

Kadi Sarva Vishwavidyalaya Gandhinagar

(A University established vide Gujarat State Government Act 21 of 2007 in May 2007 and approved by UGC (ref F. 9-18/2008(cpp-1) March 19, 2009))

(Managed by Sarva Vidyalaya Kelavani Mandal (Trust))

RESEARCH METHODOLOGY

Faculty of Engineering and Technology & Faculty of Computer Science Course Work

Paper Number	:	Paper 1
Subject Title	:	Research Methodology
Subject Code	:	PhDFETCSRM-01

Rationale: This coursework is designed in such a way as to support, motivate, and encourage quality research and undergoing this course work, the student will be equipped with fundamentals of research methodology, scientific communication, and also recent developments in the field of specialization.

Teaching and Evaluation Scheme:

Credits	Marks Total
4	100

Course Content:

[Weightage=25%]

Unit I

Introduction: Objectives and Motivation in Research, Types of Research, Research Approaches, Research Process, Criteria of Good Research, Dialectic of Research, Research Systematic Approach.

Research Problems: Introduction, Statement of Research Problem, subproblems, Research Problem/Questions, Planning Research Project, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

Research Design and Methods: Important Concepts and Need for Research Design, Features of good design, Different Research Designs, Basic Principles of Experimental Designs, Observation and Facts, Laws and Theories, Prediction and explanation, Induction, Deduction, and Development of Models. Developing a research plan - Exploration, Description, Diagnosis, Experimentation. Determining experimental and sample designs.

Unit II

[Weightage=25%]

Data Collection Methods: Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaires and Schedules, Difference between Questionnaires and Schedules, Methods of Data Collection, Collection of Secondary Data, Selection of Appropriate Method for Data Collection.

Data Processing and Analysis: Processing Operations, Elements/Types of Analysis, Statistics in Research, Simple Regression Analysis, Multiple Correlation and Regression, Partial Correlation, Association in Case of Attributes.

Data Testing and Interpretation: Testing of Hypotheses-I, II, Chi-square Test, Analysis of Variance and Covariance, Multivariate Analysis Techniques, Interpretation.

Unit III

[Weightage=25%]

Reporting and thesis writing – Structure and components of scientific reports, Types of the report, technical reports and thesis, Significance, Different steps in the preparation, Layout, structure, and Language of typical reports, Illustrations and tables, Bibliography, referencing and footnotes, Oral presentation, Planning, Preparation, Practice, Making the presentation, Use of visual aids, Importance of effective communication.

Unit IV

[Weightage=25%]

Role of Computer in Research: Fundamentals of Computers, Definition, types of Computers, Storage Devices, Input/Output Devices, Operating Systems: definition, types of the Operating Systems, Database Systems, Networks, Internet & its applications, Web Searching, Email, Documentation and Presentation Softwares (Word Processor, Spreadsheet, Presentation and other related Softwares), Research Tools for Computer Science and Engineering (GitHub, Slack, and LaTeX, and other related Tools), Research Databases (IEEE, Science Direct, ACM, Google Scholar, Springer, and other related Databases).

Reference Books and Link:

- Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
- EhtiramRaza Khan and Huma Anwar, 2021. Research Methods of Computer Science. University Science Press (an imprint of Laxmi Publication Pvt. Ltd.).
- Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
- Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Publications. 2 volumes.
- Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.
- Anthony, M., Graziano, A.M. and Raulin, M.L., 2009. Research Methods: A Process of Inquiry, Allyn and Bacon.
- Coley, S.M. and Scheinberg, C. A., 1990, "Proposal Writing", Sage Publications.
- Day, R.A., 1992. How to Write and Publish a Scientific Paper, Cambridge University Press.
- Fink, A., 2009. Conducting Research Literature Reviews: From the Internet to Paper. Sage Publications
- Leedy, P.D. and Ormrod, J.E., 2004 Practical Research: Planning and Design, Prentice Hall.
- <https://paperpile.com/g/research-databases-computer-science/>