DEPARTMENT OF COMPUTER SCIENCE

K.M.C.P.G. STUDIES (Autonomous), PUDUCHERRY

M.Sc. COMPUTER SCIENCE Ist- YEAR SYLLABUS

CSHT17209
BIO INFOMATICS

UNIT – I

The Central Dogma - Killer Application – Parallel Universes – Watson's Definition –Top Down Vs. Bottom Up Approach – Information Flow –Conversance – Communications.

UNIT – II

Definition – Data Management –Data Life Cycle – Database Technology –Interfaces – Implementation –Networks: Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

UNIT – III

Search Process – Technologies – Searching and Information Theory – Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs. Simulation.

UNIT – IV

Statistical Concepts –Micro Arrays – Imperfect Data – Basics – Quantifying – Randomness – Data Analysis – Tools selection – Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals – Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

UNIT – V

Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration and Communication – Standards – Issues – Case study.

TEXT BOOKS

1. Bryan Bergeron, "Bio Informatics Computing", Prentice Hall, 2003.

2. T.K. Affward, D.J. Parry Smith, "Introduction to Bio Informatics", Pearson Education, 2001.

3. Pierre Baldi, Soren Brunak, "Bio Informatics – The Machine Learning Approach", 2nd Edition, First East West Press, 2003.

REFERENCE BOOK

1. Neil C.Jones Pavel Pevzner – An Introduction to Bioinformatics Algorithms – MIT Press.

CSHT17206
DATA COMMUNICATIONS AND NETWORKING

UNIT-I
Introduction :– Data Communications – Networks – Network Types – Networks Models: - Protocol Layering – TCP/IP Protocol Suite-The OSI model – Physical Layer:-   Data and Signals-Digital Transmission :-– Digital-To-Digital Conversion – Analog- To-Digital Transmission – Transmission modes – Transmission Media: – Introduction- Guided media – Unguided Media – Switching – introduction-Circuit Switched Networks – Packet Switching – Structure of Switch.

UNIT–II
Data Link Layer:- Introduction - Link Layer Addressing –Error Detection And Correction: – Introduction – Block Coding – Cyclic Codes – Block Coding – Cyclic Codes – Checksum – Forward Error Correction.   Data Link Control: – DLC Services – Data Link Layer Protocols – HDLC – Point to Point-Wireless LANs: – Introduction-802.11 project – Bluetooth – Other Wireless networks – WiMax – Cellular Telephony – Satellite Networks.

UNIT-III
Network Layer: Introduction to Network Layer: – Network Layer Services – Packet Switching – Network- Layer Performance – IPV4 Address – Forwarding of IP Packets. Network Layer Protocols: -Internet Protocol -ICMPv4 – Mobile IP – Unicast Routing: – Routing Algorithms-Unicast Routing Protocols – Multicast Routing: – Introduction -Multicasting Basics – Intradomain multicast protocols - Interdomain Multicast protocols – IGMP – Next Generation IP-IPv6 Addressing – IPv6 Protocols-Transmission from IPv4 to IPv6.

UNIT –IV
Transport Layer: Introduction to Transport Layer:–Introduction –Transport Layer Protocols: – Introduction- User Datagram Protocol – Transmission Control Protocol- SCTP – Application Layer: -Introduction – Client Server Programming – Standard Client Server Protocols – World Wide Web and HTTP-FTP-EMAIL- Secure Shell- Domain Name System-Telnet.

UNIT –V
Cryptography and Network Security: – Introduction – Confidentiality – Other aspects of security – Internet security: – Network Layer Security – Transport Layer Security – Application Layer Security – Firewalls.

TEXT BOOK

1. Behrouz A. Forouzan, Data Communications and Networking, 5 Edition (Indian Edition), McGraw Hill Education, 2013.

REFERENCE BOOK

1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Pearson Education, 5th Edition, 2014.

CSHT17207
PRINCIPLES OF COMPILER DESIGN

UNIT- I : INTRODUCTION AND LEXICAL ANALYSIS

Introduction to Compiling- The structure of a Compilers-the Phases- Cousins of the compiler-The grouping of phases-Compiler construction tools.
The role of the lexical analyzer- Input buffering-Specification of tokens-Recognition of tokens-finite automata-Regular expression to automata

UNIT-II: SYNTAX ANALYSIS AND SYNTAX-DIRECTED TRANSLATION
Introduction- the role of the parser-Context-free grammars-Writing a grammar-Top down parsing-Bottom-up Parsing-LR parsers-Powerful LR Parser
Syntax Directed Definitions-Applications of Syntax-Directed Translation

UNIT-III: INTERMEDIATE CODE GENERATION AND RUN-TIME ENVIRONMENT
Intermediate code generation – variants of syntax tree –Three-address code-Types and declaration – Translation of expression- Boolean expressions- Back patching
Run-Time Environments-Source language issues-Storage organization-Storage-allocation strategies, parameter passing

UNIT-IV: CODE GENERATION
Issues in the design of a code generator- The target machine-Run-time storage management-Basic blocks and flow graphs.

UNIT-V: CODE OPTIMIZATION
Introduction-The principle sources of optimization-Peephole optimization- Optimization of basic blocks-A simple code generator-Peephole optimization-register allocation and assignment.

TEXT BOOK

1. Alfred V. Aho, Ravi Sethi Jeffrey D. Ullman, "Compilers- Principles, Techniques, and Tools", Pearson Education Asia, 2007.

REFERENCE BOOKS

1. David Galles, "Modern Compiler Design", Pearson Education Asia, 2007.
2. Steven S. Muchnick, "Advanced Compiler Design & Implementation", Morgan Kaufmann Publishers, 2000.
3. C. N. Fisher and R. J. LeBlanc "Crafting a Compiler with C", Pearson Education, 2000.

CSHT17208
WEB TECHNOLOGY

UNIT- I

Web Fundamentals: Introduction to Web-Hypertext Transfer Protocol-Java Network Programming-Hyper Text Mark-up Language-Cascading Style Sheet.

UNIT- II

XML Technologies: XML :–Common Usage-Role of XML-Prolog-Body-Elements-Attributes-Validation-Displaying XML Namespace-XML DTD:- XML Schema Languages-Validation-Introduction to DTD-Using DTD in an XML document-Element type declaration-Attribute declaration-Entity Declaration-Parsing XML-XML DOM-DOM Nodes-Node interface-Document Node-Element Node-Text Node-Attribute Node-Java DOM-Manipulating DOM tree-Java DTD validation-XPath

UNIT- III

Client side Programming:

Java Script- Java Script and HTML DOM-Advanced Java Script and HTML forms-Java Script Regular Expression.

AJAX-Introduction and Marketplace-Asynchronous Communication-Processing steps-Sending Information-Retrieving Information.

UNIT- IV

Server Side Programming:

Servlet:-Servlet Architecture- Life cycle of a Servlet-Generic Servlet and HttpServlet-First Servlet-Passing Parameters to Servlet-Retrieving Parameters-Cookies-Filters.

JSP-Introduction and Marketplace-JSP and HTTP-JSP engines-JSP and Servlet-Anatomy of JSP page-JSP syntax-JSP Components-Beans-Session Tracking-Users passing control and data between pages-Database connectivity-Retrieving and Processing data using JDBC.

UNIT- V

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

TEXT BOOKS

1. Uttam K Roy Web Technologies Oxford University Press 2010.
2. Steven Holzner, The Complete Reference PHP, Tata McGraw

REFERENCE BOOKS
1. Web Programming, building internet applications, Chris Bates 2″ edition, Wiley Dreamtech.
2. Java Server Pag —Hans Bergsten, SPD O'Reilly.
3. Java Script, D.Flanagan
4. Beginning Web Programming

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M.Sc. COMPUTER SCIENCE IInd- YEAR SYLLABUS

CSSC16421
SOFTWARE QUALITY MANAGEMENT

UNIT- I-FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.

UNIT- II-MANAGING SOFTWARE QUALITY

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management

UNIT- III-SOFTWARE QUALITY ASSURANCE METRICS

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT-IV- SOFTWARE QUALITY PROGRAM

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope

UNIT- V- SOFTWARE QUALITY ASSURANCE STANDARDIZATION

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM.

TEXT BOOKS

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi. (UNIT III to V).

2. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc. (UNIT I and II).

REFERENCES:

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007.

2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004.

CSHT16419
CLOUD COMPUTING

UNIT-I Introduction to Cloud Computing: Overview ,Roots of Cloud Computing, Layers And Types of Clouds, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform As a Service Providers ,Challenges and Risks, Assessing the role of Open Standards.

UNIT-II Cloud Architecture, Service and Application: Exploring the Cloud Computing Stack, Connecting to the Cloud, Infrastructure as a Service, Platform as a Services, Saas Vs. Paas, Using Paas Application Frameworks, Software as a Service, Identify as a Service, Compliance as a Service.

UNIT-III Abstraction and Virtualization: Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machine Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.

UNIT-IV Managing & Security the Cloud: Administrating the Clouds, Clouds Management Products, Emerging Cloud Management Standards, Security the Cloud, Securing Data, Establishing Identity and Presence.

UNIT-V Case-Studies: Using Google Web Services, Using Amazon Web Services, Using Microsoft Cloud Services.

TEXT BOOKS
1. Sosinsky B.," Cloud Computing Bible", Wiley India.
2. Buyya R., Broberg j., Goscinski a., "Cloud Computing: Principles and paradigm", John Wiley & Sons.

REFERENCE BOOKS
1. Velte T., Velte A., "Cloud Computing- A practical Approach", Tata McGraw Hill.
2. LinthiciumD.,"Cloud Computing and SOA Convergence in Enterprise", PHI.
3. Shroff G.,"Enterprise Cloud Computing", Cambridge University Press.
4. Smooth S., Tan N.,"Private Cloud Computing", Morgan Kauffman.

5. Miller Michael, "Cloud Computing: Web based applications that changes the way you work and collaborate online", PHI.

CSSC16420
CYBER SECURITY

UNIT-I-SECURITY CONCEPTS AND MECHANISMS

Networking Concepts Overview-Basics of Communication Systems-Wireless Networks-Internet-Information Security Concepts-Overview and services-Types of Attacks-Security Goal-E-commerce security-Security Threats and vulnerabilities-Hacking Techniques-Password cracking-Malicious code-Programming Bugs-Cryptography-Digital Signatures-PKI-Diffe-Hellman key exchange protocol-Applications.

UNIT-II-NETWORK SECURITY

Access Control and Intrusion Detection-Identification and Authorization techniques-Intrusion Detection System-Intrusion Prevention System-Intrusion Recovery System-Server Management and Firewalls-Security for VPN and Next Generation Networks-Security in Multimedia Networks-Link Encryption Devices.

UNIT-III-SYSTEM AND APPLICATION SECURITY

Security Architectures and Models-Designing Secure Operating Systems-Controls to enforce security services-Information flow model and Biba model-System Security –Web security-Web Authentication-Secure Socket Layer(SSL)-Secure Electronic Transaction(SET)-OS Security-OS Security Vulnerabilities, updates and patches-OS integrity checks-Anti Virus software-Design of secure OS and OS hardening-Configuring the OS for security-Trusted OS.

UNIT-IV-SECURITY MANAGEMENT

Security Management Practices-security policies, procedures and guidelines-Risk Management-Business continuity Planning and Disaster Recovery Management-Risk Management-Change Management-Privilege Management-Security Laws and Standards-Security Assurance-Security Laws-Security Audit-International standards.

UNIT-V-CYBER DEFENSE TECHNIQUES

E-Mail Security-Web security - Web Injection Attack-Cross Site Scripting (XSS)-Secure Software Development-Cybercrime and cyber terrorism-Cyber operations and Defense Techniques-Phases of cyber-attack-Information warfare and surveillance-Steganography-Security Engineering-Computer Forensics-Legal Issues and Ethics-Case studies.
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TEXT BOOKS
1. Ross J.Anderson, Security Engineering: A Guide to Building Dependable Distributed Systems. John Wiley, New York, NY, 2001, ISBN: 0471389226.
2. Matt Bishop, Computer Security: Art and Science, Addison Wesley, Boston, MA, 2003. ISBN: 0-201-44099-7.
REFERENCE BOOKS
1. Frank Stajano, Security for Ubiquitous Computing, John Wiley, 2002, ISBN: 0470844930.
1.McClure, Stuart &Scambray, Joel, et al (2005), Hacking Exposed 5th Edition, McGraw-Hill Osborne Media.
2.Ortmeier, P.J. (2005), Security Management: An Introduction, 2nd Edition, Prentice Hall.
3.Skoudis, Ed &Zeltser, Lenny (2004), Malware: Fighting Malicious Code, Second Ed. Prentice Hall.