



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

SADU/ACC/RDC/PhD/2025-26/01

Date: 22.05.2025

## NOTIFICATION

### Admission for PhD Programs

Applications are invited from the eligible candidates for admission to the Ph.D. programs in various disciplines for **August-2025 intake**, in accordance with the relevant provisions of St Aloysius (Deemed to be University), Mangaluru and the University Grants Commission (Minimum Standards and Procedure for Award of Ph.D. Degree) Regulations, 2022.

Eligible candidates are requested to go through the University website <https://phdmissions.stalloysius.edu.in/> and fill the online application. The selection of the candidates will be done as per the **Regulation for the Degree of Doctor of Philosophy (PhD) -2024**, of St Aloysius (Deemed to be University) Mangaluru,

### Eligibility

- i) A 1- year/2-semester Master's degree programme after a 4-year/8- semester bachelor's degree programme or a 2- year/4-semester Master's degree programme after a 3-year Bachelor's degree programme or qualifications declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least 55 percent marks in aggregate or its equivalent grade.
- ii) A candidate seeking admission after a 4-year/8-semester bachelor's degree programme should have a minimum of 75 per cent marks in aggregate or its equivalent grade on a point scale wherever the grading system is followed.
- iii) A relaxation of 5 per cent marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC(non-creamy layer)/ Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates
- iv) Professional qualification in Chartered Accountancy /Cost Accountancy/ Company Secretary as awarded by the respective Statutory Institutes of India will be considered as equivalent to Master's Degree for the purpose of enrolment for PhD in Commerce, Management and/or related disciplines as approved by the Regulatory Authority concerned.
- v) In case of International Students their eligibility is according to Association of Indian Universities stipulations.



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

The Departments offering the PhD program and the number of available positions is as follows:

School / Department	Number of Vacancies
<b>School of Arts and Humanities</b>	
Economics	10
Political Science	5
History	2
Psychology	2
Social Work	5
<b>School of Physical Sciences</b>	
Chemistry	10
Physics	10
<b>School of Life Sciences</b>	
Biotechnology	10
Biochemistry	10
Botany	3
Microbiology	3
Food Science	3
<b>School of Languages and Cultural Studies</b>	
English	4
Hindi	4
<b>School of Business and Management</b>	
Business and Management	3



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

## Instructions:

1. All applicants are requested to appear for an entrance test conducted by the University, followed by an interview. (Candidates with UGC-NET/ CSIR-NET/NET-PhD, GATE are exempted from the written test).
2. The written test and interview will be conducted on campus on **July 11, 2025**, and all candidates are required to be present in person.
3. The Entrance Test will be of 100 marks, consisting of descriptive questions with 50% on research methodology and 50% on subject-specific topics.
4. Applicants are requested to upload all the certificates of all relevant qualifications.
5. The University reserves the right to fill, not to fill or add the number of vacancies notified.
6. A limited number of institutional research fellowships are available for a select group of candidates. Selection for these fellowships will be based on institutional guidelines.
7. Last date to receive online applications is **July 5, 2025**

Registrar





# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

## Fee structure of PhD Programme: 2025-26

Table:1

Basic Sciences and Information Technology		
Course Fee	Full-time scholars	Part-time scholars
I Year	₹ 40,000	₹65,000
II Year	₹ 45,000	₹65,000
III Year	₹ 50,000	₹65,000

Table: 2

Social Sciences and Humanities		
Course Fee	Full-time scholars	Part-time scholars
I Year	₹ 30,000	₹55,000
II Year	₹ 35,000	₹ 55,000
III Year	₹40,000	₹ 55,000

Note:

1. An increment of Rs 5,000 will be charged every year on the III-year Fee for the extension up to three years for the full-time research scholars.
2. The part timers will pay the same amount of the Fee for the fourth year and further extension of two years.

*Masarell*

Registrar





# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

## LIST OF PhD SUPERVISORS, THEIR SPECIALIZATION AND CONTACT DETAILS

School of Arts and Humanities			
Department	Name	Specialization	Contact
Economics	Dr Manohar Serrao	<ul style="list-style-type: none"> <li>Banking and Financial Inclusion</li> <li>Agricultural Economics</li> <li>Developmental Studies</li> <li>Population Studies</li> </ul>	9036082817 manohar_serrao@staloysius.edu.in
	Dr P.P. Sajimon	<ul style="list-style-type: none"> <li>Economic Dynamics</li> <li>Conflicts and Displacement</li> <li>Welfare Economics</li> <li>Migration Studies</li> <li>Sustainable Development</li> <li>Economic Policies</li> <li>Organic Farming</li> </ul>	9446545550 saji@staloysius.edu.in
	Dr Florin Shelomith	<ul style="list-style-type: none"> <li>Developmental Studies</li> <li>Business Economics</li> <li>Institutional Economics</li> <li>International Business and Foreign exchange</li> <li>Agricultural Economics</li> </ul>	8861494847 florin@staloysius.edu.in
Political Science	Dr Rose Veera D'Souza	<ul style="list-style-type: none"> <li>Political Science and International Relations</li> </ul>	9448026838 roseveera_dsouza@staloysius.edu.in
	Dr Shakila Hegde	<ul style="list-style-type: none"> <li>Human Rights, Gender issues and aspects</li> </ul>	9342321707 shakila_hegde@staloysius.edu.in
History	Dr Mona Jacqueline Mendonca	<ul style="list-style-type: none"> <li>Women Studies and Modern and Contemporary History of India</li> </ul>	9900790202 mona_mendonca@staloysius.edu.in
Psychology	Dr Shalini Aiyappa	<ul style="list-style-type: none"> <li>Psychology</li> </ul>	9845873042 shalini_ayappa@staloysius.edu.in
Social Work	Dr Shwetha Rasquinha	<ul style="list-style-type: none"> <li>Medical and Psychiatry Social Work and Community Development</li> </ul>	9448215481 shwetha_rasquinha@staloysius.edu.in
	Dr Vidya Vinutha D'Souza	<ul style="list-style-type: none"> <li>Human Resource Management</li> <li>Unorganised Laborers and Informal Sector</li> </ul>	9591346471 vidya_vinutha@staloysius.edu.in
	Dr Roshan Monterio	<ul style="list-style-type: none"> <li>Medical and Psychiatry Social Work and Community Development</li> </ul>	8073852946 roshan_monteiro@staloysius.edu.in
	Dr Prithwi M	<ul style="list-style-type: none"> <li>Human Resource Management</li> <li>Unorganised Laborers and Informal Sector</li> </ul>	9481939221 prithwi_msw@staloysius.edu.in



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

School of Physical Sciences			
Chemistry	Rev. Dr Praveen Martis SJ	<ul style="list-style-type: none"> <li>Nanocatalysis</li> <li>Metal Organic Frameworks</li> </ul>	9901483231 praveen_martis@staloysius.edu.in
	Dr Ronald Nazareth	<ul style="list-style-type: none"> <li>Electroanalytical Techniques</li> <li>Supercapacitors</li> </ul>	9448154267 ronald.nazareth@staloysius.edu.in
	Dr Jyothi N Rao	<ul style="list-style-type: none"> <li>Synthetic Organic Chemistry and Nanochemistry</li> </ul>	9964019369 jyothirao@staloysius.edu.in
	Dr Vinola Z Rodrigues	<ul style="list-style-type: none"> <li>Nanochemistry</li> </ul>	9900813140 vinola_rodrigues@staloysius.edu.in
	Dr Roshan Fredrick DSouza	<ul style="list-style-type: none"> <li>Polymer Chemistry</li> <li>Synthetic Organic Chemistry</li> <li>Nanochemistry</li> <li>Sustainable Chemistry</li> </ul>	9591050256 roshan_dsouza@staloysius.edu.in
	Dr Divya N Shetty	<ul style="list-style-type: none"> <li>Nanotechnology</li> <li>Crystallography</li> <li>Study on Biomaterials</li> </ul>	7259461782 divyanshetty@staloysius.edu.in
	Dr Laveena Precilla D'Souza	<ul style="list-style-type: none"> <li>Single Metal Oxide</li> <li>Surface Modified Nanomaterials and Composite Materials</li> <li>Carbon Based Materials</li> </ul>	9880824615 laveena_dsouza@staloysius.edu.in
Physics	Dr Chandra Shekhara Shetty T	<ul style="list-style-type: none"> <li>Thin films, Crystal growth</li> <li>Sensor materials and nanomaterials</li> </ul>	9448249153 csshetty@staloysius.edu.in
	Dr Ravindra Swami	<ul style="list-style-type: none"> <li>Nonlinear optics</li> <li>Thin films</li> <li>Fuel Cells</li> <li>Computational Physics</li> </ul>	9448152708 swamiphysics@staloysius.edu.in
	Dr Nilakanthan V K	<ul style="list-style-type: none"> <li>Theoretical High Energy Physics</li> <li>Particle Physics</li> <li>Theoretical Physics</li> </ul>	9986817604 nilakanthan@staloysius.edu.in
	Dr Rita Crasta	<ul style="list-style-type: none"> <li>Reaction Cross Section Measurements</li> <li>Environmental Radioactivity</li> </ul>	9481961892 rita_crasta@staloysius.edu.in
	Dr Emanuel Deepak D'silva	<ul style="list-style-type: none"> <li>Thin Films</li> <li>Crystal Growth And Nanomaterials</li> </ul>	8970093263 emmanuel_dsilva@staloysius.edu.in
	Dr Praveen Prakash D'Souza P	<ul style="list-style-type: none"> <li>Phenomenological Particle Physics</li> <li>Numerical Methods</li> <li>Theoretical Physics</li> </ul>	8553213845 praveen_prakash@staloysius.edu.in



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

School of Life Sciences			
Biotechnology	Rev Dr Melwyn D'Cunha SJ	<ul style="list-style-type: none"> <li>Life Sciences/Plant Sciences</li> </ul>	9449664651 melwynbiotech@staloysius.edu.in
	Dr Shreelalitha Suvarna J	<ul style="list-style-type: none"> <li>Food Biotechnology</li> <li>Environmental Biotechnology</li> </ul>	9964215205 shreelalitha_suvarna@staloysius.edu.in
	Dr Jiji George	<ul style="list-style-type: none"> <li>Biotechnology</li> <li>Microbiology</li> </ul>	7760231210 jiji_george@staloysius.edu.in
	Dr Santhosh Wilson Goveas	<ul style="list-style-type: none"> <li>Biotechnology/life sciences</li> <li>Cancer biology</li> <li>Diabetes</li> <li>Plant tissue culture</li> <li>Animal cell culture</li> </ul>	9448724682 santhoshgoveas@staloysius.edu.in
Biochemistry	Dr Lyned Dafney Lasrado	<ul style="list-style-type: none"> <li>Biochemistry</li> <li>Biosciences</li> </ul>	9686021928 lyneddafny@staloysius.edu.in
	Dr Swarnalatha B N	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	9900284662 swarnalatha@staloysius.edu.in
	Dr Ambarish C N	<ul style="list-style-type: none"> <li>Biochemistry</li> </ul>	9743377874 ambarish@staloysius.edu.in
	Dr Remya Varadarjan	<ul style="list-style-type: none"> <li>Life-Sciences</li> <li>Biochemistry</li> <li>Nanotechnology</li> </ul>	9757088203 remya_varadarajan@staloysius.edu.in
	Dr Pallavi Baliga	<ul style="list-style-type: none"> <li>Biotechnology</li> <li>Biochemistry</li> <li>Microbiology and Life Sciences</li> </ul>	9743520166 pallavi_baliga@staloysius.edu.in
Botany	Dr Sana Sheikh	<ul style="list-style-type: none"> <li>Mycology</li> <li>Phytochemistry</li> <li>Seed Technology</li> <li>Bio Remediation</li> </ul>	9886111810 sana_sheikh@staloysius.edu.in
Microbiology	Dr Vaishali Rai M	<ul style="list-style-type: none"> <li>Microbiology</li> <li>Life-Sciences</li> </ul>	9980313361 vaishali_rai@staloysius.edu.in
Food Science	Dr S.N. Raghavendra	<ul style="list-style-type: none"> <li>Food Technology and Biotechnology</li> </ul>	9945888845 raghavendra_sn@staloysius.edu.in
	Dr Daniella Anne L Chyne	<ul style="list-style-type: none"> <li>Food Compositional Analysis</li> <li>Public Health Nutrition</li> <li>Clinical Nutrition</li> </ul>	96763 89466 daniella_chyne@staloysius.edu.in
	Dr Febi Luckose	<ul style="list-style-type: none"> <li>Non-Thermal Food Processing</li> <li>Development of Functional and Designer Foods</li> <li>Valorization and Utilization of Food Processing Waste and By-Products</li> </ul>	9538830566 feby_luckose@staloysius.edu.in



# ST ALOYSIUS

(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 – INDIA

## School of Languages and Cultural Studies

English	Dr Melisa Goveas	<ul style="list-style-type: none"> <li>Literary Theory</li> <li>Gender Studies</li> <li>Cultural Studies and Popular Culture</li> </ul>	9945901031 melisamg@staloysius.edu.in
	Dr Anup Denzil Vegas	<ul style="list-style-type: none"> <li>ELT</li> <li>English Literature</li> <li>Contemporary literature</li> </ul>	9902760165 anup_veigas@staloysius.edu.in
Hindi	Dr Sandhya U Sirsika	<ul style="list-style-type: none"> <li>Hindi Literature</li> <li>Language</li> <li>Translation studies</li> <li>Folklore</li> <li>Competative studies</li> </ul>	74113 03409 sandhya_sirsika@staloysius.edu.in

## School of Business and Management

Business and Management	Dr Rajani Suresh	<ul style="list-style-type: none"> <li>General Management</li> <li>Marketing and HR</li> </ul>	9343166421 rajani@staloysius.ac.in
	Dr Rowena Wright	<ul style="list-style-type: none"> <li>Marketing</li> <li>Finance</li> <li>General Management</li> </ul>	9036919783 rowena@staloysius.ac.in
	Dr Beena Dias	<ul style="list-style-type: none"> <li>HR</li> <li>Finance</li> </ul>	8147390149 beenadias@staloysius.ac.in
	Dr Dhananjaya	<ul style="list-style-type: none"> <li>Financial Economics</li> <li>Data Analytics</li> </ul>	9845981332 dhananjaya@staloysius.ac.in
	Dr Swapna Rose	<ul style="list-style-type: none"> <li>HR</li> <li>Entrepreneurship</li> </ul>	9449188004 swapna.rose@staloysius.ac.in



**PhD**

**Entrance Exam**

**Syllabus**



## **Syllabus for PhD Entrance Exam**

**January -2025**

**Department: Economics**

### **PART I – RESEARCH METHODOLOGY**

#### **Unit 1 Introduction to Research Methodology**

The Meaning, Definition, Nature and Need of 'Research' –Types of Research- Research in Social Sciences and Natural Sciences – Objectivity in Research – Research Philosophy-Deductive and Inductive Reasoning - Scientific method -Basic Categories in Scientific Method – Facts – Concepts – Construct - Theory.

#### **Unit 2 Basic Mechanics of Research and Research Ethics**

Formulation of Research Design - Research problem and Formulation– Role of Review of Literature– Formulation of Objectives. Hypothesis; Concept, Definition, Formulation, Concepts in testing of Hypothesis. Ethics – meaning and definition- Ethics with respect to science and research, intellectual honesty and research integrity. Scientific misconduct – falsification, fabrication and plagiarism.

#### **Unit 3 Sapling and Data Collection**

Sampling - Various Sampling Methods – Importance of Proper Sampling Design. Primary Data Collection - Tools – Observation, Interview, Schedule and Questionnaire – Questionnaire-Design, Structure, Types of questions - Reliability and validity of data. Secondary Data- Sources of Secondary Data- Collection of Secondary Data. –Qualitative Research – Methods –Case Study.

### **References**

1. C R Kothari, GauravGarg (2019). Research Methodology: Methods And Techniques, New Age International.
2. Ranjit Kumar (2014). Research Methodology: A step by step Guide for Beginners, 4th Edition, Sage Publications.
3. Barbara H Stanley J Joan E Sieber, Gary B Melton. Research Ethics: A Psychological Approach. University of Nebraska Press

## **PART II – DOMAIN SPECIFIC**

### **Unit 1    Micro Economics**

Measurement of Utility - indifference curves analysis- Market Demand- Marshallian Demand Function and Hicksian Demand Function. Revealed Preference Theory - Measurement of Consumer's Welfare. Traditional theory of Costs – Short Run and Long Run Cost Curves- Modern theory of Costs. Revenue curves under perfect and imperfect competition. Production Function, Isoquant, Ridge Line, Isocostline, Producer's equilibrium, Concepts of Elasticity, CES, VES, Cobb Douglas production functions. Perfect Competition –Monopoly, Monopolistic Competition, Kinked demand curve, Cournot's and Bertrand model, Price Leadership and Cartels.

### **Unit 2    Macro Economics**

National income concepts and accounting methods-Circular flow models GDP deflator-Demand and supply of labour – classical view and Keynesian view. The Absolute income hypothesis- Relative income hypothesis - Permanent income hypothesis- Life cycle hypothesis. Criteria of investment decisions. Main propositions of New Classical macroeconomics –Monetarist surprise model by Lucas – Rational Expectations theory –New classical economics and the business cycles- Supply side economics – Laffer curve. New Classical and New Keynesian Macroeconomics - Dynamic Stochastic General Equilibrium (DSGE). Monetary policy -Fiscal policy - effectiveness and lags. money in classical and Keynesian theory. The demand for money – approach of classical -Keynes Liquidity Preference and liquidity trap- Baumol's square root rule - Tobin's portfolio theory, Friedman-monetarist view. Inflation and Unemployment - Philips Curve Analysis.

### **Unit 3    Development Economics**

Economic growth and development — Characteristics of underdevelopment, Constraints of economic development- Concept of inequality– inverted-U-shape hypothesis. Neutral and non-neutral technical change — Hicks and Harrod, Embodied and disembodied technical progress. Rostow's Stages of

Economic Growth - Dualism — Social, technical and financial dualism, Lewis model of economic development, Balanced and unbalanced growth, Linkage effect – Big-Push theory. Role of agriculture in economic development, sustainable agriculture; industrialisation in developing countries. Service sector and its importance, Rural-Urban migration, W.T.O and the Indian Economy– FDI ,Trade Sector Reforms, Finances of Central and State Governments; Parallel Economy; Fiscal Sector Reforms in India – Goods and Services Tax - India's Balance of Payments Problems. Financial inclusion- Priority sector lending- Regional Rural Banks- Credit Cooperatives. Microfinance: concept, progress and problems. Self help groups: formation, functioning and performance.

## References

1. Ackley, G. (2008). Macroeconomics: Theory and Policy, Macmillan, New York
2. Baumol, W.J. (2015). Economic Theory and Operations Analysis, Pearson, New Delhi.
3. Koutsoyiannis, A. (2003). Modern Microeconomics, MacMillan, New York.
4. Lekhi R K &Joginder Singh (2016). Public Finance, Kalyani Publishers, New Delhi.
5. Mier, Gerald M and Joseph E. Stiglitz (2001). Frontiers of Development Economics, Oxford University Press, New York
6. Ray, Debraj (2008). Development Economics, The New Palgrave Dictionary of Economics, edited by L. Blume and S. Durlauf.
7. Shapiro, E. (2012). Macroeconomic Analysis, Galgotia Publications, New Delhi.
8. Stiglitz, Joseph., and Walsh, Carl E. (2002). Principles of Macroeconomics, WW Norton and Company (New York).
9. Thirwall, A.P (2011). Growth and Development, (9th Edition). Macmillan, U.K.

\*\*\*\*\*



**ST ALOYSIUS**  
(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 - INDIA

## **Syllabus for PhD Entrance Exam**

**January -2025**

### **DEPARTMENT: POLITICAL SCIENCE**

#### **PART I – RESEARCH METHODOLOGY**

- Unit 1 Foundations in Research: Meaning, types, philosophy and characteristics,  
- Approaches – Traditional, Post- Behavioural and Critical  
-Objectivity and subjectivity; positivism and post-positivistic approach to research
- Unit 2 Methods of research: Experimental, descriptive, historical, qualitative and quantitative methods- Data collection & Survey
- Unit 3 Fundamentals of Research: Formulating Research Problem  
Identifying of Variables and Constructing Hypotheses  
Research Design – Issues in Qualitative and Quantitative Research ; Review of literature
- Unit 4 Application of ICT in research &  
Research ethics
- Unit 5 Thesis writing –Format and styles of referencing  
Footnotes, endnotes & Bibliography

#### **References:**

- Acharyya, R., & Bhattacharya, N. (Eds.). (2019). Research Methodology for Social Sciences. Routledge.
- Ahuja, R. (2001). Research Methods. Rawat Publication.
- Brady, H. E. (2000). "Contributions of Survey Research to Political Science". Political Science and Politics, 33(1), 47–57
- Creswell, J. W., & Creswell, J. D. (2017). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. SAGE Publications.
- Grønmo, S. (2019). Social Research Methods: Qualitative, Quantitative and Mixed Methods Approaches. SAGE Publications Ltd.

- Karpf, D. (2012). "Social Science Research Methods in Internet Time". *Information, Communication & Society*, 15(5), 639–661.
- Kothari, C. R. (2009). *Research Methodology: Methods and Techniques*. New Age Publications.
- Leech, B. L. (2002). "Interview Methods in Political Science", *Political Science and Politics*, 35(4), 663–664.
- Lewis-Beck, Michael and et al (2003) *The Sage Encyclopedia of Social Science Research Methods*, London: Sage Publications
- Levin, R. I. (2018). *Statistics for Management*. Pearson Education.
- Munger, M. C. (2000). "Political Science and Fundamental Research", *Political Science and Politics*, 33(1), 25–30.

### **Journals**

Journal of Social Science Research  
 Political Science Research and Methods  
 Survey Research Methods  
 Social Sciences  
 Social Science and Humanities

## **Part II – Domain Specific**

- Unit 1 Political Theory  
 Concepts: Liberty, Equality, Justice, Rights, Democracy, Power, Citizenship,  
 Political Traditions: Liberalism; Conservatism;  
 Socialism; Marxism; Feminism; Ecologism; Multiculturalism; Postmodernism
- Unit 2 Political Thought  
 Confucius, Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Hegel, Mary  
 Wollstonecraft, John Stuart Mill, Karl Marx, Gramsci, Hannah Arendt, Frantz  
 Fanon, Mao Zedong, John Rawls
- Unit 3 Indian Political Thought  
 Dharamshastra, Kautilya, Aggannasutta, Barani, Kabir, Pandita Ramabai, Bal  
 Gangadhar Tilak, Swami Vivekanand, Rabindranath Tagore, M.K Gandhi, Sri  
 Aurobindo, Periyar E. V. Ramasamy, Muhammad Iqbal, M.N.Roy, V D Savarkar,

Dr. B.R.Ambedkar, J L Nehru, Ram Manohar Lohia, Jaya Prakash Narayan, Deendayal Upadhyaya

Unit 4 Comparative Political Analysis

Approaches: Institutional, Political Culture, Political Economy and New Institutionalism; Comparative Methods

Colonialism and decolonization

Nationalism: European and non-European.

State theory: debate over the nature of state in capitalist and socialist societies; post-colonial state; welfare state; globalization and nations-states

Political regimes: democratic (Electoral, Liberal, Majoritarian and Participatory) and non-democratic regimes (Patrimonialism, Bureaucratic authoritarianism, Military dictatorship, Totalitarianism, and fascist).

Constitutions and Constitutionalism: forms of constitutions, rule of law, judicial independence and liberal constitutionalism; emergency powers and crisis of constitutionalism.

Democratization: democratic transition and consolidation.

Development: Underdevelopment, Dependency, Modernization, World Systems Theory, development and democracy.

Structures of Power: ruling class, power elites, democratic elitism

Actor and Processes: Electoral Systems, Political Parties and Party System, Interest groups, Social movements, new social movements, Non Governmental Organizations (NGOs) and civil society campaigns; Revolutions.

Unit 5 International Relations

Approaches to the study of international relations: Idealism, Realism, Structural Marxism, Neoliberalism, Neorealism, Social Constructivism, Critical International Theory, Feminism, Postmodernism.

Concepts: State, state system and non-state actors, Power, Sovereignty, Security: traditional and non- traditional.

Conflict and Peace: Changing Nature of Warfare; Weapons of mass destruction; deterrence; conflict resolution, conflict transformation.

United Nations: Aims, Objectives, Structure and Evaluation of the Working of UN; Peace and Development perspectives; Humanitarian intervention.

International law; International Criminal Court

Political Economy of IR; Globalisation; Global governance and Bretton Woods system, North-South Dialogue, WTO, G-20, BRICS.

Regional Organisations: European Union, African Union, Shanghai Cooperation Organisation, ASEAN.

Contemporary Challenges: International terrorism, Climate change and Environmental Concerns, Human Rights, Migration and Refugees; Poverty and Development; Role of Religion, Culture and Identity Politics.

#### Unit 6 India's Foreign Policy

Perspectives on India's Foreign Policy: India's Identity as postcolonial, development, rising power and as emerging political economy

Continuity and change in India's Foreign Policy: Principles and determinants;

Non-Alignment movement: historical background and relevance of Non Aligned Movement; India's Nuclear Policy

India's relations with major powers: USA, USSR/Russia, People's Republic of China India's Engagement with multipolar world: India's relations with European Union, BRICS, ASEAN, Shanghai Cooperation Organisation, African Union, Southern African Development Community, Gulf Cooperation Council India's relations with neighborhood: SAARC, Gujaral doctrine, Look East/ Act East, Look West.

India's Negotiation Strategies in International Regimes: The United Nations, World Trade Organisation, International Monetary Fund, Intergovernmental Panel on Climate Change.

Contemporary challenges: maritime security, energy security, environmental security, migrants and refugees, water resources, international terrorism, cyber security.

#### Unit 7 Political Institutions in India

Making of the Indian Constitution: Colonialism heritage and the contribution Indian National Movement to the making of the Indian Constitution

Constituent Assembly: Composition, Ideological Moorings, Constitutional Debates Philosophy of the Constitution: Preamble, Fundamental Rights, Directive Principles Constitutionalism in India: Democracy, Social Change, National Unity, Checks and Balances, Basic Structure Debate, Constitutional Amendments Union Executive: President, Prime Minister and Council of



Ministers Union Parliament: Structure, Role and Functioning, Parliamentary Committees Judiciary: Supreme Court, High Court, Judicial Review, Judicial Activism, Judicial Reform. Executive and Legislature in the States: Governor, Chief Minister, State Legislature Federalism in India: Strong Centre Framework, Asymmetrical Federal Provisions and Adaption, Role of Intergovernmental Coordination Mechanisms, Inter-State Council, Emerging Trends. Electoral Process and Election Commission of India: Conduct of Elections, Rules, Electoral Reforms.

Local Government Institutions: Functioning and reforms.

Constitutional and Statutory Bodies: Comptroller and Auditor General, National Commission for Scheduled Castes, National Commission for Scheduled Tribes, National Commission for Human Rights, National Commission for Women, National Commission for Minorities.

#### Unit 8 Political Processes in India

State, Economy and Development: Nature of Indian State, Development Planning model, New Economic Policy, Growth and Human Development.

Process of globalisation: social and economic implications.

Identity Politics: Religion, Tribe, Caste, Region, Language.

Social Movements: Dalit, Tribal, Women, Farmers, labour

Civil Society Groups: Non-Party Social Formations, Non-Governmental Organisations, Social Action Groups.

Regionalisation of Indian Politics: Reorganisation of Indian States, States as Political and Economic Units, Sub-State Regions, Regional disparities, Demand for New States,

Gender and Politics in India: Issues of Equality and Representation.

Ideology and Social basis of Political Parties: National Parties, State Parties.

Electoral Politics: Participation, Contestation, Representation, Emerging trends.

#### Unit 9 Public Administration

Public Administration: meaning and evolution; public and private administration

Approaches: System Theory, Decision Making, Ecological Approach

Public administration theories and concepts: Scientific Management Theory,

Rational Choice theory, New Public Administration, Development Administration,  
 Comparative Public Administration, New Public Management, changing nature of Public Administration in the era of liberalisation and Globalisation  
 Theories and Principles of Organization: Scientific Management Theory, Bureaucratic Theory, Human Relations Theory  
 Managing the organization: Theories of leadership and motivation.  
 Organisational Communication: Theories and Principles, Chester Bernard  
 Principles of Communication, Information Management in the organization  
 Managing Conflict in the Organization: Mary Parker Follett  
 Management by Objectives- Peter Drucker

#### Unit 10 Governance and Public Policy in India

Governance, good governance and democratic governance, role of state, civil society and individuals.  
 Accountability and control: Institutional mechanism for checks and balances, legislative control over executive, administrative and budgetary control, control through parliamentary committees, judicial control over legislature and executive administrative culture, corruption and administrative reforms  
 Institutional mechanisms for good governance: Right to Information, Consumer Protection Act, Citizen Charter; Grievance redress system: Ombudsman, Lokpal, Lokayukta  
 Grassroots Governance: Panchayati Raj Institutions and their functioning  
 Planning and Development: Decentralised planning, planning for development, sustainable development, participatory development, e-governance; NITI Aayog: Public policy as an instrument of socio-economic development: public policies with special reference to housing, health, drinking water, food security, MNREGA, NHRM, RTE  
 Monitoring and evaluation of public policy; mechanisms of making governance process accountable: jansunwai, social audit.

#### References:

- Chakrabarty, B., & Pandey, R. K. (2008). Indian Government and Politics. SAGE Publications Pvt. Ltd.  
 Kohli, Atul. (1991). India's Democracy: An Analysis of Changing State-Society

Relations, Orient Longman, New Delhi.

Kohli, Atul and Singh, Prema (2013), Routledge Handbook of Indian Politics, London. Routledge.

Kothari, R. (1978). The Democratic Polity and Social Change in India, New Delhi, Allied.

Bhargava, R. (ed.) (2008), Politics and Ethics of the Indian Constitution, New Delhi: Oxford University Press.

Dua, B.D., Singh, M.P. and Saxena, R. (eds.) (2006) Indian Judiciary and Politics: The Changing Landscape, Delhi: Manohar.

Malhotra, V K. (2008) International Relations (4th Rev. & Enl. Edn.) Anmol publishers.

Melone, David, Raja, Mohan and Raghvan (2016), Oxford Handbook of Indian Foreign Policy, London: OUP

Pai, S and Kumar, A. (2014) The Indian Parliament: A Critical Appraisal. Hyderabad: Orient Blackswan.

Pant, Harish. (2019). Indian Foreign Policy: An Overview. Delhi: Orient Blackswan.

..... (2010) International Relations in the 21st Century, McGraw Hill.

Sikri, Rajiv. (2009). Challenge and strategy: Rethinking India's Foreign Policy. SAGE Publications India.

Terry O'Callaghan, Martin Griffiths, Steven C. Roach, (2013) International Relations: The Key Concepts (Routledge Key Guides)

### **Journals**

Asia-Pacific Journal of Public Administration

India Quarterly

India Review

Indian Journal of Politics and International Relations

Journal of South Asian Studies

Public Policy and Administration

Strategic Analysis

Studies in Indian Politics

Indian Journal of Political Science

Indian Journal of Public Administration

\*\*\*\*\*



## **Syllabus for PhD Entrance Exam**

**January -2025**

**Department: HISTORY**

### **PART I – RESEARCH METHODOLOGY**

#### **Unit 1 – Introduction to Research Methodology**

The Meaning, Definition, Nature and Need of 'Research' –Types of Research- Research in Social Sciences and Natural Sciences – Objectivity in Research –Research Philosophy- Deductive and Inductive Reasoning - Scientific method -Basic Categories in Scientific Method – Facts – Concepts – Construct - Theory.

#### **Unit 2 – Basic Mechanics of Research and Research Ethics**

Formulation of Research Design - Research Problem and Formulation– Role of Review of Literature– Formulation of Objectives. Hypothesis; Concept, Definition, Formulation, Concepts in testing of Hypothesis. Ethics – meaning and definition- Ethics with respect to science and research, intellectual honesty, and research integrity. Scientific misconduct – falsification, fabrication, and plagiarism.

#### **Unit 3 – Sampling and Data Collection**

Sampling - Various Sampling Methods – Importance of Proper Sampling Design. Primary Data Collection - Tools – Observation, Interview, Schedule and Questionnaire – Questionnaire-Design, Structure, Types of questions - Reliability and validity of data. Secondary Data- Sources of Secondary Data- Collection of Secondary Data. –Qualitative Research – Methods –Case Study.

#### **References**

1. C R Kothari, Gaurav Garg (2019). Research Methodology: Methods And Techniques, New Age International.
2. Ranjit Kumar (2014). Research Methodology: A Step by Step Guide for Beginners, 4th Edition, Sage Publications.
3. Barbara H Stanley J Joan E Sieber, Gary B Melton. Research Ethics: A Psychological Approach. University of Nebraska Press

## **PART II – DOMAIN-SPECIFIC**

### **Unit 1 - Historiography and Historical Methods**

Definitions of History, Periodisation, and Temporal Context, Concepts of Time, Historical Consciousness and Historical Thinking, Facts in History Writing: Objectivity, Narratives and Perspectives, Causation and Generalization in History, Ideology and/in History, Subjectivity and Objectivity Debate, Different Types of sources and their use, Basics of Archiving. What is an archive? Politics of archiving., Different Approaches to writing history, Themes in history

### **Unit 2 – History and Theory**

Structuralism- Poststructuralism- Post Modernism and the Critique of Historical Objectivity- Critique of Post Modernism.

### **Unit 3 – Modern Indian History**

Different Schools of Modern Indian History: National, Marxist, Subaltern (Historiography), Peasants, Labour, Women, and Caste Movements in India, Indian National Movement, Economic History of India, Post Independence India: partition, implementing the Nehruvian model in Economics, the language debate, caste debate, India in Cold War

## **References**

1. David Arnold, Ranajit Guha, and David Hardiman, Subaltern studies: Essays in honour of Ranajit Guha (Oxford University Press, 1999).
2. E.H. Carr, What is History, 2001, Palgrave, Basingstoke
3. Derek Attridge, et al, Post Structuralism and the question of History, 1987, Cambridge University Press.
4. Dipesh Chakrabarty, Provincializing Europe: Postcolonial Thought and Historical Difference, Princeton University Press, 2000.

5. Dyos H.J., The Study of Urban History, Edward Arnold, 1968.
6. Dipesh Chakrabarty, Habitations of Modernity, Orient Blackswan, 2004.
7. Fernand Braudel, Of History, Chicago University Press, 1980.
8. Janaki Nair, Women and Law in Colonial India, New Delhi: Kali for Women, 1996.
9. Jan Vansina, The Oral Tradition, London, 1965.
10. Jayapalan N., Historiography, Atlantic Publishers & Distributors, 2004.
11. Joan Kelley, Women, History and Theory, Chicago University Press, 1984.
12. Joan Wallach Scott, Gender and the Politics of History, New York Columbia University Press, 1988.
13. John Sturrock, Structuralism, 2nd edition, Blackwell, 2003
14. Kumkum Sangari, Uma Chakravarti, and Indian Institute of Advanced Study, From Myths to Markets: Essays on Gender, Indian Institute of Advanced Study, 1999.
15. Sarkar, Sumit 1983, Modern India, 1886-1947, Basingstoke/London: Macmillan.
16. Sarkar, Sumit 1997, Writing Social History, New Delhi: OUP.
17. Sarkar, Sumit 2002, Beyond Nationalist Frames. Relocating Postmodernism, Hindutva, History, New Delhi: Permanent Black

\*\*\*\*\*



**ST ALOYSIUS**  
(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 - INDIA

**SYLLABUS FOR PHD ENTRANCE EXAM**  
**JANUARY – 2025**

**DEPARTMENT: PSYCHOLOGY**

**Part A**

**Research Methodology**

Unit 1 Meaning of research, research methods, and research process

Unit 2 Research problem selection, Research Design

Unit 3 Parametric & Non-Parametric Statistics

Unit 4 Qualitative Research

Unit 5 Research Proposal

**Suggested Readings:**

1. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
2. Leedy, P. D., & Ormrod, J. E. (2020). Practical research: Planning and design (12th ed.). Pearson.
3. Gravetter, F. J., & Wallnau, L. B. (2017). Statistics for the behavioral sciences (10th ed.). Cengage Learning.
4. Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). The SAGE handbook of qualitative research (5th ed.). SAGE Publications.
5. Punch, K. F. (2006). Developing effective research proposals (2nd ed.). SAGE Publications.

## **Part B**

### **Subject-specific**

#### **Unit 1, 2, 3, 4 are compulsory. Rest of the units are based on specialisation**

Unit 1 Attention, perception, Learning, Memory, Emotions, Motivation, Thinking, intelligence, creativity, Personality

Unit 2 Psychological Testing & Assessment

Unit 3 Social psychology

Unit 4 Biological basis of behaviour

Unit 5 Life span development

Unit 6 Psychopathology

Unit 7 Health Psychology

Unit 8 I/O Psychology

Unit 9 Positive Psychology

#### **Suggested Readings:**

1. Baron, R. A., Branscombe, N. R., & Byrne, D. (2016). Social psychology (14th ed.). Pearson.
2. Kalat, J. W. (2019). Biological psychology (13th ed.). Cengage Learning.
3. Ciccarelli, S. K., & White, J. N. (2017). Psychology (5th ed.). Pearson.
4. Gregory, R. J. (2019). Psychological testing: History, principles, and applications (8th ed.). Pearson.
5. Santrock, J. W. (2020). Life-span development (18th ed.). McGraw-Hill Education.
6. Nevid, J. S. (2020). Essentials of abnormal psychology (8th ed.). Cengage Learning.
7. Taylor, S. E. (2017). Health psychology (10th ed.). McGraw-Hill Education.
8. Snyder, C. R., Lopez, S. J., & Pedrotti, J. T. (2018). Positive psychology: The scientific and practical explorations of human strengths (4th ed.). SAGE Publications.





## **Syllabus for PhD Entrance Exam January -2025**

### **Department: SOCIAL WORK**

#### **Part I – Research Methodology**

- Unit 1 Introduction to Research: Concept and significance of research–types of research, research design–selection and formulation of research problem–objectives and hypotheses. Problem formulation, operationalization of variables, literature view and application of theory in research,
- Unit 2 Research Design: Quantitative and qualitative research designs such as survey research, participatory action research, evaluation research, ethnographic, phenomenological, and case studies. Quantifying data; Qualitative and quantitative data analysis
- Unit 3 Sample and Sample Design. The logic and process of sampling of quantitative and qualitative. Data Collection: Sources of data: Types of Data (Categorical and Numerical). Methods of Data collection.
- Unit 4 Report writing- Report–types of report- steps in preparation of report- Structure, Layout and Language of report- Illustrations and Tables. Bibliography, Referencing, and Foot Notes. Preparation of Project Proposal- References (Styles of referencing). Budget and Justification.
- Unit 5 Research Ethics: Research Ethics – Ethics Committee/Review Board. Intellectual Property rights –Reproduction of Published Material. Citation and Acknowledgement, Plagiarism.

#### **References:**

1. Fortune, A. E., & Reid, W. J. (1999). *Research in social work*, 3rd ed. New York: Columbia, University Press.
2. Babbie, Earl and Monton, Johann (2002), *The Practice of Social Research*, .Cape Town: Oxford University Press.

3. Black, Thomas R. (2003), *Doing Quantitative Research in the Social Sciences*. Sage, London
4. Compton, Beulah R. and Galaway, Burt (1979), *Social Work Process*. Homewood, 111: The Dorsey Press.
5. Dooley, David (2001), *Social Research Methods*. Upper Saddle River, New Jersey: Prentice Hall.
6. Rubin Allen (2009), *Essential Research Methods for Social Work*, Wadsworth Publishing, New York

## **PART II – DOMAIN SPECIFIC**

### **Unit 1 Social Work Theory and Methods**

- An overview of the methods of social work (casework, group work, community organisation, social action) and their applicability in the contemporary world.
- Critical analysis of the principles of social work with critical application of ethical issues in practice
- Grand Macro level social theoretical framework in social work: (Marxism, Humanistic theory, existentialism)
- Middle range theories: (psychodynamic theory, cognitive theory, conflict theory, systems theory, ecological perspective, social learning theory):
- Micro level theories, (psychoanalytic theory, psychosocial theory, role theory), modernity and post-modernity
- Social work practice models: problem solving process, crisis intervention, task centered approach, problem solving, locality development model, cognitive behavioural approach in counseling

### **Unit 2 Community Organisation and Development**

- Theoretical perspectives of community development and their application in different contexts, assessing community needs and resources, community organizing techniques and outcomes, community mobilization, resource generation,
- Planning for social action change in communities, developing strategic plans/ social and economic development in community planning and social action,
- Capacity building and training of trainers in community mobilization and action, the role of globalization in community planning and action, and strategies of collective action and organizing

### **Unit 3 Human Rights and Social Justice**

- Conceptualization of the core foundations (Human Rights, Social Justice and Professional conduct) and their role, effectiveness, strengths, limitations

- The meaning and conceptualisation of social and economic justice in different contexts; social and economic justice as a basic human right; the continuum of basic human rights and resource distribution; the conceptualisation of justice, meaning of social justice, social justice, and its relationship with economic justice; the problems involved in practical implementation of social and economic justice; and dimensions of social justice in relation to the family and minority groups in society.
- Critical application of ethical issues in practice, alongside the principles (acceptance, self-determination, individualism etc)

#### Unit 4     **Programme Planning and Management**

- Project Identification & Project Sequences (cycles)
- Application of Logical Framework Approach (LFA), Stakeholder analysis, Community participatory techniques,
- Strategic planning for positive social change, understanding and solving organizational and community problems, challenges of employees in social service agencies.
- Monitoring and evaluation of financial statements in social service delivery services, improving internal and external communication,
- Fundraising for service delivery, designing service delivery programs, volunteer programs in social service delivery and resource development for effective management of social service delivery agencies

#### Unit 5     **Social Policy Development and Analysis**

- The nature of social policy and its formulation, social policy and culture, importance of social policy in development, housing, disability, youth at risk, maternal child health care services, social protection through social policy,
- Social policy analysis process and its challenges, social policy formulation, actors in social policy formulation and implementation
- Challenges of policy implementation and evaluation, the situation of social welfare, and implementation in the world today.

## Unit 6     **Gender Issues in Development**

- Meaning and conceptualization of gender in different contexts, meaning of gender and its role in development, meaning of development, concepts in gender analysis,
- Implication and effect of gender in social work practice and discourse
- Gender violence and conflict resolution, gender reconstruction wheel,
- Gender and employment, gender and law, gender and religion, gender issues in democracy, governance and political participation,
- Gender and reproductive health, gender and technology transfer, gender theories, environment and globalization

## Unit 7     **Psychology & Health Service**

- The biological and environmental foundations of human growth and development, nature vs. Nurture in human growth and development, cognitive emotional and physical phases of elderly development,
- Principles and approaches of counselling, social and psychological aspects of counselling, counselling theory, the social-cultural counselling and challenges of counselling in different social-cultural contexts
- Indian Public Health Care System, Health policy and health quality assurance, inequalities in health and mechanisms for reduction

## **References:**

1. Berlin, S. B., & Marsh, J. C. (2006). *Generic Methods of Social Practice*. New York: Macmillan.
2. Browne, N., & Keeley, S. (2001). *Asking the right questions: A guide to critical thinking in Social Work*. Upper Saddle River, NJ: Prentice Hall
3. Fawcett, S. B. et al (2009). Conducting intervention Social work—the design and
4. development process; In J. Rothman & E. J. Thomas (Eds.) (2000), *Intervention research: Design and development for human service*. (pp. 25– 56). New York: Haworth Press.
5. Fortune, A. E., & Reid, W. J. (1999). *Research in social work*, 3rd ed. New York: Columbia, University Press.
6. Geddes, J. (2000). Evidence-based Social Work Practice. In L. Trinder & S.

- Reynolds (Eds.), *Evidence-based practice: A critical appraisal* (pp. 66–88). Malden, MA: Blackwell Science.
7. Gerdes, K. E., et al (2011). Modern Approaches in Social Work practice: A critical evaluation of procedures. *Columbia University Press*, 6 (1), 27–39.
  8. Gibbs, L. E. (2012). *Scientific reasoning for social workers: Bridging the gap between research and practice*. New York: Macmillan.
  9. Daley James G. (2006), *Advances in Social Work: Special Issue on The Futures of Social Work*, Indiana University School of Social Work, USA
  10. Giddens, A. (2007), *Capitalism and Modern Social Theory*. Cambridge: Verso.
  11. Johnson, D.P. (2008), *Sociological Theory: Classical Founders and Contemporary Perspectives*. New York: Macmillan.
  12. Karen H. Lyons, Robin Lovelock , Jackie Powell [Eds], (2004 ), *Reflecting on Social Work: Discipline and Professional* (Contemporary Social Work Studies) Ashgate Publishing, New York
  13. Kellner, D. (2005), *Critical Theory, Marxism and Modernity*. Cambridge: Polity.
  14. Mouzelis, N. (2009), *Sociological Theory: What Went Wrong?* London: Routledge.
  15. Ritzer, G. and Smart, B. (eds.) (2001). *The Handbook of Social Theory*. London: Sage.
  16. Abel Giatu Mugendi (2008) *Social Science Research: Theory and Principles*, Acts Press, Nairobi, Pgs, 1-23
  17. Baum, W.C and Tolbert S.M. (2009) *Investing in Development, Lessons from the World bank*, New York, Oxford University Press, pg. 298-335
  18. Bradley J, et al (2007), *Marriage, Domestic Violence and Child Development*, Bell and Sons Publishers, London.
  19. Marvin H. R, (2009) "*Culture, People and The Family*" Allyn and Balcon Ltd, London
  20. Marvin Harris (2006) *Culture, Man and Society*. Edger and Sons Publishing, London
  21. Morrison, S. (2010), *Gender and Economic Development: New dimensions in theory*. W.W. Norton and Company Inc, New York:
  22. Cordilia, F. (2010) *Delusions of Gender: Effects on Human Wellbeing*, W. W. Norton and Company Inc, ISBN 03930168382
  23. Emma, T. (2011) *Gender, Faith and Development: Practical Action Publishing*,

Oxfam, UK

24. Blown, M. J. (Ed.) (2009), Gender based Holistic Development: Theory and Methods of Planned Change. New Delhi: Vikas Publishing House.
25. Harrison Gough (2007), "A sociological theory of psychopathy" American Journal of Sociology, St. Louis, 15, Pp. 102-112
26. Peter G. Bourne (ed) (1997), Delinquency and drug abuse; New York; Academic Press.
27. Ross W. H and Monroe J. J. (2008), Personality and narcotic addicts. Journal of Clinical Psychology; 29, pp.105-122
28. Spitzer Steven (2008), "Towards a Marxian theory of deviance", New York: Harper & Row. Pp.2-35.
29. Gove Walter R. (2011), The Labelling of Deviance and Crime Motives, New York: Sage/Halsted pp.35-81.
30. Ginter L.(2002), Strategic Management of Healthcare Organization, Blackwell Learning. London
31. Christopher G. Petr (2003), *Social Work with Children and Their Families: Pragmatic Foundations (Sociology & Social Work)*, Oxford University Press, UK
32. Lambert Maguire (2001), *Clinical Social Work: Beyond Generalist Practice with Individuals, Groups and Families*, Brooks Cole, Belmont, California, USA
33. Stretch, J.J. (ed) (2003), Practicing Social Justice. New York: Haworth Press.

\*\*\*\*\*



## Syllabus for PhD Entrance Exam January -2025

### Department: CHEMISTRY

#### PART I – RESEARCH METHODOLOGY

- Unit 1     **Research:** Definition, characteristics, objectives, scientific research, need and importance of research. Types of Research, significance of research in chemical sciences, Research Strategies - meaning and types.
- Unit 2     **Research Problem** – Identification and meaning, selecting and formulation of a problem, Research objectives- research design, hypothesis, significance and report writing.
- Unit 3     **Review of Literature** – meaning and need for literature review, sources of literature review, reporting the review of literature, identification of research gap. Print Sources of information – Primary, Secondary, Tertiary sources.
- Unit 4     **Scientific Writing:** Scientific document, Organization and writing of research paper, short communications, review articles, monographs, technical and survey reports, authored books, edited books and dissertation.
- Unit 5     **Research Ethics and Intellectual Property Rights (IPR):** Ethics – meaning and definition, Ethical issues, ethical committees. Rights and obligations of Research Participants. Scientific misconduct – falsification, fabrication and plagiarism. Publication ethics – meaning and importance, plagiarism and Self-plagiarism. Intellectual property rights and patent laws.

#### References:

1. Kothari C R., Research methodology: Research & Techniques, New Age International Publishers, New Delhi.
2. A K Singh, Tests, Measurements and Research Methods in Behavioral Sciences, Bharathi Bhawan (Publishers & Distributors), New Delhi.
3. David I Bainbridge (2012), Intellectual Property Rights, Long man Publication.
4. Y. K Singh., Fundamentals of Research Methodology and Statistics, New International (P) Ltd., New Delhi.



## Part II – Domain Specific

- Unit 1     **Acids and Bases:** Factors affecting strengths of hydracids, oxoacids and Lewis acids and bases, Hard & soft acid-bases, Lux-Flood, Usanovich & solvent system definition of acids and bases, solvent levelling effect, HSAB concepts, Symbiosis. Super acids - Hammett acidity function,
- Unit 2     **Coordination Chemistry:** Coordination numbers 2-10 and their geometry, Crystal Field Theory- Salient features, d-orbital splitting in octahedral, tetrahedral, square planar and tetragonal complexes, spectrochemical series, Jahn-Teller distortions.
- Stability of Metal Complexes - Stepwise and overall formation constants, factors affecting stability of metal complexes, determination of stability constants of metal complexes by spectrophotometry (Job's method)
- Unit 3     **Stereochemistry;** Chiral centres, chirality, Chiral molecules, **Optical Isomerism:** Conformation and configuration of molecules, (R,S) system of nomenclature, threo and erythro isomers, methods of resolution, stereo specific and stereo selective synthesis, Optical activity in the absence of chiral carbon-biphenyls, allenes and spiranes. Stereochemistry of compounds containing nitrogen, sulphur and phosphorus. Conformational analysis of cycloalkanes and decalins.
- Unit 4     **Organic Name Reactions:** Reactions and Mechanisms of the following: Stobbe condensation, Darzen condensation, Gattermann-Koch reaction, Cannizzaro reaction, Chichibabin reaction, Benzoin condensation, Claisen-Schmidt condensation, Simon-Smith reaction, Stork Enamine reactions, Hofmann-Löffler-Freytag reaction, Woodward and Prevost Hydroxylation, Bucherer reaction, Ullmann reaction. Wittig reaction-Mitsunobu reaction, Stephen reaction.
- Unit 5     **Aliphatic Nucleophilic Substitution Reactions:** Mechanism of aliphatic nucleophilic substitution reactions -  $S_N1$ ,  $S_N2$  and  $S_Ni$ . Stereochemistry of nucleophilic substitution reactions. allylic, vinylic and benzylic nucleophilic substitution reactions, neighbouring group. Factors influencing the rates of nucleophilic substitution reactions.
- Aliphatic Electrophilic Substitution Reactions:** Bimolecular mechanisms -  $S_E1$ ,  $S_E2$  and  $S_{Ei}$  mechanism

- Unit 6**      **Chemical kinetics:** Complex reactions- parallel, consecutive and reversible reactions. Photochemical (hydrogen-halogen reactions- derivation of rate equation for  $\text{H}_2\text{-Br}_2$ ) and oscillatory reactions. Substituent effects on the rates of reactions-Hammett and Taft equations, Collision and transition state theory of reaction rates, catalysis- homogenous, heterogenous and enzyme catalysis. Michaelis Menten equation.
- Surface reaction kinetics:** adsorption isotherms, Langmuir and Freundlich isotherm. Multilayer adsorption-BET equation-its derivation and application in surface area determination.
- Unit 7**      **Electrochemistry:** Nernst equation, Kohlrausch law of independent migration of ions. Activities in electrolytic solutions, mean activity coefficient Ionic atmosphere, Debye – Huckel - Onsager equation of conductivity and its validity. Galvanic cells. Reference electrodes, Calomel, Quinhydrone, Ag-AgCl and glass electrode.
- Unit 8**      **Chromatography** - Introduction; classification - types of chromatography, partition and adsorption,  $R_f$  value. Principle and Applications of Thin layer, paper and column chromatography, Gas chromatography, HPLC and Ion exchange chromatography.
- Thermal Methods of Analysis:** Principle and applications of TGA, DTA and DSC.
- Optical Methods of analysis:** Principle and applications of AAS, AES and spectrofluorimetry.
- Unit 9**      **Microwave Spectroscopy:** rotation spectra of diatomic and polyatomic molecules. Rigid and non-rigid rotator models. Derivation of the expression for moment of inertia of diatomic molecule, isotope effect on rotation spectra. Moment of inertia expression for linear polyatomic molecules.
- Vibrational Spectroscopy:** Vibration spectra of diatomic molecules - linear harmonic oscillator, vibrational energies, zero point energy, force constants and bond strengths, energy curves for simple harmonic oscillator. Anharmonicity of molecular vibrations - Morse potential energy diagram, fundamental, overtones and hot bands.

**Unit 10 UV absorption spectroscopy:** Beer-Lambert law, Molar absorptivity, theory of electronic spectra, formation of bands, effect of conjugation with examples; Concept and effect of addition of chromophore and auxochrome. Absorption and intensity shifts- Bathochromic, hypsochromic, hyperchromic and hypochromic shifts.

**NMR AND MASS SPECTROMETRY:**

Shielding and deshielding in NMR, Nuclear magnetic resonance ( $^1\text{H}$  and  $^{13}\text{C}$ ) Spectroscopy- Chemical shift, factors affecting chemical shift values.

**Mass Spectrometry:** Basic principles, ionization technique MALDI, molecular ions, meta-stable ions and isotope ions. Fragmentation processes- representation of fragmentation, basic fragmentation types and rules. McLafferty rearrangement.

**References:**

1. Puri, Sharma and Kalia (2016), Principles of Inorganic chemistry, Vishal Publishing House, 33rd Edition.
2. J. D. Lee (2014), Concise Inorganic Chemistry, Blackwell Science, 5th Edition
3. K. J. Laidler (2003), Chemical Kinetics, Harper and Row, 3rd Edition.
4. S. Glasstone (2006), Electrochemistry, Affiliated to East-west press, 1st Edition.
5. Bockris and Reddy (1998), Modern electrochemistry - vol I 2A & 2B, Plenum, New York, 2nd Edition
6. Gurudeep R. Chatwal, (2010), Instrumental methods of Chemical Analysis, S Chand.
7. R. A. Day and A. L. Underwood (2008), Quantitative Analysis, Prentice-Hall, 6th Edition
8. A. Bahl and B. S. Bahl (2019), A Textbook of Organic Chemistry, S. Chand Publications, 22nd Edition.
9. P. Y. Bruice (2018), Organic Chemistry, 3rd Edition
10. V. K. Ahluwalia and K. Parashar (2006), Organic Reaction Mechanisms, Narosa Publishers, 3rd Edition.
11. Banwell & McCash (2015), Fundamentals of Molecular Spectroscopy, Tata McGraw Hill, 5th Edition.
12. Y. R. Sharma (2013), Elementary organic spectroscopy, S. Chand, 5th Edition.



**Syllabus for PhD Entrance Exam  
January -2025**

**Department: Physics**

**Part I – Research Methodology**

- Unit 1      **Research:**  
Research – meaning, characteristics, objectives, motivation in research, need and importance of research. Types of Research.
- Unit 2      **Ethics:**  
Ethics – meaning and definition, Ethics vs moral philosophy, nature of moral judgments and reactions. Rights and obligations of Research Participants. Scientific conduct – ethics with respect to science and research, intellectual honesty and research integrity.
- Unit 3      **Research Problem**  
Meaning, selecting the problem, sources of problem, statement of a problem; Review of Literature – meaning and need for literature review, sources of literature review, reporting the review of literature, identification of research gap; Research Questions; Objectives of the study.
- Unit 4      **Research Report**  
meaning, features of a good Research Report, elements of Research Report, format of a Research Report, Appendices and References/ Bibliography – styles.  
Research design, system of interest- experimental setup-characterization-data acquisition-data analysis-reproducibility-statistical and error analysis-application studies - relevance of research.
- Unit 5      **Publication Ethics:**  
Scientific misconduct – falsification, fabrication and plagiarism. Publication ethics – meaning and importance, conflicts of interest, publication misconduct – meaning, problems that lead to unethical behaviors, types of publication misconduct, identification of publication misconduct,

complaints and appeal.

**References:**

1. Kothari C R. Research methodology: Research & Techniques. New Age International Publishers, New Delhi.
2. A K Singh. Tests, Measurements and Research Methods in Behavioral Sciences. Bharathi Bhawan (Publishers & Distributors), New Delhi.
3. Singh Y K. Fundamentals of Research Methodology and Statistics. New International (P) Ltd., New Delhi.

## Part II – Domain Specific

- Unit 1 **Mathematical Physics:** Vector analysis, curvilinear coordinates, Matrices and determinants, differential equations, partial differential equations, special functions, complex analysis, group theory, Integral transforms and numerical techniques
- Unit 2 **Classical mechanics:** Constraints, Lagrangian formalism, Hamiltonian formalism, central force problem, equation of orbits, rigid body problem, Euler's equations.
- Unit 3 **Electrodynamics:** Electrostatics, magnetostatics, Maxwell's equations, conservation of energy, dipole radiation, electro magnetic waves.
- Unit 4 **Quantum Mechanics:** Schrodinger equation, Potential well problem, Harmonic oscillator, Angular Momentum, Scattering, Relativistic quantum mechanics, Klein Gordon equation, Dirac's equation, Perturbation theory (Time independent and Time dependent), Variational method, WKB approximation.
- Unit 5 **Condensed Matter Physics:** Crystallography, Free electron theory, Band theory, Magnetism, superconductivity, thin film technology, smart materials, nanotechnology.
- Unit 6 **Nuclear Physics:** Properties of nuclei, Alpha, beta and gamma decay, nuclear radiation detection, nuclear reactions, nuclear forces, nuclear models, particle physics.
- Unit 7 **Electronics:** OpAmps and applications. Integrators, Differentiators, Filters. Waveform generators. Transducers and Power amplifiers. Digital electronics: K map, flip-flops.
- Unit 8 **Thermodynamics and Statistical Physics:**  
Laws of thermodynamics and their consequences. Thermodynamic potentials, Maxwell relations, chemical potential, phase equilibria. Phase space, micro- and macro-states. Micro-canonical, canonical and grand-canonical ensembles and partition functions. Free energy and its connection with thermodynamic quantities. Classical and quantum statistics. Ideal Bose and Fermi gases. Principle of detailed balance. Blackbody radiation and Planck's distribution law.
- Unit 9 **Atomic & Molecular Physics**  
Quantum states of an electron in an atom. Electron spin. Spectrum of helium and alkali atom. Relativistic corrections for energy levels of hydrogen atom, hyperfine structure and isotopic shift, width of spectrum lines, LS & JJ couplings. Zeeman, Paschen-Bach & Stark effects. Electron spin resonance.

Nuclear magnetic resonance, chemical shift. Frank-Condon principle. Born-Oppenheimer approximation. Electronic, rotational, vibrational and Raman spectra of diatomic molecules, selection rules. Lasers: spontaneous and stimulated emission, Einstein A & B coefficients. Optical pumping, population inversion, rate equation. Modes of resonators and coherence length.

#### Unit 10 **Instrumentation**

Transducers (temperature, pressure/vacuum, magnetic fields, vibration, optical, and particle detectors). Measurement and control. Signal conditioning and recovery. Impedance matching, amplification (Op-amp based, instrumentation amp, feedback), filtering and noise reduction, shielding and grounding. Fourier transforms, lock-in detector, box-car integrator, modulation techniques. High frequency devices (including generators and detectors).

#### **References:**

1. Barron R F: Cryogenics Systems (2nd Edition (Oxford university Press 1985)
2. Roth A: Vacuum Technology (2nd Edition North Holland, 1982)
3. Arfken G B, Weber H J, Harris F E, 'Mathematical Methods for Physicists', (VII Edn. Academic Press, 2013)
4. Harper C, 'Introduction to Mathematical Physics', (PHI, 1978)
5. Mary L Boas, 'Mathematical Methods in the Physical Sciences', (John Wiley, 1983)
6. Kittel C, 'Introduction to Solid State Physics', (VIII Edn. Wiley India, 2005)
7. Ashcroft N W, Mermin N D, 'Solid State Physics', (Harcourt Asia, 1974)
8. Cullity B D, Stock S R, 'Elements of X-ray Diffraction', (Prentice Hall, 2001)
9. Goswami A, 'Thin film fundamentals', (New Age International, 1996)
10. Ohring M, 'The Materials Science of Thin films', (Academic Press, 1992)
11. Glenn F Knoll, "Radiation Detection and Measurement", Tata McGraw Hill (2007).
12. Krane K. S., "Introductory Nuclear Physics", Wiley Eastern (2010).
13. Schiff L I, 'Quantum Mechanics' (III Edn. McGraw Hill 1968)
14. Griffiths D J, 'Introduction to Quantum Mechanics', (II Edn. Pearson, 2011)
15. Goldstein H, Poole P.C, Safko J 'Classical mechanics', (III Edn, Pearson 2011)
16. Landau L D, Lifshitz E M, 'Mechanics - A course on theoretical Physics - Volume I', (Elsevier, 2007)
17. Griffiths D J, 'Introduction to Electrodynamics', (III Edn. PHI, 2009)
18. Jackson J D, 'Classical Electrodynamics', (III Edn. John Wiley, 1999)



**ST ALOYSIUS**  
(DEEMED TO BE UNIVERSITY)  
MANGALURU 575003 - INDIA

## Syllabus for PhD Entrance Exam

January -2025

**Department: Biotechnology**

### Part I – Research Methodology

- Unit 1    **Foundations of research:** Concepts of research: Definition of research, the need for research. Types of research -purpose driven and method based.
- Unit 2    **Research Methodology:** Selecting and defining a research problem: Criteria for selecting a problem, techniques involved. Research design –Need for Research design, features of a good design, important experimental designs.
- Unit 3    **Research Ethics:** Scientific conduct – ethics with respect to science and research, intellectual honesty and research integrity. Scientific misconduct – falsification, fabrication and plagiarism.
- Unit 4    **Intellectual Property Rights:** Basics of patents, trademarks, copyrights, industrial designs, geographical indications, and traditional knowledge.
- Unit 5    **Scientific communication:** Scientific presentations- scientific poster preparation; PowerPoint presentation.  
Types of reports- Abstract, research articles/ thesis. Elements of a scientific paper, Styles for citing references, Impact Factor of Journals.

### References:

1. Hochberg, M. (2019). An Editor's Guide to Writing and Publishing Science, United Kingdom: Oxford University Press.
2. Johnson, S., & Scott, J. (2019). Study and Communication Skills for the Biosciences, 3<sup>rd</sup> ed., United Kingdom: Oxford University Press.
3. Kothari, S. R. (2012). Research Methodology Methods and Techniques, New Age: New Age International (P) Ltd.
4. Matthews, J. R., & Matthews, R. W. (2021). Successful Scientific Writing (A Step-by-Step Guide for the Biological and Medical Sciences), 4<sup>th</sup> ed., United Kingdom: Cambridge University Press.
5. Muralidhar, K., Ghosh, A., & Singhvi, A. K. (2019). Ethics in Science Education, Research and Governance, India: Indian National Science Academy (INSA).



## Part II – Domain Specific

- Unit 1 **Molecules and their interaction relevant to Biology:** Structure and function of biomolecules (carbohydrates, lipids, proteins, nucleic acids and vitamins), Principles of biophysical chemistry (pH, buffer, reaction kinetics, Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, Conformation of proteins and nucleic acids; Metabolism of carbohydrates, lipids, amino acids nucleotides and vitamins.
- Unit 2 **Cellular Organization:** Membrane structure and function, Structural organization and function of intracellular organelles, Organization of genes and chromosomes, Cell division and cell cycle.
- Unit 3 **Fundamental Processes of Molecular Biology:** DNA replication, repair and recombination, RNA synthesis and processing, Protein synthesis and processing, Control of gene expression at transcription and translation level.
- Unit 4 **Cell communication and cell signalling:** Host parasite interaction, virus-induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells. Cell signaling Hormones and their receptors, oncogenes, tumor suppressor genes, cancer and the cell cycle, virus-induced cancer, Innate and adaptive immune system.
- Unit 5 **Developmental Biology:** Basic concept of plant and animal developmental biology.
- Unit 6 **Plant System Physiology** - Photosynthesis, CO<sub>2</sub> fixation-C<sub>3</sub>, C<sub>4</sub> and CAM pathways. B. Respiration and photorespiration; Nitrogen metabolism - Nitrate and ammonium assimilation; amino acid biosynthesis; Plant hormones ; Secondary metabolites, Stress physiology – Responses of plants to biotic and abiotic stresses.
- Unit 7 **Animal System Physiology:** Cardiovascular System, Respiratory system, Nervous system, Sense organs, Excretory system, Digestive system, Endocrinology and reproduction
- Unit 8 **Environmental Biotechnology:** Biodiversity, its threats, and conservation, Values and types of Biodiversity. *Conservation: In-situ and Ex-situ* Conservation. Pollution of air, water and soil, and the control measures.
- Unit 9 **Food Microbiology and Preservation:**  
Biochemical changes in food (rancidity, enzymic browning, nutritional changes, flavor changes, Maillard reactions). Mechanism of action of

exotoxins (enterotoxins) and endotoxins. Microbial food poisoning.

Natural preservatives, pasteurization, dehydration, canning, irradiation, refrigeration, canning, pickling of food.

Unit 10 **Applied Biology:** Microbial fermentation and production of small and macro molecules; Application of immunological principles- vaccines, diagnostics. Tissue and cell culture methods for plants and animals; Transgenic animals and plants, molecular approaches to diagnosis and strain identification. Genomics and its application to health and agriculture, including gene therapy; Bioresource and uses of biodiversity. Breeding in plants and animals, including marker – assisted selection; Bioremediation and phytoremediation; Biosensors

### References:

1. Alberts, B., Hopkin, K., Johnson, A., Morgan, D., Lewis J., Raff M., Roberts, K., & Walter, P., (2019). Essential Cell Biology, International student edition, 5<sup>th</sup> ed., New York: W. W. Norton & Co.
2. Buchanan, B. B., Gruissem, W., & Jones, R. L. (2015). Biochemistry and Molecular Biology of Plants, 2<sup>nd</sup> ed, United States: Wiley Blackwell.
3. De, A. K., (2019). Environmental Chemistry, 9<sup>th</sup> ed., New Delhi: New Age International Pvt. Limited.
4. Freshney, R. I. (2016). Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, 7<sup>th</sup> ed., United States:Wiley-Blackwell.
5. Lee, B. H. (2015). Fundamentals of Food Biotechnology, 2<sup>nd</sup> ed., United Kingdom: Wiley- Blackwell Publishers.
6. Owen, J., Jenni P. J., & Stranford, S. (2018). Kuby Immunology, 8<sup>th</sup> ed., New York: W. H. Freeman.
7. Stanburry, P. F., Whitaker, A., & Hall, S. (2016). Principles of Fermentation Technology, 2<sup>nd</sup> ed., United Kingdom: Butterworth Heinemann.
8. Tropp, B. E. (2020). Molecular Biology: Genes to Proteins, 5<sup>th</sup> ed., New York: Jones & Bartlett Learning.
9. Voet, D., & Voet, J. G. (2016). Biochemistry, 5<sup>th</sup> ed., Hoboken, New Jersey: J. Wiley & Sons.
10. Wolpert, L. (2011). Developmental Biology: A Very Short Introduction, 1<sup>st</sup> ed., United Kingdom: Oxford University Press.

\*\*\*\*\*



**Syllabus for PhD Entrance Exam**

**January -2025**

**Department: BIOCHEMISTRY**

**Part I – RESEARCH METHODOLOGY**

**Unit 1 Research and Types of Research**

**Meaning of Research:** Definition, scope, and significance.

**Types of Research:** Primary, secondary, qualitative, quantitative, basic, applied, fundamental, and empirical research.

**Research Problem Identification:** Approaches to identify and frame research problems.

**Objectives of Research:** Formulating objectives and understanding criteria for good research.

**Unit 2 Data Collection and Interpretation**

**Sources of Data:** Primary and secondary data sources.

**Types of Data:** Categorical (nominal, ordinal) and numerical (discrete, continuous, ratio, interval).

**Data Collection Methods:** Surveys, in-depth interviews, focus group discussions (FGDs), observational methods, experimental records.

**Sampling and Errors:** Sampling techniques, sampling errors, statistical errors.

**Statistical Methods and Tools:** Central tendency, variation, hypothesis testing (z-test, t-test, F-test, ANOVA, Chi-square), correlation and regression analysis, error estimation.

**Statistical Graphics:** Histograms, frequency polygons, ogives, dot plots, stem plots, bar graphs, Pareto charts, pie charts, scatterplots, boxplots.

**Unit 3 Scientific Writing**

**Project Proposal Preparation:** Structuring titles, abstracts, rationales, objectives, methodology, timelines, work plans, budgeting, and referencing.

**Scientific Report Components:** Structure and significance of technical reports and theses, components of research reports.

**Research Metrics:** Understanding impact factor, h-index, i10-index, and other parameters.

Unit 4 **Research Ethics**

**Ethics in Research:** Plagiarism types, ethical misconduct (self-plagiarism, ghost-writing, salami publications, undue benefits), publishing ethics.

Unit 5 **Intellectual Property Rights**

**Introduction to IPR:** Basics of patents, trademarks, copyrights, industrial designs, geographical indications, and traditional knowledge.

**References:**

1. Marder M.P. (2011). *Research Methods for Science*. Cambridge University Press.
2. Rosner B. (2010). *Fundamentals of Biostatistics*, 7th Edition. Brooks/Cole Cengage Learning.
3. Dunleavy P. (2003). *Authoring a PhD*. Palgrave Macmillan.
4. Kothari, C. (2017). *Research Methodology: Methods and Techniques*. New Age International.

## Part II – DOMAIN SPECIFIC

### Unit 1 **Fundamentals of Biochemistry**

**Principles of Life:** Supramolecular structures, importance of weak noncovalent interactions.

**Water and pH:** Structure, ionization, acid-base concept, pH, and buffers.

**Thermodynamics in Biology:** Laws of thermodynamics, ATP and energy coupling, Gibbs free energy in biological systems.

### Unit 2 **Biomolecules**

**Carbohydrates, Amino Acids, Proteins, Lipids, and Nucleic Acids:** Structure, classification, properties, and functions.

**Immunoglobulins:** Structure, formation, and various forms and functions.

### Unit 3 **Enzymology**

**Enzyme Kinetics:** Basic principles, Michaelis-Menten kinetics.

**Catalysis and Regulation:** Mechanisms of catalysis, enzyme regulation, and inhibition.

### Unit 4 **Metabolic Pathways**

**Carbohydrate Metabolism:** Glycolysis, Gluconeogenesis, Glycogen metabolism.

**Central Energy Pathways:** TCA cycle, Oxidative phosphorylation.

### Unit 5 **Macromolecule Metabolism**

**Amino Acid Metabolism:** Pathways and regulatory mechanisms.

**Nucleotide and Lipid Metabolism:** Synthesis, degradation, and regulation.

### Unit 6 **Molecular Biology of Genes**

**Genome Organization:** Complexity, organization in prokaryotes and eukaryotes, chromatin structure.

**DNA Structure and Replication:** Semi-conservative replication, DNA polymerases, topoisomerases, ligases, and replication inhibitors.

### Unit 7 **Gene Expression and Regulation**

**Transcription:** Basic principles, stages (initiation, elongation, termination), RNA processing, RNA interference.

**Translation:** Ribosome structure, genetic code, aminoacyl tRNA synthetases,

translation stages, inhibitors.

**Gene Regulation:** Mechanisms in prokaryotes and eukaryotes, post-translational modifications.

#### Unit 8 **Techniques in Biochemistry and Molecular Biology**

**Chromatography:** Principles and applications of paper, thin-layer, column, gel filtration, ion exchange, affinity, HPLC, FPLC.

**Electrophoresis:** Techniques including native PAGE, SDS-PAGE, 2D-PAGE, and capillary electrophoresis.

#### Unit 9 **Analytical Techniques**

**Centrifugation:** Types, applications, preparative and analytical ultracentrifugation.

**Spectroscopy:** UV-VIS, fluorescence, FTIR, NMR, ESR, X-ray spectroscopy.

**Mass Spectrometry:** MS/MS, LC-MS, GC-MS, MALDI-TOF, and applications in biochemistry.

#### Unit 10 **Immunological and Molecular Techniques**

**Immunological Methods:** Antibody production, immunoprecipitation, immunoblotting, RIA, ELISA.

**Molecular Biology Techniques:** PCR, cloning, restriction enzymes, gel electrophoresis, molecular markers, blotting, DNA/protein arrays.

**Cell Culture:** Plant tissue culture, Animal cell line culture techniques, and cryopreservation.

#### **References:**

1. Nelson, D. L., & Cox, M. M. (2020). *Lehninger Principles of Biochemistry*. W.H. Freeman.
2. Wilson, K., & Walker, J. M. (2010). *Principles and Techniques of Biochemistry and Molecular Biology*. Cambridge University Press.
3. Alberts, B. et al. (2019). *Molecular Biology of the Cell*. Garland Science.
4. Goldsby, R. A., Kindt, T. J., & Osborne, B. A. (2013). *Kuby Immunology*. W.H. Freeman.

\*\*\*\*\*



## **Syllabus for PhD Entrance Exam**

**January -2025**

### **DEPARTMENT: BOTANY**

#### **Part I – RESEARCH METHODOLOGY**

##### **Unit 1 Fundamentals of Research:**

Introduction to Research- Definition, objectives, and significance of research.

Types of research: Basic vs. Applied, Qualitative vs. Quantitative, Exploratory, Descriptive, and Experimental research.

Research process: Steps in the research process, formulating a research problem;

Literature Review- Importance of literature review, sources of literature, Reviewing research articles, systematic literature review, and meta-analysis, Identifying research gaps

##### **Unit 2 Research Design and Sampling :**

Research Design- Concept and types of research design: Experimental, Quasi-experimental, Descriptive, and Exploratory;

Variables- Independent, dependent, control, extraneous variables; Hypothesis formulation-Null and alternative hypotheses, characteristics of a good hypothesis.

Sampling Techniques-

Population vs. sample, sampling frame. Probability sampling: Simple random, stratified, cluster sampling. Non-probability sampling: Convenience, judgmental, quota, snowball sampling. Determining sample size.

##### **Unit 3 Data Collection and Measurement :**

Data Collection Methods-Primary data: Surveys, interviews, observations, and experiments. Secondary data: Sources, advantages, and limitations. Questionnaire design: Types of questions, scaling techniques (Likert scale, Semantic differential scale).

Measurement and Scaling Techniques-

Types of scales:-Nominal, ordinal, interval, and ratio scales.

Reliability and validity- Concepts, types, and techniques for assessing reliability and validity.

#### **Unit 4 Data Analysis and Interpretation**

Statistical Tools for Data Analysis-

Descriptive statistics:- Mean, median, mode, standard deviation, variance.

Inferential statistics:- Hypothesis testing (t-test, chi-square test, ANOVA), correlation and regression analysis.

Multivariate analysis:-x Factor analysis, cluster analysis, discriminant analysis.

Qualitative Data Analysis:

Content analysis, thematic analysis, narrative analysis, grounded theory. Use of software tools for qualitative analysis. Interpretation of Data and Report Drawing conclusions, implications of findings. Avoiding common errors in data interpretation.

#### **Unit 5 Ethics in Research and Report Writing:**

Research Ethics-

Ethical issues in research:- Plagiarism, data fabrication, falsification, and informed consent. Institutional Review Boards (IRB) and ethical guidelines. Data privacy and confidentiality.

Report Writing and Presentation:-

Structure of a research report:- Title, abstract, introduction, methodology, results, discussion, conclusion, references.

Citation and referencing styles:- APA, MLA, Chicago, Harvard.

Publishing research:- Peer-reviewed journals, conference papers, and thesis submission guidelines.

#### **References:**

1. Research Methodology: Methods and Techniques by C.R. Kothari and Gaurav Garg
2. Business Research Methods by Donald R. Cooper and Pamela S. Schindler
3. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches by John W. Creswell
4. Statistics for Research by George Argyrous



## **Part II – DOMAIN SPECIFIC**

### **Unit 1 Plant Systematics and Taxonomy:**

Plant Taxonomy-Principles of plant classification; systems of classification (Linnaean, Engler & Prantl, APG system).

Nomenclature: ICBN rules, species concept, and typification.

Molecular Taxonomy- DNA barcoding and phylogenetics.

Recent trends in taxonomy using molecular markers (RAPD, RFLP, AFLP).

### **Unit 2 Plant Physiology and Biochemistry:**

Plant Physiology-

Photosynthesis:- Light reactions, Calvin cycle, CAM and C4 pathways.

Respiration: Glycolysis, TCA cycle, electron transport chain.

Plant hormones and growth regulators (Auxins, Gibberellins, Cytokinins, Ethylene, Absciscic acid).

Biochemistry-Structure and function of carbohydrates, proteins, lipids, and nucleic acids.

Enzymes:- Mechanism, kinetics, and regulation.

Secondary metabolites:- Types, biosynthesis, and roles.

### **Unit 3 Genetics and Plant Breeding:**

Mendelian Genetics-

Laws of inheritance, linkage, recombination, and gene mapping, Molecular Genetics: Gene structure and function, transcription, and translation.

Mutations and DNA repair mechanisms.

Plant Breeding-

Principles of plant breeding- Hybridization, mutation breeding, and polyploidy, Molecular breeding- Use of genetic markers in crop improvement.

### **Unit 4 Plant Ecology and Environmental Botany:**

Plant Ecology- Ecosystem structure and function, energy flow, biogeochemical cycles. Plant interactions- Competition, allelopathy, symbiosis, and plant-animal interactions.

Environmental Botany- Global environmental issues: Climate change, deforestation, and desertification.

Conservation strategies- In-situ and ex-situ conservation, biodiversity hotspots.

### **Unit 5 Plant Anatomy and Developmental Biology:**

Plant Anatomy- Meristematic tissue, secondary growth, xylem and phloem differentiation. Structure of wood, leaf, root, and stem.

Developmental Biology- Embryogenesis, organogenesis, and morphogenesis.

Apical dominance, photoperiodism, and vernalization.

- Unit 6    **Plant Pathology:**  
Plant Diseases- Classification of plant diseases:- Fungal, bacterial, viral, and nematode diseases, Symptoms, causes, and control measures of major plant diseases.  
Disease Management- Integrated Disease Management (IDM), Biological control and use of biopesticides.
- Unit 7    **Plant Biotechnology:**  
Techniques in Plant Biotechnology-  
Plant tissue culture:- Micropropagation, callus culture, somatic embryogenesis,  
Genetic engineering- Gene cloning, CRISPR-Cas9, Agrobacterium-mediated transformation.  
Applications of Plant Biotechnology-  
Transgenic plants:- GM crops, biofortification, and edible vaccines.  
Industrial applications: Production of biofuels, secondary metabolites.
- Unit 8    **Economic Botany and Ethnobotany:**  
Economic Botany-Importance of plants in agriculture, medicine, and industry, Plants as sources of food, fiber, oil, and medicinal compounds.  
Ethnobotany-Role of plants in traditional medicine and cultural practices.  
Conservation of indigenous plant knowledge.
- Unit 9    **Paleobotany and Palynology:**  
Paleobotany- Fossil plants, methods of fossilization, and importance of fossil records. Evolutionary history of plants: Major plant fossils, Paleozoic to Cenozoic era.  
Palynology- Pollen morphology, applications in plant taxonomy, forensic science, and climate studies.
- Unit 10   **Plant Molecular Biology and Genomics:**  
Molecular Biology- DNA replication, RNA processing, gene expression regulation, Signal transduction pathways in plants.  
Genomics-Plant genome organization, whole-genome sequencing, and comparative genomics, Functional genomics:-Transcriptomics, proteomics, and metabolomics.

**References:**

1. Plant Physiology by Taiz and Zeiger
2. Introduction to Plant Biotechnology by H.S. Chawla
3. Plant Systematics by Michael G. Simpson
4. Molecular Biology of the Cell by Alberts et al.
5. Genetics: Analysis & Principles by Robert Brooker



## **Syllabus for PhD Entrance Exam**

**January -2025**

### **Department: MICROBIOLOGY**

#### **Part I – Research Methodology**

- Unit 1      **Introduction to Research and Research Process:** Definition and characteristics of research, Types of research: Fundamental vs. Applied, Qualitative vs. Quantitative, Stages of the research process, Problem formulation and hypothesis development, Ethical issues in research
- Unit 2      **Research Design and Methodology:** Research design: Exploratory, Descriptive, Experimental, and Analytical research designs. Sampling techniques: Random, Stratified, Cluster, Purposive, and Snowball sampling. Types of data: Primary vs. Secondary data. Data collection methods: Surveys, Interviews, Observation, Case Studies, and Archival Research. Tools for data collection: Questionnaires, Interview schedules, and Observation checklists
- Unit 3      **Quantitative and Qualitative Research Methods:** Quantitative Research: Survey methods, Experimental design, Statistical analysis. Qualitative Research: Case study, Grounded theory, Ethnography, Phenomenology, Content analysis. Mixed methods: Combining quantitative and qualitative approaches. Data analysis techniques for both approaches. Graphical Representation of data: Line graph, histogram, bar graph, pie chart.
- Unit 4      **Statistical Methods for Research:** Descriptive statistics: Central tendency and variability measures. Measures of dispersion; variance, standard deviation, standard error, measures of skewness, and kurtosis. Correlation and regression: correlation coefficient - positive and negative correlation. Probability theory and distributions: Binomial, Poisson, and Normal

distributions. Inferential statistics: Hypothesis testing, Confidence intervals, t-tests, Chi-square tests, ANOVA. Correlation and regression analysis. Statistical software tools: SPSS, Excel.

**Unit 5      Research Report Writing and Presentation:** Structure of a research paper: Abstract, Introduction, Literature Review, Methodology, Results, Discussion, Conclusion. Citation and referencing styles: APA, MLA, Chicago, Harvard Presentation techniques: Writing clear and concise research reports and visual aids (graphs, tables, charts). Academic integrity: Avoiding plagiarism, proper citation, and referencing.

### **References:**

1. "Research Methodology: Methods and Techniques" by C.R. Kothari
2. "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" by John W. Creswell
3. "Research Methodology: A Step-by-Step Guide for Beginners" by Ranjit Kumar
4. "Introduction to the Practice of Statistics" by David S. Moore, George P. McCabe, and Bruce A. Craig
5. "Statistical Methods for Research Workers" by R.A. Fisher
6. "Research Methodology: A Practical Approach" by Neuman, W. Lawrence

## **Part II – Domain Specific (Microbiology)**

- Unit 1      **Introduction to Microbiology:** History and development of microbiology, Overview of microorganisms: Bacteria, viruses, fungi, protozoa, algae, Scope and importance of microbiology in medicine, industry, agriculture, and environmental science, Classification of microorganisms: Bergey's Manual of Systematic Bacteriology, Microbial diversity, and microbial habitats.
- Unit 2      **Microbial Cell Biology:** Structure and function of prokaryotic and eukaryotic cells, Cell wall, plasma membrane, and internal structures, Ribosomes, nucleoids, and plasmids in bacteria, Comparative study of prokaryotic and eukaryotic cell organelles, Microbial cell division: Binary fission, budding, and other mechanisms.
- Unit 3      **Microbial Genetics:** DNA replication, transcription, and translation in prokaryotes. Genetic variation in bacteria: Mutation, recombination, transformation, transduction, and conjugation, Plasmids and their role in horizontal gene transfer, Operon concept: Lac operon and Trp operon, Genetic regulation and control mechanisms in bacteria.
- Unit 4      **Microbial Metabolism and Physiology:** Metabolic pathways: Glycolysis, Krebs cycle, Electron transport chain, Fermentation, and anaerobic respiration, Bioenergetics: ATP synthesis and energy conservation, Nutritional requirements of microorganisms: Macro and micronutrients, Enzyme function, regulation, and coenzymes in microbial metabolism.
- Unit 5      **Microbial Ecology:** Microbial interactions: Symbiosis, commensalism, mutualism, and antagonism, Microbial communities and biofilms, The role of microorganisms in nutrient cycles: Nitrogen, carbon, sulfur, and phosphorus cycles, Microbial succession and its impact on ecosystems, Environmental microbiology: Soil, water, and air microbiomes.
- Unit 6      **Immunology and Microbial Pathogenesis:** The immune system: Innate and adaptive immunity. Immunoglobulins and their role in microbial defense. Pathogenicity and virulence factors in bacteria, viruses, fungi, and

protozoa. Mechanisms of host-pathogen interactions and immune evasion strategies. Host defense mechanisms: Phagocytosis, inflammation, and complement system.

**Unit 7      Microbial Diseases and Diagnostics:** Classification of infectious diseases: Bacterial, viral, fungal, and parasitic. Clinical microbiology techniques: Microscopy, staining, culture methods, and biochemical tests. Rapid diagnostic methods: PCR, ELISA, immunofluorescence, and molecular diagnostics. Antimicrobial resistance: Mechanisms, detection, and prevention strategies. Emerging infectious diseases and their impact on public health.

**Unit 8      Industrial and Applied Microbiology:** Microbial fermentation: Production of antibiotics, enzymes, vitamins, alcohol, and organic acids. Microbial biotechnology: Genetic engineering, recombinant DNA technology, and industrial microbiology. Microorganisms in food processing, preservation, and quality control. Bioremediation: Microbial degradation of pollutants and waste treatment. Role of microorganisms in agriculture: Biopesticides, biofertilizers, and soil health.

**Unit 9      Microbial Taxonomy and Systematics:** Principles of microbial classification and identification. Methods in microbial taxonomy: Morphological, physiological, biochemical, and molecular techniques. Molecular markers in taxonomy: 16S rRNA gene sequencing, whole-genome sequencing. Phylogenetic relationships and tree of life. Modern approaches in microbial taxonomy: Metagenomics and metatranscriptomics.

**Unit 10     Advanced Topics in Microbial Research:** Microbial genomics: Genome sequencing, functional genomics, and proteomics. Transcriptomics, metabolomics, and systems biology approaches in microbiology. Microbial bioinformatics: Tools and databases for genomic and metagenomic data analysis, CRISPR-Cas system and its applications in microbiology. Microbial diversity studies using next-generation sequencing technologies.

**References:**

1. "Brock Biology of Microorganisms" by Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, and David A. Stahl.
2. "Microbiology: An Introduction" by Gerard J. Tortora, Berdell R. Funke, and Christine L. Case.
3. "Lehninger Principles of Biochemistry" by David L. Nelson and Michael M. Cox.
4. "Molecular Genetics of Bacteria" by Larry J. Snyder and Wendy Champness.
5. "Bacterial Genetics" by David Freifelder.
6. "Immunology" by Janis Kuby, Thomas J. Kindt, Richard A. Goldsby, and Barbara A. Osborne.
7. "Microbial Ecology: Fundamentals and Applications" by R.M. Atlas and Richard Bartha.
8. "Medical Microbiology" by R. Ananthnarayan and C.K. Paniker
9. "Prescott's Microbiology" by Joanne M. Willey, Linda M. Sherwood, and Christopher J. Woolverton.



## **Syllabus for PhD Entrance Exam**

**January -2025**

**Department: Food Science**

### **PART I – RESEARCH METHODOLOGY**

#### **Unit 1 Foundations of Research Methodology**

Research and its types, Identifying and Defining Research Problem, Introduction to different Research Designs. Basic principles of experimental design, selection of experimental material, Essential Constituents of Literature Review. Basic Principles of Experimental design.

#### **Unit 2 Data Collection and Sampling Techniques**

Primary data and secondary data, methods of primary data collection, classification and summarization of data. Presentation of Data - Diagrams and Graphs. Introduction to scientific writings (research papers). Sampling, Need for sampling, unit, population, sample, sampling error, sampling methods; Simple Random Sampling, Probability Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling. Sample size, Standard Error.

#### **Unit 3 Statistical Analysis and Hypothesis Testing**

Normal Distribution; Measures of Central Tendency (Mean, Mode Median); Measures of Central Dispersion (Range, Standard Deviation, Standard Error, Coefficient of Variation); Tests of Significance – ‘t’ Test ( One Sample and Two Sample Tests), Testing of Hypothesis- Type I and type II errors; Analysis of Variation (ANOVA).



#### **Unit 4      Probability, Correlation, and Experimental Design**

Probability distribution- Binomial, Poisson, and Normal. Study of relationship between variables Regression – Simple, Multiple (three Variables). Chi square test for goodness of fit, Correlation Analysis, Design of experiments.

#### **Unit 5      Scientific Reporting and Thesis Preparation**

Types, Structure and components of Scientific Reports; Technical Reports and Thesis; Steps in the preparation of reports and thesis layout, structure and language of typical reports, illustrations and tables, bibliography, referencing and foot notes. Citation, Impact factor, h-index and Acknowledgement.

#### **References**

1. Kothari, C. R. (2004). Research methodology: Methods and techniques. New Age International.
2. Montgomery, D. C. (2007). Introduction to statistical quality control. John Wiley & Sons.
3. Chawla, D & Sodhi, N. (2011). Research methodology: concepts and cases. Vikas Publishing House.
4. Singh, Y. K. (2006). Fundamental of research methodology and statistics. New Age International.
5. Gupta, S. (2002). Research methodology and statistical techniques. Deep and Deep Publications.

## **Part II – Domain Specific**

### **Food Technology and Nutrition**

#### **Unit 1      Fundamentals of Food Microbiology and Preservation**

Historical developments in general and food microbiology. Sources of microorganisms in foods. Microbial growth and its implications in food. Immunological methods: fluorescent antibody, radioimmunoassay, ELISA, and PCR. Water activity: role in food preservation, intermediate moisture foods (IMF).

#### **Unit 2      Food Preservation Techniques**

Dehydration: definition, drying vs. concentration, drying curves, and drying methods. Types of dryers and their applications in food preservation. Gamma irradiation, Microwave heating, and Ohmic heating in food processing. Freezing and thawing: phase change operations in food preservation.

#### **Unit 3      Dairy and Cereal Processing**

Dairy industry: definition, composition, nutritive value, and types of milk. Physico-chemical properties of milk: milk fat structure, fat destabilization, milk proteins. Structure and chemical composition of wheat. Wheat milling: general principles, dough rheology, and measurement. Bread making processes and the role of enzymes in bread making.

#### **Unit 4      Food Engineering and Heat Transfer**

Units, Dimensions, and Conversions: SI System. Steam generation, properties, and Psychrometric chart. Boilers: types and applications in food processing. Mechanism of heat transfer: heat exchangers, boiling, condensation, and evaporation.

#### **Unit 5      Storage and Preservation of Fruits, Vegetables, Meat, and Fish**

Classification, composition, and nutritional significance of fruits and vegetables. Pre-storage treatments, refrigerated storage, CA, MA, and hypobaric storage. Modified Atmospheric Packaging (MAP) and recent developments. Meat, poultry, and fish industries: status, scope, and preservation techniques. Meat tenderization methods: natural and artificial, pre-rigor processing.

**Unit 6      Functional Foods and Food Safety**

Nutraceuticals and functional foods: definition, importance, and role in disease prevention. Food safety management systems: HACCP principles. Role of national regulatory agencies: PFA, FPO, FSSAI. Introduction to food packaging: functions, Vacuum and Modified Atmosphere Packaging Systems

**Unit 7      Basic Nutrition Concepts**

Introduction to nutrition: definition, scope, and significance. Basic nutrition terminology: nutrients, metabolism, and dietary guidelines. Carbohydrates: types, functions, and food sources. Proteins: amino acids, complete vs. incomplete proteins, functions, food sources. Fats: types (saturated, unsaturated, trans fats), functions, food sources. Recommended dietary intake and energy balance.

**Unit 8      Micronutrients and Dietary Guidelines**

Water-soluble vs. fat-soluble vitamins: functions, deficiencies, and sources. Key minerals (calcium, iron, potassium, magnesium, zinc) and their roles in health. Impact of micronutrient deficiencies. Food guides, food pyramids, MyPlate, and dietary guidelines. Portion sizes and reading food labels.

**Unit 9      Nutrition Across the Life Span**

Nutritional needs at different life stages: infants, children, adolescents, adults, and older adults. Special considerations during pregnancy and lactation. Role of diet in chronic disease prevention: obesity, heart disease, diabetes, osteoporosis. Understanding antioxidants and their role in health.

**Unit 10     Specialized Nutrition and Assessment**

Dietary considerations for athletes, vegetarians, and vegans. Addressing food allergies and intolerances: lactose intolerance, gluten sensitivity. Nutritional assessment methods: BMI, dietary recall, food diaries. Meal planning for various age groups and special dietary needs. Nutritional supplements: types and appropriate use.

**References:**

1. James M. Jay (2000). Modern Food Microbiology, 5th Edition, CBS Publishers.
2. Khetarpaul N. (2005). Food Processing and Preservation, Dya Publishing House, New Delhi.
3. Rathore N S (2008). Fundamentals of Dairy Technology-Theory & Practices. Himanshu Publication.
4. R. Paul Singh and Dennis R. (2013) Introduction to Food Engineering, Elsevier Science

& Technology, 5th Edition, ISBN: 9780123985309.

5. A.K. Thompson (2003): Fruit and Vegetables – Harvesting, handling and storage. 2nd Edition Blackwell Publishing.
6. Vacklavic Vickie, A., and W. Christian Elizabeth. (2008). Essential of Food Science Texas Springer Science Business Media.
7. A R Sen, M Muthukumar, B M Naveena. (2013) Meat Science: A Student Guide. Satish Serial Publishing House.
8. Robert EC. (2006). Hand book of Nutraceuticals and Functional Foods. 2nd Ed. Wildman.
9. Stanbury, P.F., A. Whitaker and S.J. Hall, (1997), Principles of Fermentation Technology, 2nd Edition Aditya Books (P) Ltd.
10. Vogel, H.C. and Todaro, C.L. (2005). Fermentation and Biochemical Engineering Handbook: Principles, Process Design and Equipment, 2nd Edition, Standard Publishers.
11. Ahvenainen, R. (2003) Novel Food Packaging Techniques, CRC Press.
12. Robertson, G.L. (2006). Food Packaging: Principles and Practice (2nd), Taylor & Francis.
13. Early R. (1995) Guide to Quality Management Systems for the Food Industry, Blackie, Academic and professional, London.
14. [David Zachary Mc Swane](#), [Richard Linton](#), [Nancy R. Rue](#), (2010). Food Safety Fundamentals: Essentials of Food Safety and Sanitation - Second Edition, Food Marketing Institute.
15. Mann, J., Truswell, S., & Hodson, L. (Eds.). (2023). Essentials of Human Nutrition 6e. Oxford University Press.
16. Gibney, M.J., Lanham-New, S.A., Cassidy, A. and Vorster, H.H. (2009). Introduction to Human Nutrition, 2nd Edition. Wiley-Blackwell, A John Wiley and Sons, Ltd., Publication.
17. Venn, B. J. (2020). Macronutrients and human health for the 21st century. Nutrients, 12(8), 2363.
18. Krause's food and the nutrition care process, 14th edition (2017), L Kathleen Mahan and Janice Raymond.
19. Raymond, J. L., & Morrow, K. (2022). Krause and Mahan's Food and the Nutrition Care Process, 16e, E-Book: Krause and Mahan's Food and the Nutrition Care Process, 16e, E-Book. Elsevier Health Sciences
20. Mahan, L. Kathleen (2018). Krause's Food & the Nutrition Care Process-E-Book: Krause's Food & the Nutrition Care Process-E-Book. Elsevier Health Sciences.

\*\*\*\*\*



**SYLLABUS FOR PHD ENTRANCE EXAM  
JANUARY – 2025**

**DEPARTMENT: ENGLISH**

**PART I – RESEARCH METHODOLOGY**

- UNIT 1** What is Research? Meaning, Objectives and Motivation  
Basic types of research – Basic, Applied, Qualitative, Quantitative Steps of Research:  
Steps of doing Research  
Parts of thesis – abstract, contents, survey of literature, chapters
- UNIT 2** Style sheets – MLA, Cambridge, Oxford, APA  
MLA – 9<sup>th</sup> Edition  
Spelling and punctuation/capitalization, underlining and italics  
Footnotes and endnotes/ Appendix/tables/pictures  
Preparing Works Cited
- UNIT 3** Ethics – meaning and definition - Rights and obligations of Research Participants  
Falsification, fabrication, plagiarism and Self plagiarism  
Publication ethics - Types of publication misconduct- Redundant publications –duplicate and overlapping publications, salami slicing  
Predatory journals
- UNIT 4** Origin, development, nature and characteristics of IPR  
Forms of IPR  
Filing and Registration process of IPRs
- UNIT 5** Scholarly/research article – meaning and features of scholarly article.  
Successful scientific writing – process  
Referencing Journal data base – Journal finder/ journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer  
Data bases– indexing data base, citation data base, Web of science, Scopus, so on

Research Metrics – Impact Factor of Journal as per Journal Citation Report  
Use of plagiarism software like Turnitin, Urkund and other open-source  
software tools

**REFERENCES:**

1. Kothari C R. Research methodology: Research & Techniques. New Age International Publishers, New Delhi
2. Wallinman N. Your Research Project: A Step by Step Guide for the first time Researcher. Sage Publications, London
3. Correa, Delia Sousa and W.R. Owens: *The Handbook to Literary Research*
4. Gabrielle, Griffin ed. *Research Methods for English*
5. *MLA Handbook* – 9<sup>th</sup> Edition
6. Modern Rhetoric - Brooks and Warren. New Delhi.
7. Sinha, M.P. *Research Methods in English*
8. Paul Oliver. Writing your Thesis.
9. Thesis and Assignment Writing– Anderson, Durston and Poole.
10. Thesis Writing (Prentice Hall) – Iverson
11. Thesis Writing. - C.J. Parsons
12. Thorpe, James. Ed. The Aims and Methods of Scholarship in Modern Languages and Literatures, New York, PMLA

## **PART II – DOMAIN SPECIFIC**

- UNIT 1** British Literature with emphasis from the Romantics up till the Modernists and the Postmodernists
- UNIT 2** American Literature with special emphasis on the American Nationalist period, the 20<sup>th</sup> and 21<sup>st</sup> centuries and the contributions to American Culture and Literature by the Afro Americas, the Native Americans and the Diaspora communities
- UNIT 3** Indian Writing in English with focus on the Nationalist Movement in India and the contributions made to the genre by the modern day 20<sup>th</sup> and 21<sup>st</sup> centuries authors including the expatriate communities
- UNIT 4** Literary Criticism from Plato and Aristotle up to the New Critics and the Formalists
- UNIT 5** Literary Theory from the Structuralists, the Modernists, the Postmodernists, the Poststructuralists, the Post structural Psychoanalysts and, Cultural Studies theorists
- UNIT 6** Gender Studies with focus on the literature of the LGTQIA+ communities, and gender theories  
Women's Studies with focus on the authors of women writing, and feminists theories
- UNIT 7** Postcolonial Studies including the ideas of theoreticians, postcolonial texts and postcolonial concepts like decolonization and neocolonialism
- UNIT 8** Subaltern Studies including the ideas of theoreticians, subaltern texts and concepts from thinkers like Spivak, Guha , and so on
- UNIT 9** Linguistics which could include the theories of language, the branches and schools of linguistics, concepts of sign, semiotics and codes.
- UNIT 10** Popular Culture including the up and coming areas of Science Fiction, Fantasy literature, Children's Literature and YA Literature

### **REFERENCES:**

1. Baldick, Chris. *The Oxford Dictionary of Literary Terms*. USA: OUP, 2009 (3ed.). Print.
2. Edward Albert, *History of English Literature*, 1971.
3. Abrams (M H). *Glossary of Literary Terms*.

4. Arnold, Matthew. *Essays in Criticism*. New York: MacMillan and Company, 1865.
5. Daiches, David. *Critical Approaches to Literature*, 2nd ed. Hyderabad: Orient Longman, 2001
6. Terry Eagleton: *Literary Theory*
7. Waugh, Patricia. *Literary Theory & Criticism: An Oxford Guide*. Delhi: OUP, 2006..
8. Ferdinand de Saussure, *Course in General Linguistics*
9. Barry ,Peter: *Beginning Theory; An Introduction to Theory and Cultural Studies:*
10. Julie, Rivkin and Michael Ryan: Ed, *Literary Theory: An Anthology:*
11. Klages, Mary: *Literary Theory: A Guide for the Perplexed*
12. Lodge, David: *Modern Criticism and Theory:*
13. M. K Naik – *Critical Essays in Indian Writing in English*
14. Current, Richard N., et al. *The Essentials of American History*.
15. Gattel, F. O. and Allen Weinstein, eds. *American Themes: Essays in Historiography*.
16. Gray, Richard. *A History of American Literature*. Wiley-Blackwell, 2004.
17. Hart: *The Oxford Companion to American Literature* (OUP)
18. Ahmed, Aijaz. *Indian Literature – Notes Towards a Definition of Category*
19. Kirpal, Viney (ed). *The Post Modern Indian Novel in English*.
20. Mehta, Kamal (ed). *The Twentieth Century Indian Short Story in English*.
21. Mukherjee, Meenakshi. *The Twice Born Fiction: Themes and Techniques of the Indian Novel in English*.
22. Loomba, Ania. *Colonialism/Postcolonialism*: Routledge India. 2016. Print.
23. McLeod ,John. *Beginning Postcolonialism*. New Delhi : Viva Books, 2011. Print.
24. Print.
25. Said, Edward W. *Orientalism*. New Delhi : Penguin India, 2001. Print.
26. Barker, Chris: *Cultural Studies: Theory and Practice*
27. *Cultural theory and Popular culture* - by John Storey
28. *Defining Popular culture* - Claim Mac Cabe
29. Dipanker Gupta *Culture, Space and Nation State*
30. During, Simon: Ed. *The Cultural Studies Reader*- 2<sup>nd</sup> edition
31. *Feminist Perspectives on Popular Culture*- Lana Rakov



32. Longhurst, Brian: *Introducing Cultural Studies*
33. Nayar, Pramod: *An Introduction to Cultural Studies*
34. Dale Spender : Women and Literary History
35. Elaine Showalter: A Literature of their own
36. Glover, David and Cora Kaplan. *Genders: New Critical Idiom*. 2<sup>nd</sup> ed., London: Routledge, 2008. Print.
37. Judith Butler: *Gender Trouble*
38. Niveditha Menon *Seeing like a Feminist*
39. Sandra Gilbert and Susan Gubar : *Mad Woman in the Attic*
40. Simone de Beauvoir: *Second Sex*
41. Datta, Prithvi and Chandra Shobhi. *The Flaming Feet and Other Essays: The Dalit Movement in India*. University of Chicago Press, 2011.
42. Gajarawala, ToralJatin. *Untouchable Fictions: Literary Realism and the Crisis of Caste*. Fordham University Press, 2012.
43. Ganguly, Debjani. *Caste and Dalit Lifeworlds: Postcolonial Perspectives*. Orient Longman, 2008.
44. Omvedt, Gail. *Dalit Visions*. Orient Blackswan, 2006.

\*\*\*\*\*

## **Ph D Entrance Syllabus for Business Administration**

### **RESEARCH METHODOLOGY**

#### **Unit 1 AN OVERVIEW OF RESEARCH MEHODOLOGY**

Definition of Research; Objectives, Scope, Criteria, Characteristics, Importance of Research; Challenges for Research; Ethics in Research; Research Applications in Business Decisions.

Types of Research (from the point of applications) – Basic Research, Applied Research;

Types of Research (from the point of Objectives) – Exploratory Research, Descriptive Research, Casual Research;

Types of Research (from the point of inquiry mode) – Qualitative & Quantitative Research;

Other Research Types: Empirical Research, Scientific Research, Social/Behavioral Research, Historical Research, Action Research.

#### **Unit 2 CONCEPTS AND TOOLS FOR BUSINESS RESEARCH**

Business Research; Business Research Process; Deductive & Inductive approach in research; Introduction to Constructs, Concepts, Variables & its Types.

Literature Review: Methods of Reviewing Literature; Theoretical and Conceptual Frameworks; Literature Map.

#### **Unit 3 BUSINESS RESEARCH PROCESS**

Management Dilemma, Defining the Research Problem; Formulating the Research objectives, research questions, research hypothesis ; Developing Research Proposal; Research Design ; Sampling Design – Sampling, Types – Probability sampling, Non – probability sampling, Steps involved in selection of sampling, Sample Size determination, Sampling Errors; Creating Research Instrument – Drafting questionnaire, Administering the questionnaire; Pre – testing the questionnaire – Pilot Testing; Criteria of good measurement – Reliability, Validity; Methods of data collection – Primary & Secondary Data Sources; Data Refining and Preparation; Processing of data – Editing, Coding, Classification, Tabulation; Data Analysis and Interpretation ; Research Reporting.

#### Unit 4      **SURVEY RESEARCH**

Nature of Surveys; Survey Objectives; Role of the participants – Researcher Role & Respondents Role; Types of Surveys – Census and Sample Surveys; The Survey Process; Errors in Survey Research – Random Sampling Error Vs Systematic Error (bias); Ethical issues in Survey research.

##### **Qualitative Research tools:**

Interview methods, Delphi Technique, Focus Groups, Case study methods, Projective Techniques, Experience Survey, Observation Methods.

##### **Scaling Techniques:**

Type of Measurement scales – Nominal/ Ordinal/ Interval/ Ratio scales.

Classification of Scales: Comparative Scaling Techniques – Paired Comparison, Rank Order, Constant Sum Scaling; Non – Comparative Scaling Techniques – Rating scale, Likert Scale, Semantic Differential Scale, Stapel Scales.

#### Unit 5      **REPORT WRITING**

Significance of Research report; Types of research report – Technical Report, Popular Report; Steps in writing Report, Layout of the research report, Mechanics of writing Research report, Precautions for writing reports, Standard methods of quoting Bibliography.

#### **LEARNING RESOURCES**

1. Neena Sodhi, Deepak Chawla (2011), Research Methodology Concepts & Cases, 2/e, Vikas Publishing House Pvt. Ltd.
2. Donald R. Cooper, Pamela S. Schindler, (2014), Business Research Methods, 12/e, Tata McGraw – Hill Co. Ltd.,
3. Kothari C.R. (2013). Research Methodology: Methods and Technique, 3/e, new age international publishers.
4. William G. Zikmund, Barry J. Babin, Jon C. Carr, and Mitch Griffin, (2011), Business Research Method, 8/e, Cengage Learning.
5. Srivastava T. N and Shailaja Rego (2011), Business Research Methodology, Tata McGraw Hill.
6. Bell Emma and Broman Alan, (2016), Business Research Methods – 3/e, Oxford University.
7. Sekaran Uma and Bougie Roger (2016), Research Methods for business – A skill building Approach, 7/e, John Wiley & Sons publications.

## **BUSINESS MANAGEMENT**

- Unit 1** Management – Concept, Process, Theories and Approaches, Management Roles and Skills Functions – Planning, Organizing, Staffing, Coordinating and Controlling. Communication – Types, Process and Barriers. Decision Making – Concept, Process, Techniques and Tools Organization Structure and Design – Types, Authority, Responsibility, Centralization, Decentralization and Span of Control. Managerial Economics – Concept & Importance – Demand analysis – Forecasting Market – Market Classification & Price Determination – Business Ethics & CSR – Ethical Issues & Dilemma Corporate Governance Value – Based Organization
- Unit 2** Organizational Behaviour – Significance & Theories – Individual Behaviour – Personality, Perception, Values, Attitude, Learning and Motivation Group Behaviour – Team Building, Leadership, Group Dynamics – Organizational Culture & Climate – Human Resource Management – Concept, Perspectives, Influences and Recent Trends – Human Resource Planning, Recruitment and Selection, Induction, Training and Development.
- Unit 3** Strategic Role of Human Resource Management, Competency Mapping & Balanced Scoreboard, Career Planning and Development – Performance Management and Appraisal – Organization Development, Change & OD Interventions, Talent Management & Skill Development – Employee Engagement & Work – Life Balance – Industrial Relations: Disputes & Grievance Management, Labour Welfare and Social Security – International Human Resource Management – HR Challenge of International Business – Green HRM
- Unit 4** Accounting Principles and Standards, Preparation of Financial Statements – Financial Statement Analysis – Ratio Analysis, – DuPont Analysis – Preparation of Cost Sheet, Marginal Costing, Cost Volume Profit Analysis Standard Costing & Variance Analysis – Financial Management, Concept & Functions – Capital Structure – Theories, Cost of Capital, Sources and Finance Budgeting and Budgetary Control.
- Unit 5** Time Preference for Money, Valuation of Bonds and Shares, Risk and

Returns – Capital Budgeting – Nature of Investment – Dividend – Theories and Determination – Mergers and Acquisition – Corporate Restructuring, Value Creation, Merger Negotiations, Leveraged Buyouts, Takeover – Portfolio Management – CAPM, APT – Derivatives – Working Capital Management – Determinants, Cash, Inventory, Receivables and Payables Management, Factoring – International Financial Management, Foreign exchange market

**Unit 6** Strategic Management – Concept, Process, Decision & Types – Strategic Analysis – External Analysis, PEST, Porter’s Approach to industry analysis, Internal Analysis – Resource Based Approach, Value Chain Analysis  
Strategy Implementation – Challenges of Change, Developing Programs  
Mckinsey 7s Framework – Marketing – Concept, Orientation, Trends and Tasks, Customer Value and Satisfaction

**Unit 7** Market Segmentation, Positioning and Targeting – Product and Pricing Decision – Product Mix, Product Life Cycle, New Product development, Pricing – Types and Strategies – Place and promotion decision – Marketing channels and value networks, VMS, IMC, Advertising and Sales promotion.

**Unit 8** Statistics for Management: Concept, Measures of Central Tendency and Dispersion, Probability Distribution – Binominal, Poison, Normal and Exponential – Data Collection & Questionnaire Design Sampling – Concept, Process and Techniques – Hypothesis Testing – Procedure; T, Z, F, Chi – square tests Correlation and Regression Analysis.

**Unit 9** International Business – Managing Business in the Globalization Era; Theories of International Trade; Balance of Payment – Foreign Direct Investment – Benefits and Costs – Multilateral regulation of Trade and Investment under WTO International Trade Procedures and Documentation; EXIM Policies Role of International Financial Institutions – IMF and World Bank – Information Technology – Use of Computers in Management Applications; MIS, DSS.

**Unit 10** Entrepreneurship Development – Concept, Types, Theories and Process, Developing Entrepreneurial Competencies – Intrapreneurship – Concept and Process – Women Entrepreneurship and Rural Entrepreneurship –

Innovations in Business – Types of Innovations, Creating and Identifying Opportunities, Screening of Business Ideas – Business Plan and Feasibility Analysis – Concept and Process of Technical, Market and Financial Analysis.

#### **LEARNING RESOURCES**

1. Robbins, S. P., Judge, T., & Campbell, T. (2017). *Organizational behaviour*. Pearson Higher Ed.
2. N. Gregory Mankiw and Mark P. Taylor (2020), *Economics* (5 ed.), Cengage Learning
3. Gupta, S.P., Gupta P.K., (2022), *Business Statistics & Business Mathematics*. Sultan Chand & Sons.
4. Hill, C. W., Jones, G. R., & Schilling, M. A. (2014). *Strategic management: Theory & cases: An integrated approach*. Cengage Learning.
5. Philip Kotler, Gary Armstrong, Prafulla Agnihotri (2021) *Principles of Marketing*, 17/e. Pearson.
6. Gary Dessler and Biju Varkey (2017) *Human Resource Management*, 15/e, Pearson, New Delhi.
7. Maheshwari, S.N., Suneel K. Maheshwari, Sharad K. Maheshwari (2022). *Financial and Management Accounting*, 6/e, Sultan & Chand New Delhi.
8. Kuratko, D. F. (2016). *Entrepreneurship: Theory, process, and practice*. Cengage Learning.
9. Khan and Jain (2018) *Financial Management Text, Problems and Cases*, 8/e, Tata McGraw Hill.

\*\*\*\*\*