper 1 Course no. 3, Course code USZO201

- CO1:** The learner would examine the role of population as a unit of study.
- CO2:** The learner would understand population dynamics, examine factors regulating population growth and analyze growth patterns observed in animal population.
- CO3:** The learner is introduced to the ecosystem and its types, the various biogeochemical cycles that are operating in the ecosystem and the food chains and food webs functional in the ecosystem.
- CO4:** The learner learns about the number, energy and biomass pyramid and also the various types of animal interactions.
- CO5:** The learner would describe various national parks, examine the status of endangered species and understand wildlife conservation strategies in India.
- CO6:** The learner would be acquainted with the concepts of ecotourism and biopiracy and would be able to distinguish between national park, wildlife sanctuary and biosphere reserve.

Course Outcome of F.Y.B.Sc., Zoology, Sem 2, Paper 2

Course no. 4, Course code 202

- CO 1.** Students would practice different healthy dietary habits which they would inculcate in their lifestyle in order to prevent the risk of developing health hazards.
- CO 2.** Students would be aware of the contribution of WHO and the health ministry of India in controlling some of the communicable diseases. They would also aware about the ill effects of self medication
- CO 3.** Learners would practice different methods of water purification and conservation of water.
- CO 4.** Learners would maintain personal hygiene for the betterment of health.
- CO 5.** Learners would use electronic gadgets optimally and without any health hazards.
- CO 6.** Students can use the knowledge of first aid against dog bite.
- CO 7.** Learners would describe and interpret various techniques of blood preservation used in blood banks.
- CO.8 :**Learners can identify various stress related disorders and describe its causes, symptoms and treatment options available . Learners can figure ways to be more optimistic and apply problem solving skills to self-analyze and work towards a healthier lifestyle.
- CO. 9:**Learners can judge diseases with respect to communicable and non-communicable .Students can understand the etiology ,identify the causative agents and mode of transmission of various diseases. Students can explain prevention and treatment of the same.

F.Y.B.Sc. Semester two PSO-CLO mapping table:

		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
Paper 1	CO1	YES	-	-	-	-	-
	CO2	YES	-	-	-	-	-
	CO3	-	YES	-	-	-	-
	CO4	-	YES	-	-	-	-
	CO5	-	-	YES	-	-	-
	CO6	-	-	YES	-	-	-
Paper 2	CO1	-	-	-	YES	-	-
	CO2	-	-	-	-	YES	-
	CO3	-	-	-	-	YES	-
	CO4	-	-	-	-	YES	-
	CO5	-	-	-	-	YES	-
	CO6	-	-	-	-	YES	-
	CO7	-	-	-	-	YES	-
	CO8	-	-	-	-	-	YES
	CO9	-	-	-	-	-	YES

Program Specific Outcome for S.Y.B.Sc., Zoology, Sem 3, course 5+6+7

PSO1. Learners would understand the principles of inheritance, concepts of multiple alleles, linkage and crossing over. Learners would understand and be able to analyse various types of pedigrees.

PSO2. Learners would comprehend the structure of chromosome, mechanisms of sex determination and inheritance of sex linked disorders.

PSO3. Learners would know the classical experiments behind discovery of genetic material. They would understand the central dogma of molecular biology and regulation of gene expression.

PSO4. Learners will have a Comparative study of nutritional apparatus, excretory and osmoregulatory structures and their functions in vertebrates and invertebrates.

PSO5. Learners will learn the concepts of physiology of respiration and circulation and various respiratory and circulatory organs in different classes of organisms.

PSO6. Learners will understand the process of control and coordination by the nervous and endocrine system and they will be acquainted with various reproductive strategies in various animals.

PSO7. Learners would understand basic concepts of ethology and examine different aspects of animal behaviour.

PSO8. Students would develop insight into parasitology.

PSO9. Learners would examine rearing methods, management and economic importance of apiculture, vermiculture and dairy industry.

Course Outcome of S.Y.B.Sc., Zoology, Sem 3, Paper 1

Course no. 5, Course code 301

- CO1.** Learners would comprehend and apply principles of Mendalian inheritance to study heredity.
- CO 2.** Learners would understand concepts of multiple allelism, linkage and crossing over.
- CO 3.** Learners would understand pedigree analysis and infer the mode of inheritance of a trait.
- CO 4.** Learners would comprehend the structure of chromosomes, its types and basis of classification.
- CO 5.** Learners would interpret the various mechanisms of sex determination in animals and factors impacting them.
- CO 6.** Learners would analyze the inheritance of various disorders linked to sex chromosomes.
- CO 7.** Learners would understand the discovery process and structural features of genetic material.
- CO 8.** Learners would comprehend the flow of genetic information from genotype to phenotype in the eukaryotic system.
- CO 9.** Learners would comprehend regulation of gene expression.

Course Outcome of S.Y.B.Sc., Zoology, Semester 3, Paper 2

Course no. 6, Course code 302

- CO 1.** Learners will have a Comparative study of nutritional apparatus of vertebrates and invertebrates.
- CO 2.** Learners will have a Comparative study of excretory and osmoregulatory structures and their functions in vertebrates and invertebrates.
- CO 3** Learners would describe the comparable complexity of respiratory and circulatory physiology in evolutionary hierarchy.
- CO 4** Learners would illustrate the different respiratory and circulatory organs from different animals.
- CO 5** Learners will understand the process of control and coordination by the nervous and endocrine system.
- CO 6** Learner would be acquainted with various reproductive strategies adopted by the animals.

Course Outcome of S.Y.B.Sc., Zoology, Sem 3, Paper 3

Course no. 7, Course code 303

- CO 1.** Learners would be able to define the scope of ethology and differentiate between innate and learned behaviour.
- CO 2.** Learners would comprehend various types of learning, examine various aspects of social behaviour in animals and their interaction with the environment.
- CO 3.** Learners would understand certain parasites with respect to their epidemiology, life cycle, mode of transmission, effect on humans and would take simple preventive measures.
- CO 4.** Learners would be able to identify different species of honeybees and earthworms used for apiculture and vermiculture respectively.
- CO 5.** Learners would develop a comprehensive understanding of pests and associated diseases and examine rearing and culture methods used for apiculture, dairy industry and vermiculture.
- CO 6.** Learners would enhance their entrepreneurial skills by studying various commercial products obtained from apiculture, dairy industry and vermiculture

		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
Paper 1	CO1	Yes	-	-	-	-	-	-	-	-
	CO2	Yes	-	-	-	-	-	-	-	-
	CO3	-	Yes	-	-	-	-	-	-	-
	CO4	-	Yes	-	-	-	-	-	-	-
	CO5	-	Yes	-	-	-	-	-	-	-
	CO6	-	Yes	-	-	-	-	-	-	-
	CO7	-	-	Yes	-	-	-	-	-	-

Program Specific Outcome for S.Y.B.Sc., Zoology, Sem 4, course 8+9+10

- PSO1.** Learners would examine various theories of evolution and trace the origin of life.
- PSO2.** Learners would understand and infer the interlink between the concept of evolution, genetic variations speciation.
- PSO3.** Learners would develop a scientific temper.
- PSO4.** Learners will learn about the structural and functional organization of cell with an importance on nucleus, plasma membrane, cytoskeleton and transport mechanisms adopted by the cell.
- PSO5.** Learners would be acquainted with the ultrastructure of cell organelles of endomembrane systems and their functions.
- PSO6.** The learner will get an insight into the structure of biomolecules, their role in sustenance of life and also the clinical significance of biomolecules.
- PSO7.** Learner would get acquainted with basic embryology.
- PSO8.** Learners would understand human reproductive physiology, infertility associated disorders, contraception and examine various assisted reproductive techniques and related ethical issues.
- PSO9.** Learners would become aware about the impact of human activities that lead to pollution and its implications on human health and the environment.

Course Outcome of S.Y.B.Sc., Zoology, Sem 4, Paper 1

Course no. 8, Course code 401

- CO 1.** Learners would comprehend the origin of life, origin of eukaryotic cells and examine the various theories of evolution.
- CO 2.** Learners would analyze the various evidence in favour of organic evolution.
- CO 3.** Learners would understand the forces that bring about the evolution of natural populations.
- CO 4.** Learners would comprehend the mechanisms of speciation.
- CO 5.** Learners would understand and distinguish between the processes of Microevolution, Macroevolution and Megaevolution
- CO 6.** Learners would understand the scientific communication and ethical aspects of research.
- CO 7.** Learners would develop critical thinking and analytical skills.

Course Outcome of S.Y.B.Sc., Zoology, Sem4, Paper 2

Course no. 9, Course code 402

- CO 1** Learner will learn about the structural and functional organization of cell with an emphasis on nucleus, plasma membrane and cytoskeleton.
- CO 2.** Learners would acquire insight into the composition of the transport mechanisms adopted by the cell and its organelles for its maintenance and composition of cell.
- CO 3** Learners would explain and describe the intricacies of the endomembrane system.
- CO 4.** Learners would be able to describe the interrelationship between the endomembrane system and functioning of the cell.
- CO 5.** The learner will get an insight into the structure of biomolecules and their role in sustenance of life.
- CO 6.** The learner will learn the importance of biomolecules and their clinical significance.

Course Outcome of S.Y.B.Sc., Zoology, Sem 4, Paper 3

Course no. 10, Course code 403

- CO 1.** Learners would understand and compare the different types of egg and sperms, blastulae, gastrulae and mechanisms of coelom formation.
- CO 2.** Learners would have a comprehensive understanding of anatomy and physiology of human reproductive systems.
- CO 3.** Learners would examine various reproductive disorders, contraception methods and different causes of infertility.
- CO 4.** Learners would analyze modern tools of assisted reproductive technologies that are used for treatment of infertility.
- CO 5.** Learners would analyze the impact of different kinds of pollution on human health and on the environment.
- CO 6.** Learners would examine the various sources of pollution, types of pollutants, mitigation and control measures of pollution, environmental protection laws and comprehend concepts of carbon footprint and climate change.

		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
Paper 1	CO1	Yes	Yes	Yes	-	-	-	-	-	-
	CO2	Yes	Yes	Yes	-	-	-	-	-	-
	CO3	Yes	Yes	Yes	-	-	-	-	-	-
	CO4	Yes	Yes	Yes	-	-	-	-	-	-
	CO5	Yes	Yes	Yes	-	-	-	-	-	-
	CO6	-	-	Yes	-	-	-	-	-	-
	CO7	-	-	Yes	-	-	-	-	-	-
Paper 2	CO1	-	-	-	Yes	Yes	-	-	-	-
	CO2	-	-	Yes	Yes	Yes	-	-	-	-
	CO3	-	-	-	-	Yes	-	-	-	-
	CO4	-	-	Yes	-	Yes	-	-	-	-
	CO5	-	-	-	-	-	Yes	Yes	-	-
	CO6	-	-	-	-	-	Yes	Yes	-	-
	CO1	-	-	-	-	-	-	Yes	-	-
	CO2	-	-	-	-	-	Yes	-	Yes	-

Paper 3	CO3	-	-	-	-	-	-	-	Yes	-
	CO4	-	-	Yes	-	-	-	-	Yes	-
	CO5	-	-	-	-	-	-	-	-	Yes
	CO6	-	-	Yes	-	-	-	-	-	Yes

Programme Specific Outcome T.Y.B.Sc., Zoology, sem 5, course 11+12+13+14

- PSO 1.** Learners would demonstrate a thorough understanding of animal diversity, taxonomy, classification and phylogeny of invertebrates. They would also be able to distinguish between and identify lower organisms based on morphological characteristics. They would have knowledge of anatomy of sepia.
- PSO 2.** Learners would be able to comprehend basic haematology and clinical aspects of haematology. Along with this learning they would be able to impart the knowledge of diagnostic techniques used in pathology.
- PSO 3.** Learners would understand concepts of basic immunology, analyze the clinical applications of antigen-antibody interactions and examine organ transplantation and types of vaccines.
- PSO 4.** Learners would understand the cellular architecture of various organs in the body and examine the different types of tissues and their functions.
- PSO 5.** Learners would be able to recognize and describe properties of toxicants, their effect, response and excretion from the organism. Even learners would understand the regulatory toxicology and their use in clinical studies.
- PSO 6.** Learners would understand the basic concepts of pathology and examine certain necrotic and retrogressive changes that occur in the body due to pathological conditions.
- PSO 7.** Learners will get the knowledge of Biostatistics and its application to test hypotheses.
- PSO 8.** Learners learn about the basic structure of integuments, epidermal, dermal and special derivatives of integuments in vertebrates.
- PSO 9.** Learners can develop the skill in identifying the limb bones of the human body and their functions. Learners would summarize the arrangement, functioning of long limb muscles and their role in body movement.
- PSO 10.** Learners can summarize processes involved in development of embryos in chick and some basic concepts along with recent methods and experiments to further analyze this subject matter.
- PSO 11.** Learners will learn the various concepts of Oceanography and Aquaculture Practices.
- PSO 12.** Learners will gain knowledge about the postmortem changes, spoilage mechanisms and methods involved in evaluating the freshness and quality of fishes, marketing and finance with respect to the fishery sector.

Course Outcome of T.Y.B.Sc., Zoology, Sem 5, Paper 1

Course no. 11, Course code - USZO501

- CO 1.** Learners learn about the principles of animal classification and systematic.
- CO 2.** Learners gets an insight into the taxonomy of Kingdom Protista.
- CO 3.** Learner explains the distinguishing features of the organisms representing a class.
- CO 4.** Learner describes and compares the features of various classes belonging to the same and different phyla.
- CO 5.** Learner identifies the phylum and class to which an organism belong to by observing its external morphology giving justification for the same.
- CO 6.** Learners get a complete knowledge about the classification, habit, habitat and economic importance of sepia.
- CO 7.** Learners learn the morphology and anatomy of various systems in sepia as an invertebrate organism.

Course outcome of T.Y.B.Sc., Zoology, Sem5, Paper 2

Course no. 12, Course code - USZO502

- CO 1.** Learners should be able to describe the different concepts of haematology and able to identify the various components of blood.
- CO 2.** Learners should be familiar with different diagnostic techniques which he can use in diagnosing various hematological and pathological disorders.
- CO 3.** The student would be able to define immunity, comprehend the types of immunity and examine the various components of the immune system.
- CO 4.** The student would understand the role the immune system plays in resistance against infections.
- CO 5.** The student shall examine and interpret the principles and clinical applications of antigen-antibody interactions. The student would develop understanding of immunology of organ transplantation and role of vaccines in immunization against some pathogens.

Course Outcome for T.Y.B.Sc., Zoology, Sem 5, Paper 3

Course no. 13, Course code - USZO503

- CO 1.** Learners can identify and describe different vital organs at tissue and cellular level to better understand its types and functions .
- CO 2.** Learners can recall and name the various toxins and the basic concepts required to understand and describe the response by the body. Even they can utilize the knowledge of regulatory toxicology in the field of research and pharmaceutical.
- CO 3.** Learners can identify and interpret some aspects of general pathology and can describe mechanisms connected to it .
- CO 4.** Learners will recognize the relation between statistics and biological sciences.
- CO 5.** Learners can collect, classify , analyze and interpret the data.
- CO 6.** Learners applied an appropriate statistical test to prove or disprove hypotheses.

Course Outcome for T.Y.B.Sc., Zoology, Sem5, Paper 4,

Course no. 14, Course code - USZO504

- CO 1.** Learners can identify the different dermal and epidermal derivatives as well as state their respective functions .
- CO 2.** Learners can identify the bones of the human body and remember the function that each one performs.
- CO 3.** Learners can describe and illustrate the arrangement, functioning of long limb muscles and their role in body movement.
- CO 4.** Learners can utilize the knowledge of the long limb muscles in study of muscle injuries and in physiotherapy treatment.
- CO 5.** Learners can gain a deeper understanding of processes involved in development of embryo in chick and the basic concepts required to grasp the topic along with recent methods and experiments to further analyze the subject matter.

Course Outcome for T.Y.B.Sc., Zoology, Sem5, Applied component.

- CO 1.** Learners would learn uses of different instruments and equipment of navigation and oceanography and be able to describe the physical, chemical and biological properties of oceanography.

- CO 2** Learner will be equipped to carry out entrepreneurial operations or gain confidence to work in freshwater prawn unit.
- CO 3** Learner will gain knowledge about how to breed and rear ornamental fishes and commercially viable fish species
- CO 4** Learner will be oriented towards understanding the various stages of quality control
- CO 5** Learner will gain knowledge about the postmortem changes, spoilage mechanisms and methods involved in evaluating the freshness and quality of fishes and prawns / shrimps

T.Y.B.Sc. Sem 5 PSO - CO Mapping

	PSO	1	2	3	4	5	6	7	8	9	10	11	12
Paper 1	CO1	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO2	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO3	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO4	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO5	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO6	Yes	-	-	-	-	-	-	-	-	-	-	-
	CO 7	Yes	-	-	-	-	-	-	-	-	-	-	-
Paper 2	CO1	-	Yes	-	-	-	-	-	-	-	-	-	-
	CO2	-	Yes	-	-	-	-	-	-	-	-	-	-
	CO3	-	-	Yes	-	-	-	-	-	-	-	-	-
	CO4	-	-	Yes	-	-	-	-	-	-	-	-	-
	CO5	-	-	Yes	-	-	-	-	-	-	-	-	-
Paper 3	CO1	-	-	-	Yes	-	-	-	-	-	-	-	-
	CO2	-	-	-	-	Yes	-	-	-	-	-	-	-
	CO3	-	-	-	-	-	Yes	-	-	-	-	-	-
	CO4	-	-	-	-	-	-	Yes	-	-	-	-	-

Program specific outcome for T.Y.BSc., Zoology, Sem 6

Course 15+16+17+18

- PSO 1.** Learners would demonstrate a thorough understanding of animal diversity, taxonomy, chordate classification and phylogeny of animals with point of view of evolution. They would also be able to distinguish between and identify higher organisms based on morphological characteristics. They would have knowledge of shark anatomy.
- PSO 2.** Learners would be able to summarize the fundamental concept of enzyme biochemistry and applications of enzymes in applied sciences. Learners are expected to learn the concept of homeostasis, thermoregulation and osmoregulation.
- PSO 3.** Learners would understand the basic mechanism of hormone action, functions of hormones secreted by endocrine glands and examine various endocrine disorders. Learners would also be introduced to fundamental concepts of animal tissue culture and examine its applications in industries.
- PSO 4.** Learners would be able to summarize and describe the use of gene manipulation in human benefits.
- PSO 5.** Learners would understand the process of mutagenesis and examine DNA repair mechanisms. Learners would comprehend how chromosomal aberrations lead to genetic disorders and examine diagnostic methods that help in their detection.
- PSO 6.** Students would get knowledge of various bioinformatic resources, biological databases, pharmacogenomics, proteomics and metabolomics.
- Students would be able to use tools for comparison of nucleotide sequences and protein sequences.
- PSO 7.** Learners learn the different types of resources, their exploitation, solid waste and water management and legal acts pertaining to environmental protection.
- PSO 8.** Students would be sensitized about the threats to wildlife and conservation of the same.
- PSO 9.** Learners would be able to utilize the knowledge of bioprospecting and zoopharmacognosy in developing commercialized products.
- PSO 10.** Learners can summarize the principles of plate tectonics and continental drift theory as well as identify and describe the various animal species with respect to their geographical distribution along with their means of dispersal and barriers of distribution and explain the types of isolating mechanisms in organisms.
- PSO 11.** Learners will get complete knowledge about the various marine fin - fish and shell fishes of India. They will know the basics of nutritional requirements of fish and crustaceans.

PSO 12. Learners will learn about the various preservation and processing strategies and also byproducts and value added products from fishery. They will be oriented towards understanding fish diseases and physiological disorders

PSO 13.Learners will learn the techniques in farm engineering and novel fish culture practices.

Course Outcome for T.Y.B.Sc., Zoology, Sem 6, Paper 1:

Course no. 15, Course code - USZO601

- CO 1.** Learners learn about the classification and salient features of the protochordates.
- CO 2.** Learners learn about the classification and salient features of Cyclostomata
- CO 3.** Learners would describe the origins of chordates. They would discuss the chordate taxonomy upto class level, phylogenetic relationships between classes and their salient features.
- CO 4.** Learners would classify with justification higher organisms based on their morphology.
- CO 5.** Learners get a complete knowledge about the classification, habit, habitat and economic importance of shark.
- CO 6.** Learners learn the morphology and anatomy of various systems in sharks as a vertebrate organism.

Course Outcome for T.Y.B.Sc., Semester 6, Paper 2

Course no. 16, Course code - USZO602

- CO 1.** Learners would be able to classify, describe and explain the nomenclature, structure, action kinetics, role and applications of enzymes.
- CO 2.** Learners would be able to comprehend the adaptive responses of animals to the environmental changes for their survival.
- CO 3.** The learner would examine the basis of classification of hormones and comprehend the mechanism of hormone action and its interaction with target tissues.
- CO 4.** The learner would understand the histology of endocrine glands and functions of hormones secreted and various endocrine disorders associated with them.
- CO 5.** The learner would describe the techniques of animal tissue culture and comprehend the properties of culture media, factors affecting cell culture and the use of aseptic techniques.
- CO 6.** The learner would interpret the applications of animal tissue culture in various industries and its significance as a tool in biological research.

Course Outcome for T.Y.B.Sc., Semester 6, Paper 3:

Course no. 17, Course code - USZO603

- CO 1.** The learner would develop a thorough understanding of the various mutagenic agents and the process of mutagenesis that affects genetic material.
- CO 2.** The learner would examine the various DNA repair mechanisms in place that deal with DNA damage and concept of eukaryotic gene expression.
- CO 3.** The student would familiarize with the tools and techniques used in gene manipulation.
- CO 4:** The learner would understand various chromosomal aberrations, nondisjunction of chromosomes and its impact on human health.
- CO 5:** The learner would describe genetic disorders and inborn errors of metabolism and comprehend diagnostic techniques and the process of genetic counselling.
- CO 6.** Learners would be able to understand and describe the applications of bioinformatics, metabolomics, proteomic, pharmacogenomics as well as various types of biological databases.
- CO 7.** Learners would understand the significance of and perform comparison of protein and nucleotide sequences using BLAST.
- CO 8.** Learners would interpret phylogenetic trees to infer the type of evolution depicted by them.

Course Outcome for T.Y.B.Sc., Zoology Sem 6, Paper 4:

Course no. 18, Course code - USZO604

- CO 1.** Learners learn about the different types of resources and their exploitation and technologies in solid waste management.
- CO. 2.** Learners also learn about the various techniques in water management and legal acts pertaining to environmental protection.
- CO 3. :** Learners would describe the knowledge based on the conservation and utilization of the wildlife and natural resources.
- CO 4. :** Learners would summarize and describe the knowledge of biomolecules from the organisms for commercial product development.
- CO 5. :** Learners can summarize the principles of plate tectonics and continental drift theory.
- CO 6. :** Learners can identify and describe the various animal species with respect to their geographical distribution along with their means of dispersal and barriers of distribution . Learners can explain the types of isolating mechanisms in organisms.

Course Outcome for T.Y.B.Sc., Zoology Sem 6, Applied Component:

- CO 1.** Learners shall understand deep sea fishes, coastal fishes and commercial potential and major landing centres of the fishes.
- CO 2.** Learners will get acquainted with the basics of nutritional requirements at various developmental stages of fish and crustaceans.
- CO 3.** Learners will be oriented towards understanding causes, pathogenicity, prophylaxis and preventive measures of various fish diseases and physiological disorders. They will learn about the preservation and processing strategies, byproducts and value added products from fishery.
- CO 4.** Learners will understand the selection process of hatchery sites and various types of its designs and construction of aquaculture farm practices.
- CO 5.** Learners will be able to describe different open water culture practices and can be able to comprehend the uses of equipment and accessories involved in aquaculture farms

T.Y.B.Sc. Zoology Sem 6 PSO - CO Mapping

	PSO	1	2	3	4	5	6	7	8	9	10	11	12	13
P A P E R 1	CO1	YES	-	-	-	-	-	-	-	-	-	-	-	-
	CO2	YES	-	-	-	-	-	-	-	-	-	-	-	-
	CO3	YES	-	-	-	-	-	-	-	-	-	-	-	-
	CO4	YES	-	-	-	-	-	-	-	-	-	-	-	-
	CO5	YES	-	-	-	-	-	-	-	-	-	-	-	-
	CO6	YES	-	-	-	-	-	-	-	-	-	-	-	-
P A P E R 2	CO1	-	YES	-	-	-	-	-	-	-	-	-	-	-
	CO2	-	YES	-	-	-	-	-	-	-	-	-	-	-
	CO3	-	-	YES	-	-	-	-	-	-	-	-	-	-
	CO4	-	-	YES	-	-	-	-	-	-	-	-	-	-
	CO5	-	-	YES	-	-	-	-	-	-	-	-	-	-
	CO6	-	-	YES	-	-	-	-	-	-	-	-	-	-
P A P E R 3	CO1	-	-	-	-	YES	-	-	-	-	-	-	-	-
	CO2	-	-	-	-	YES	-	-	-	-	-	-	-	-
	CO3	-	-	-	YES	-	-	-	-	-	-	-	-	-
	CO4	-	-	-	-	YES	-	-	-	-	-	-	-	-
	CO5	-	-	-	-	YES	-	-	-	-	-	-	-	-
	CO6	-	-	-	-	-	YES	-	-	-	-	-	-	-

PROGRAMME: ENGLISH

Programme Objectives:

- PO1 To acquaint the learners of literature with the various genres and literary terms and pluralistic dimensions of Literature with its intersections with race, gender, class and sexuality in local, national and international literary studies.
- PO2 To sensitize them to the themes and styles of Literature and to familiarize them with different perspectives of approaching literature
- PO3 To introduce them to the socio-cultural milieu of literary texts. To introduce learners to the uniqueness of literature of different eras and countries – Indian /American/British/World Literature
- PO4 To facilitate cross-cultural perspectives and discussions on diverse literatures within cultures.
- PO5 To make learners aware of prominent writers and the issues and concerns they represent.

Programme Specific Outcomes:

- PSO1 To be able to articulate in writing, critical thinking abilities and appreciation of creative writing as possible facilitators to post graduate studies.
- PSO2 To be able to apply literary theoretical concepts for a better understanding of society and life. To develop interest in, and produce academic research
- PSO3 To be able to assert agency in their personal, professional and social environment.
- PSO4 To be able to use soft skills along with communication skills like reading, speaking and writing that are strengths for a variety of careers.

FYBA:

Course Title: Communication Skills in English (w.e.f. 2021-22)

Semester 1 & 2

Course Outcomes:

- CO1. The learners will learn to understand and interpret any text they are reading from different perspectives**
- CO2. The interest of learners in listening to and watching good quality audio and visual media will be aroused.**
- CO3. Learners will acquire proficiency in the skills of listening, speaking, reading and writing that will help them meet the challenges of the world.**
- CO4. The learners will develop good oral and written skills of communication in the English language.**

Course Title: Introduction to Prose and Fiction-English Ancillary I (w.e.f. 2021-22)

Semesters 1&2

Course Outcomes:

CO1 To have a passion for reading literary works

CO2 To be at ease in the process of appreciation of literature

CO3 To understand and analyze selected stories, prose, fiction and nonfiction masterpieces

CO4 To possess the capacity to imbibe the underlying philosophy and values reflected in literature

CO5 To possess sensitivity to nature and understand the relationship between human beings and environment

SYBA:

Course Title: Indian Writing in English Anc Paper II Semester 1 & 2

CO1 An awareness of the uniqueness of Indian Literature in English

CO2 To be sensitive to the pluralistic dimensions of Indian Literature in English

CO3 To possess an enhanced understanding of the different genres of Indian Literature in English

CO4 To be familiar with different perspectives of approaching this literature

CO5 An awareness of prominent Indian Writers in English

Paper III

Course Title: American Literature English Anc Semester 1 & 2

Course Outcomes:

CO1 Students will be sensitized to the themes and styles of American Literature

CO2 Will be aware of the socio-cultural milieu of twentieth century America through literary texts studied

CO3 Will have an enhanced understanding of American, African American and Multicultural sensibilities

Applied Component:

Course Title: Business Communication

Course Outcomes:

After successful completion of the course, the learner is expected to have:

CO1 Enhanced Listening, Speaking, Reading and Writing skills

CO2 Preparedness to meet the challenges of Communication in the business world

Applied Component:

Course Title: Mass Communication

Course Outcomes:

By the end of the course the students are expected to possess the capacity to:

CO1 Receive and analyse various mediaproducts critically

CO2 consider careers in Media Industry.

TYBA

Paper IV

Course Title:

Sem - V UAENG501 16th to 18th Century English Literature - I

Sem VI UAENG501 16th to 18th Century English Literature – II

Course Outcomes

CO1 To understand the distinctive features of English literature of the 16th, 17th and 18th centuries

CO2 To comprehend how background influences shaped the writer's thinking.

CO3 To recognize and appreciate the literary masters who dominated the scene.

CO4 To grasp the different writing styles that each age adopted.

Paper V

Course Title: Literary Criticism

Sem V UAENG502 Literary Criticism - I

Sem - VI UAENG602 Literary Criticism - II

Course Outcomes:

After completion of the course, students are expected to be able to:

CO1 use some important critical terms

CO2 become aware the nature and function of literature and criticism

CO3 impart the technique of close reading of literary texts

CO4 understand the various literary theories and critical approaches

CO5 be familiar with the tenets of practical criticism

Paper VI-C

Course Title: Popular Culture

Sem - V UAENG503C Popular Culture - I

Sem - VI UAENG603C Popular Culture - II

Course Outcomes:

After completion of the course, students are expected to be able to:
CO1 To articulate in writing responses to thinking critically about Popular Culture
CO2 To be able to assert agency over events involving their lives

Paper VII

Course Title:

Sem - V UAENG504 19th Century English Literature - I
Sem - VI UAENG604 19th Century English Literature - II

Course Outcomes:

After completion of the course, students are expected to be able to:
CO1 To view literary works in their dynamic interface with the background
CO2 To understand the literature of the 19th century as a complex outcome of artistic, intellectual and socio-political cross-currents
CO3 To appreciate poetry as mirroring private personality, protest and subsequently, public concerns
CO4 To view the development of the Victorian Novel as informed by Victorian morality as well as by larger democratic processes
5. To contextualize the impulses behind the significant emergence of women writing in the 19th century

Course Title:

Paper VIII

Sem - V UAENG505 20th Century British Literature – I
Sem - VI UAENG605 20th Century British Literature – II

Course Outcome:

CO1 Students will be equipped with a comprehensive understanding of literary genres, trends and movements in 20th Century British Literature
CO2 Enabled to understand the valuable co-relation between the sociocultural, economical and historical contexts, behind the literary production.

Course Title:

Paper IX-C

Sem - V UAENG506C Film and Literature - I
Sem - VI UAENG606C Film and Literature - II

Course Outcomes:

After completion of the course, students are expected to be able to:

CO1 To understand the nature of film as an 'art' form.

CO2 To explore ways in which film as art and literature influence each other.

CO3 To expand existing textual analytical skill towards an understanding of film adaptation.

CO4 To understand different perspectives on film adaptations.

CO5 To aid students to think critically and articulate in writing responses about films.

Prepared by:

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(All data contained in this document is as per the guideline of the Board of Studies-Approved Syllabi for the above mentioned courses)

POs for M.Sc Part I Semester I and II

The learners will:

- PO 1.** Gain knowledge of the advanced concepts in the branch of chemistry, scrutinize and accomplish a solution to problems encountered in the field of research and analysis.
- PO 2.** Apply the basic knowledge of chemistry to perform various tasks assigned to them at the workplace in industry and academia to meet the global standards.
- PO 3.** Deduce qualitative and quantitative information of chemical compounds using advanced spectroscopic methods which can further be analysed using practical skills inculcated in them during the course.
- PO 4.** Imbibe the attitude as well as aptitude of a scientific approach along with analytical reasoning with respect to the novel techniques actually implemented in the Industry.
- PO 5.** Use the subject knowledge, communication and ICT skills to become an effective team leader/team member in the interdisciplinary fields.
- PO 6.** Understand, Manage and contribute to solve basic societal issues and environmental concerns ethically based on principles of scientific knowledge gained.
- PO 7.** Exhibit professional work ethics and norms of scientific development.

SEMESTER -I

Course Learning Outcomes (CLOs) of M.Sc Physical Chemistry: Course Code: PSCH 101 Paper I

At the end of the Course,

CLO-1: To study the advanced thermodynamics Maxwell equation and its applications to ideal gases.

CLO-2: To learn the concept of Quantum Mechanics and be able to solve the problems related to 1D box and be able to explain the role of operators in quantum.

CLO-3: To understand the concept of different laws of thermodynamics.

CLO-4: To learn the Debye Huckel Theory of ion-ion interactions.

CLO-5: To understand the effect of temperature on reaction rates.

CLO-6: To understand the different theories of chemical kinetics.

Mapping:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLOs) of M.Sc Inorganic Chemistry: Course Code: PSCH 102 Paper II

At the end of the Course,

CLO 1: The learners will be able to recapitulate the concepts of resonance, resonance energy, formal charges and to critically analyze the Valence Bond Theory. To derive the wave functions for sp , sp^2 , sp^3 hybridization considering only sigma bonding and understand the involvement of the d orbitals in various types of hybridizations.

CLO 2: The learners will be able to understand the Molecular Orbital Theory for diatomic species of First transition elements and for Polyatomic species considering σ bonding.

CLO 3: The learners will learn the different weak forces of attraction, their types, properties and the method of their detection and importance. These include elaborate understanding of the Hydrogen bonding concept along with Van der Waals forces, ion-dipole, dipole-dipole, London forces.

CLO 4: The learners will understand and adopt a systematic procedure for studying the different concepts of group theory and construct the character table for different point groups and to study the matrix representation of symmetry operations.

CLO 5: The learners will apply the concepts of Group Theory in sigma bonding in different molecules, Mulliken's notations, group-subgroup relationships, etc.

CLO 6: The learners will determine the electronic structure of AB, AB₂, anti-fluorite and rutile type solids and learn the synthesis of inorganic solids by ceramic, precursor and sol-gel method. The learners will also get introduced to the concept of Microwave Synthesis.

CLO 7: The learners will learn different methods of preparation of Nanomaterials and also study its application in the field of semiconductors and solar cells.

CLO 8: The learners will characterize different coordination compounds with the help of conductivity measurements, electronic and magnetic measurements and spectroscopic measurements.

CLO 9: The learners will calculate spectra and electronic parameters along with Nephelauxetic ratio and also determine formation constants of metal complexes.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓	✓
CLO 8	✓	✓	✓	✓	✓	✓	✓
CLO 9	✓	✓	✓	✓	✓	✓	✓

Paper III

Organic Chemistry: Course Code: PSCH 103

Course Learning outcomes (CLOs)

CLO 1. To understand the role of thermodynamic and kinetic aspects on a chemical reactivity and selectivity.

CLO 2. To evaluate types of reaction mechanisms from the given kinetic isotope effect data and other concepts helping in identifying the reaction mechanisms.

CLO 3. To understand mechanisms of various nucleophilic substitution reactions and comparison in their rate of reactions based on nucleophilicity of the used nucleophile.

CLO 4: To draw all possible ester hydrolysis mechanisms and understand the logic behind it.

CLO 5: To identify and classify the given unknown molecule into non-aromatic, aromatic, antiaromatic and homoaromatic along with the knowledge of Huckel's rule, HMO and Frost-Musolin diagram.

CLO 6: To identify chiral, achiral, prochiral centres and faces from the given unknown molecules and to draw different projection formulae along with their interconversions.

CLO 7: To understand the stereochemistry of molecules with tri-and tetra-coordinated centres and genesis of aromaticity in compounds such as spiranes, allenes, biphenyls, cyclophanes among others.

CLO 8: To improve the ability of learners in functional group interconversions using reduction oxidation reagents with ability to draw their mechanisms.

Mapping of PLOs with Course Learning outcomes (CLOs)

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓

CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓	✓
CLO 8	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLOs) of M.Sc Analytical Chemistry: Course Code: PSCH 104 Paper IV

At the end of the Course,

CLO 1: The learners will be able to understand the basic terms involved in Analytical chemistry.

CLO 2: The learners will use the concept of quality in analytical chemistry, safety in laboratories, accreditations, GMP and GLP during the steps involved in manufacturing and analysis of product samples.

CLO 3: The learners will be able to prepare solutions of various concentrations based on ppm, ppb, molarity, normality etc.

CLO 4: The learners will apply the knowledge of principles, instrumentation and working of spectroscopic techniques for the analysis of analytical samples.

CLO 5: The learners will be able to use the knowledge of different thermal methods to find the heat of reaction, specific heat, percentage crystallinity, oxidative stability etc of analytical samples.

CLO 6: The learners will be able to understand the need for automation and the various processes which can be automated.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓	✓

SEM-I Practical

Course Learning Outcomes for Physical Chemistry Practical

Paper I Course Code: PSCHP 101

CLO-1: To study the effect of substituent on dissociation constant, pK_a values of tribasic acids, mean ionic activity coefficient and Ostwald's dilution law of monobasic acid using various instrumental methods.

CLO-2: Interpretations of plots of mathematical functions.

CLO-3: To determine solubility product of sparingly soluble and heat of solution of sparingly soluble acids at different temperatures.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓

CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Inorganic Chemistry Practical

Paper II Course Code: PSCHP 102

At the end of the Course:

CLO 1: The learners will learn to open up different types of Alloys/Ores and carry out a Quantitative Analysis of the elements present in them.

CLO 2: The learners will be trained to estimate the amount of Copper using the Iodometric method and the amount of Iron using Ce^{+4} in a given sample Potentiometrically.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓

Paper III

Organic Chemistry: Course Code: PSCH 103 Practical Course Learning outcomes (CLOs)

CLO 1. To develop a practical hand in organic synthesis.

CLO 2. To understand the important aspects and safety concerns while dealing with different chemicals.

CLO 3. To gain expertise in product purification and measurements of its physical constants.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Analytical Chemistry Practical
Paper IV Course Code: PSCHP 104

CLO 1: The learners will be able to carry out assay of saline samples for its sodium chloride content.

CLO 2: The learners will be able to determine the cation content by ion exchanger resins and by complexometric titrations involving EDTA as a titrant.

CLO 3: The learners will be able to determine the number of nitro groups in the given compound using TiCl_3 .

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓

SEMESTER II

Course Learning Outcomes (CLOs) of M.Sc Physical Chemistry: Course Code: PSCH 201 Paper I

CLO-1: To learn about the concept of phase and derivative of phase rule.

CLO-2: To understand the Phase diagram for one, two and three component systems.

CLO-3: To study the thermodynamics of defects in solids.

CLO-4: To understand the chemical potential of non-ideal solutions and its applications.

CLO-5: To study the kinetics of reactions in solution and influence of pressure, ionic strength, solvent on reaction rates.

CLO-6: To learn about kinetics of catalytic reactions i.e acid-base catalysis, heterogeneous catalysis and enzyme catalysis.

CLO-7: To evaluate Michaelis's constant for enzyme-substrate binding by Lineweaver-Burk plot.

CLO-8: To solve Schrodinger wave equation for Rigid rotor and linear harmonic oscillator and calculate their respective energies.

CLO-9: To understand the application of Schrodinger equation to two electron systems.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓
CLO 6	✓	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓	✓
CLO 8	✓	✓	✓	✓	✓	✓	✓
CLO 9	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLOs) of M.Sc Inorganic Chemistry: Course Code: PSCH 202 Paper II

At the end of the Course,

CLO 1: The learners will be able to study rates of reactions and the factors affecting them and understand the different techniques used to study the rate of the reaction.

CLO 2: The learners will be able to learn ligand substitution reactions of Octahedral and Square planar complexes, Trans effect and factors affecting these substitution reactions.

CLO 3: The learners will be able to understand the 18 e⁻ and 16 e⁻ electron rule by studying different examples. They will also learn the preparation and properties of a few selected compounds including sandwich compounds of Fe, Cr

CLO 4: The learners will understand the structure and bonding of a few inorganic compounds like Ziese's salt, ferrocene and bis(arene)chromium(0)

CLO 5: The learners will understand the occurrence and effect of toxic metals like Pb, As, Cu, Cd, and Hg on the environment, the different diseases caused by poisoning of metals and the impact these metals have on the living organism.

CLO 6: The learners will be familiar with the role of Inorganic chemistry in Biological systems, understand the structure of various biological oxygen carriers and molecules involved in electron storage and transport.

CLO 7: The learners will understand the function of Cu containing enzymes and their role as biocatalyst. They will also learn the role of Pt in the treatment of cancer.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓
CLO 5	✓	✓	✓	✓	✓	✓	✓

CLO 6	✓	✓	✓	✓	✓	✓	✓
CLO 7	✓	✓	✓	✓	✓	✓	✓

Organic Chemistry: Course Code: PSCH 203

Course Learning outcomes (CLOs)

CLO 1. To understand, nucleophilic reactions (carbon based nucleophiles), thermodynamic-kinetic approach and their mechanisms.

CLO 2. To gain expertise in drawing mechanisms for various cationic and anionic rearrangement reactions.

CLO 3. To understand the HOMO-LUMO approach, theories associated with it and their applications.

CLO 4. To understand various spectroscopic techniques and to apply it for structural elucidation.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLOs) of M.Sc Analytical Chemistry: Course Code: PSCH 204 Paper IV

At the end of the Course,

CLO 1: The learners will be able to optimize the chromatographic conditions to increase the column efficiency and resolution of chromatographic peaks.

CLO 2: The learners will apply the principles of chromatographic techniques for the separation/identification of analytical samples.

CLO 3: The learners will be able to apply the concepts of Mass spectroscopy, X-ray fluorescence, absorption and diffraction spectroscopy to characterize the analytical samples.

CLO 4: The learners will be able to analyse the surface morphology of samples by SEM, STM or TEM.

CLO 5: The learners will be able to analyse and calculate the analyte concentrations by Ilkovic equation/ Cottrell equation using polarographic techniques.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓

CLO 5	✓	✓	✓	✓	✓	✓	✓
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SEM-II Practical

Course Learning Outcomes for Physical Chemistry Practical

Paper I Course Code: PSCHP 201

CLO-1: To study the shape of atomic orbital using wave function.

CLO-2: To study phase rules for three component systems.

CLO-3: To study kinetics of decomposition reaction by dilatometry.

CLO-4: To study complex formation, CMC and Hammett's constant by instrumental methods.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓
CLO 4	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Inorganic Chemistry Practical

Paper II Course Code: PSCHP 202

At the end of the course,

CLO 1: The learners will be able to synthesize and characterize different inorganic coordination complexes.

CLO 2: The learners will be trained in calculating the equilibrium constant for $\text{Fe}^{3+}/\text{SCN}^{1-}$ by slope intercept method and in determining the electrolytic nature of some inorganic compounds by conductance measurements.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓

Organic Chemistry: Course Code: PSCH 203 Practical

CLO 1. To apply basic organic chemistry principles for the separation of the given unknown binary mixtures.

CLO 2. To characterize separated chemical components using chemical analysis, physical constants and derivatization.

CLO 3. To gain practical knowledge in various purification techniques.

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Analytical Chemistry Practical
Paper IV Course Code: PSCHP 204

At the end of the course:

CLO 1: The learners will be able to estimate the amount of different types of metal ions like Fe(II), Fe (III), Ce(IV), Cr(VI) and Mn(VII) potentiometrically or spectrochemically.

CLO 2: The learners will be able to determine the percentage composition of HCl and H₂SO₄ conductometrically.

CLO 3: The learners will be able to analyse fertilizers for its potassium content using flame photometer and percentage purity of sodium carbonate in washing soda pH metrically.

MAPPING:

CLO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CLO 1	✓	✓	✓	✓	✓	✓	✓
CLO 2	✓	✓	✓	✓	✓	✓	✓
CLO 3	✓	✓	✓	✓	✓	✓	✓

M.Sc. Sem-III and IV (Physical Chemistry)

After completing M.Sc. Physical Chemistry programme, students will be able to:

Knowledge Outcomes:

PO-1: Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Physical Chemistry.

PO-2: Apply knowledge to build up small scale industry for developing endogenous product.

PO-3: Apply various aspects of physical chemistry in the field of polymers, petroleum products, forensic etc. and also to develop interdisciplinary approach of the subject.

Skill Outcomes: It would help students to

PO-4: Collaborate effectively on team-oriented projects in the field of Physical Chemistry or other related fields.

PO-5: Communicate scientific information in a clear and concise manner both orally and in Writing.

PO-6: Inculcate logical thinking to address a problem and become result oriented with a positive attitude.

PO-7: Apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.

Generic Outcomes:

PO-8: Have developed their critical reasoning, judgment and communication skills.

PO-9: Enhance the scientific temper among the students so as to develop a research culture and implementation of the policies to tackle the burning issues at global and local.

M.Sc. (Physical Chemistry) Semester – III Paper – I

(Polymer, Surface & Photo Chemistry)

Paper Code: PGCHEP301

CO-1. To evaluate molar mass of polymers by different methods like end group analysis, viscometry, vapour phase osmometry and molecular weight distribution curve.

CO-2. To understand the properties and importance of surface active agents, micelles and emulsion and to learn the applications of surface chemistry for the storage of graphene, fullerenes and nanomaterials.

CO-3. To learn the principles of photo physical processes in electronically excited molecules and mechanism of their relaxation by fluorescence and phosphorescence.

CO-4. To understand application of photochemical reactions in organic systems (conjugated olefins and aromatic compounds).

Mapping of PSOs and COs (Paper I, Physical Chemistry Sem-III)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓

M.Sc. (Physical Chemistry) Semester – III Paper – II

(Nanochemistry, statistical mechanics & Nuclear chemistry)

Paper Code: PGCHEP302

CO-1. To introduce the nanochemistry of gold, cadmium and selenide and to understand optical and magnetic properties of nano material and how it varies with the shape, size and surface of nano particles.

CO-2. To aware the learners about the diagnosis and treatment of diseases using nano particles.

CO-3. To learn the concept of distribution and thermodynamic probability and to evaluate most probable distribution state for all type of statics i.e. for Maxwell- Boltzmann, Fermi dirac and Bose – Einstein statistics.

CO-4. To understand the concept of partition function, its physical significance and calculation of molar and atomic partition function

CO-5. To determine the age of minerals, rocks, earth and solar system employing the nuclear chemistry and to discuss the application of radiochemistry in medical, industrial and agricultural field.

Mapping of PSOs and COs (Paper II, Physical Chemistry Sem-III)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓

M.Sc. (Physical Chemistry) Semester – III Paper – III

(Atomic and Molecular: Structure and Spectroscopy)

Paper Code: PGCHEP303

CO-1. To discuss the variation and perturbation theory and its application to Helium atom. To introduce term symbol for multi electron atoms, exchange of interactions and multiplicity of states.

CO-2. To evaluate hydrogen molecule using valence bond method.

CO-3. To apply molecular spectroscopy on spherical top, symmetrical top and asymmetrical top molecules.

CO-4. To determine term symbol and energy state of Inorganic and organic compounds.

Mapping of PSOs and COs (Paper III, Physical Chemistry, Sem-III)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓

M.Sc. (Physical Chemistry) Semester – III Paper – IV

(Advanced Instrumental Techniques)

Paper Code: PGCHEP304

CO-1: Understand the basic principles of light-matter interactions and learn quantum mechanical methods to analyze the interactions.

CO-2: Apply the fundamental knowledge of radioanalytical methods to existing and an emerging problem in basic science

CO-3: Describe the principles of ORD, CD, ENDOR, ELDOR, EWDOR, Nuclear quadrupole resonance spectroscopy.

CO-4: Differentiate various resonance techniques used in the analysis of molecules.

CO-5: Apply the fundamental knowledge of electro-analytical methods to existing and an emerging problem in basic science.

Mapping of PSOs and COs (Paper IV, Physical Chemistry, Sem-III)

COs	PSOs								
	1	2	3	4	5	6	7	8	9

4	✓	✓	✓	✓	✓	✓	✓	✓	✓
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M.Sc. (Physical Chemistry) Semester – IV Paper – I

(Polymer, Green, Biophysical and Applied)

Paper Code: PGCHEP401

CO-1. To understand properties of polymers in solid state, characterization of polymers and chemical analysis by spectral methods and.

CO-2. To understand the properties and importance of surface active agents, micelles and emulsion and to learn the applications of surface chemistry for the storage of graphene, fullerenes and nanomaterials.

CO-3. To learn the principles of photo physical processes in electronically excited molecules and mechanism of their relaxation by fluorescence and phosphorescence.

CO-4. To understand application of photochemical reactions in organic systems (conjugated olefins and aromatic compounds).

Mapping of PSOs and COs (Paper I, Physical Chemistry Sem-IV)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓

M.Sc. (Physical Chemistry) Semester – IV Paper – II

(Material Science, network and irreversible thermodynamics)

Paper Code: PGCHEP402

CO-1: Understand the laws of thermodynamics and their applications.

CO-2: know the information and applications of material Sciences.

CO-3: Understand the applications of statistical thermodynamics.

CO-4: Understand the how irreversible thermodynamics more effective than the reversible thermodynamic.

CO-5: know the information and applications of irreversible thermodynamics and networking.

Mapping of PSOs and COs (Paper II, Physical Chemistry, Sem-IV)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓

M.Sc. (Physical Chemistry) Semester – IV Paper – III

(Symmetry & Spectroscopy)

Paper Code: PGCHEP403

CO-1: Understand the basic concepts of symmetry and its mathematical expression.

CO-2: Apply these mathematical notations into objects and molecules.

M.Sc. (Physical Chemistry) Semester – IV Paper – IV

(Research Methodology)

Paper Code: PGCHEP404

CO-1. To enable the student to be able to extract information from journals and digital resources.

CO-2. Understanding tools to analyse the data, writing and presenting scientific papers.

CO-3. Safe working procedure And ethical handling of chemicals.

CO4. Describe research, identification of research problems, and preparation of proposals.

CO-5. Practice ethics in all the domains of research.

CO-6. Analyze the results using mathematical and statistical tools.

Mapping of PSOs and COs (Paper IV, Physical Chemistry, Sem-IV)

COs	PSOs								
	1	2	3	4	5	6	7	8	9
1	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓	✓

Master of Science [M.Sc] (Inorganic Chemistry) SEM-3 AND SEM-4

Programme Objectives (POs)

1. The programme is designed in a manner so as to cover all the relevant aspects of the subject in a holistic manner
2. This program helps the candidate in polishing their skills of analyzing the subjects, strengthening as well as gaining a logical understanding of this course.
3. To impart the basic analytical and technical skills to work effectively in the various fields of chemistry.
4. The study is focused on theoretical and practical aspects of principles and techniques in an academic discipline such as fundamentals of analytical chemistry, coordination and nuclear chemistry.
5. The master study develops the skills to analyze and diagnose chemical reaction to provide a proper solution, developing a hypothesis and the ability to identify.
6. To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.
7. To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modeling methods.
8. To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.
9. To develop laboratory competence in relating chemical structure to spectroscopic phenomena.
10. To demonstrate the ability to synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

Programme Specific Outcomes (PSO)

1. Understand theoretical concepts of instruments that are commonly used in most chemistry fields as well as interpret and use data generated in instrumental chemical analyses.
2. Apply the concepts of quantum mechanics and group theory
3. Design and synthesize new compounds which have potential applications in Industry.

2	✓	✓	✓	✓	✓	✓	✓	✗
3	✓	✓	✓	✓	✓	✓	✓	✗
4	✓	✓	✓	✓	✓	✓	✓	✗

Course Learning Outcomes (CLO) of Paper IV

1. Learners will get aware of handling various hazardous Materials and Disposal Management systems in Chemical Laboratories.
2. Learners will be able to study manufacture and applications of different Ceramics and refractory materials and various inorganic explosives.
3. Learners will be able to understand preparation and importance of Fertilizers, micronutrients, glass, paints and pigments.
4. Learners will be able to study extraction, physical and chemical properties and various applications of some metals and their alloys.

Mapping of PSOs and CLOs (MSc, Inorganic Chemistry, Paper IV, SEM III)

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	✗	✓	✓	✓	✓	✓	✓

2	✓	×	✓	✓	✓	✓	✓	✓
3	✓	×	✓	✓	✓	✓	✓	✓
4	✓	×	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLO) for SEM-III Practicals

1. Learners will be able to perform analysis of alloy and quantitative estimation of the metal content present in it by gravimetric or volumetric method.
2. Learners will be able to understand solvent extraction techniques and separate and estimate metals in the mixture.
3. Learners will be able to prepare various coordination complexes.
4. Learners will be able to perform quantitative analysis of some metals by volumetric titration method.

Mapping of PSOs and CLOs (MSc, Inorganic Chemistry, Practicals, SEM III)

CLOs	PSOs							
	1	2	3	4	5	6	7	8
1	✓	×	✓	✓	✓	✓	✓	✓

1	✓	✓	✓	✓	✓	×	✓	✓
2	✓	✓	×	✓	×	✓	✓	✓
3	✓	✓	×	✓	×	✓	✓	✓
4	✓	✓	✓	✓	×	✓	✓	✓

Course Learning Outcomes (CLO) of Paper II

1. Learners will get knowledge about the fundamental principles involved in bonding in Organo-metallic compounds of f-block elements.
2. Learners will get basic ideas on synthesis and applications of organo palladium and platinum compounds.
3. Learners get familiar with the structure and bonding involved in inorganic cage, cluster, ring and chain compounds.
4. Will also study the use of organometallic compounds as catalyst in several organic homogeneous and heterogeneous reaction

Mapping of PSOs and CLOs (MSc, Inorganic Chemistry, Paper II, SEM IV)

CLOs	PSOs							
	1	2	3	4	5	6	7	8

1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	×	✓	×	✓	✓	✓
3	✓	✓	×	✓	×	✓	✓	✓
4	✓	✓	✓	✓	×	✓	✓	✓

Course Learning Outcomes (CLO) of Paper III

1. Learners Learn to interpret IR and Raman spectra of inorganic molecules.
2. They will learn to understand the need and challenges in characterization of surfaces.
3. Learners will learn instrumentation of various electron microscopic techniques.
4. Ability to choose the appropriate thermal technique based on the type of analyte and the desired qualitative and quantitative analytical information.

Mapping of PSOs and CLOs (MSc, Inorganic Chemistry, Paper III, SEM IV)

CLOs	PSOs							
	1	2	3	4	5	6	7	8

1	✓	✓	✓	✓	✓	✓	✓	×
2	✓	✓	×	✓	×	✓	✓	✓
3	✓	✓	×	✓	×	✓	✓	×
4	✓	✓	✓	✓	×	✓	✓	×

Course Learning Outcomes (CLO) of Paper IV

1. To enable the learner to extract information from journals and digital resources.
- 2' Understanding tools to analyse the data, writing and presenting scientific papers.
3. Safe working procedure And ethical handling of chemicals.
4. Describe research, identification of research problems, and preparation of proposals.
5. Practice ethics in all the domains of research.
6. Analyze the results using mathematical and statistical tools.

Mapping of PSOs and CLOs (MSc, Inorganic Chemistry, Paper IV, SEM IV)

CLOs	PSOs							
	1	2	3	4	5	6	7	8

1	×	✓	✓	✓	✓	✓	✓	×
2	×	✓	×	✓	×	✓	✓	✓
3	×	✓	×	✓	×	✓	✓	×
4	×	✓	✓	✓	×	✓	✓	×
5	✓	×	✓	×	✓	×	✓	✓
6	✓	✓	×	×	✓	✓	×	×

Course Learning Outcomes (CLO) of Sem - IV Practicals

1. To make students learn the technique of opening the ore using suitable acid followed by estimating the metal quantitatively by gravimetric or volumetric or colorimetric technique.
2. To understand the method for determining the stability constant of zinc and silver complexes using potentiometer.
3. To calculate the CFSE of titanium and chromium complexes and Racah parameter of nickel complexes from spectral data using spectrophotometer.
4. To analyze the alkali metal content in electrical powder and fertilizer sample, salinity of sea water and chloride content in fasting salt.
5. To understand the interpretation of structure of complexes using spectral Techniques.

SEM-III: Analytical Chemistry

Programme Learning Outcomes (PLOs) of M.Sc Analytical Chemistry Sem III

- 1) To generate conceptual and empirical knowledge in the field of Analytical chemistry.
- 2) To disseminate knowledge regarding rigorous interdisciplinary research practices.
- 3) To promote ethical research practices.
- 4) To extend the horizon of knowledge in various domains of Analytical chemistry.
- 5) To promote research that leads to actionable decisions by the industry
- 6) To impart the basic analytical and technical skills to work effectively in the various fields of chemistry.
- 7) To learn the problemsolving skills, increase the affinity to innovation and the passion for creativity.
- 8) To develop global mind set to meet the challenges of international and work in a cross-cultural environment.
- 9) To create socially responsible and globally competitive post graduates who can effectively contribute to inclusive growth of the society.
- 10) To develop a sense of social purpose for managerial decision-making and to develop leadership capabilities without compromising on ethical values

Course Learning Outcomes (CLOs) of M.Sc Analytical Chemistry sem III

Paper 1

Course Code: PSCHA301-Quality in Analytical Chemistry

- 1) To understand sampling, pretreatment of samples and selection of methods of sampling.
- 2) To understand measurement of uncertainties, signal to noise ratio and pharmaceutical legislations relating to it.
- 3) To learn ion exchange chromatography, ion chromatography and exclusion chromatography
- 4) To understand chromatographic techniques like Supercritical fluid chromatography, Affinity chromatography and Optimum pressure liquid chromatography.

Mapping of PSOs and COs (MSc, Analytical Chemistry, SEM III, Paper 1)

COs	PSOs
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4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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Paper 3

Course Code: PSCHA303-Bioanalytical Chemistry and Food analysis

- 1) To study bioanalytical chemistry of body fluids, physiological and nutritional significance of vitamins and analytical techniques for vitamins
- 2) To understand immunological methods and human nutrition.
- 3) To study fuel value of food, food additives and food contaminants
- 4) To understand food packaging and analysis of milk, oils, fats and spices.

Mapping of PSOs and COs (MSc, Analytical Chemistry, SEM III, Paper 3)

COs	PSOs									
	1	2	3	4	5	6	7	8	9	10
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Paper 4

Course Code: PSCHAEC-I 304- Environmental and certain industrially important materials

- 1) To study certain aspects of air pollution like sources, sampling methods, analysis, carbon credit, greenhouse gases and environmental legislation.
- 2) To understand certain aspects of Water quality standards, bore well water quality, process of its purification and regulatory requirement.
- 3) To understand different types of pollution like soil pollution, noise pollution, thermal pollution, radioactive pollutants and environmental audits.
- 4) To study certain industrial materials like insecticides, pesticides, soaps, detergents and petrochemical products.

SEM-IV: Analytical Chemistry

Programme Learning Outcomes (PLOs) of M.Sc Analytical Chemistry sem IV

PLO 1: The learner will be able to develop knowledge and skills in different areas of Analytical and Materials Chemistry.

PLO 2: The learner will learn the various instrumental principles and working of different types of instruments used for analysis.

PLO 3: Programme will help to develop eco-friendly protocols/procedures for chemical processes in the industry.

PLO 4: To understand basic concept of chromatographic and spectroscopic methods.

PLO 5: To apply the concepts of green chemistry to analytical chemistry for better environment.

PLO 6: To understand principle and instrumentation of advanced analytical techniques.

PLO 7: The learners will comprehend the process of chemical metallurgy to obtain metals from their ores and also recycling of waste products and improving the technology in metallurgical industries.

PLO 8: The learners will have the capability to use computational tools, software, and databases relevant to Analytical Chemistry.

Course Learning Outcomes (CLOs) of M.Sc Analytical Chemistry Sem I and II

CLO 1: The learner will be able to apply the concept of microfiltration, ultra-filtration, reverse osmosis, dialysis and electro-dialysis during the separation process.

CLO 2: The learner will be able to use the principles of solvent extraction in sample preparation and pretreatment steps,

CLO 3: The learner will be able to standardize herbal formulation and herbal extracts:

CLO 4: The learner will be able to apply the principles of Green chemistry in designing the Greener Processes.

CLO 5: The learner will be able to understand the different types and dimensions of nano-materials and their consequences on nanoparticles morphology, electronic structure, optical properties.

Mapping of PSOs and COs (MSc, Analytical Chemistry, SEM IV, Paper 1)

CO's	PO's							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes (CLOs) of M.Sc Analytical Chemistry

Course Code: PSCHA402-Advanced Instrumental Techniques

At the end of the Course,

CLO 1: The learner will be able to understand the concept of FTNMR, 2D NMR,- FID signal generation mechanism, Techniques in 2D NMR- homo nuclear correlation spectroscopy (COSY), total correlation spectroscopy (TOCSY), heteronuclear correlation (HETCOR) in interpreting the complex NMR spectra.

CLO 2: The learner will be able to interpretate mass spectra and able to derive analytical information from mass spectra- molecular identification, metastable peaks, Fragmentation Reactions.

CLO 3: The learner will be able to learn about practical application of GC – MS, ICP - MS, GC – IR.

CLO 4: The learner will be able to learn tandem mass spectrometry technique for identifying and quantifying different metabolites using LC – MS: HPLC-MS, CE-MS.

CLO 5: The learner will be able understand the Neutron activation analysis (NAA) and Thermal analysis for determining the concentrations of elements in a vast amount of materials.

Mapping of PSOs and COs (MSc, Analytical Chemistry, SEM IV, Paper 2)

3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Analytical Chemistry Practical
Paper I1 Course Code: PSCHA4P2

At the end of the course:

CLO 1: The learner will be able to analyze drugs such as Glycine , Sodium Benzoate etc by non-aqueous titrations.

CLO 2:The learner will be able to analyze detergent powder for its alkalinity, Oxygen releasing capacity and Active detergent matter,

CLO 3: The learner will be able to estimate Ca in Ca-pentathionate/calcium lactate tablets.

CLO 4: The learner will be able to dyes such as crystal violet for its percentage purity.

CO's	PO's							
	1	2	3	4	5	6	7	8
1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓

Course Learning Outcomes for Analytical Chemistry Practical
Paper I1 Course Code: PSCHA4P3

At the end of the course:

CLO 1: The learner will be able to analyse milk for its Calcium, Iron and Phosphorous content.

CLO 2:The learner will be able to estimate the aldehydic content of lemon grass/Cinnamon oil.

MSC-Organic chem SEM-III &IV

Programme learning objectives (PLO)

To develop appreciation of the subject of organic chemistry by graded exposure to important topics and concepts.

To enable the student to understand and apply the following :

1. Understand the role of reactive intermediates in reactions and applications of physical organic chemistry.
2. Reactions without intermediates.
3. Stereochemistry and asymmetric synthesis.
4. Photochemical processes
5. Supramolecular chemistry and its importance.
6. A comprehensive view of synthetic organic chemistry including name reactions, role of enamines, metals, non-metals, electro-organic methods and transition metals and rare earths in organic synthesis.
7. Designing organic synthesis.
8. Chemistry of natural products, their multi-step synthesis and biosynthetic pathways
9. Chemistry of heterocyclic compounds
10. Advanced spectroscopic techniques.
11. Drug discovery, development, design and synthesis.
12. Green chemistry. Comparison of traditional methods with green methods.
13. To familiarise students with different sources of information.
14. To enable students to analyse the data and present scientific papers.
15. To create awareness regarding chemical handling and safety.

2	x	✓	x	x	x	x	x	x	x	x	x	✓
3	x	x	✓	x	x	x	x	x	x	x	x	✓
4	x	x	✓	x	x	x	x	x	x	x	x	✓

Course Code: PSCHO302

Paper-II

Synthetic Organic Chemistry-I

Course learning objectives (CLO)

Student will able

1. To write mechanism and application of some named reactions.
2. Will know the importance of radicals in organic synthesis with relevant applications in organic synthesis.
3. To understand the reactions and applications of enamines and ylides in organic synthesis.
4. To discuss the importance of reaction, mechanism, and regiochemistry of metals and non-metals in synthetic organic chemistry with illustration.

C L O	PL O 1	P L O 2	P L O 3	P L O 4	P L O 5	P L O 6	P L O 7	P L O 8	P L O 9	P L O 10	P L O 11	P L O 12 to 15
1	✓	×	×	×	×	×	×	×	×	×	×	✓
2	×	×	×	×	×	×	×	×	×	×	×	✓
3	×	×	×	×	×	×	×	×	×	×	×	✓
4	×	×	✓	×	×	×	×	×	×	×	×	✓

Course Code: PSCHO303

Paper-III

Natural products and Spectroscopy

Course learning objectives (CLO)

Student will be able to-

1.know About biomolecules such as carbohydrates, alkaloids, insect Pheromones etc..and understand the structures and functions of biomolecules that form the basis of what we understand to be living organisms.

2. Learn basic principles of structure and applications of carbohydrates, natural pigments, insect pheromones, and alkaloids.
3. Understanding the use of nuclear magnetic resonance spectroscopy and advanced nuclear magnetic resonance spectroscopy techniques in diverse areas of organic chemistry.
4. Understanding multi-step synthesis of natural products with respect to reagents used, stereochemistry and functional group transformations.

C L O	PL O 1	P L O 2	P L O 3	P L O 4	P L O 5	P L O 6	P L O 7	P L O 8	P L O 9	P L O 10	P L O 11	P L O 12to 15
1	×	×	×	×	✓	×	×	×	×	×	×	✓
2	×	×	×	×	✓	×	×	×	×	×	×	✓
3	×	×	×	×	×	×	×	×	×	✓	×	✓

2	x	x	x	x	x	x	x	x	x	x	✓	✓
3	x	x	x	x	x	x	x	x	x	x	x	✓
4	x	x	x	x	x	x	x	x	x	x	x	✓

SEMIV

Course Code: PSCHO401

Paper - I (Theoretical organic chemistry-II)

Course learning objectives (CLO)

To enable the student to understand and apply the following:

1. Mechanistic aspects of organic reactions based on empirical equations and their modifications.
2. Important aspects and applications of supramolecular chemistry.
3. Molecular dissymmetry, chiroptical properties, determination of composition of stereoisomers and shift reagents.
4. Principles of asymmetric synthesis with examples.

CLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12 to15
-----	----------	----------	----------	----------	----------	----------	----------	----------	----------	-----------	-----------	-------------------

1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	×	×
2	×	✓	✓	×	✓	×	×	×	×	×	×	×
3	×	×	✓	×	×	✓	×	×	×	✓	✓	×
4	×	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	×

Course Code: PSCHO402

Paper - II (Synthetic organic chemistry-II)

Course learning objectives (CLO)

To enable the student to understand and apply the following:

1. Designing organic synthesis by using protecting groups, retrosynthesis and disconnection approach.
2. Electro-organic chemistry.
3. Transition metals in organic synthesis.
4. Rare earths in organic synthesis.

Course Code: PSCHO403

Paper - III (Natural products and heterocyclic chemistry)

Course learning objectives (CLO)

1. To enable the student to understand and appreciate the exotic variety of natural products with reference to occurrence, biological importance, stereochemistry and synthesis.

2. To well verse the student with nomenclature, reactions and synthesis of monocyclic, bicyclic and tricyclic heterocyclic compounds.

C L O	P L O 1	P L O 2	P L O 3	P L O 4	P L O 5	P L O 6	P L O 7	P L O 8	P L O 9	P L O 10	P L O 11	P L O 12to 15
1	x	x	✓	x	x	x	✓	✓		x	x	x
2	x	x	x	x	x	✓	x	x	x	x	x	x
3	✓	x	x	x	x	x	x	x	x	x	x	x

Course Code: PSCHOOC-II 404

PAPER – IV: RESEARCH METHODOLOGY

Course learning objectives (CLO)

1. To enable the student to be able to extract information from journals and digital resources.
2. Understanding tools to analyse the data, writing and presenting scientific papers.

3. Safe working procedure and practise of ethics in handling of chemicals and other domains of research.

CLO	P L O It o 4	P L O 5	P L O 6	P L O 7	P L O 8	P L O 9	P L O 10	P L O 11	P L O 12	P L O 13	P L O 14	P L O 15
1	x	x	x	x	x	x	x	x	x	✓	x	x
2	x	x	x	x	x	x	x	x	x	x	✓	x
3	x	x	x	x	x	x	x	x	x	x	x	✓

PRACTICAL

Programme learning objectives

Student should be able to :

1. Separate ternary mixture by physical and chemical methods.
2. Identify an organic compound supported by the preparation of derivatives.
3. Carry out one step synthesis and purify the products employing suitable techniques.
4. Carry out two step synthesis.
5. Elucidate the structure on the basis of spectral data.
6. Undertake a project and present the results

Semester III practicals

Course learning objectives:

Student should be able to :

1. Separate and identify ternary organic mixtures.
2. carry out single step preparation with stitometry and analyse the spectra of compound.
3. Present the project undertaken .

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CLO 1	✓	✓	×	×	×	×
CLO 2	×	×	✓	×	×	×
CLO 3	×	×	×	×	×	✓

Semester IV practicals

Course learning objectives:

Student should be able to :

1. Plan and execute two step synthesis and present results with reference to stoichiometry, safety data, purity and percentage yield.
2. Analyse the given UV,IR,PMR,CMR and Mass spectra and elucidate the structure.
3. Present the project undertaken .

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
CLO 1	×	×	×	✓	×	×
CLO 2	×	×	×	×	✓	×
CLO 3	×	×	×	×	×	✓