

RESEARCH METHODOLOGY
(Course Code: 19APRR0001)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To acquire scientific knowledge and skills and expertise in formulating problem for research
- To prepare research designs, and use of methods and techniques in conducting research, and
- To develop professional skill in writing a research report

Learning Outcomes: Upon completion of the course, the scholars will be able to:

- identify and formulate a problem for research
- prepare a suitable research design for carrying out the research
- use appropriate tools and techniques for data collection
- draw its inferences scientifically
- apply the skill to prepare research report and disseminate research findings

UNIT – I: Scientific Research – Methods of acquiring knowledge; Objectivity and Subjectivity in Research; Epistemology, Phenomenology, Positivism, Constructivism, Pragmatism- Inductive and Deductive Reasoning, Scientific Method and its applications; Research Paradigms and Ethics in Research; Types of Research.

UNIT – II: Research Process: Identification, Selection and Formulation of problem, Sources and criterion for selection; Review of literature and Summarizing, Conceptual Model; Objectives, Hypotheses formulation, Variables and its types.

UNIT – III: Research Designs and Methods: Experimental, Explorative, Descriptive and historical research; Diagnostic and Evaluation studies, case study, interdisciplinary research Qualitative and Quantitative studies, Trend and Futuristic studies, Ethnography, Grounded Theory and Mixed Methods.

UNIT – IV: Data – Primary and Secondary data – Data Collection Tools & Techniques – Observation, Interview Schedule, Questionnaire, Projective techniques, Content Analysis, Focus group, Online Tools, Survey, PRA; Psychological tests and Scaling Techniques –Pre-test, Test of Validity and Reliability.

UNIT - V: Data Interpretation and Report Writing: Data processing – Scoring, Categorization and Coding – Draw of inferences and interpretation. Research Report – Steps in writing Research Report, Types of reports, Format of a research report; Bibliography, Weblibliography, Style of writing; Plagiarism check– Evaluation of a research report; Dissemination of research findings- Presentation and Publication.

REFERENCES:

- George Thomas. C, Research Methodology and Scientific Writing, New Delhi: Ane Books Pvt. LTD, 2016.
- Bridget Somekh and Cathy Lewin, Theory and Methods in Social Science Research, New Delhi: Sage Publication, 2012
- Creswell, John.W. Research Design: Qualitative, Quantitative, and Mixed Method Approaches (4thed). Thousand Oaks, CA: Sage, 2014.
- Debasis Chakraborty, Research Methodology, New Delhi: Sourath Publishing House, 2012
- Deepak Chawala and Neena Sandhi, Research Methodology: Concept of Cases, New Delhi: Vikas Publication House Pvt Ltd, 2011
- Kenneth's Barden and Bruce B.Abbott, Research Design: Qualitative and Quantitative Approaches, Tata MaGrewHill Education Pvt, New Delhi, 2011.
- Kothari.C.R, Research Methodology (Methods & Techniques), New Delhi: New Age International (3rded), 2014.
- Kundra S., Reporting Methods, New Delhi: Anmol Publications Pvt. Ltd., 2005.
- Fred. N. Kerlinger, Foundations of Behavioral Research Delhi: Surjeet Publications, 2018.

JOURNALS

- International Journal of Applied Research
- Journal for Extension and Research
- Journal of Social Science Research
- Journal of Social Science
- Journal of Social Research and Policy

WEBSITES

- <https://www.socialresearchmethods.net/>
- <https://ndl.iitkgp.ac.in/>
- <http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291099-1328/issues>
- <http://shodhganga.inflibnet.ac.in/>
- <http://journals.sagepub.com/>

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	MECHANISM	HOURS
I.	Methods of acquiring knowledge	L, PPT	1
	Objectivity and subjectivity in Research	L, PPT	2
	Epistemology	L, PPT	1
	Phenomenology	L, PPT	1
	Positivism, Constructivism	L, PPT	1
	Pragmatism	L, PPT	1
	Inductive and Deductive reasoning	L, PPT	2
	Scientific Methods	L, PPT	1
	And its applications	L, PPT	1
	Research Paradigms	L, PPT	1
	Research ethics	L, PPT	1
	TOTAL		
II.	Research process-Identification	O, S	2
	Selection and Formulation of problem	O, L	2
	Sources and criterion for selection	O, S	2
	Review of literature	O, L	1
	Conceptual Model	O, S	1
	Objectives	O, L	1
	Hypothesis formulation	O, S	2
	Variables and its types	O, L	1
	TOTAL		
III.	Research design and Methods	O, S	1
	Experimental design	D, L	1
	Explorative design	D, L	1
	Descriptive design	D, L	1
	Historical research	D, L	1
	Diagnostic studies	D, L	1
	Evaluation studies	D, L	1
	Qualitative studies	D, L	1
	Quantitative studies	D, L	1
	Case Study	D, L	1
	Trend and Futuristic studies	D, L	1
	Ethnography, Ground theory	D, L	1
	Mixed Methods - Types	D, L	1
TOTAL			13
IV.	Instruments for data collection	L, PPT	1
	Primary and Secondary data	A, Se	1
	Observation	A, Se	1
	Interview, Schedule	A, Se	1
	Questionnaire	A, Se	1
	Projective techniques	A, Se	1
	Content analysis	A, Se	1
	Focus group	FV, D	1
	Online tools, Survey	IL	1

	PRA	A, Se	1
	Psychological tests	FV, D	1
	Scaling techniques, Pre-test	A, Se	1
	Test of validity and reliability	A, Se	1
	TOTAL		13
V.	Data processing	L, PPT	1
	Scoring, Categorization and Coding	L, PPT	1
	Draw inferences and interpretation	L, PPT	1
	Steps in writing research report	L, PPT	1
	Types of reports	L, PPT	1
	Format of a research report	L, PPT	1
	Bibliography, Webliography	L, PPT	1
	Style of writing references	L, PPT	1
	Plagiarism check	L, PPT	1
	Evaluation of a research report	L, PPT	1
	Dissemination of research findings	L, PPT	1
	Presentation	L, PPT	1
	Publications	IL	1
	TOTAL		13

A - Assignment; D - Demo; FV - Field Visit; IL - Invited Lecture; L - Lecture; PPT - Power Point; O - Online sources; Se - Seminar; S - SWAYAM

QUANTITATIVE TECHNIQUES
(Course Code: 19APRR0002)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To develop an understanding of the basic concepts and fundamental principles guiding the use of quantitative methods, acquire basic practical skills with regard to the performance of statistical analysis and develop the ability to critically examine quantitative analysis in the research process.
- To enhance skills as well as the ability to independently formulate and adequately analyze quantitative research questions.
- To develop the ability to independently, critically and efficiently collect and summate the most relevant quantitative research findings within a specific/defined research area.

Learning Outcome: Upon completion of the course, the doctoral scholars will be in a position to demonstrate the following:

- Explain the basic concepts and principles associated with quantitative techniques;
- Skill to perform basic quantitative analysis, including choosing the appropriate techniques, interpreting the outcome and reporting the results;
- Summarize and critically examine the quantitative research findings in a highly knowledgeable, independent and theoretically informed way, and
- Ability to incorporate quantitative research findings and qualitative research findings and/or quantitative research findings and theoretical work within a specific research area.

UNIT – I: Descriptive Statistics: Central Measures; Variability Measures; Skewness Measures Inductive, generalization and data modeling and Working with databases; Correlation and Regression – Simple problems.

UNIT – II: Probability: Basic Concepts, Definitions of Probability - Different approaches to probability; – Simple Problems; Sampling Techniques; Sampling and Sample Designs: Census Vs Sample Methods – Laws of Sampling; Methods of Sampling. Sample Size; Sampling and Non Sampling Errors.

UNIT – III: Inferential Statistics: Basic Concepts; Type I and Type II Errors; Steps in Hypothesis Testing; Tests of Attributes, Small and Large Sample Tests – Test based on Normal, t, F – Mean and Variance; Chi-square Test – Goodness of fit and independents; Analysis of Variance – One way and Two way Analysis with illustrations; Non – parametric Tests.

UNIT – IV: Multivariable Analysis: Multiple Correlation and Regression with three variables, Partial Correlation and Regression Logistic Regression Analysis; Factor Analysis, Discriminant Analysis; Cluster Analysis; Demonstration with Software Packages.

UNIT – V: Practical: Data Processing, Analysis and Interoperation Use of Statistical Softwares; R – State, SPSS, STATA

REFERENCE

- Alvin.C. Rencher, William F. Christensen, **Methods of Multivariate Analysis, 3rd edition**, Wiley, (2012).
- Blalock, H.J, **Social Statistics**, New York; MC Graw Hill, (1960).
- David R. Abderson, Dennis. J. Sweeney, Thomas.A Williams, Jeffrey.S Camm, James.J. Cochran **Statistics for Business and Economics**, 13^e Revised CENGAGE Learning USA, (2017).
- Gupta, S.P, **Statistical Methods**, Sultan and Chand Publications New Delhi
- Johnson R.A, Wichern D.W, **Applied Multivariate Statistical Analysis**, Prentice – Hall Saddle River, NJ, USA (1988).
- Kenblack, **Business Statistics ; for Contemporary Decision Making** : 8th edition ; Wiley Global Education, (2013).
- Sinha, B.L, **Statistics in Psychology and Education**, New Delhi; Anmol Publications Private Limited (2006).

REFERENCES

- Ajai S. Gaur, Sanjaya S. Gaur, **Statistical Methods for Practice and Research – A Guide to Data Analysis Using SPSS**, Response Books Business books from SAGE, B-1.I-1, Mohan Corporate Industrial Area, Madura Road, New Delhi – 110 044 India, (2010).
- Aneshensel, Carol S. **Theory-Based Data Analysis for the Social Sciences**, Thousand Oaks, Calif., Pine Forge Press. (254 pp) (2002).
- Hair Jr, Joseph F., William C. Black, et al. **Multivariate Data Analysis**. Upper Saddle River, New Jersey 07458, Pearson, Prentice Hall., chapters 1–5, 8, 10–12 (2006).
- Vijayalakshmi, G and C. Sivapragasam, **Research Methods: Tips and Techniques**, MJP Publishers, Chennai (2009).

WEBLIOGRAPHY:

- **Resource for methods in evaluation in social research**

<http://gsociology.icaap.org/methods/>

Extensive site providing information on how to evaluate research. This site was created by a US academic in Sociology, Dr Gene Shackman. Information about his background and credentials are available via the site.

- **Research methods and statistics arena**

<http://www.researchmethodsarena.com/resources/resources.asp>

An up-to-date guide to books and journals in research methods. Includes free datasets for SPSS. This site was compiled by Psychology Press, an Informa brand. It therefore focuses on Informa products.

- **Institute tutorial in research methods**

<http://www.vts.intute.ac.uk/he/tutorial/social-research-methods>

A tutorial on using the internet as a resource on social research methods. Funded by JISC and created by academics, tutors and librarians.

- **Practical examples for the analysis of surveys**

<http://www2.napier.ac.uk/depts/fhls/peas/index.htm>

In depth guide to analyzing surveys with practical examples and resources on theory. This site is produced with a collaboration between Napier University in Edinburgh and the National Centre for Social Research.

- **Economic and Social Data Service guides**

<http://www.esds.ac.uk/support/onlineguides.asp>

A series of guides on methods, using datasets, and resources for particular research themes. Researchers based in UK universities can use specially created teaching versions of datasets as examples when using some of these guides.

- **Associations, programmes and research units Economic and Social Data Service: Linking International Macro and Micro Data training:**

<http://www.esds.ac.uk/international/e-learning/limited/resource>

A learning resource including downloadable PDF files and videos about combining micro and macro data and making cross national data comparisons. The ESDS is a national data archive and disseminating programme for the UK, funded jointly by the Economic and Social Research Council (ESRC) and the Joint Information Systems Committee (JISC).

- **Data analysis: online manuals and guides to software packages**

SPSS product site <http://www.spss.com/statistics> the product site for SPSS a statistical data management and analysis package, Includes free demo.

- **Introduction to State using the UK Labour Force Survey**

<http://www.esds.ac.uk/government/docs/documents/StartingStata9.pdf>

A training guide produced by ESDS Government. State is a statistical analysis tool. The dataset used as an example in this guide can be downloaded by researchers and students in UK Higher Education Secondary analysis of statistics and quantitative data analysis www.data-archive.ac.uk.

LECTURE SCHEDULE

Unit	Topics to be covered	Lecture Delivery Mechanism	Lecture Hours
I.	1.1. Descriptive Statistics: Measures of central value, Dispersion and Skewness	L + P + SS	4
	1.2. Correlation Analysis	L + P + S.S	2
	1.3. Regression Analysis	L + P + S.S	2
	1.4. Association measures	L + P	2
	Total		10
II.	2.1. Probability –Basic Concepts, Definitions	L	2
	2.2. Approaches to Probability	L	1
	2.3. Simple Problems	L + P	1
	2.4. Binominal, Poisson & Normal Distribution with application in Research	L + P	6
	Total		10
III.	3.1. Sampling and Designs – Basic concepts	L + S.S	2
	3.2. Census Vs Sampling	L + S.S	2
	3.3. Laws of Sampling	L + S.S	2
	3.4. Methods of Sampling, Reliability of samples	L + S.S	4
	3.5. Merits & Demerits, Sample Size, Errors in Sampling	L + S.S	2
	Total		12
IV.	4.1. Inferential Statistics – Basic Concepts	L	2
	4.2. Types I and Type II Errors	L	2
	4.3. Steps in Hypothesis Testing	L + S.S	2
	4.4. Small and Large Sample Tests, Test of attributes - Problems	L + P	6
	4.5. Analysis of variance – One way and two way	L + P	2
	4.6. Non – Parametric Tests	L + P	2
	Total		16
V.	5.1 Introduction to Multivariate Analysis	L + P	2
	5.2 Multiple Correlation and Regression	L + P	2
	5.3 Factor Analysis	L + P	2
	5.4 Discriminate Analysis	L + P	2
	5.5. Logistic Regression Analysis, Correspondence Analysis, and Cluster analysis	L + P	8
	Total		16
	Total		64

L – Lecture;

P – Practical;

S.S – Self Study

DYNAMICS OF RURAL DEVELOPMENT

(Course Code: 19APRR0003)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To understand the concept and dimensions of Rural Development
- To expose the scholars to the various facets for Rural Development
- To acquire the knowledge in preparing Development Projects

Learning Outcomes: After completion of the course the scholar will be able to:

- apply knowledge gained in promoting rural development
- diagnose the strategies and approaches to Rural Development in India and Asian countries
- promote the art and craft of the methods for Rural Development

UNIT – I: Rural Development: Concept – Dimensions – Structure – Experiments – Strategies - Development Models: Historical perspectives in India and in Asia - Community Development and National Extension Service - Integrated Rural Development - Area and People's Development - Sustainable Livelihood: MGNREGA – PURA - Social Inequality: Caste – Class – Gender - Gandhian Approaches to Rural Development: Micro and Macro Level Planning.

UNIT – II: Rural Development Movements: Peasant Movements during Pre British - Colonial and Post – Colonial era – Agrarian struggles under Bhoodan and Gramdan movements – Land Reforms- Green Revolution – Strategies and Models Outreach Campaign - Corporate Social Responsibility (CSR); Methods and Techniques, Transfer of Technology Models (ToT).

UNIT – III: Rural Development Policies and Programmes: Poverty Reduction - Self and Wage Employment – Programmes for Basic Minimum Needs and Infrastructure- Programmes for Natural Resource Management – District Agriculture Area Programme, Hilly Area Development Programme, Integrated Watershed Development Programme– Drought Prone area Development Programme – Social Assistance Programme,– Farm and Non-Farm Sector, MSME.

UNIT – IV: Efforts on Rural Development in India: Five Year Plans and Rural Development, NIRD, SIRD, Rural Health Mission – Green Revolution - Globalization and Rural Development. Democratic Decentralization – Rural Local Governance – New Panchayth Raj– Decentralized Planning - Cooperatives. Community Based Organizations. Rural Banking and Micro Finance – SHGs - Role of Voluntary Organizations.

UNIT – V: Research in Rural Development: Development Planning: Resource based - Monitoring and Evaluation – Impact Assessment - Extension Technology - Infrastructural Resource Development – Rural Industrialization - Public Private Partnerships (PPPs) - Participatory Research in Rural Development: Individuals and Institutions.

REFERENCE:

- Katar Singh and Anil Shishodia (2016), Rural Development – Principles, Policies and Management, Sage, New Delhi.
- Chambers, Robert (1998): Poverty in India: Concepts Research and Reality, Discussion Paper 241. Brighton: IDS.
- Venkatta Reddy.K (2000) Rural Development in India, Himalaya Publishing House, New Delhi.
- Boraian M.P. (Ed.) (2016), Best Practices in Rural Development, Shanlax, Madurai.
- Suman Chandra K, Suresh Babu, V & Nath.P.K (2013), Agrarian Crisis in India - The Way Out, NIRD, Hyderabad.
- Gopal Jain. (1998). Rural Development. Mangaldeep Publication. New Delhi.
- Rajashekha and Sridhar. (2017). Rural Development, New Dimensions and Approaches, Sage Publication, New Delhi.
- I Sundaram. (2018). Rural Development in India, Himalaya Publishing New Delhi.

WEBSITE:

- www.nird.org.in/
- www.ncri.in
- www.rural.nic.in/scheme_websites
- www.sk.sagepub.com/books/participatory-rural-appraisal
- www.grd.org
- www.irdo.org

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	1.1. Rural Development: Concept – Dimensions – Structure – Experiments – Strategies - Development Models: Historical perspectives in India and in Asia	3
	1.2. Community Development and National Extension Service - Integrated Rural Development	3
	1.3. Area and People’s Development - Sustainable Livelihood: MGNREGA –PURA	3
	1.4. Social Inequality: Caste – Class – Gender - Gandhian Approaches to Rural Development: Micro and Macro Level Planning.	4
	Total	13
II.	2.1 Rural Development Movements: Peasant Movements during Pre British - Colonial and Post – Colonial era	3
	2.2 Agrarian struggles under Bhoodan and Gramdan movements	3
	2.3 Land Reforms- Green Revolution – Strategies and Models Outreach Campaign	2
	2.4 Corporate Social Responsibility (CSR) - Methods and Techniques	3
	2.5 Transfer of Technology Models (ToT)	2
	Total	13
III.	3.1 Rural Development Policies and Programmes: Social Mobilization and Poverty Reduction - Self and Wage Employment – Programmes for Basic Minimum Needs and Infrastructure	4
	3.2 Programmes for Natural Resource Management – District Agriculture Area Programme, Hilly Area Development Programme, Integrated Watershed Development Programme– Drought Prone area Development Programme	4
	3.3 Social Assistance Programme,– Farm and Non-Farm Sector.	4
	Total	12
IV.	4.1 Efforts on Rural Development in India: Five Year Plans and Rural Development, NIRD, SIRD	3
	4.2 Democratic Decentralization – Rural Local Governance	2
	4.3 New Panchayth Raj– Decentralized Planning	3
	4.4 Cooperatives, Community Based Organizations	3
	4.5 MSME - Rural Banking and Micro Finance – SHGs - Role of Voluntary Organizations	2
	Total	13
V.	5.1 Research in Rural Development: Development Planning: Resource based - Monitoring and Evaluation	2
	5.2 Impact Assessment - Extension Technology - Infrastructural Resource Development	2
	5.3 Rural Industrialization	3
	5.4 Public Private Partnerships (PPPs)	3
	5.5 Participatory Research in Rural Development: Individuals and Institutions	2
	Total	13
Total hours for unit 1-5		64

POPULATION AND DEVELOPMENT

(Course Code: 19APRR0004)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To introduce the scholars to population issues, concepts, theories and methods by encompassing the entire field of demography including principle and practice and its linkage with development.
- To know the causes and consequences of population growth with special references to National development
- To understand the relations between population and development and their potential consequences from a sociological, economic and geographical perspectives.
- To enhance the knowledge and skills of students on demographic techniques and population research methodology.
- To critically analyze demographic data and help in planning development agenda.

Learning Outcomes: Upon completion of the course, the scholars will be able to:

- acquire knowledge on fundamentals of the key components of population and development.
- understand the mechanism underlying the demographic theories and application.
- learn the inter-linkages between population and development.
- equipped with knowledge and skill to undertake studies on the linkages of population growth and development.

UNIT – I: Population growth: Global and National level with special reference to India – Levels, trends and differentials.

UNIT – II: Demographic techniques and measures – mortality, fertility, migration, age, sex composition, urbanization, family and household characteristics.

UNIT – III: Malthusian theory of population, Demographic transition theory, Optimum population theory, Caldwell theory of population and development.

UNIT – IV: Population and development- inter linkages – Global and National – Demographic dividend and population ageing – problems and prospects; Population and Environment.

UNIT – V: Population policies and programmes – National surveys, data sources and analysis.

REFERENCES

- Anrudh Jain, *Do Population Policies Matter*, New York: Population Council, 1998.
- George W.Barclay, *Techniques of Population Analysis*, New York: John Wiley & Sons Inc., 1958.
- Joseph A. McFalls, Jr., *Population: A Lively Introduction*, Washington: Addison Wesley, 1977.
- Mishra.S, *An Introduction to the Study of Population*, New Delhi: South Asian Publishers Pvt. Ltd, 1981
- Mahadevan.K, *Infant and Childhood Mortality in India*, Delhi : Mittal Publications, 1993.
- Pathak, Ram.F., *Techniques of Demographic Analysis*, Bombay : Himalaya Publishing House, 1992.
- Peter R.Cox, *Demography*, Cambridge: Cambridge University Press, 1976.
- Pollard, A.H., Farhat Yusuf, Pollard, G.N., *Demographic Techniques*, Hong Kong, Pergamon Press, 1983.
- Srivastava, S.C., *Studies in Demography*, New Delhi: Anmol Publications Pvt. Ltd., 2004.
- Zdenek Pavilk, *Position of Demography among other Disciplines*, Prague: John Willy and Sons, 2000.

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	Population growth: Global and National level with special reference to India – Levels, trends and differentials	13
	Total	13
II.	Demographic techniques and measures – mortality, fertility, migration, age, sex composition, urbanization, family and household characteristics.	13
	Total	13
III.	Malthusian theory of population, Demographic transition theory, Optimum population theory, Caldwell theory of population and development	12
	Total	12
IV.	Population and development- inter linkages – Global and National – Demographic dividend and population ageing – problems and prospects; Population and Environment	13
	Total	13
V.	Population policies and programmes – National surveys, data sources and analysis.	13
	Total	13
	Total hours for unit 1-5	64

RURAL ENVIRONMENT AND QUALITY OF LIFE

(Course Code: 19APRR0005)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To create awareness among scholars on environment and quality of life of people in rural areas.
- To make scholars acquire knowledge on the impact of environment on various dimensions of quality of life.
- To enhance the capacity of scholars to apply various methods and strategies to preserve environmental resources for ensured quality of life.

Learning Outcomes: Upon the completion of the course the scholars will be able to:

- acquire knowledge about the various aspects of rural environment and quality of life
- gain knowledge about the rural environment issues and problems and its influence on quality of life
- undertake research on rural environment and quality of life

UNIT – I: Rural Environment: Concepts and theories - Environmental Pollution: Air – Water – Soil – Nuclear - Solid waste - Biomedical waste – Sanitation - e-waste – Sources, impact and control mechanisms - Environmental Ethics - Global Warming - Climate Change - Ozone Depletion - Acid Rain – Cloud Bursting - Eco-friendly environmental practices - Waste Management, Energy Practices and Agricultural Practices.

UNIT – II: Environmental Issues and Strategies: Degradation, deforestation and soil erosion; extinction of flora and fauna. Environmental Management: conservation, protection and restoration of environmental resources: Role of community, PRIs and Environmental Protection Acts.

UNIT – III: Environment and Quality of Life: Concept, Impact Assessment- Steps and application, Dimensions of Quality of Life. Health Promotion, Disease Prevention. Factors Contributing to Health Behaviour Change.

UNIT – IV: Environment and Development: Concept, principles, models. Rights Based Approach for development and Developmental Planning- Macro and Micro level. Sustainable Development Goals (SDGs), - its status, strategies, community intervention.

UNIT – V: Research on Environment and Quality of Life: Interdisciplinary research studies in rural environment and quality of life. Identification, promoting research in environmental problems – Trends and issues. National and International policies and programmes on environment and quality of life.

REFERENCE

- Sudhir & Alankara Masillamani, Environmental Issues, Reliance Publishing House, New Delhi, 2003.
- Benny Joseph, Environmental Studies, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2005.
- Manmahan Singh Gill, Jasleen Kewlani, Environmental Conscience Socio-Legal and Judicial Paradigm, Concept Publishing Company, New Delhi, 2009.
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- Pandian K.L., Global Environmental Problems, ALP Books, New Delhi, 2009.
- Singh S.K., Seema Singh, Environmental Education and Pollution Control, Arish Publishers & Distributors, New Delhi, 2008.
- Pruthi R.K., Towards Sustainable Development, Rajat Publications, New Delhi, 2005.

WEBSITE

- www.epa.gov/environmental-topics/z-index
- <http://guides.libraries.psu.edu/environment>
- <https://www.journals.elsevier.com/environmental-research>

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	1.1 Rural Environment: Concepts and theories	3
	1.2 Environmental Pollution: Air – Water – Soil – Nuclear - Solid waste - Biomedical waste – Sanitation - e-waste – Sources, impact and control mechanisms	3
	1.3 Environmental Ethics - Global Warming - Climate Change - Ozone Depletion - Acid Rain – Cloud Bursting	3
	1.4 Eco-friendly environmental practices - Waste Management, Energy Practices and Agricultural Practices	4
	Total	13
II.	2.1 Environmental Issues and Strategies: Degradation, deforestation and soil erosion, extinction of flora and fauna	3
	2.2 Environmental Management: conservation, protection	3
	2.3 Restoration of environmental resources	2
	2.4 Role of community, PRIs	3
	2.5 Environmental Protection Acts.	2
	Total	13
III.	3.1 Environment and Quality of Life: Concept Reduction - Self and Wage Employment – Programmes for Basic Minimum Needs and Infrastructure	4
	3.2 Impact Assessment- Steps and application, Dimensions of Quality of Life	4
	3.3 Health Promotion, Disease Prevention. Factors Contributing to Health Behaviour Change	4
	Total	12
IV.	4.1 Environment and Development: Concept, principles, models.	3
	4.2 Rights Based Approach for development	2
	4.3 Developmental Planning- Macro and Micro level	3
	4.4 Sustainable Development Goals (SDGs), - its status, strategies,	3
	4.5 Community intervention	2
	Total	13
V.	5.1 Research on Environment and Quality of Life	2
	5.2 Interdisciplinary research studies in rural environment and quality of life	3
	5.3 Identification, promoting research in environmental problems	3
	5.4 Trends and issues, National and International policies and programmes on environment and quality of life	4
	Total	13
Total hours for unit 1-5		64

CONTEMPORARY SOCIAL WORK

(Course Code: 19APRR0006)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To enable the scholars in understanding of emerging theories, models and best practices of social work, and
- To develop analytical capacity and apply contemporary social work knowledge in practice.

Learning Outcomes: Upon completion of the course, the scholars will be able to:

- know the emerging trends in social work profession
- learn the recent social work intervention and research strategies
- understand the contemporary reality and discourses of social work practice
- analyze the domains of social work research
- apply the acquired knowledge and skills in dealing with the issues related to social work

UNIT – I: Social Work Profession: Concept of Social Work, Ethics of social research, Values in Social Work - Professional Social Work: Realities and Responsibilities - Current Social Issues: Eco-social justice, Gender Equity, Civic Rights, Criminal Justice, Social Exclusion, Livelihood, Displacement and migration.

UNIT – II: Social Work Intervention: Techniques and Micro Skills. Reflective practice, Evidence-based practice, Solution focused practice. Models of Social Work: Problem solving Model - Remedial Model - Crisis intervention Model - Therapeutic Model- Development Model - Strengths based model.

Unit III- Trends in Social work Practice: Eco-social justice and Criminal justice Social Work, School Social Work, Gerontological Social Work, Hospice and Palliative Care Social Work, International Social Work, Inter-cultural Social Work, Radical Social Work, Application of Gandhian Values in Social Work.

UNIT – IV: Domains of Social Work Research: Health: Physical – Mental - Social - Spiritual- Development: Rural - Tribal - Urban. Persons with special needs: Transgender - Differently abled persons- Destitute - Substance Abuse - Social security: Child – Youth – Women- Elderly- Labourers: Unorganized - Organized.

UNIT – V: Thrust Areas in Social Work: Theory and Model building in Social Work- Professional development and networking: International – National – Regional - Social Policy Research - Digitalization of Social Work Knowledge - Dissemination of Social Research Findings.

REFERENCE:

- Allen Rubin and Earl Babbie, *Methods for Social Work Research*, Rawat Publication, New Delhi, 2010.
- Ilango Ponnuswami, *Professional Social Work*, Authors press, New Delhi, 2011.
- Lena Dominelli, *Social Work*, Washington: Polity press, 2004.
- JhaJainedra Kumar, *Practice of Social Work*, New Delhi: Anmol Publications Pvt, Ltd. 2002.
- Desai, M, *Curriculum Development on History of Ideologies for Social Change and Social Work*, Mumbai: Social work Education and Practice Cell, 2000.
- Banks.S, *Ethics and Values in Social Work, Practical Social Work Series*, London: Macmillan press Ltd. 1995.
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- Monika, Esperanza and Hilaria, *Social Diversity: International Social Work from Intercultural and De-colonial Perspective*, Springer VS, Wiesbaden, 2018
- S. Maclean, J. Finch and P. Tedam, *SHARE: A New Model for Social Work*, Kirwin Maclean Associates Ltd, Staffordshire, 2018.

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- <http://socialjustice.nic.in>
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- http://oasis.col.org/bitstream/handle/11599/2737/2016_Swaraj_CD001-M1_Social-Work-Overview.pdf?sequence=1&isAllowed=y
- dceutkal.ac.in/Syllabus/MSW/PAPER-1.pdf

Journals:

- Indian Journal of Social Work
- Adelaide Journal of Social Work
- Loyola Journal of Social Sciences
- Journal of Rural Development
- Research on Social Work Practice

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	1.1. Social Work Profession: Concept of Social Work, Ethics of social research, Values in Social Work	2
	1.2. Professional Social Work: Realities and Responsibilities	2
	1.3. Current Social Issues: Eco-social justice, Gender Equity, Civic Rights	2
	1.4. Criminal Justice, Social Exclusion	2
	1.5. Livelihood	2
	1.6. Displacement and migration	3
	Total	13
II.	2.1. Techniques and Micro Skills. Reflective practice	2
	2.2. Evidence-based practice, Solution focused practice	2
	2.3. Models of Social Work: Problem solving Model - Remedial Model	2
	2.4. Crisis intervention Model	2
	2.5. Therapeutic Model- Development Model	2
	2.6. Mass contact methods - use of Audio Visual aids Strengths based model	2
	Total	12
III.	3.1. Trends in Social work Practice: Eco-social justice, Criminal justice social work	2
	3.2. School Social Work	2
	3.3. Gerontological Social Work, Hospice and Palliative Care Social Work	2
	3.4. International Social Work, Inter-cultural Social Work	3
	3.5. Radical Social Work, Application of Gandhian Values in social work	4
	Total	13
IV.	4.1. Domains of Social Work Research: Health: Physical – Mental - Social – Spiritual	2
	4.2. Development: Rural - Tribal – Urban	3
	4.3. Persons with special needs: Transgender - Differently abled persons- Destitute - Substance Abuse	2
	4.4. Social security: Child – Youth – Women- Elderly	3
	4.5. Labourers: Unorganized - Organized.	3
	Total	13
V.	5.1. Thrust Areas in Social Work: Theory and Model building	2
	5.2. Professional development and networking: International – National – Regional	4
	5.3. Social Policy Research	3
	5.4. Digitalization of Social Work Knowledge	2
	5.5. Dissemination of Social Research Findings	2
	Total	13
Total hours for unit 1-5		64

RURAL COMMUNITY OUTREACH

(Course Code: 19APRR0007)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To enlighten scholars on the importance, methods and techniques of community outreach programmes
- To expose the scholars in understanding the social, economic and environmental issues and challenges of rural areas
- To develop capacity building of the scholars in undertaking community based participatory research in rural development

Learning Outcomes: Upon completion of the course, the scholars will be able to:

- gain knowledge and skills for undertaking rural outreach programmes
- critically analyze the nature of rural community and their developmental needs
- apply the art and craft of the community outreach towards sustainable rural development

UNIT – I: Rural Development and extension: Origin – Evolution – Concepts – recent development trends - Community outreach - Development Communication -- Village economy - Rural Institutions: Gram Panchayats – Cooperatives - Village Schools - Community based Organizations (CBOs) - Self-Help Groups (SHGs) - Non Governmental Organizations (NGOs) –Farmers Associations and Youth Club.

UNIT – II: Methods and Techniques: Outreach methods: individual – group- mass contact – Knowledge Attitude and Practice (KAP) application –Use of Audio Visual aids - Social Media – Evaluation Practices and Feed back – Follow-up activities – Skills and Qualities of a good outreach worker.

UNIT – III: Educational Institutions and Outreach Programmes: Rural exposure programmes of Universities, Colleges and Research Institutions: Rural Institutes, Agriculture Universities, NIRD&PR, SIRD, TISS, IITs, IIMs, and other professional institutions in gaining rural experience.

UNIT – IV: Village Placement Programme (VPP): Village Selection, Planning for a camp, Scheduling of activities, Programming Implementation with community participation -Processes, and Procedures of VPP- Experiential Learning from VPP – Participatory Initiatives - Students’ personality and leadership development – Evaluation and Follow up.

UNIT – V: Relevance of Outreach Programmes: Rural Development, Livelihood, Employment, Housing, Drinking Water and Sanitation, Social Assistance, Road and Electricity, Environmental Sustainability, Skill training. Corporate Social Responsibility (CSR): concept, linkages to development - Growth of CSR - Factors influencing growth of CSR - Government initiatives for promoting CSR.

REFERENCE:

- Singh, Katar, Rural Development: Principles, Policies and Management, Sage Publications, New Delhi, 2015.
- Palanithurai G., New Panchayati Raj in Tamil Nadu, New Delhi: Concept Pub, 2003.
- Narayanasamy.N, Participatory Rural Appraisal- Principles, Methods and Application, Sage Publications, 2009.
- Boraian M.P., Best Practices in Rural Development, Shanlax publishers, 2016.
- Boraian M.P., Community Development - An Outreach approach, Anmol publishers, 2008.
- Raja Sekar and Sridhar, Rural Development – Principles and Practices, Sage Publications, New Delhi, 2017

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- www.nird.org.in/
- www.ncri.in
- www.rural.nic.in/scheme_websites
- www.sk.sagepub.com/books/participatory-rural-appraisal

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	1.1 Rural Development and extension: Origin – Evolution – Concepts	2
	1.2 Recent development trends - Community outreach- Development	2
	1.3 Rural Institutions: Gram Panchayats – Cooperatives	2
	1.4 Village Schools - Community based Organizations (CBOs)	2
	1.5 Self-Help Groups (SHGs)	2
	1.6 Community based Organizations (CBOs) and Non Governmental Organizations (NGOs) –Farmers Associations and Youth Club	3
	Total	13
II.	2.1 Methods and techniques of Rural outreach	2
	2.2 S individual – group- mass contact	2
	2.3 Knowledge Attitude and Practice (KAP) application	2
	2.4 Use of Audio Visual aids - Social Media	2
	2.5 Evaluation Practices and Feed back – Follow-up activities	2
	2.6 Skills and qualities of a good outreach worker.	2
	Total	12
III.	3.1 Educational Institutions and Outreach Programmes	2
	3.2 Rural exposure programmes of Universities, Colleges and Research Institutions	2
	3.3 NIRD&PR, SIRD, TISS	2
	3.4 IITs, IIMs	3
	3.5 Other professional institutions in gaining rural experience	4
	Total	13
IV.	4.1 Village Placement Programme (VPP)	2
	4.2 Village selection, Planning for a camp	3
	4.3 Scheduling of activities, Programming Implementation with community participation	2
	4.4 Processes, and Procedures of VPP	2
	4.5 Experiential Learning from VPP	2
	4.6 Students’ personality and leadership development –Evaluation and Follow up	2
	Total	13
V.	5.1 Relevance of Outreach programmes	2
	5.2 Rural Development, Livelihood, Employment	2
	5.3 Housing, Drinking Water and Sanitation	2
	5.4 Social Assistance, Road and Electricity, Skill training	2
	5.5 Corporate Social Responsibility (CSR): Concept, linkages to development	2
	5.6 Growth of CSR - Factors influencing growth of CSR - Government initiatives for promoting CSR	3
	Total	13
Total hours for unit 1-5		64

INFORMATION TECHNOLOGY ENABLED MANAGEMENT

(Course Code: 19APRR0008)

Credit: 4

Contact hours: 64

Max. Marks: 100

Objectives:

- To understand about Information Technology and Information systems, Functional Information systems, DBMS, Disaster Management, Data Mining and Cloud Computing.
- Find out the core of functional areas of management for research and development.

Learning Outcomes: After completion of the course the scholar will be able to:

- apply of management process through information technology
- know the critical managerial functions and tasks in an organization digitally
- apply the managerial skills to solve the up-to-date human resource management issues

UNIT – I: Introduction: Data – Information – Intelligence - Information Technology Enabled Management - Information System: Evolution – Types - Based on functions and hierarchy- Functional Information Systems: Decision Supportive System (DSS) - Executive Information System (EIS) – Knowledge Management System (KMS) – Geo Informatics System (GIS) - International Information System (IIS).

UNIT – II: Systems Analysis and Design: Systems Development Methodologies - Systems Analysis and Design Tools: System Flow Chart - Decision Table - Data Flow Diagram (DFD) - Entity Relationship (ER) Model - Object oriented Analysis and Design - Unified Modeling Language (UML) and diagram.

UNIT – III: Database Management Systems: Data Base Management System (DBMS) – Hierarchical Data Base Management System (HDBMS) – Network Data Base Management System (NDBMS) – Relational Data Base Management System (RDBMS) – Object – Oriented Data Base Management System (OODBMS) - Query Processing – Structured Query Language (SQL) - Concurrency Management - Data warehousing and Data Mart.

UNIT – IV: Security, Control and Reporting: Security Testing -Error Detection – Controls -Information System (IS) Vulnerability - Disaster Management - Computer Crimes - Securing the Web - Intranets and Wireless Networks - Software Audit - Ethics in Information Technology enabled Management - User Interface and Reporting.

UNIT – V: IT enabled Management Research: Role of Information Management Research: Enterprise Resource Planning (ERP) - e-business - e-governance – Business Analytics - Data Mining - Business Intelligence - Pervasive Computing - Cloud computing – Capability Maturity Model (CMM).

REFERENCE:

- Robert Schultheis and Mary Summer, Management Information Systems – The Managers View, Tata McGraw Hill, 2008.
- Kenneth C. Laudon and Jane Price Laudon, Management Information Systems – Managing the digital firm, PHI Learning / Pearson Education, PHI, Asia, 2002.
- Gordon Davis, Management Information System: Conceptual Foundations, Structure and Development, Tata McGraw Hill, 7 th edition, 2006.
- Haag, Cummings and Mc Cubbrey, Management Information Systems for the Information Age, McGraw Hill, 2012.
- Turban, McLean and Wetherbe, Information Technology for Management – Transforming Organisations in the Digital Economy, John Wiley, 6 th edition, 2009.
- Raymond McLeod and Jr. George P. Schell, Management Information Systems, Pearson Education, 2007.
- James O Brien, Management Information Systems – Managing Information Technology in the E-business enterprise, Tata McGraw Hill, 2010.
- Corey Schou and Dan Shoemaker, Information Assurance for the Enterprise – A Roadmap to Information Security, Tata McGraw Hill, 2007.
- Frederick Gallegor, Sandra Senft, Daniel P. Manson and Carol Gonzales, Information Technology Control and Audit, Auerbach Publications, 4 th edition, 2012

WEBSITE:

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- www.shrmindia.org
- www.ipma-hr.org
- www.ahrd.org
- www.quickmba.com
- www.mindtools.com
- www.studygs.net

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	1.1 Data – Information – Intelligence - Information Technology Enabled Management	2
	1.2 Information System: Evolution – Types - Based on functions and hierarchy	2
	1.3 Functional Information Systems: Decision Supportive System (DSS)	2
	1.4 Executive Information System (EIS) – Knowledge Management System (KMS)	2
	1.5 Geo Informatics System (GIS)	2
	1.6 International Information System (IIS)	3
	Total	13
II.	2.1 Systems Analysis and Design: Systems Development Methodologies	2
	2.2 Systems Analysis and Design Tools: System Flow Chart - Decision Table	2
	2.3 Data Flow Diagram (DFD) - Entity Relationship (ER) Model	2
	2.4 Object oriented Analysis and Design	2
	2.5 Unified Modeling Language (UML)	2
	2.6 Diagram.	2
	Total	12
III.	3.1 Database Management Systems: Data Base Management System (DBMS)	2
	3.2 Hierarchical Data Base Management System (HDBMS) – Network Data Base Management System (NDBMS)	2
	3.3 Relational Data Base Management System (RDBMS) – Object – Oriented Data Base Management System (OODBMS)	2
	3.4 Query Processing – Structured Query Language (SQL)	3
	3.5 Concurrency Management - Data warehousing and Data Mart	4
	Total	13
IV.	4.1 Security, Control and Reporting: Security Testing	2
	4.2 Error Detection – Controls -Information System (IS) Vulnerability	3
	4.3 Disaster Management - Computer Crimes - Securing the Web	2
	4.4 Intranets and Wireless Networks - Software Audit	2
	4.5 Ethics in Information Technology enabled Management	2
	4.6 User Interface and Reporting	2
	Total	13
V.	5.1 IT enabled Management Research: Role of Information Management Research	2
	5.2 IT enabled Management Research: Role of Information Management	2
	5.3 Enterprise Resource Planning (ERP) - e-business - e-governance – Business Analytics	2
	5.4 Data Mining - Business Intelligence	2
	5.5 Pervasive Computing - Cloud computing	2
	5.6 Capability Maturity Model (CMM)	3
	Total	13
Total hours for unit 1-5		64

B.Sc. MICROBIOLOGY**COURSE SYLLABUS**

Course Code & Title	19APRU0003 ALLIED BIO-STATISTICS - I	No. of Credits: 4 (3 + 1)	3 hours
Programme	B.Sc Microbiology	Semester - III	Max. Marks: 100
Cognitive Level	K-1	Understanding basic concepts in Bio-Statistics	
	K-2	Skill in computing basic statistical measures in the biological data analysis	
	K-3	Interpretation of statistical outcomes	
Course Objectives	<ul style="list-style-type: none"> To understand the basic concepts and terms and its relevance in biology. To develop computation skills in statistics and analyze data using relevant statistical methods. 		

UNIT	CONTENT	NO. OF HOURS
I	Biostatistics – definition – types of data – Primary and Secondary data – Methods of Collection of data – Sources of data in life science – Limitation and uses of statistics.	6
II	Classification and Tabulation of data – Diagrammatic and Graphic representation of data.	16
III	Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean – Merits and Demerits. Measures of dispersion: Range, Standard deviation, Mean deviation, Quartile deviation, – Merits and Demerits, Coefficient of variation.	8
IV	Measures of skewness – Definition, Types; Karl Pearson’s coefficient of skewness – Bowley’s Co-efficient of Skewness; Measures of Kurtosis – Definitions, Types and Measures; Simple problems.	12
V	Correlation: Definition, Types and Measures of Correlation – Karl Pearson’s correlation coefficients, Spearman’s Rank Correlation coefficients. Regression: Concept, Definitions – Simple regression equations – fitting of regression equation – Illustrations.	12

PRACTICAL	1. Graphical presentation of data – Diagrams, Frequency curves and polygons.	4
	2. Measures of Central values – Mean, median and mode.	6
	3. Measures of dispersion – Range, standard deviation and coefficient of variation.	6
	4. Correlation & Regression analysis – Computation of correlation coefficient and determination of regression equations.	4

REFERENCES	<p>Text Books:</p> <ul style="list-style-type: none"> • Verma B.L, Shukla G.D and Srivastava.R.N, <i>Biostatistics – Perspectives in Health Care; Research and Practice</i>, New Delhi: CBS Publishers & Distributors, 1993. • Daniel WW,(1987). <i>Biostatistics</i>, John Wiley and Sons, New York • Gurumani, N – <i>Introduction to Bio-Statistics</i>, MJA Publishers, Chennai, 2004. • Arora.P.N. and Malhan.P.K, <i>Biostatistics</i>, Delhi: Himalaya Publishing House, 1996 <p>Reference Books:</p> <ul style="list-style-type: none"> • Daroga Singh, Chaundjari.F.S, <i>Theory and Analysis of Sample Survey</i>, New Delhi; Wiley Eastern Ltd., 1986. • Gupta. C.B, <i>An Introduction to Statistical Methods</i>, New Delhi: Vikas Publishers, 1992. • Gupta. S.P, <i>Statistical Methods</i>, New Delhi: Sultan Chand, 1992 <p>Website:</p> <ul style="list-style-type: none"> • https://www.biostat.washington.edu/about/biostatistics • http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_BiostatisticsBasics • https://www.edx.org/course/biostatistics-0
COURSE OUTCOMES	<p>On completion of the course, students will be able to do the following:</p> <p>C01: Understand the basic concepts of statistics and its relevance with core area.</p> <p>C02: Present biological data using diagrams charts and graphs.</p> <p>C03: Describe sample characteristics using descriptive statistics.</p> <p>C04: Bring out the relationship between different biological variables.</p> <p>C05: Make regression estimates and carry out analysis and interpretation of biological data.</p>

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	Introducing and defining Biostatistics	2
	Types of data. And Primary and Secondary data	2
	Methods of Collection of data	3
	Sources of data in life science	2
	Limitation and uses of statistics	2
	Total	11
II.	Classification and Tabulation of data	6
	Diagrammatic and Graphic representation of data	6
	Total	12
III.	Measures of Central Tendency, and calculation of Mean, Median, Mode, Geometric Mean and Harmonic Mean, and their Merits and Demerits	7
	Measures of dispersion, calculating Range, Standard deviation, Mean deviation, Quartile deviation, and their Merits and Demerits,	7
	Coefficient of variation	2
	Total	16
IV.	Measures of skewness – Definition, Types; Karl Pearson’s coefficient of skewness – Bowley’s Co-efficient of Skewness;	6
	Measures of Kurtosis – Definitions, Types and Measures; Simple problems.	6
	Total	12
V.	Introduction to Correlation, its Definition and Types	2
	Measures of Correlation - Karl Pearson’s correlation coefficients	3
	Spearman’s Rank Correlation coefficients	3
	Regression, Simple regression equation, fitting of regression equation and Illustrations	5
	Total	13
Total hours for unit 1-5		64

B.Sc. MICROBIOLOGY**COURSE SYLLABUS**

Course Code & Title	19APRU0004 ALLIED BIO-STATISTICS - II	No. of Credits: 4 (3 + 1)	3 hours
Class	B.Sc Microbiology	Semester - IV	Max. Marks: 100
Cognitive Level	K-1 Knowledge on application of Statistics in Bio-Sciences		
	K-2 Skill in computing statistical measures in the biological data analysis		
	K-3 Interpretation of statistical outcomes		
Course Objectives	<ul style="list-style-type: none"> To understand the basic concepts and terms and its relevance in biology. To develop computation skills in statistics and analyze data using relevant statistical methods. 		

UNIT	CONTENT	NO. OF HOURS
I	Probability – Concept, Definition; Addition and Multiplication Theorems (without proof). Simple Problems based on Probability.	6
II	Sampling – Definition, basic concepts; types of Sampling – sample versus census, simple random sampling with and without replacement, use of random number tables and lottery method for selection of random samples; Determination of sample size.	6
III	Sampling distribution - Standard error – Test of Hypothesis: Simple Hypothesis, Null hypothesis – Test of Significance: Large sample tests with regard to Mean, Differences of Means, Proportions and difference of Proportions.	8
IV	Test of Significance: Small Sample Test with regard to Mean, Difference of Means and Variances – Paired t test - Chi – square test – Procedures and simple problems.	12
V	Analysis of variance (ANOVA) – concepts and examples – explanation. ANOVA for one way and two way classifications – Procedures and simple problems.	12

PRACTICAL	1. Test of significance – Large sample tests and Test of significance for attributes.	6
	2. Test of significance – Small sample tests	4
	3. Chi-square test – Independence of attributes (for 2 X 2 contingency table)	4
	4. Analysis of variance – One-way and Two-way classifications.	6

REFERENCES	<p>Text Books:</p> <ul style="list-style-type: none"> • Verma B.L, Shukla G.D and Srivastava.R.N, <i>Biostatistics – Perspectives in Health Care; Research and Practice</i>, New Delhi: CBS Publishers & Distributors, 1993. • Daniel WW,(1987). <i>Biostatistics</i>, John Wiley and Sons, New York • Gurumani, N – <i>Introduction to Bio-Statistics</i>, MJA Publishers, Chennai, 2004. • Arora.P.N. and Malhan.P.K, <i>Biostatistics</i>, Delhi: Himalaya Publishing House, 1996 <p>Reference Books:</p> <ul style="list-style-type: none"> • Daroga Singh, Chaundjari.F.S, <i>Theory and Analysis of Sample Survey</i>, New Delhi; Wiley Eastern Ltd., 1986. • Gupta. C.B, <i>An Introduction to Statistical Methods</i>, New Delhi: Vikas Publishers, 1992. • Gupta. S.P, <i>Statistical Methods</i>, New Delhi: Sultan Chand, 1992 <p>Website:</p> <ul style="list-style-type: none"> • https://www.biostat.washington.edu/about/biostatistics • http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_BiostatisticsBasics • https://www.edx.org/course/biostatistics-0
COURSE OUTCOMES	<p>On completion of the course, students will be able to do the following:</p> <p>C01: Understand the concepts of statistics and its relevance with core area.</p> <p>C02: Understand the concepts of probability and sampling.</p> <p>C03: Visualize their biological research issues in terms of scientific inquiry.</p> <p>C04: Understand the concept of Decision making with aid of hypothesis testing.</p> <p>C05: Make estimates and carry out analysis and interpretation of biological data.</p>

LECTURE SCHEDULE

UNIT	TOPICS TO BE COVERED	HOURS
I.	Introduction to Probability, Concept and Definition	3
	Addition and Multiplication Theorems	4
	Simple Problems based on Probability	3
	Total	10
II.	Definition and basic concepts of Sampling	2
	Types of Sampling and sample versus census	3
	Simple random sampling with and without replacement	3
	Use of random number tables and lottery method for selection of random samples	3
	Determination of sample size	2
	Total	13
III.	Sampling distribution and Standard error	2
	Test of Hypothesis, Simple Hypothesis and Null hypothesis	2
	Test of Significance: Large sample tests with regard to Mean, Differences of Means, Proportions and difference of Proportions	12
	Total	16
IV.	Small Sample Test with regard to Mean, Difference of Means and Variances	5
	Paired t test	4
	Chi – square test	4
	Total	13
V.	Analysis of variance (ANOVA), concepts and examples, explanation	4
	ANOVA for one way and two way classifications, Procedures and simple problems	8
	Total	12
Total hours for unit 1-5		64

PANEL OF EXAMINERS

CENTRE FOR APPLIED RESEARCH

Ph.D PROGRAMME

RESEARCH METHODOLOGY

PANEL OF EXAMINERS

S.No	FACULTY DETAILS	S.No	FACULTY DETAILS
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CENTRE FOR APPLIED RESEARCH

Ph.D PROGRAMME

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PANEL OF EXAMINERS

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3	Dr. T. EDWIN PRABAKARAN Associate Professor of Statistics Department of Statistics Loyola College, Chennai – 600034. Mobile: 9444926016. E-mail: teprabakaran@yahoo.com	4	Dr. V. S. VAIDYANATHAN Assistant Professor Department of Statistics Pondicherry University Pondicherry - 605 014 Mobile: 9884264084
5	Dr. C. NANTHAKUMAR Associate Professor of Statistics & Head Salem Sowdeswari College, Salem – 636010 Mobile: 9443496217.	6	Dr. PADI THIRUPATHI RAO Head, Department of Statistics Pondicherry University R.Venkatraman Nagar, Kalapet Pondicherry – 605 014 Email: head.sta@pondiuni.edu.in, drtrpadi@gmail.com Mobile: 9502175901.

CENTRE FOR APPLIED RESEARCH

Ph.D PROGRAMME

COURSE: DYNAMICS OF RURAL DEVELOPMENT

PANEL OF EXAMINERS

S.No	FACULTY DETAILS	S. No	FACULTY DETAILS
1	Dr. P. BALAMURUGAN, Associate Professor, Centre for Rural Development, Annamalai University, Annamalai Nagar. Mobile: 9486527638 E-mail: drbalamuruganarasi@gmail.com	2	Dr. A. THOMAS WILLIAM Associate Professor Department of Rural Development Science Arul Anandar College (Autonomous) Karumathur, Madurai – 625514. Mobile: 9443883894 E-mail: williamsrvt@gmail.com
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CENTRE FOR APPLIED RESEARCH

Ph.D PROGRAMME

POPULATION AND DEVELOPMENT

PANEL OF EXAMINERS

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