

# Bachelor of Computer Applications

## SIXTH SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits	Marks Internal	Marks External
<b>THEROY PAPERS</b>						
BCA 302	Data Ware Housing & Data Mining	3	1	4	25	75
BCA 304	Mobile Computing	3	1	4	25	75
BCA 306	Linux Environment	3	1	4	25	75
<b>***ELECTIVES (Select any One)</b>						
BCA 308	Multimedia & Its Applications	3	1	4	25	75
BCA 310	Bio Informatics	3	1	4	25	75
BCA 312	Artificial Intelligence	3	1	4	25	75
BCA 314	Network Security	3	1	4	25	75
BCA 316	Network Programming	3	1	4	25	75
<b>PRACTICALS</b>						
BCA 352	Practical – X Linux Lab	0	4	2	40	60
BCA 356	Major Project	----	10	5	40	60
BCA 358**	Seminar	2	0	2	100	
	<b>Total</b>	<b>14</b>	<b>18</b>	<b>25</b>	<b>280</b>	<b>420</b>

### Note:

1. The total number of the credits of the BCA programme = 160.
2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn the minimum of 150 credits.

### Total Marks : 700

**\*\*\* Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.**

Note : A Minimum of 40 Lectures is mandatory for each course.

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**Paper Code: BCA 302**

**Paper ID: 20302**

**Paper: Data warehouse and data mining**

**Pre-requisites:**

- **Information System Concepts**

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>

**Objectives:** This course is an attempt to provide you with the basic information about data warehouse and their development. This course also provides the basic conceptual background necessary to design and develop data warehouse applications.

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**UNIT – I**

**Data mining:** Introduction, Data mining – on what kind of data, data mining functionalities – what kind of patterns to be mined, Classification of data mining systems, data mining task primitives, integration of a data mining systems with a database or data warehouse systems, major issues in data mining.

**Data preprocessing:** Descriptive data summarization, data cleaning, data integration and transformation, data reduction, data discretization and concept hierarchy generation.

**[No. of Hrs: 11]**

**UNIT – II**

**Data warehouse and OLAP technology:** What is data warehouse, A multidimensional data model, data warehouse architecture, data warehouse implementation, data warehouse usage, OLAP, OLAM

Mining frequent patterns, association and correlation, efficient and scalable frequent itemset mining methods, From association mining to correlation analysis.

**[No. of Hrs: 11]**

**UNIT – III**

**Classification and prediction:** Introduction, issues, classification by decision tree induction, rule based classification, classification by back propagation, lazy learners, other classification methods, Prediction: accuracy and error measures, evaluating the accuracy of a classifier or predictor.

**Cluster Analysis:** Types of data in cluster analysis, a categorization of major clustering methods, partitioning methods.

**[No. of Hrs: 11]**

**UNIT – IV**

**Mining complex types of data:** Multidimensional analysis and descriptive mining of complex data objects, mining spatial database, multimedia database, mining world wide web.

Applications and trends in data mining: Data mining applications, data mining system products and research prototypes, social impact of data mining, trends in data mining.

**[No. of Hrs: 11]**

**TEXT BOOKS:**

[T1] Kamber and Han, “Data Mining Concepts and Techniques”, Hartcourt India P. Ltd.,2001.

[T2] Paul Raj Poonia, “Fundamentals of Data Warehousing”, John Wiley & Sons, 2003.

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**REFERENCE BOOKS:**

- [R1] Margaret Dunham, “ Data Mining: Introductory and Advanced Topics, 1/e”, Pearson
- [R2] G. K. Gupta, “Introduction to Data Mining with Case Studies”, PHI, 2006.
- [R3] W. H. Inmon, “Building the Operational Data Store”, 2<sup>nd</sup> Ed., John Wiley, 1999
- [R4] B. M. Shawkat Ali, Saleh A. Wasimi, “Data Mining Methods and Techniques”, Cengage Learning, 2009

**Paper Code: BCA 304**

**L T C**

**Paper ID: 20304**

**3 1 4**

**Paper: Mobile Computing**

**Pre-requisites: Knowledge of Digital Electronics(BCA 106), Computer Networks and Programming Concepts**

**Aim**

To provide basic knowledge on Wireless Communications, Mobile Internet and Mobile Content Services.

**Objectives**

- To learn the basics of Wireless voice and data communications technologies.
- To build working knowledge on various telephone and satellite networks.
- To build skills in working with Wireless application Protocols to develop mobile content applications
- To build practical knowledge on WML and WML Script

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**UNIT - I**

**Introduction to wireless communications:** Applications, Short History of Wireless Communications, Market of Mobile Communications. [T1]

**Elementary Knowledge on Wireless Transmission:** Frequency of Radio Transmission, Signals, Antennas, Signal Propagation: Path Loss of Radio Signals, Additional Signal Propagation Effects, Multipath Propagation, Multiplexing: Space Division Multiplexing, Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Modulation: Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Advanced Frequency Shift Keying, Advanced Phase Shift Keying, Multicarrier Modulation, Spread Spectrum: Direct Sequence Spread Spectrum, Frequency Hopping Spread Spectrum, Cellular Systems. [T1]

**[No. of Hrs: 11]**

**UNIT – II**

**Elementary Knowledge on Medium Access Control:** Motivation for a specialized MAC, Hidden and exposed terminals, Near and far terminals, Introduction to SDMA, FDMA, TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access, CDMA, Spread Aloha multiple access, Mobile communications, Comparison of S/T/F/CDMA. [T1]

**Elementary Knowledge on Telecommunications Systems:** GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services, DECT: System architecture, Protocol architecture.[T1]

Elementary Knowledge on Satellite systems: History, Applications, Basics: GEO, LEO, MEO, Routing, Localization, Handover. [T1]

**[No. of Hrs: 11]**

**UNIT – III**

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**Mobile Internet:** Introducing the Mobile Internet, Services for the mobile Internet, Business opportunities.[T2]

**Implementing WAP Services: WML:** WML Variables and Contexts: Variable Substitution, Setting Variables, Browser Contexts, WML Tasks and Events, WML User Interaction: Problems with Web Interaction, Interaction in WAP, Elements: <input> , <select> ,<option> , <optgroup>, <do> , <anchor> , <a> , The tabindex Attribute, WML Timers, WML Decks, Templates, and Cards: Elements: <wml>, <head>, <access>, <meta> , <card> , <template>, WML Text and Text Formatting, Elements <p>, <br>, Character Formatting, Tables, WML Images: <img> Element, The WBMP Image Format. [T2, T3] **[No. of Hrs: 11]**

#### **UNIT – IV**

**WAP:** the Mobile Internet Standard, Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol [T2]

**Implementing WAP Services: WML Script:** Datatypes, Variables, and Conversions, Operators and Expressions: Operand Conversions, Assignment Operators, Arithmetic Operators, Bitwise Operators, Shift Operators, Logical Operators, Increment and Decrement Operators, Comparison Operators, Type Operators, The Conditional Operator, The Comma Operator, Precedence and Associativity, WMLScript Statements: Expressions as Statements, Blocks of Statements, Conditions, Loops, Returning from a Function, Other Statements, WMLScript **Functions:** Function Declarations, Function Calls, Calls to Other Script Units, Calling WMLScript from WML, Standard Libraries, WMLScript Pragmas: The access Pragma, The meta Pragma, Elementary Knowledge on Libraries: Lang , Float , String ,URL , WMLBrowser , Dialogs [T2, T3] **[No. of Hrs: 11]**

#### **TEXT BOOKS**

[T1] Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.

[T2] Sandeep Singhal, “The Wireless Application Protocol, Writing Applications for Mobile Internet”, Pearson Education, 2000

[T3] Learning WML, and WMLScript, Programming the Wireless Web, Martin Frost, Publisher: O'Reilly 2000

#### **REFERENCE BOOKS**

[R1] William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002

[R2] Theodore S Rappaport, “Wireless Communication Principles and Practice”, 2nd Ed, Pearson Education. 2002

[R3] C. Y. Lee and William, “Mobile Cellular Telecommunications”, 2nd Ed, McGraw Hill. 2001

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**Paper Code: BCA 306**

**Paper ID: 20306**

**Paper: Linux Environment**

**Pre-requisites: Operating Systems**

**Aim:** To understand Linux Operating System and its security.

**L T C**

**3 1 4**

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

**UNIT – I**

**UNIX & LINUX:-** Overview of UNIX and LINUX Architectures, UNIX Principles, GNU Project/FSF, GPL, Getting help in Linux with –help, whatis, man command, info command, simple commands like date, whoami, who, w, cal, bc, hostname, uname, concept of aliases etc Linux filesystem types ext2, ext3, ext4, Basic linux directory structure and the functions of different directories basic directory navigation commands like cd, mv, copy, rm, cat command, less command, runlevel (importance of /etc/inittab) [T1, T2, R1] **[No. of Hrs: 11]**

**UNIT – II**

Standard Input and Output, Redirecting input and Output, Using Pipes to connect processes, tee command, Linux File Security, permission types, examining permissions, changing permissions (symbolic method numeric method), default permissions and umask  
Vi editor basics, three modes of vi editor, concept of inodes, inodes and directories, cp and inodes, mv and inodes rm and inodes, symbolic links and hard links, mount and umount command, creating archives, tar, gzip, gunzip, bzip2, bunzip2 (basic usage of these commands) [T1, T2, R1] **[No. of Hrs: 11]**

**UNIT – III**

Environment variables (HOME, LANG, SHELL, USER, DISPLAY, VISUAL), Local variables, concept of /etc/passwd, /etc/shadow, /etc/group, and su- command, special permissions (suid for an executable, sgid for an executable, sgid for a directory, sticky bit for a directory)  
tail, wc, sort, uniq, cut, tr, diff, aspell, basic shell scripts grep, sed, awk (basic usage) [T1, T2, R1] **[No. of Hrs: 11]**

**UNIT – IV**

Process related commands (ps, top, pstree, nice, renice), Introduction to the linux Kernel, getting started with the kernel (obtaining the kernel source, installing the kernel source, using patches, the kernel source tree, building the kernel process management (process descriptor and the task structure, allocating the process descriptor, storing the process descriptor, process state, manipulating the current process state, process context, the process family tree, the Linux scheduling algorithm, overview of system calls, Introduction to kernel debuggers (in windows and linux) [T2] **[No. of Hrs: 11]**

**TEXT BOOKS:**

[T1] Sumitabha Das, “Unix Concepts and Application”, TMH

[T2] Robert Love, “Linux Kernel Development”, Pearson Education

[T3] Sumitabha Das, “Your Unix The Ultimate Guide”, TMH

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**REFERENCE BOOKS:**

- [R1] Sivaselvan, Gopalan, “A Beginner’s Guide to UNIX”, PHI Learning
- [R2] The Unix Programming Environment by Brian W. Kernighan and Rob Pike, PHI
- [R3] Understanding the Linux Kernel Daniel P. Bovet; Marco Cesati, O'Reilly Media, Inc. 2005

**Paper Code: BCA 308**

**L T C**

**Paper ID: 20308**

**3 1 4**

**Paper: Multimedia & Its Applications**

**Pre-requisite: Computer Graphics**

**Aim:** To understand the basics of software testing, its need and implications on software development and its overall effect on software quality.

**Objectives**

- To get the Knowledge about the basics concepts of multimedia and its applications.
- To get the knowledge of its relevance with internet and its future aspects.

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**UNIT**

**Introductory Concepts:** Multimedia - Definitions, Basic properties and medium types.(Temporal and non temporal) . Multimedia applications Uses of Multimedia, Introduction to making multimedia - The Stages of project, the requirements to make good multimedia, Multimedia skills and training .  
**Multimedia-Hardware and Software:** Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Media software - Basic tools, making instant multimedia, Multimedia software and Authoring tools, Production Standards. [T1,T2,R1] **[No. of Hrs: 11]**

**UNIT-II**

**Multimedia building blocks Creating & Editing Media elements:** Text, image, Sound, animation Analog/ digital video Data Compression: Introduction, Need, Difference of lossless/lossy compression techniques. Brief overview to different compression algorithms concern to text, audio, video and images etc .[T1,T2,R3] **[No. of Hrs: 11]**

**UNIT-III**

Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW - Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, Designing for the WWW -Working on the Web, Multimedia Applications - Media Communication, Media Consumption, Media Entertainment, Media games.[T2.R2] **[No. of Hrs: 11]**

**UNIT-IV**

Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Virtual Reality, Digital Camera. Assembling and delivering a Multimedia project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM: The CD family, production process, CD-i – Overview – Media Types Technology.[T2,R2]

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**TEXTBOOKS:**

- [T1] Tay Vaughan, "Multimedia: Making it work", TMH, 1999.
- [T2] Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson, 2001.

**REFERENCES:**

- [R1] Keyes, "Multimedia Handbook", TMH, 2000.
- [R2] Steve Heath, "Multimedia & Communication Systems", Focal Press, UK, 1999.
- [R3] K. Andleigh and K. Thakkar, "Multimedia System Design", PHI, PTR, 2000.
- [R4] Steve Rimmer, "Advanced Multimedia Programming", MHI, 2000.

**Paper Code:BCA 310**

**Paper ID:20310**

**Paper: BioInformatics**

**Pre-requisites:None**

**Aim:** Aims at providing an elementary knowledge of Bioinformatics, Databases and Algorithms.It aims at introduction of PERL as PERL is one of the important programming languages for Bioinformatics

**Objectives**

1. To understand Scope of Bioinformatics
2. To understand Types of Databases and their use.
3. To understand Notation and different types of Algorithms
- 4.To understand the basic commands in Unix and PERL.

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**UNIT-I**

**HISTORY, SCOPE AND IMPORTANCE:** Important contributions - sequencing development - aims and tasks of Bioinformatics - applications of Bioinformatics - challenges and opportunities - Computers and programs – internet - world wide web – browsers - EMB net – NCBI.

**[No. of Hrs: 11]**

**UNIT-II**

**DATABASES - TOOLS AND THEIR USES:** Importance of databases - nucleic acid sequence databases - protein sequence data bases - structure databases - bibliographic databases and virtual library - specialized analysis packages

**[No. of Hrs: 11]**

**UNIT-III**

**INTRODUCTION TO BIOINFORMATICS ALGORITHMS:** Algorithms and Complexity- Biological algorithms versus computer algorithms – The change problem –Correct versus Incorrect Algorithms – Recursive Algorithms – Iterative versus Recursive Algorithms – Big-O Notations – Algorithm Design Techniques.

**[No. of Hrs: 11]**

**UNIT-IV**

**UNIX COMMANDS:** Advanced Unix commands-Introduction-ls-cat-more-, Advanced Unix commands-mv-rm-rmdir-uniq-sort- , Advanced Unix commands-grep.

**PERL:** Introduction to Perl-scalars, Arrays-Using standard Perl modules-Perl regular expressions I.

**BIOPERL:** Installation and usage of bioperl modules

**[No. of Hrs: 11]**

**TEXTBOOKS**

[T1] T K Attwood, D J parry-Smith, Introduction to Bioinformatics, Pearson Education, 1st Edition, 11<sup>th</sup> Reprint 2005.

[T2] S. Ignacimuthu, S.J., Basic Bioinformatics, Narosa Publishing House, 1995.

[T3] Neil C. Jones and Pavel A. Pevzner, An Introduction to Bioinformatics Algorithms, MIT Press, First Indian Reprint 2005.

[T4] Harshawardhan P BAL, Perl Programming for Bioinformatics, Tata McGraw Hill, 2003.

Note : A Minimum of 40 Lectures is mandatory for each course.

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**REFERENCES BOOKS:**

- [R1] Stephen A. Krawetz, David D. Womble, Introduction To Bioinformatics A Theoretical and Practical Approach, Humana Press, 2003.
- [R2] Hooman H. Rashidi, Lukas K. Buehler, Bioinformatics Basics-Applications in Biological Science and Medicine, CRC press, 2005.
- [R3] C S V Murthy, Bioinformatics, Himalaya Publishing House, 1st Edition 2003.
- [R4] ary Benson Roderic page (Eds), Algorithms in Bioinformatics, Springer International Edition, First Indian Reprint 2004.
- [R5] James Tisdall, Mastering Perl for Bioinformatics, O'Reilly, 2003.

**Paper Code: BCA 312**  
**Paper Id: 20312**

<b>L</b>	<b>T</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>4</b>

**Paper: Artificial Intelligence**

**Aim:** To understand the concept of Artificial Intelligence, Knowledge Representation, Logic, NLP and Learning.

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

**UNIT - I**

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem.

Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

**[No. of Hrs.: 11]**

**UNIT - II**

Knowledge representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.

Using Predicate Logic: Representing Simple Facts in logic, Representing instances and is-a relationship, Computable function and predicate.

**[No. of Hrs.: 12]**

**UNIT - III**

Natural language processing: Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.

Learning: Introduction learning, Rote learning, Learning by taking advice, learning in problem solving, Learning from example-induction, Explanation based learning.

**[No. of Hrs.: 11]**

**UNIT - IV**

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells. LISP and other AI Programming Language

**[No. of Hrs.: 10]**

**TEXTBOOKS:**

[T1] E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1999.

**REFERENCE:**

[R1] D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999

[R2] Nils J Nilsson, "Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

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**Pre-requisite: Basic knowledge of Computer networks and various network protocols**

**Aim:** The aim of this course is to provide an overview of information security and network security and management.

**Objectives**

- The course covers a broad range of security related concepts and issues that face industries today.
- The course will also examine the practical aspects of the issues involved in secure systems and networks and industry practices being adopted to protect information systems.
- Students will gain the knowledge, skills and abilities to incorporate good information security practice in any organization.

**INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**Unit I**

**Information security**

Attributes of Information Security: Confidentiality, Integrity, Availability. Threats & Vulnerabilities: Unauthorized Access, Impersonation, Denial of Service, Malicious Software; Trap Doors, Logic Bomb, Trojan Horses; Viruses, Worms & Bacteria; Cryptography Basics: Plain Text, Cipher Text, Encryption Algorithm, Decryption Algorithm; Requirements for Cryptography, Symmetric vs Asymmetric, Block and Stream ciphers, DES. T[1], T[2]

**Unit – II**

**Public Key Infrastructure &. Message Authentication**

Public Key Cryptography Principles & Applications, Algorithms: RSA, Message Authentication: One way Hash Functions: Message Digest, MD5, SHA1. Public Key Infrastructure: Digital Signatures, Digital Certificates, Certificate Authorities. T[1], T[2]

**Unit-III**

**Network Security**

Network Attacks: Buffer Overflow, IP Spoofing, TCP Session Hijacking, Sequence Guessing, Network Scanning: ICMP, TCP sweeps, Basic Port Scans; Denial of Service Attacks: SYN Flood, Teardrop attacks, land, Smurf Attacks.

IP security Architecture: Overview, Authentication header, Encapsulating Security Pay Load, combining Security Associations, Key Management. Virtual Private Network Technology: Tunneling using IPSEC. T[1], T[2]

**Unit – IV**

**Web Security**

Requirements, Secure Socket Layer, and Secure Electronic Transactions, Network Management Security: Overview of SNMP Architecture- SNMPV1, SNMPV3. Firewall Characteristics & Design Principles, Types of Firewalls: Packet Filtering Router, Application Level Gateway or Proxy, Content Filters, Bastion Host. T[1], T[2]

Note : A Minimum of 40 Lectures is mandatory for each course.

**TEXTBOOKS:**

[T1] W. Stallings, Networks Security Essentials: Application & Standards, Pearson Education, 2000

[T2] TCP/IP Protocol Suite , Behrouz A. Forouzan, “Data Communication and Networking”, Tata Mc Graw Hill,

**REFERENCE BOOKS:**

[R1] W. Stallings, Cryptography and Network Security, Principles and Practice, Pearson Education, 2000.

**Paper Code : BCA 316**

**L T C**

**Paper Id: 20316**

**3 1 4**

**Paper: Network Programming**

**Pre-requisite: Knowledge of Basic Networking/ Networking Protocols**

**Aim:** To enable the students to develop the necessary skills for developing robust & scalable network applications and to build necessary basic knowledge for managing networks

**Objective**

- To learn the basics of socket programming using TCP Sockets.
- To learn basics of UDP sockets.
- To develop knowledge of threads for developing high performance scalable applications.
- To learn about raw sockets.
- To understand simple network management protocols & practical issues.

**INSTRUCTIONS TO PAPER SETTERS:**

**Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

**UNIT-I**

**Introduction to Network Programming:** OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application. **[No. of Hrs.: 11]**

**UNIT-II**

**Sockets :** Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function. **[No. of Hrs.: 11]**

**UNIT-III**

**TCP client server :** Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination,

Crashing and Rebooting of server host shutdown of server host. I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option.

**[No. of Hrs.: 11]**

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## **UNIT-IV**

**Elementary UDP sockets:** Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP. Elementary name and Address conversions: DNS, gethost by Name function, Resolver option.

**[No. of Hrs.: 11]**

### **TEXT BOOKS:**

[T1] UNIX Network Programming, Vol. I, Sockets API, 2nd Edition. - W.Richard Stevens, Pearson Edn. Asia.

[T2] UNIX Network Programming, 1st Edition, - W.Richard Stevens. PHI.

### **REFERENCES:**

[R1] UNIX Systems Programming using C++, T CHAN, PHI.

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