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**Ph.D. Course Work
for
Computer Science**

Introduction:-

The course work for the doctoral research has been made mandatory by the UGC. Samalkha Group of Institutions in Collaboration with University of Mysore has decided to implement this aspect on the immediate basis for the benefit of the students pursuing Ph.D. The course work is designed in such a way as to support, motivate and encourage quality research. By undergoing this course work, the student will get equipped with fundamentals of research methodology, scientific communication and also recent developments in the field of research. The course work has to be completed by the student in a satisfactory way before submission of his/her dissertation / thesis.

COURSE STRUCTURE

S.No.	Nomenclature of the Paper	Duration	Passing Marks	Max. Marks
1	Advanced Research Methodology	3 Hours	40	100
2	Review of Literature in Area of Research	3 Hours	40	100

**SYLLABUS OF THE Ph.D COURSE WORK
ADVANCED RESEARCH METHODOLOGY
PAPER -I**

M. Marks: 100

Time Allowed: 3 hrs.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of four Units I, II, III & IV. All the Units will have two questions from their respective sections of the syllabus carrying equal marks.

INSTRUCTIONS FOR THE CANDIDATE

The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT-I

Over View of Research Methodology: Meaning of Research, Characteristics and Types of Research Process. Formulation of Research objectives, Formulation of Hypotheses, Types of Hypotheses, Methods of testing Hypotheses - Research plan and its components, Methods of Research (Survey, Observation, Case study, experimental, historical and comparative methods) Concept of Sampling Design, types and Steps in Sample Design.

UNIT-II

Data Collection, Processing and its Analysis: Methods of Primary data collection. Collection of data through questionnaires, Schedule. Collection of Secondary data. Processing Operations, Elements of Analysis. Use of library, research books, monograph, periodicals, abstract, documents, review of relevant literature.

Elements in research methodology: Identification and formation of research problem (Hypothesis). Research design: CRD (Completely Randomized Design), RBD (Randomized Block Design), and LSD (Latin Square Design). Scientific database: Science Direct and DOAJ (*Direct Open Access Journals*)

UNIT-III

Scientific body in research: Ethical, legal, social and scientific issues in research. A brief idea about the funding agencies such as DST (Department of Science and Technology), DBT (*Department of Biotechnology*), ICMR (Indian Council of Medical Research), CSIR (Council of Scientific & Industrial Research) and UGC (*University Grants Commission*). Role of IPR (Intellectual Property Rights) in Research and Development.

Measurement and scaling Technique: Measurement in research, Measurement Scales, Error sources. Test of sound measurement. Technique of developing measurement tools. Meaning of Scaling and its bases of classification, Scaling techniques.

UNIT-IV

Interpretation and report writing: Writing of Research Proposal, Report and Research Paper: Meaning and types, Stages in preparation, Characteristics, Structure, Documentation: Footnotes and Bibliography - Editing the final draft-Evaluating the final draft- Checklist for a good proposal/report/research paper, online submission and e-submission. Basic knowledge of organizing conferences, symposia, workshop, exhibition etc.

Suggested Books:

- 1) Research Methodology-CR Kothari.
- 2) Research Methodology- C.H. Chaudhary, RBSA Publication.
- 3) Research Methodology- G.R. Basotia and K.K. Sharma.
- 4) Statistics By T.R Jain & S C Aggarwal, VK (India) Enterprises, Darya Ganj (New Delhi).

**REVIEW OF LITERATURE IN AREA OF RESEARCH
PAPER –II**

M. Marks: 100

Time Allowed: 3 hrs.

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of four Units I, II, III & IV. All the Units will have two questions from the respective sections of the syllabus carrying equal marks.

INSTRUCTIONS FOR THE CANDIDATE

The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

UNIT-I

Review of Literature : Concept of review of Literature, Nature and scope review literature, Practices of review of literature, Identification of sources for review of literature – books, theses, Professional Journals, Internet source, Committee reports etc..

Types of Data: Basic concepts of frequency distribution, Measure of central values Mean, median and mode, Measures of dispersion, range, mean deviation and standard deviation.

UNIT-II

NETWORK SECURITY

Network Threats, Authentication & Access Control Mechanism, Secured Communication Mechanisms, Biometric, Secured Design for LAN, Firewall, Intrusion Detection System, Virtual Private Network, Email and Web Security. WEP, Access Controls, Secure Socket Layer, IPSEC, WAP Security, Security Issues, Challenges & Defense Mechanisms for Bluetooth, GSM, CDMA, GPRS, Wi-Fi, Wi-Max.

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Complement, Intersection, Union, Combinations of Operations, Aggregation Operations.

Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Linguistic Hedges.

UNIT-III

Statistical Estimation and Testing: Tests of significant of attributes, Z-test of significance and Coefficient of correlation, Small sample test, T-test, Paired Test, F test of equality of variance, large sample test, Normal test.

Non-Parametric Test: Chi-square test, Sign test and Rank test.

UNIT-IV

Computer and Internet basics: Introduction and need of Computers, classifications of computer Operating system and basics of Windows, User Interface, File management, File Transfer (FTP, WS_FTP), DOS, UNIX, Difference between presentation and document, introduction to Notepad, MS-Office word, MS-Excel, Power Point, Opening Documents and Closing documents, introduction to Paint and Photoshop. Computer Communication and Internet, Electronic mails, Communication on Internet, Surfing the Internet.

Suggested Books:

- 1) Statistics By T.R Jain & S C Aggarwal, VK (India) Enterprises, Darya Ganj (New Delhi).
- 2) Statistical Methods for Research: S. Singh et al (1988) Central Publishing Ludhiana.
- 3) Research Methodology-CR Kothari.
- 4) Statistical Methods: S.P. Gupta. S. Chand Publication.
- 5) Fundamentals of Biostatistics- Khan and Khanna, Ukaz Publication.
- 6) C.S. French "Data Processing and Information Technology", BPB Publications 1998.
- 7) P.K Sinha `Computer Fundamentals`, BPB Publications, 1992.
- 8) Fuzzy Sets & Fuzzy Logic”, G.J. Klir & B. Yuan, PHI, 1995.
- 9) Network Security, Compete Reference, Tata Mc-Graw Hill.