


VIKRAM UNIVERSITY, UJJAIN

Computer Science

Syllabus

Ph.D. - Course Work

S.No.	Subjects/Papers	Credit	Maximum Marks
1	Ph.D.- 1.1 Research Methodology	4	100
2	Ph.D.- 1.2 Review of Published Research in the relevant field	3	100
3	Ph.D.- 1.3 Computer Application	3	100
4	Advanced Course in the relevant subject		
	Ph.D.- 1.4 Network Security	3	100
5	Ph.D.- 1.5 Comprehensive viva-voce	3	100
	Grand Total	16	500


01.08.18





Ph.D.- 1.1 RESEARCH METHODOLOGY

Unit - I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis – Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance

Unit - II

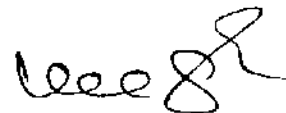
Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

Unit - III

Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.

Unit - IV

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

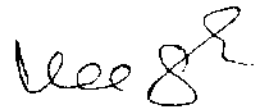


Vikram University, Ujjain -Ph.D. Course Work Syllabus (As per ordinance no. 11)
w.e.f. 2018-19 and onwards

Unit – V

Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline. Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism

1. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition
2. Business Research Methods – Alan Bryman & Emma Bell, Oxford University Press.
3. Research Methodology – C.R.Kothari
4. S.S.Chandel, Umesh Kumar Singh and Kailash Phuleria, Research Methodology Tools and Techniques, S.K. book agency, New Delhi.



Ph.D.- 1.3 COMPUTER APPLICATION

Unit-I

Using Computer: Importing and Exporting of computer Data a Knowledge of .pdf and html formats, using notepad/word pad, MS Access and Adobe PageMaker, basic knowledge of programming and data processing, Two dimensional and three dimensional plots, using Excel and origin for graphical representation and computation, using SPSS and Matlab, using internet and search engines, using power-point / flash /video for making deliberations, Internet and Intranet: HTML, web pages, Creating a web pages using MS Frontpage, adding graphics and images, Current web technologies. Hosting a web site. Advance search techniques, case studies: Google &Yahoo and GoogleScholar, Building an Intranet. Word Processing advance features helpful in preparing thesis in MS-Word.

Unit-II

Data Analysis and Display: Facilities in MS Excel for Data analysis and display, what-if-analysis /data analysis in worksheet using MS-Excel, other data analysis and display softwares, case study: Origin software for, Scientific and Statistical Analysis: Case studies: SPSS Database: Creating a Database and simple Querying, Graphics and Drawing: Adobe Photoshop: Basics (only Introductory, level), Image compression (GIF, JPEG, PNG formats), Multimedia, Digital Arts, Audio and Video formats, Multimedia Projections.

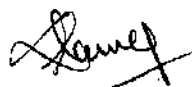
Unit- III

Educational and Research resources on Net: Encyclopedia case study: Wikipedia, Online Tutorials and Lectures, Java Applets, Educational Applets, Virtual Labs, Electronic Journals, E-books, Digital libraries. Searching research information using J-gate, Scopus and resources. Written Communication: preparing and sending E-mails, Letters , proposals and reminders, formal and informal reports, work plans and progress reports. Presentation using visual aids and powerpoints. IP address, Hypertext, Uniform Resource Locators, web Browsers, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services.

Unit-IV

Security problem in Computing: Protecting variables- Characteristics of computer intrusion- Attacks- Security goals- Vulnerabilities – Computer criminals – methods of defense – Elements of cryptography : Terminology and background – Substitution ciphers – Transpositions- Encryption algorithms – Data encryption standard – AES encryption algorithms – uses of encryption.

Introduction to Data Mining : Functionalities- Classification of data mining system- Data warehouse and OLAP technology for Data Mining- Data models – warehousing architecture, implementation –Data Cube Technology,



Unit-V

Artificial Intelligence: AI technique – level of the model – defining the problem Introduction system-production system characteristics – Heuristic search techniques Expert Systems Introduction- architecture of expert systems – knowledge representation – decomposition / Hierarchy of knowledge – augmented transition networks – semantic analysis of knowledge.

Introduction to data representation and processing with XML: syntax- data representation – well- formed document – style sheets –XSL- Xlinks _Xpointers _ XMLSchema

REFERENCES:

1. Information Communication Technology by Tim Shortis.
2. Handook of Communciation and Social Interaction Skills By John
3. Jiawei Han and Michelinekamber," Data Mining: Concepts and Techniques", Morgan Kaufman Publishers (Elsevier Science),2001, (ISBN:81-7867-023-2)
4. William Stallings,"Cryptography and network Security – Principles and Practices",
5. Prentice Hall (Pearson Education), Fourth Edition,2006
6. Atulkahate, Cryptogrpsphy and Network Security, Tata McGraw Hill Publication, New Delhi
7. Elaine Rich and Kevin Knight."Artificial Intelligence", Tata Mc-Graw Hill Edition, 2nd Edition, 1995
8. Eugene charniat and Drew McDermot, "Introduction to Artificial Intelligence Addison Wesley, 1985.



Ph.D.- 1.4 Network Security

Unit-I

Need of Security, security approaches, principals of security, types of attacks, authentication basics, passwords, authentication tokens, certificate based authentications, biometric authentication, Kerberos.

Unit-II

Cryptographic techniques: Plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric cryptography, overview of steganography, key range and key size, possible types of attacks.

Unit-III

Symmetric key algorithms: algorithm types and modes, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC5, Blowfish, Advanced Encryption Algorithm (AES), Differential and Linear Cryptanalysis.

Unit-IV

Asymmetric Key Algorithm: History and overview of asymmetric key algorithms. RSA algorithm, Digital Signatures, Digital certificates, private key management, PKIX model, Public Key Cryptography Standards (PKCS), XML, PKI and Security.

Unit-V

Internet Security Protocols: Secure Socket Layer (SSL), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL vs. SET, 3-D secure protocol, Electronic money, E-mail security, WAP security

Books:

1. Network Security and Cryptography, William Stallings.
2. Cryptography and Network Security, Atul Kahate.
3. Cryptography and Security, Shyamla, Harini and Padmanabhan, Wiley India.

