

Ph.D. Course Work

Paper I: Research Methodology

Max Marks: 100

UNIT I:

Research: Meaning, Objective, Type of research. Criteria of good research. Research Approaches.

Research Process: Problem Definition, Literature survey, Hypothesis Formulation, Research design, data collection, data analysis, Interpretation, Report writing.

UNIT II:

Research design: Meaning, Features and need

Data Collection: Collection of primary data, Schedules; Collection of secondary data; Published and unpublished.

Academic databases: Academic databases for Computer Science discipline.

UNIT III:

Literature Collection: Sources of literature collection. Collection of relevant literature.

Review of Literature: Critical Review of Collected Literature. Identifying strong and weak features of existing methodologies/techniques.

UNIT IV:

Report Writing: Skills of writing advanced technical papers.

Presentation: Skills of presenting advanced technical concepts easily.

Ethics in Research: APA Ethics Code, Intellectual property rights, Patent law. Plagiarism – Definition, Various forms, and Avoidance (practices and tools).

References:

1. "Research Methodology" C. R. Kothari,
2. "Research design: Qualitative, Quantitative, and mixed method approaches", John W. Creswell, Sage Publications, 2014.
3. "Research methodology: Methods & Techniques", C.R. Kothari, New Age International Publishers, 2004.
4. "Research methods for everyday life: Blending qualitative & quantitative approaches", Scott W. Vanderstoep & Deirdre D. Johnston, Wiley, 2009.
5. "Research Imagination: An introduction to qualitative & quantitative methods", Paul S. Gray, John B. Williamson, David A. Karp, John R. Dalphin, Cambridge University Press, 2007.
6. "Writing for Computer Science", Justin Zobel, Springer-Verlag, 2014.
7. "Writing your thesis", Paul Oliver, Sage Publication, 2004.
8. "Ethics in Research", Ian Gregory, Continuum Research Methods Series, Continuum, 2003.

UNIT – I

Big Data: Definition and Explanation. Characteristics of Big Data (Basic, 3V and 5V). Types of Big Data – Structured, Semi-structured, and unstructured. Why Big Data is important?

Big Data Technology Foundation: Physical Infrastructure (Generation, Computation, Communication, and Storage), Security Infrastructure. Current trends and Challenges.

UNIT – II

Cloud Computing: Overview, Evolution and Characteristics. How Cloud Computing works? Pros and Cons of Cloud Computing. Challenges of Cloud Computing. Comparison with traditional computing architecture (Client/Server). Comparison with other recent computing trends (Grid, Cluster and Distributed Computing).

Virtualization: Introduction to virtualization, types and implementation levels.

Cloud Computing Architecture: Cloud computing stack, *Introduction to Cloud Service Models* - Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). *Introduction to Cloud Deployment Models* – Public Cloud, Private Cloud, Hybrid Cloud, and Community Cloud. Services provided at various levels.

UNIT – III

IoT Definition: Overview, Application, Potential and Challenges, Architecture, M2M vs IoT.

Internet vs IoT: Layers, Protocols, Packet-services, Performance parameters of Packet-networks (Web, P2P, Sensor Networks, & Multimedia).

References:

“*Big Data for Dummies*”, Judith Hurwith, Alan Nugent, Fern Halper, and Marcia Kaufman, John Wiley & Sons, 2013.

“*Big Data – Principles and best practices of scalable real-time data systems*”, Nathan Marz and James Warren, Dreamtech Press, 2016.

“*Cloud Computing Bible*”, Barrie Sosinsky, Wiley-India, 2010.

“*Cloud Computing: Principles and Paradigms*”, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011.

“*Designing Internet-of-Things*”, Adrain McEwen, & Hakim Cassimally, Wiley.

“*The Internet of Things*”, Samuel Greengard, MIT Press.

“*The Silent Intelligence: The Internet of Things*”, Daniel Kellmereit & Daniel Obodovski, DND Ventures LLC.

“*Internet of Things: A hands on approach*”, Arhdeep Bahga, & Vijay Madiseti, Orient Blackswan.