

St. PETER'S UNIVERSITY

St. Peter's Institute of Higher Education and Research

(Declared under section 3 of UGC Act 1956)

Avadi, Chennai – 600 054.



M.Phil., (CS & CA)

(I and II SEMESTERS)

REGULATIONS AND SYLLABI

M.Phil Computer Applications & Computer Science
Curriculum

I Semester

Code No.	Course Title	Credit	Marks		
Theory			CA	EA	Total
108MRC01	Research methodology	6	25	75	100
108MRC02	Advanced Topics in Computer Science	6	25	75	100
	** Elective **	6	25	75	100
	Total	18			

List of Electives

Code No.	Course Title	Credit	Marks		
Theory			C A	E A	Total
108MRCSE1	Data Mining and data Warehousing	6	25	75	100
108MRCSE2	Digital Imaging	6	25	75	100
108MRCSE3	Computer Networks	6	25	75	100
108MRCSE4	Bio-Metrics	6	25	75	100
108MRCSE5	Bio-Informatics	6	25	75	100
108MRCSE6	Mobile Computing	6	25	75	100
108MRCSE7	Wireless technology	6	25	75	100

II Semester

Code No.	Course Title	Credit	Marks		
Theory			CA	EA	Total
208MRCSP1	Dissertation	18	25	75	100
	Total	18			

UNIT – 1 RESEARCH METHODOLOGY

An Introduction-meaning of research- objectives of research – motivation in research – types of research – research approaches – significance of research – research methods versus methodology – research and scientific method – importance of knowing how research is done – research process – criteria of good research – Defining the research problem – selecting the problem – necessity of the defining problem – technique involved in defining a problem – an illustration – Research design: - meaning of research design – need for research design – features of a good design – important concept relating to research design – different research designs – basic principles of experimental designs.

UNIT – 2 INTERPRETATIONS AND REPORT WRITING

Meaning of interpretation – why Interpretation? – technique of interpretation – precaution in interpretation – significance of report writing – different steps in writing report – layout of the research report – types of reports – oral presentation – mechanics of writing a research report – precautions for writing research reports – The computer: its role in research – the computer and computer technology – the computer system – important characteristics – computer applications – computer and researcher.

UNIT – 3 RESEARCH TOOLS

Classification of research tools – Criteria for selection of tools – Factors related to the construction of tools – Questionnaire – Attitude scale or opinionnaire – rating scales – score card – Interview – observation – critical incidents technique – schedule – check list – Interest inventories – Q Technique – Content analysis – Tools to measure social measures – Psychological tests.

UNIT - 4 CONSTRUCTIONS AND STANDARDISATION OF A TEST

An Introduction – Characteristics of a Good test – Construction of a standardised test – Concept of Reliability – Estimates of reliability – Methods of determining reliability – factors affecting the reliability – Criteria for establishing Validity – Types of Validity – Validity and the length of a test – Development of norms.

UNIT - 5 SAMPLING

Meaning of sampling – terms and concepts used in sampling- Sampling theory – Bases of sampling – Advantages and disadvantages of Sampling – Characteristics of a good Sample – Methods of Sampling -Adequacy of the size of the sample – Sampling & Non –Sampling Errors.

Text Books :

1. C.R. Kothari, Research methodology – Methods and techniques, second edition, Wishwa Prakashan publications, New Delhi, 2001.
2. S.Swaminatha pillai – Research Methodologies in education, 1994.

108MRCS02 ADVANCED TOPICS IN COMPUTER SCIENCE

UNIT – 1 JAVA PROGRAMMING

Review of the java programming Language – classes – objects – methods – constructors – inheritance – Exception Handling File and I/o streams – string handling – Networking with java.net package – Distributed computing with java _ RMI – java and CORBA.

UNIT – 2 JAVA BEANS

Overview – JAR files – software component Architecture – Java Bean Design signatures – Java Beans and Events – java Bean persistence – Bean persistence – Beans and related APIS.

Java servlets: Introduction to servlets – servlets API goals – servlets API Overview – servlets API writing simple servlets – handling HTML forms.

UNIT – 3 WAP

Introduction WAP – WAP Architecture – WAP services – WAP Application - The user Interface – WAP Development tools and software -WAP Editors – WAP Emulators.

UNIT - 4 EMERGING NEW TYPES OF DATA BASES

Spatial and multimedia Databases: Spatial data – spatial databases – spatial data model – spatial queries – multimedia data bases – multimedia sources – image data bases Mobile databases: Mobile computing – Mobile Databases – Mobile Database processing – Technology Requirements. Web databases: Internet and World Wide Web – internet addressing – web Browsers – Accessing Databases on the Web

UNIT - 5 COMPONENT TECHNOLOGY

Introduction to component object Model (com) and Distributed com – multi tiered component architecture: overview – three tiered design, multi tiered design – Introduction to CORBA – CIRBA concepts CORBA Interface Definition Language (IDL) – CORBA architecture – CORBA clients and object implementation – Interface and Implementation repositories – CORBA And Software Architecture.

TEXT BOOKS

1. Ken Around and James Gosling, The Java Programming language, Addison Wesley, second Edition, 1998.
2. Patrick Naughton and Herbert Schildt, Java 2 – The complete reference, Tata McGraw Hill.
3. Dale Bulbrook, WAP: A Beginner's guide, TMH Edision,2001.
4. Alexis leon and Mathews Leon, Database Managements systems, Vikas Publishing House Ltd., 1999
5. Thomas J.Mowbray, William A.Ruh, Inside CORBA, Distributed object standards and Applications, Wesley 1999.
6. Randy Abernethy, randy Morin, Jesus Chahin, COM/DCOM unleashed, techmedia 1999.

108MRCSE1 DATA WAREHOUSING AND DATA MINING

UNIT - 1. INTRODUCTION

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

UNIT - 2. DATA PREPROCESSING AND ASSOCIATION RULES

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization- Mining Association Rules In Large Databases.

UNIT - 3. PREDICTIVE MODELING

Classification And Prediction: Issues Regarding Classification And Prediction- Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types Of Data In Cluster Analysis-Categorization Of Major Clustering Methods: Partitioning Methods –Hierarchical Methods

UNIT - 4. DATA WAREHOUSING

Data Warehousing Components -Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- -Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.-Need- Categorization of OLAP Tools.

UNIT - 5. APPLICATIONS

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

TEXT BOOKS:

1.Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

REFERENCES:

1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata McGraw- Hill, 2004.
2. Usama M.Fayyad, Gregory Piatetsky - Shapiro, Padhrai Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

UNIT - 1. DIGITAL IMAGE FUNDAMENTALS

Image formation, Image transforms – fourier transforms, Walsh, Hadamard, Discrete cosine, Hotelling transforms.

UNIT - 2. IMAGE ENHANCEMENT & RESTORATION

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

UNIT - 3. IMAGE COMPRESSION & SEGMENTATION

Compression Models - Elements of information theory - Error free Compression -Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

UNIT - 4. REPRESENTATION AND DESCRIPTION

Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors

UNIT - 5. OBJECT RECOGNITION AND INTERPRETATION

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

TEXTBOOK:

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, II Ed., Pearson Education, 2002.

REFERENCES:

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

UNIT - 1. INTRODUCTION

Building a network – Requirements – Network Architecture – OSI – Internet – Direct Link Networks – Hardware building blocks – Framing – Error detection – Reliable transmission.

UNIT - 2. NETWORK FUNDAMENTALS

LAN Technology – LAN Architecture – BUS/Tree – Ring – Star – Ethernet – Token Rings – Wireless.

UNIT - 3. NETWORK LAYER

Packet Switching – Switching and Forwarding – Bridges and LAN switches – Internetworking – Simple Internetworking – Routing.

UNIT - 4. TRANSPORT LAYER

Reliable Byte Stream (TCP) – Simple Demultiplexer (UDP) – TCP Congestion Control – Congestion Avoidance Mechanisms.

UNIT - 5. PRESENTATION LAYER and APPLICATIONS

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES — Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

TEXT BOOKS

1. Larry L. Peterson & Bruce S. Davie, “Computer Networks – A systems Approach”, 2nd Edition, Harcourt Asia / Morgan Kaufmann, 2000.

REFERENCES

1. James F. Kurose and Keith W. Ross, “Computer Networking - A Top Down Approach featuring the Internet”, 1st Edition, Addison Wesley Publishing Company, 2001.
2. William Stallings, “Data and Computer Communications”, 5th Edition, PHI, 1997.
3. Andrew S. Tanenbaum, “Computer Networks”, Tata Mcgraw Hill, 3rd Edition, 2001

UNIT I

Introduction – Benefits of biometric security – Verification and identification – Basic working of biometric matching – Accuracy – False match rate – False non-match rate – Failure to enroll rate – Derived metrics – Layered biometric solutions.

UNIT II

Finger scan – Features – Components – Operation (Steps) – Competing finger Scan technologies – Strength and weakness. Types of algorithms used for interpretation.

UNIT III

Facial Scan - Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness.

UNIT IV

Iris Scan - Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness.

UNIT V

Voice Scan - Features – Components – Operation (Steps) – Competing voice Scan (facial) technologies – Strength and weakness. Biometrics for Network Security. Statistical measures of Biometrics. Biometric Transactions.

TEXT BOOKS :

1. Biometrics – Identity Verification in a Networked World – Samir Nanavati, Michael Thieme, Raj Nanavati, WILEY- Dream Tech
2. Biometrics for Network Security- Paul Reid, Pearson Education.

REFERENCE:

1. Biometrics- The Ultimate Reference- John D. Woodward, Jr. Wiley Dreamtech.

UNIT – I Introduction to Bioinformatics

Definition and History of Bioinformatics, Internet and Bioinformatics, Introduction to Data Mining, Applications of Data Mining to Bioinformatics Problems and Applications of Bioinformatics

UNIT – II Bioinformatics Software

Clustal V, Clustal W 1.7, RasMol, Oligo, Molscrip, Treeview, Alscript, Genetic Analysis Software, Phylip

UNIT-III High throughput Technology

High throughput genome and Protein sequencing, Genome and Proteome assembly; DNA and Protein micro arrays, Gene and Protein expression data sets.

UNIT-IV Algorithms

Protein and Nucleic acid sequence Algorithms: Sequence Databases, Use of the algorithms BLAST, Multiple sequence alignments and Clustering algorithms. Phylogeny: Evolutionary trees; Biological networks: Pathway analysis.

UNIT-V Protein structure analysis

Protein structure databases; Protein structure comparison; Fold recognition; 3D-1D Profiles; Threading and Comparative structure modeling.

REFERENCE BOOKS:

1. Claverie, J.M. and Notredame C. 2003 Bioinformatics for Dummies. Wiley Editor.
2. Letovsky, S.I. 1999 Bioinformatics. Kluwer Academic Publishers.
3. Baldi, P. and Brunak, S. 1998 Bioinformatics. The MIT Press.
4. Mont, D.W., Bioinformatics: Sequence and Genome Analysis.

UNIT - 1. INTRODUCTION

Medium Access Control : Motivation for Specialized MAC- SDMA- FDMA- TDMA- CDMA- Comparison of Access mechanisms – Tele communications : GSM- DECT- TETRA – UMTS- IMT-200 – Satellite Systems: Basics- Routing- Localization- Handover- Broadcast Systems: Overview – Cyclic Repetition of Data- Digital Audio Broadcasting – Digital Video Broadcasting

UNIT - 2. WIRELESS NETWORKS

Wireless LAN: Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks- IEEE 802.11 – HIPERLAN – Bluetooth- Wireless ATM: Working Group- Services- Reference Model – Functions – Radio Access Layer – Handover- Location Management- Addressing Mobile Quality of Service- Access Point Control Protocol

UNIT - 3. MOBILE NETWORK LAYER

Mobile IP : Goals – Assumptions and Requirement – Entities – IP packet Delivery- Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP- Ad hoc Networks

UNIT - 4. MOBILE TRANSPORT LAYER

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP

UNIT - 5. WAP

Architecture – Datagram Protocol- Transport Layer Security- Transaction Protocol- Session Protocol- Application Environment-Wireless Telephony Application

TEXT BOOKS:

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

REFERENCE BOOKS:

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II TELECOMMUNICATION NETWORKS 11

Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks - Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

UNIT III WIRELESS LAN

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.

UNIT IV MOBILE NETWORK LAYER

Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

UNIT V TRANSPORT AND APPLICATION LAYERS

Traditional TCP – Classical TCP improvements – WAP, WAP 2.0.

TEXT BOOKS

1. Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003. (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7. Unit IV Chap 8- Unit V Chap 9&10.)
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002. (Unit I Chapter – 7&10-Unit II Chap9)

REFERENCES

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of Mobile Computing”, Springer, New York, 2003.
3. Hazysztof Wesolowski, “Mobile Communication Systems”, John Wiley and Sons Ltd, 2002.