Scheme of Instructions & Syllabi

of

DOCTOR OF PHILOSOPHY (Ph.D.)

in

COMPUTER APPLICATIONS

Dr. Akash Sanghi	**Prof. YDS Arya**	**Prof. Manish Gupta**
HOD, Computer Applications	Vice Chancellor	Dean, Computer Applications

Faculty of Computer Applications
INVERTIS UNIVERSITY
Bareilly-243123 U.P.

COURSE STRUCTURE

(EFFECTIVE FROM THE ACADEMIC SESSION: 2014)

1. Duration of the Pre-Ph.D. Course: 06 Months
2. Qualifying Marks: 50%(in each paper)

S.No	CODE	SUBJECT	MARKS DISTRIBUTION			
			IAM*	SM	TOTAL	CREDIT
1	DRM-101	Research Methodology	30	70	100	4
2	PhD-032	Advance Research Studies In Computer Science	30	70	100	4
ELECTIVE PAPER (ANY ONE)						
3	PhDCS-103	Software Project Management	30	70	100	4
4	PhDCS-104	Networking Protocols				
5	PhDCS-105	Real-Time Systems				
TOTAL			**90**	**210**	**300**	**12**

Note: "02 Assignments of 10 Marks Each and Seminar of the Concerned Paper 10 Marks."

DRM-101: RESEARCH METHODOLOGY

MODULE-I

Research Topic: selection of problems, stages in the execution of research, preparation of manuscript and report writing. Search engines: google, pubmed, google scholar, EMBL, etc. **Publication of Report in Journals:** Standard of research journals, impact factor, citation index, H index, and more. Proof reading, reading journals and review.

MODULE-II

Introduction of computer science: Database management systems, presentation graphics, **Management of biological data by office applications:** MS-office, MS-Word, MS-Excel, and MS-PowerPoint.

MODULE-III

Measures of dispersion: sampling methods: random sampling - types of variables: qualitative and quantitative variables- continuous and discontinuous variables- scaling method– mean- standard deviation- standard error - coefficient of variation. Comparison of means: chi square test, students test and ANOVA.

MODULE-IV

Spectrophotometer: principle and applications, Ultra violet, Infra Red, Nuclear magnetic resonance (NMR), fundamental and procedure of chromatography: Paper Chromatography, TLC, Gas Chromatography, etc., Generation and evaluation of data.

MODULE-V

Principle and application of microscopy, Light and electron microscope - scanning electron microscopy, transmission electron microscopy; X-ray diffraction, generation and analysis of data, **Basic of software:** Mat-lab and Lab-view.

Text and Reference Books:

1. Statistical methods, Snedecor, G,W. and W. G. Cohran, 1978. Oxford and IBH publishing CO Pvt. Ltd.
2. Biometry, Sokal, R.R. and F. J. Rohlf, 1981. W. H. Freeman, NewYork.
3. Authoringa PhD, thesis: how to plan, draft, write and finish a doctoral dissertation, Duncary, P. 2003. Macmillan, pp 256.
4. Bio-statistical analysis, Zar,J.H.,1996. Prentice Hall, Uppar Saddle River, Newjersy, USA.
5. Scientific courses and presentations, Martha Davis,2005. Academic press, Tokyo.pp.356

PhD-032: ADVANCE RESEARCH STUDIES IN COMPUTER SCIENCE

Module-I (Data Warehouse and Mining):

Introduction to Data Warehousing. Client/Server Computing mode, Parallel processors & Cluster Systems. Data Warehousing Components, Building a Data Warehouse, Mapping the Data Warehousing to a Multi-processor Architecture, DBMS Schemas for Decision Support. Introduction to Data Mining. Decision Trees, Neural Networks, Nearest Neighbor & Clustering, Genetic Algorithms, Rule Induction, Selecting & Using the Right Technique.

Module-II (Advance Computer Network and Ad-hoc Networks):

Next Generation IP protocol, TCP extensions for high speed network, Introduction to SCTP. P2P file sharing and structure overlay network. Introduction to wireless and ad-hoc networks, Mobility in networks, Mobile IP, Mobile TCP, advantages and limitations of ad-hoc networks, Routing in MANETs.

Module-III

Introduction to Mat-Lab and NS-2.

Text and Reference Books:

1. Data Mining -Concepts and Techniques, Han, Kamber, Harcourt India, 2006.
2. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson, 2002.
3. Data Mining Techniques, Arjun K. Pujari, University Press, 2001.

PhDCS-103: SOFTWARE PROJECT MANAGEMENT

MODULE-I

Overview of Project Management, PMI Processes, Software project phases, Organizational structures, Project charter, Statement of Work(SOW) Planning Phase, Development lifecycle models, Matching lifecycles to projects, Project plans, Work Breakdown Structures (WBS) Estimation and Budgeting, Estimation, Budgeting, Project, selection, NPV, ROI, Payback models.

MODULE-II

Scheduling, Project network diagram fundamentals, PERT techniques, Gantt charts, Critical chain scheduling Risk and Change Management, Mid-term review, Risk management, Change control, More MS-Project.

Development Management, Team models, Requirements process, Configuration, management, Software metrics, Programming languages & tools, Managing conflict and motivating, MS-Project: Assigning Resources.

MODULE-III

Project Control, Status reporting, Project metrics, Earned value analysis, Communications Techniques, Process Improvement, MS Project: (a) Resource leveling (b) Other views System Test Process, Test specifications, Black box and white box testing, Test scripts, Unit and integration testing, Acceptance test specifications, Test tools, MS Project: (a)Reporting. Final Phases & Other Issues, Project Recovery, Documentation, Cutover/Migration Post Project Reviews, Closing, MS Project: (a) Advanced features.

Text and Reference Books:

1. S. McConnell, “Software Project Survival Guide”(1997)
2. S. Berkun, “The Art of Project Management”, (2005)
3. C. Larman, “Agile and Iterative Development: A Manager's Guide”, (2003)
4. W. Royce, “Software Project Management: A Unified Framework”, (1998)
5. J. Highsmith, “Agile Project Management: Creating Innovative Products”, (2004)
6. T. DeMarco, “The Deadline: A Novel About Project Management”, (1997)
7. T. DeMarco, “People-ware: Productive Projects and Teams”, (1999)
8. E. Bennatan, “On Time Within Budget: Software Project Management Practices and Techniques”, (2000)

PhDCS-104: NETWORKING PROTOCOLS

MODULE-I

Networks and Services, Approaches to Network Design, The OSI Reference Model; Overview of TCP/IP Architecture, Application Protocols and TCP/IP Utilities, Internet Architecture Interconnection through IP Routers, Internet Protocol (IP), User datagram protocol (UDP).

MODULE-II

Routing Cores: peers Algorithms Autonomous Systems Exterior Gateway Protocol Multicast Address. Internet Group Management Protocol (IGMP) and Implementation. TCP/IP over ATM networks: ATM cell Transport, Adaptation Layer, IP Address Building in an ATM network Logical IP subnet Concept ATMARP packet format. Domain name system, Remote Login (Telnet, Rlogin) File Transfer and Access (FTP, TFTP, NFS), Electronic mail (SMTP, MIME) Internet Management (SNMP, SNMPV2) Internet Security and Firewall Design Post Office Protocol (POP) Network News Transfer Protocol (NNTP).

MODULE-III

TCP/IP over view: The Transport Layer: TCP and UDP. Elementary TCP Sockets. TCP Client-Server Example. I/O Multiplexing: The select and poll Functions. Socket Options. Elementary UDP Sockets. Elementary Name and Address Conversions. The Client Server Model and Software Design, Concurrent Processing in Client-Server Software, Iterative, Connectionless Servers (UDP), Iterative, Connection-Oriented Servers (TCP), Concurrent, Connection-Oriented Servers (TCP). Single-Process, Concurrent Servers (TCP). Multiprotocol Servers (TCP, UDP), Multiservice Servers (TCP, UDP). Uniform, Efficient Management of server. Concurrency in clients. TCP/IP Architecture, The Internet Protocol, Limitations ofIPv4 and Introduction to IPv6, User Datagram Protocol, Transmission Control Protocol, DHCP, Introduction to Internet Routing Protocols.

Text and Reference Books:

1. A. Leon- Garcia, Indra Widjaja, "Communication Networks", Tata McGraw Hill, 2000
2. William tallings, "Data and Computer Communications", Pearson Education, 7th Edition.
3. Andrew S. Tanenbaum, "Computer Networks", Prentice HallIndia,4th Edition, 2003
4. W. Richard Stevens: TCP/IP Illustratedvol1: The Protocols, Pearson Edun. Asia 2000.
5. Douglas Comer: Internet working with TCP/IP vol.1: Principles, Protocols and Architecture, Prentice Hall, 4th edition, 2000

PhDCS-105: REAL TIME SYSTEMS

MODULE-I

Time System, Issues in real time computing, Performance measures of Real Time System, Issues in Real Time Computing, Performance measures of Real time Systems, Real Time Application. Task Assignment and Scheduling: Different task model, Scheduling hierarchy, offline vs Online Scheduling, Clock Drives. Model of Real Time System: Processor, resources, temporal parameter, Periodic Task Model, Sporadic Task Model, Precedence Constraints and Data Dependencies, Scheduling hierarchy Scheduling of Periodic Task: Assumptions, fixed versus dynamic priority algorithms, schedule ability test for fixed priority task with arbitrary deadlines.

MODULE-II

Scheduling of A periodic and Sporadic Tasks: Assumptions and approaches, deferrable, sporadic servers, slack stealing in deadline driven and fixed priority systems. Two level scheme for integrated scheduling, Scheduling for application shaving flexible constrains.

MODULE-III

Resources and Resource Access Control: Assumptions on resources and their usage, resource contention, resource access control (Priority Ceiling Protocol, Priority Inheritance protocol, Slack Based Priority Ceiling Protocol, Preemption Ceiling Protocol). Multi Processor Scheduling: Model of multiprocessor and distributed systems, scheduling algorithms for end to end periodic tasks in homogeneous/heterogeneous systems, Predictability and validation of dynamic multiprocessor system. Real time Communication: Model of real time Communication, Priority base service for switched network, Weighted Round Robin Service, Medium access Control Protocol, Real Time Protocol.

Text and Reference Books:

1. Jane. W. S. Liu Real Time Systems Pearson Education.
2. Krishna. C. M Real Time Systems Mc-Graw Hill Publication