

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Theory		
Network Security	CST- 701	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (<i>Theory</i>)
I	Introduction to Network Security, Computer Security, Information Security, Introduction to Threats, Attacks, Types of Attacks, Introduction to Packet Sniffing, Spoofing, Introduction to Authentication and Authorization, Introduction to Cryptography, Elements of Cryptography, Steganography, Cryptanalysis, Cryptographic Attacks, Classical Encryption Techniques, Symmetric Key Cryptography, Simple DES Algorithm, DES Algorithm, AES and IDEA Encryption Algorithm.
II	Introduction to Public/Private Key Cryptography, Shared Key Cryptography, RSA Algorithm, Diffie Hellman Algorithm, Elliptic Curve Cryptography, Introduction to Key Management, Key Management Techniques, Introduction to Message Digest, Introduction to Digital Signatures, Digital Signature Algorithm and MD5 Function.
III	Introduction to Message Digest Functions, Hash Functions, Classification, MAC Functions, Classifications, HMAC, Introduction to SHA and RIPEMD, Introduction to KerBERos, KerBERos Security, Introduction to Sure Socket Layer and Secure Electronic Transactions.
IV	Introduction to Malicious Softwares, Virus and Worms, Classification, Trojan Horse and Trap Doors, Types of Trojans, Zombies, Introduction to Intruders, Types, Intrusion Detection System, Intrusion Detection Techniques, Introduction to Anti-Virus Softwares and its Applications.
V	Application security- web application security , regular application security , emBEDded application security, remote administration security, data base security, Firewalls and TCP/IP, packet filtering firewalls, stateful packet- inspection firewalls, OS-based firewalls and functions of firewalls.

References:

- 1 William Stallings, "Cryptography and Network Security: Principles and Practice" Pearson
- 2 Charlie Kaufman, Radia Perlman, Mike Speciner, Michael Speciner, " Network Security - Private communication in a public world" TMH
- 3 Fourozon, "Cryptography & Network Security" TMH
- 4 Atul Kahate, "Cryptography and Network Security" Mc Graw Hill

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory			Practical		
Compiler Design	CST- 703	L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
		3	1	2			Min: 40 (D Grade)			Min:20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Practical internal - max marks: 15

Lab performance/Lab Record/Viva

Assignment / Quiz/ Attendance

–Max. Marks: 10

– Max. Marks: 05

Unit	Contents (<i>Theory</i>)
I	Introduction & Lexical Analysis Introduction to Translator, Interpreter, Assembler, Compiler, Analysis Synthesis Model, Phases, Pass Structure, Introduction to Porting, Cross Compiler, Bootstrapping, Introduction to Lexical Analysis, Finite State Machines, Regular Expressions and LEX.
II	Syntax Analysis & Semantic Analysis Introduction to Syntax Analysis, Parsing, CGF's, Parse Trees, Ambiguity, Normal Forms, Types of Parsing, LL(1) Parsing, LR Parsers, YACC, Introduction to Semantic Analysis, SDT, SDD, Types of Attributes and Introduction to Type Checker.
III	Intermediate Code Generation & Run Time Environments Introduction to Intermediate Code Generation, Three Address Code, Representation of TAC, 3AC for Programming Language Constructs, Introduction to Run Time Memory Storage, Activation Records, Parameter Passing Mechanisms, Static Binding v/s Dynamic Binding, Memory Allocation Techniques, Dynamic Memory Allocation and Garbage Collection.
IV	Symbol Table, Error Handler and Code Optimization Introduction to Symbol Table, its Uses, Data Structures used for Symbol Table Management, Introduction to Error Handler, its Applications, Types of Errors, Introduction to Basic Block and Flow Graph, Introduction to Code Optimization, Code Optimization Techniques, Local Optimization, Loop Optimization, Global Optimization, Data Flow Analysis and Peep Hole Optimization.
V	Code Generation Introduction to Target Code Generation, Types of Target Codes, Design of a Code Generator, Directed Acyclic Graph, and Target Code Generation from DAG, Back patching, DAG for TAC, Assembly Code, Introduction to Linkers, Loaders, De-compilation and Symbolic Debugging of Optimized Code.

References

- 1 Compiler Design Principles by Aho, Sethi & Ullman.
- 2 Compiler Design by A A Puntambekar
- 3 Compiler Construction 2/e by D.M.Dhamdhere, Macmillan Publishers India LTD

List of Experiments

- 1 Program to implement a DFA that accepts all Strings of 'a' and 'b' ending with 'abb'
- 2 Program to implement a DFA that accepts all Strings of 'a' and 'b' having equal numBEr of 'a' and 'b'
- 3 Program to implement Lexical Analyzer
- 4 Program to implement LL(1) Parser
- 5 Program to implement Recursive Descent Parser
- 6 Program to implement Operator Precedence Parser
- 7 Program to generate Intermediate Code as Postfix Notation
- 8 Program to generate Intermediate Code as Three Address Code

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Theory			Practical		
Artificial intelligence and Neural Network	BT-714	L	T	P	External (70)	Internal (30)	Total (100)	External (35)	Internal (15)	Total (50)
		3	1	2			Min: 40 (D Grade)			Min:20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Practical internal - max marks: 15

Lab performance/Lab Record/Viva

Assignment / Quiz/ Attendance

–Max. Marks: 10

– Max. Marks: 05

Unit	Contents (Theory)
I	Introduction to Artificial Intelligence Knowledge Representation using Predicate Logic: Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems. Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic.
II	Knowledge Representation using Predicate Logic: Resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning. Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.
III	Introduction to Neural Network: Concept, biological neural network, evolution of artificial neural network, McCulloch-Pitts neuron models, Learning (Supervised & Unsupervised) and activation function, Models of ANN-Feed forward network and feedback network, Learning Rules- Hebbian, Delta, Perceptron Learning and Windrow-Hoff, winner take all. Perceptron learning,- Single layer/multilayer, linear Separability, Adaline, Madaline, Back propagation network, RBFN. Application of Neural network in forecasting, data compression and image compression.
IV	Genetic Algorithm: Introduction to GA, Simple Genetic Algorithm, terminology and operators of GA (individual, gene, fitness, population, data structure, encoding, selection, crossover, mutation, convergence criteria). Reasons for working of GA and Schema theorem, GA optimization problems including JSPP (Job shop scheduling problem), TSP (Travelling salesman problem), Network design routing, timetabling problem.
V	Reasoning and game playing techniques: Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning. Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

References

- 1 S.N. Shivnandam, "Principle of soft computing", Wiley.
- 2 Rajshekaran and G.A.V. Pai, "Neural Network, Fuzzy logic And Genetic Algorithm",
- 3 Jack M. Zurada, "Introduction to Artificial Neural Network System" JAico Publication.
- 4 Simon Haykins, "Neural Network- A Comprehensive Foudation"

List of Experiments

- 1 Implement OR, AND Using Perceptron in C
- 2 Implement OR, AND Using Perceptron in MATLAB Command-line Argument
- 3 Implement OR, AND Using Perceptron in MATLAB GUI
- 4 Implement OR, AND, X-OR gate, Using back propagation algorithm in MATLAB using Command-line Argument as well as GUI
- 5 Solve a given problem-1 (Operatons) using Fuzzy Logic in MATLAB.
- 6 Solve a given problem-1 (Max-Min Composition) using Fuzzy Logic in MATLAB.
- 7 To find the solution of the function Maximize, given the constraints using GA approach in C.

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credit			Practical		
Programming Lab -III	BT-715	L	T	P	External (Nil)	Internal (50)	Total (50)
		-	-	2			Min: 20 (D Grade)

Practical internal - max marks: 50

Lab work & Sessional

– Max Marks: 45

Assignment / Quiz/ Regularity

– Max. Marks: 05

Unit	Contents (<i>Practical</i>)
I	Introduction to PHP programming Introduction to PHP, installation and configuration, Variables, String functions, Numeric functions.
II	Operator, Loops and Array Operators, Conditions, Loops, Array, Multidimensional Array, Associative array.
III	Classes and Functions Classes, Regular Expression, Working with Date time, code re-use, require(), include(), and include path; file system functions, and file input and output; file uploads; error handling and logging; sending mail.
IV	Working with database MYSQL, Introducing MYSQL, database design concepts, the Structured Query, Language (SQL), communicating with a MYSQL backend via the PHP, MYSQL API Building Database Applications.
V	Working with Frameworks Working with Wordpress, Mambo, Joomla, OS Commerce, Zend Framework, Drupal.

References

- 1 Beginning PHP, Apache, MySQL Web Development
- 2 Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner References:
- 3 PHP Manua

List of Experiments

- 1 Write the process of installation of web server.
- 2 Write programs to print all details of your php sever. Use phpinfo().
- 3 Write a program to give demo of ECHO and PRINT command
- 4 Write a program sort ten number by using array.
- 5 Create a database in MySql and connect that database from PHP
- 6 Write a program to Update, insert and delete the values of table in MySQL.

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Practical		
Major Project-I	CST-706	L	T	P	External (105)	Internal (45)	Total (150)
		-	-	6			Min: 60 (D Grade)

Practical Internal - Max Marks: 45

Lab work & Sessional

Assignment / Quiz

–Max Marks: 40

– Max. Marks: 05

Contents (Practical)
<p>The Major Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which should be selected from some real life problem as far as possible, which may involve fabrication, design or investigation of a technical problem. The project work involves sufficient work so that students get acquainted with different aspects of manufacturing, design or analysis. The student also have to keep in mind that in final semester they would be required to implement whatever has been planned in the major project in this semester. It is possible that a work, which involves greater efforts and time, may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated internally. At the end of semester, all students are required to submit a synopsis.</p>

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Practical		
Industrial Training-II	CST- 707	L	T	P	External (70)	Internal (30)	Total (100)
		-	-	4			Min: 40 (D Grade)

Practical Internal - Max Marks: 30

Lab work & Sessional

– Max Marks: 25

Assignment / Quiz

– Max. Marks: 05

Contents (Practical)
<p style="text-align: center;">OBJECTIVE OF INDUSTRIAL TRAINING</p> <p>The objective of undertaking industrial training is to provide work experience so that student's engineering knowledge is enhanced and employment prospects are improved. The student should take this course as a window to the real World of Work and should try to learn as much as possible from real life experiences by involving and interacting with industry staff. Industrial training also provides an opportunity to students to select an engineering problem and possibly an industry guide for their Major Project in final Year.</p> <p>Industrial training of the students is essential to bridge the wide gap between the classroom and industrial environment. This will enrich their practical learning and they will be better equipped to integrate the practical experiences with the classroom learning process.</p>

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Theory		
Information Storage & Management	CST-7101	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (<i>Theory</i>)
I	Introduction to Storage Technology: Evolution of Storage Management, Storage technologies at a glance, Storage Devices, File Allocation Methods, Challenges in Data Storage and Management, Data Storage Infrastructure, Information Lifecycle Management, Data categorization.
II	Storage Systems: Architecture Components of a Storage System Environment, Disk drive components, Disk Drive Performance, properties, performance, and specifications, Logical Components, Concept of RAID and its Components, Different RAID levels and their suitability for different application environments: RAID 0, RAID 1, RAID 3, RAID 4, RAID 5, RAID 0+1, RAID 1+0, RAID 6, Comparison of Levels, mapping and operation.
III	Introduction to Networked Storage: Evolution of networked storage, Architecture, Overview of JBOD, DAS, NAS, SAN, limitations of DAS, NAS, CAS & SAN. Benefits of NAS, Components, Implementations, CAS Architecture, Storage and Retrieval, Security Criticism in Networked Storage Technologies, Risk Mitigation for Networked Storage.
IV	Hybrid Storage solutions: Hybrid Storage Appliance, Virtualization, Types of Virtualization, Storage Virtualization, Virtual Appliance, Industry management standards (SNMP, SMI-S, CIM), standard framework applications, Data Center. Requirement for the design of a secure data center, Key Program Management Metrics, Back up and Disaster Recovery, Importance of disaster recovery planning.
V	Introduction of Cloud Computing Introduction, Types of Cloud Computing, Cloud Computing Model Cloud Computing Characteristics, Advantage & Disadvantage of Cloud Computing, Essential Characteristics of Cloud Computing, Evolution of Cloud Technologies, Cloud Application Services, Cloud Computing Model, Storage on Cloud, Cloud Security and integration, Cloud Architecture, Risk of Cloud Computing, The future of Cloud Computing.

References

1. W. Rittinghouse and James F. Ransome; Cloud Computing : Implementation , Management and Security, CRC Press, Taylor Frances Pub.
2. Nick Antonopoulos, Lee Gillam; Cloud Computing : Principles, System & Application, Springer.
3. Anthony T. Velete, Toby J.Velk, and RoBERT Eltenpeter, Cloud Computing : A practical Approach, TMH Pub.

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Theory		
Distributed Systems	CST- 7102	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (<i>Theory</i>)
I	Introduction to Distributed Systems: Distributed system, Architecture, Goals, and Advantages & Disadvantage, designing Issues, examples of Distributed system, Hardware and Software concepts, Distributed Computing Model, method of communication Between distributed objects, Layered Protocols, ATM Networks and the Client-Server models.
II	Synchronization in Distributed Systems: Clock Synchronization, Mutual exclusion, Election algorithm, The Bully algorithm, a ring algorithm, Atomic Transaction, Deadlock overview & prevention technique in Distributed systems, Processes & Processors in Distributed Systems, Threads, system models, Processor allocation, Scheduling in distributed systems, fault tolerance & real time distributed systems, API for Internet Protocol, Data Representation & Marshaling, Group Communication, Client Server Communication, RPC Messages & Implementation Mechanism and Stub Generation.
III	Memory Sharing and File System of Distributed Systems: Distributed Share Memory: Architecture & its Types, Implementations & Designing issues, Structure of Share Memory Space, Consistency Model, and Thrashing, Distributed File System, File Service Architecture & features, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault tolerance. Trends in distributed file systems: Features, System Oriented Names, Object Locating Mechanism and Human Oriented Name.
IV	Distributed databases & Distributed Scheduling: Distributed databases, Features & its types, levels of distribution transparency, data fragmentation & integrity constraints, various types of Transaction management, concurrency control, reliability, distributed database administration, locks, time stamping, Distributed Scheduling, Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues.
V	Distributed Multimedia & security techniques: Distributed Multimedia, Characteristics of multimedia Data, Quality of Service Managements, Security techniques, cryptographic Algorithms, use of digital signature methods for security enhancement, Case Study of Distributed System, Amoeba, Mach, Chorus. Protection and security in distributed systems

References

1. Singhal & Shivratri, Advance Concept in Operating System, McGraw Hill
2. Attiya & Welch, Distributed Computing, Wiley Pub
3. Tanenbaum, Andrew.S. , Distributed Operation System, PHI
4. Distributed systems and networks by Buchanan.

PEOPLE'S UNIVERSITY, BHOPAL

Programme: **B. Tech. (Computer Science & Engineering)**

Semester -VII

Subject Title	Subject Code	Credits			Theory		
Wireless Network	CST- 7103	L	T	P	External (70)	Internal (30)	Total (100)
		3	1	-			Min: 40 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal - Max Marks: 30

Best of Two Mid Semester Test

Assignment / Quiz

–Max Marks: 20

– Max. Marks: 10

Unit	Contents (Theory)
I	Introduction: Introduction of Wireless Networks, Different Generations of Wireless Networks, Characteristics of the Wireless Medium, Radio Propagation Mechanisms, Path Loss Modeling and Signal Coverage, Effect of Multipath and Doppler, Channel Measurement and Modeling Techniques, Wireless Network Topologies, Cellular Topology, Cell Fundamentals, Signal to Interferences Radio Calculations, Network Planning for CDMA Systems, Wireless Network Operations, Mobility Management, Radio Resources and Power Management.
II	Wireless LAN and Wireless Communication: Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop.
III	Mobile Communication Systems: GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security-GSM SMS –International roaming for GSM- call recording functions-subscriber and service data mgt –Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing.
IV	Mobile Network and Transport Layers: Mobile IP – Dynamic Host Configuration Protocol- Mobile Ad Hoc Routing Protocols–Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast Retransmit Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks.
V	Application Layer: Home RF, Bluetooth, Interference Between Bluetooth and 802.11, Adhoc Networks, Introduction to 2.5 G and 3 G Networks, WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile- caching model-wireless Bearers for WAP - WML – WMLScripts – WTA - iMode- SyncML.

References

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas StoBER, "Principles of Mobile Computing", Springer, 2003.
3. C.K.Toth, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
4. Kamilo Fehir "Wireless Communications", Prentice Hall Publication.