PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Software Engineering (03105401)

Type of Course: BTech

Prerequisite: Basic knowledge of software applications.

Rationale: This course provides a broad introduction to software engineering. The various process models required to develop software is also being described. Moreover the functional and non-functional requirements are also described

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction**: Study of Different Models, Software Characteristics, Components, Applications, Layered Technologies, Processes, Methods and Tools, Generic View Of Software Engineering, Process Models- Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral And Concurrent Development Model	10%	6
2	**Requirements Engineering**: Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases and Functional specification, Requirements validation, Requirements Analysis	15%	9
3	**Structured System Design**: Design Concepts, Design Model, Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Alternative architectural designs, Modeling Component level design and its modeling, Procedural Design, Object Oriented Design	12%	7
4	**Data Oriented Analysis & Design**: Difference between Data and Information, E-R Diagram, Dataflow Model, Control Flow Model, Control and Process Specification, Data Dictionary	12%	7
5	**Agile Development**: Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.	6%	4

6	**Planning a Software Project**: Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling	10%	6
7	**Quality Assurance**: Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability	10%	6
8	**Coding and Unit Testing**: Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code evaluation, Unit testing- procedural units, classes, Code Inspection, Metrics- size measure, complexity metrics, Cyclomatic Complexity, Halstead measure, Knot Count, Comparison Of Different Metrics	10%	6
9	**Testing**: Concepts, Psychology of testing, Levels of testing, Testing Process- test plan, test case design, Execution, Black-Box testing – Boundary value analysis – Pair wise testing- state based testing, White-Box testing – criteria and test case generation and tool support	15%	9

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Software Engineering (TextBook)
   R. Pressmen; 6th
2. Software Engineering
   Sommerville
3. Software Engineering
   Rajiv Mall; PHI
4. Software Engineering
   PankajJalote; Wiley India

Course Outcome:

After Learning the course the students shall be able to:

1. Analyze, design, verify, validate, implement and maintain software systems.
2. Define a Project Management Plan, tabulate Testing Plans and Reproduce effective procedures.
3. Manage the development of software systems.

List of Practical:

1. Project Definition and objective of the specified module.

2. Design and Implementation of different software engineering models.

3. Design of Software Requirement Specification (SRS) for the module.

4. Documentation of Software project management planning (SPMP) for the specified module.

5. Design of different Software Cost Estimation models.

6. Designing SA/SD including Requirement specification, DFD with data dictionary and Structure chart for the specific module.

7. Designing the module using Object Oriented approach including Use case Diagram with scenarios, Class Diagram and State Diagram

8. Designing the module using Object Oriented approach including Collaboration Diagram, Sequence Diagram and Activity Diagram

9. Defining Coding Standards and walk through

10. Use of different Testing Tools with comparison.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Parallel and Distributed Computing (03105402)

Type of Course: BTech

Prerequisite: Computer Architecture/Organization, Operating systems, Computer Networks, programming knowledge.

Rationale: Systems are equipped with more than one processor. Multi tasking and multi processing are inherent features of the modern operating systems and present hardware architecture. Engineering graduates from computer stream should know how to program in the Concurrent Programming within the system, Concurrent Programming across the system, How to distribute workload of Processor and Analyze existing system etc.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
3	0	2	4	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Basics of Parallel Programming**: Need for Parallel Computing – Parallel Computer Models – ILP, TLP and Data Parallelism – Parallel Programming Overview – Parallel Programming Models– Shared Memory Programming – Message Passing Paradigm **-**Interaction and Communication – Interconnection Networks.	15%	6
2	**Issues in Parallel Programming & Basic Communication operation**: Cache Coherence issues– Memory Consistency Models – Maintaining Memory Consistency – Synchronization Issues – Performance Considerations - Performance measurement and analysis of parallel programs **-** sources of overhead in parallel programs -performance metrics for parallel systems-the effect of granularity on performance. One to All broadcast and All to One reduction-All to All broadcast and reduction -scatter and gather	20%	8
3	**Programming with Common Address**: Basics of Processes, Tasks and Threads- Need for threads- POSIX-Thread basics-Synchronization primitives in Pthreads-controlling thread and synchronization attributes-Composite synchronization constructs	10%	5
4	**Basics of Distributed Computing**: Introduction to distributed computing, Relation to Parallel System, Distributed Computing Model, Design Issues	10%	5

5	**Message Passing**: Introduction to Message passing, IPC Message format, IPC Synchronization, Message buffering strategies, Multi datagram Messaging, Process addressing techniques, Failure handling mechanism Remote Communication: Remote Procedure Call Basics , RPC Implementation, RPC Communication, RMI basics, RMI Implementation. Distributed Shared Memory: Introduction, Basic concepts of DSM	25%	12
6	**Introduction to Cloud Technologies**: Introduction to the Cloud Computing, History of cloud computing, Cloud services, Cloud Deployment models Virtualization and Cloud Platforms: Exploring virtualization, Load balancing, Hypervisors, Machine imaging, Cloud marketplace overview	20%	9

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. 1. Parallel Programming in C with MPI and OpenMP (TextBook)
   M.J. Quinn; McGraw-Hill Science/Engineering/Math.
2. Introduction to Parallel Computing (TextBook)
   Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar; Pearson Publication
3. Distributed Computing (TextBook)
   Sunita Mahajan and Seema Shah; Oxford University Press.
4. Distributed Systems Concepts and Design (TextBook)
   George Coulouris, Jean Dollimore and Tim Kindberg; Addison-Wesley Inc./Pearson Education; 4
5. Mastering Cloud Computing foundation and application Programming (TextBook)
   Rajkumar Buyya, Christan Vecchiola, S. Thamarai Selvi; MK
6. Introduction to Parallel Processing
   M. SasiKumar, Dinesh Shikhare, P.Raviprakash; PHI
7. Parallel Computers – Architecture and Programming
   V. Rajaraman And C. Siva Ram Murthy
8. Distributed Systems: Principles and Paradigms
   A. Tanenbaum
9. Cloud Computing Bible
   Barrie Sosinsky; Wiley India Pvt Ltd
10. Cloud Computing Principles and Paradigms
    Rajkumar Buyya , James Broberg, Andrzej Goscinski; Willey

Course Outcome:

After Learning the course the students shall be able to:

1. Understand parallel mechanism of the System.
2. Analyze distributed environment.
3. Implement some primitive methods related to parallelism.
4. Understand Cloud computing

List of Practical:

1. Write a program to implement Matrix Multiplication using parallelism

2. Write a program to implement Quick Sort Algorithm

3. Write a program to implement Prim's Algorithm
4. Write a program to implement Dijkstra's Algorithm.
5. Write a Program to demonstrate producer and consumer thread
6. Write a program of condition mutex variable using pthread
7. Write a program of calculation of PI using pthread
8. Write a Program to implement Concurrent Echo Client Server Application.
9. Write the Programs for Remote Procedure call.
10. Write the Programs for Remote Method Invocation.
11. Implement CORBA
12. Creation of a BPEL(Business Process Execution Language) Module and a Composite Application

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Data Mining and Warehousing (03105430)

Type of Course: BTech

Prerequisite: Basic Understanding of DBMS, Algorithms and Programming

Rationale: This course is design to provide knowledge about data mining, data warehouse and business intelligence. This course aims to teach students the techniques and concepts involved in data mining and their application in various areas.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	**Tut Hrs/ Week**	**Lab Hrs/ Week**		**External**		**Internal**			
				T	**P**	**T**	**CE**	**P**	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction to data mining (DM):** Importance of Data Mining, Data Mining-Definition and Functionalities, Classification of Data mining systems, Data mining Architecture, KDD, DM task primitives,Major Issues in Data Mining, Data mining Technologies, Applications of Data Mining.	10%	8
2	**Overview and concepts Data Warehousing and Business Intelligence::** Reporting and Analysis of data, Raw data to valuable information - Lifecycle of Data, Business Intelligence,Relation between BI, DM and DW.	5%	2
3	**Data Warehousing and Online Analytical Processing:** Introduction, Motivation for Data Warehouse,Multitier Architecture, ETL process, Multidimensional Data Model, Schemas for Multidimensional Data Models, Data Warehouse Models - Enterprise Warehouse, Data Mart, and Virtual Warehouse, The Role of Concept Hierarchies,OLAP Server, Typical OLAP Operations,Dimensional analysis.	20%	10
4	**Data Pre-processing:** Data Quality, Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Reasons of Missing Values, & Noisy Data, Tasks in Data Preprocessing, Cleaning, Integration, Reduction, Transformation and Discretization, Concept Hierarchy Generation.	15%	9

5	**Mining Frequent Patterns, Associations, and Correlations**: Market Basket Analysis,Association Rules, Multidimensional & Multilevel association rules, FrequentItemsets, Frequent Itemset Mining Methods Apriori algorithm, Improved Apriori algorithm, Pattern-Growth Approach: FP-growth, Generating Association Rules from Frequent Itemsets, Interesting Pattern Evaluation Methods, Correlation analysis.	15%	9
6	**Classification**: Classification vs. prediction,Supervised learning, Approach to Classification: Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Advanced Classification Methods.	15%	9
7	**Clustering**: Unsupervised learning, Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density-Based Methods, Evaluation of Clustering, Outlier Detection	14%	9
8	**Applications**: Introduction to spatial mining, multimedia mining, temporal mining, text mining and web mining with related algorithms.10	6%	4

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Data Mining concepts and Techniques (TextBook)
    Jiawei Han, Micheline Kamber; Elsevier
2. Data Mining Techniques
    Arun K. Pujari; Universities Press
3. Mordern Data Warehousing, Data Mining and Visualization
    George M.Marakas; Pearson
4. Data Warehousing
    Reema Theraja; Oxford Press

Course Outcome:

After Learning the course the students shall be able to:

1. Identify the key processes of data mining, data warehousing and Business Intelligence.
2.Use Data mining tools.
3. Apply data mining techniques to solve problems in other disciplines like machine learning etc.

List of Practical:

1. Design and Create cube by identifying measures and dimensions for Star Schema, Snowflake schema and fact Constellation Schema.
2. Make an OLAP cube and perform Roll Up and Drill Down operations on it. Show the Apex and Base cuboid for the same. Draw Star-net query model for the cube.
3. Create calculated member using arithmetic operators and member property of dimension member
4. Design and Create cube by identifying measures and dimensions for Design storage using storage mode MOLAP, ROLAP and HOLAP.
5. Perform preprocessing on a dataset. Apply various Filters and discuss the effect of each filter applied.

6. Perform different binning techniques to smooth out the noise in the dataset. Make sure that the user should have the choice to apply all the possible techniques. Show the output of different bins. Use histogram to partition the dataset into groups.

7. Perform regression on the data set using R programming.

8. Perform Association rule mining using WEKA tool.

9. Perform classification with WEKA tool. a. using Decision Tree Classifier b. using Naïve Bayes Classifier c. using Multilayer Perceptron

10. Perform Clustering using WEKA tool

11. Write a program to implement Minimum Spanning based clustering

12. Mini Project

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering

SYLLABUS FOR 7th Sem BTech PROGRAMME

Artificial Intelligence (03105431)

Type of Course: BTech

Prerequisite: Data structure and algorithm (primitive, non-primitive, linear data structure (stack, queue, linked list, nonlinear data structure (tree, graph), hashing, File structure)

Rationale: Now-a-days systems are equipped with more than one processor. Multi tasking and multi processing are inherent features of the modern operating systems and present hardware architecture. Engineering graduates from computer stream should know how to program the same,The students will learn: – Concurrent Programming within the system – Concurrent Programming across the system – How to distribute workload – Analyze existing system

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction**: What is artificial Intelligence? Major areas of Artificial Intelligence, Introduction to AI Problems and applications, Defining problems as a state space search, Production systems	10%	6
2	**Search techniques**: Breadth first search, Depth first search, Hill climbing, Best first search, A* algorithm, AO* Algorithm, Iterative Deepening Search, IDA*, Recursive Best First Search, Constraint Satisfaction and Heuristic Repair, Applications	20%	12
3	**Game Playing**: Introduction to Game playing, The Minimax Search Procedure, AlphaBeta Procedure, The Search Efficiency of Alpha-Beta Procedure, Recent applications	10%	6
4	**Knowledge Representation**: Production rules, Predicate Calculus- Rules of Inference; Semantics and Deduction; Unification; Soundness and completeness of rules; Resolution; Resolution refutation, Semantic Nets, Frames, symbolic reasoning, statistical reasoning.	20%	12
5	**Learning**: Definition, Rote learning, learning by taking advice, learning in problem solving, learning from examples, induction	10%	6

6	**Uncertain Reasoning**: Joint probability, Marginal probability, Probabilistic reasoning and Bayes Nets, forward reasoning versus backward reasoning, Certainty Factors, Fuzzy set theory, Fuzzy relation, fuzzification, Fuzzy value assignment methods, Inference and Composition methods- Min-Max composition, max product composition, Defuzzification methods, Applications and recent developments	10%	6
7	**Expert Systems (ES)**: Advantages and characteristics of Expert System, Knowledge engineering, Steps in Developing an Expert System, Mycin, ES Applications and recent developments.	10%	6
8	**Connectionist Models**: Introduction to Neural Network, Activation functions, Supervised and Unsupervised Learning, Neuro Processing and Neural Network Learning, Learning, Learning rules, Single layer Perceptrons and Classification, Introduction to Multilayer Neural Networks, Neural Network Applications and recent developments.	10%	6

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Artificial Intelligence
   Elaine Rich and Kevin Knight; TMH
2. Artificial Intelligence: A New Synthesis, Harcourt Publishers
   N. J. Nilsson; Harcourt Publishers
3. Fuzzy Logic and Engineering Application,
   Tomthy Ross,; Wiley Publication.
4. Expert Systems Principles and Programming
   Giarratano & Riley son; Vikas Publishing House; 3rd Edition
5. Elements of Artificial Neural Network
   Kishan Mehrotra
6. Genetic Algorithm in Search, Optimization, and Machine Learning
   D.E. Goldberg; Addison-Wesly
7. Neural Networks
   J. M. Jurada

Course Outcome:

After Learning the course the students shall be able to:

1. Understand AI Problems and Apply Various Techniques for Engineering Problem Solving.
2. Solve Game Playing Problems.
3. Design Artificial Neural Network.
4. Understand how Expert System is designed and how Knowledge Engineering works.
5. Apply Fuzzy Logic for Problem Solving.
6. Apply Semantic Rules for reasoning and inference.
7. Apply Various Algorithms like Breadth First Search, Depth First Search, A*, Heuristic Search for various Applications

List of Practical:

1. Write a program to implement Tic Tac Toe game.
2. Write a program to implement 8 Puzzle problem.
3. Write a program to implement Water Jug Problem.

4.   Write a program to implement Travelling Salesman Problem.

5.   Write a program to implement N Queens Problem.

6.   Write a program to implement Tower of Hanoi Problem.

7.   Write prolog programs for following problems

8.   Demonstrate Knowledge Base and Query System in prolog.

9.   Convert Prolog predicates into Semantic Net.

10. Demonstrate supervised learning using artificial neural network

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Advanced Python (03105432)

Type of Course: BTech

Prerequisite: Programming Concepts, Basic Python

Rationale: Python is a modern language useful for writing compact codes specifically for programming in the area of Server side Web development, Data Analytics, AI and scientific computing as well as production tools and game programming. This course covers the basics and advanced Python programming to harness its potential for modern computing requirements.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		T	P	T	CE	P	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**UNIT-1**: Classes and Object-Oriented Programming, Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding	5%	5
2	**UNIT-2**: Simple Algorithms and Data structures – Stack, Queue, Search Algorithms, Sorting Algorithms, Hash Tables	10%	7
3	**UNIT-3**: Multithreading- Thread, Starting a thread, Threading module, Synchronizing threads, Multithreaded Priority Queue	10%	7
4	**UNIT-4**: Network programming and web scrapping – Socket, Socket Module Methods, Client and server, URLLIB, BeautifulSoup, XML and JSON parsing	15%	8
5	**UNIT-5**: Database - Introduction ,Connections, Executing queries, Transactions Handling error, Importing data from Web and CSV	15%	8

6	**UNIT-6**: Graphics and GUI Programming – Drawing using Turtle, Tkinter and PyQT.	15%	8
7	**UNIT-7**: Introduction to NumPy, Panda and 2D plotting- Plotting with matplotlib, Understanding the N-dimensional data structure, Creating arrays, Indexing arrays by slicing or more generally with indices or masks, Basic operations and manipulations on N-dimensional arrays	15%	9

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Introduction to Computation and Programming Using Python (TextBook)
   John V Guttag

2. Core Python Programming
   R. Nageswara Rao; dreamtech

3. Core Python Programming - Second Edition
   Wesley J. Chun; Prentice Hall

4. Data Structures and Algorithms in Pyhon
   Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser; Wiley

5. Fundamentals of Python – First Programs
   Kenneth A. Lambert; CENGAGE Publication

6. Beginning PHP – wrox
   by Matt Doyle; wrox.

7. Hacking Secret Ciphers with Python
   Al Sweigart

Useful Links:

Turtle: https://docs.python.org/2/library/turtle.html

PyLab: https://scipy.github.io/old-wiki/pages/PyLab

Course Outcome:

After Learning the course the students shall be able to:

After learning the course, the student will be able:
• To be able to understand the various data structures available in Python programming language and apply them in solving computational problems using NumPy.
• To be able to do testing and debugging of code written in Python
• To be able to draw various kinds of plots using Matplotlib
• To be able to do text filtering with regular expressions in Python
• To be able to create socket applications in Python
• To be able to create GUI applications in Python

List of Practical:

1. PRACTICAL SET-1

2. PRACTICAL SET-2

3. PRACTICAL SET-3

4. PRACTICAL SET-4

5. PRACTICAL SET-5

6. PRACTICAL SET-6

7. PRACTICAL SET – 7

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Advance Computer Graphics (03105433)

Type of Course: BTech

Prerequisite: Must have completed the course: Computer Graphics or equal. Basic mathematics is necessary such as vectors, matrix operations, derivatives, and basic trigonometry.Programming skills in C and C++ is also required

Rationale: This course will discuss some advanced concepts and methods in three dimensional computer graphics. Thefocus will be on learning recent methods in shading, rendering, modeling, and animation.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		T	P	T	CE	P	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction**: Basic raster graphics algorithms for drawing 2D Primitive, linear , circles, ellipses. Arcs, clipping, clipping circles, ellipses and polygon.	10%	6
2	**Geometric transformation**:: 2D, 3D transformations, Window-to-viewport transformations.	10%	6
3	**Shading Techniques**:: Transparencies, Shadows, Object reflection, Gouraud & Phony Shading Techniques. Visible Surface determination techniques for visible line determination, Z- Buffer algorithm, Scanline algorithm, Algorithm for oct-tres, algorithm for curve surfaces visible surfaces, ray tracing, recursive ray tracing.	15%	9
4	**Advanced Rendering Techniques**:: Photorealistic rendering, Global Illumination, Participating media rendering, Ray tracing, Monte Carlo algorithm, Photon mapping	15%	9
5	**Image manipulation & Storage**:: File formats for BMP, GIF, TIFF, IPEG, MPEG-II,III,IV,JPEG,PNG	15%	9
6	**Animation**:: Conventional and Computer Assisted Animation, Methods of Controlling Animation, Tweening, Morphing.	15%	9

7	**Multimedia:**: Applications, Components, Hypertext, Hypermedia, Authoring Tools.	10%	6
8	**Texture Synthesis and Image Processing:**: Environmental mapping, Texture synthesis, Anisotropic image smoothing	10%	6

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Computer Graphics Principles and Practices
    by Folay Vandam, Feiner, Hughes,; Pearson Pub.
2. Computer Graphics
    Donald Hearn & M. Pauline Baker; PHI,2011; Second Edition
3. Computer Graphics
    N. Krishnamurty; Tata McGraw Hill

Course Outcome:

After Learning the course the students shall be able to:

1. Demonstrate an understanding of contemporary graphics hardware.
2. Create interactive graphics applications in Open GL using one or more graphics application programming interfaces.
3. Write program functions to implement graphics primitives, to demonstrate geometrical transformations, to implement visibility detection, to demonstrate computer graphics animation, to demonstrate 2D image processing techniques.
4. Demonstrate an understanding of the use of object hierarchy in graphics applications.

List of Practical:

1. Study of Open GL Tool.

2. Write a program for 2D line drawing as Raster Graphics Display.

3. Write a program for circle drawing as Raster Graphics Display.

4. Write a program for polygon filling as Raster Graphics Display

5. Write a program for line clipping.

6. Write a program for displaying 3D objects as display using perspective transformation.

7. Devise a routine to produce the animation effect of a square transforming to a triangle and then to a circle

8. Write a program to show a bitmap image on your computer screen.

9. Write a program to play "wave" or "midi" format sound files.

10. Create animations of any object.

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering
SYLLABUS FOR 7th Sem BTech PROGRAMME
Network Security (03105434)

Type of Course: BTech

Prerequisite: Basic knowledge of web Computer Network & Information Security.

Rationale: The use of the Internet for various purpose including social, business, communication and other day to day activities has been in common place. The information exchanged through Internet plays vital role for their owners and the security of such information/data is of prime importance. Knowing the concepts, principles and mechanisms for providing security and attack analysis on data in network is very important for the students of Computer Engineering/Information technology. The subject covers various important topics concern to Network security like Vulnerability, Mail security, IP security, Web security.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
4	0	2	5	60	30	20	20	20	150

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Introduction to Network Security::** Introduction; A short History of Cryptography; Principles of Cryptography; Attacks on Cryptosystems, Security Services, Mechanism, Symmetric and Asymmetric Cryptography A model for Internetwork Security.	10%	6
2	**Flaws and Malware::** Introduction, Software Flaws, Buffer overflow, Incomplete Mediation,Race Conditions, Malware, Brain, Morris Worm, Code red, SQL Slammer, Trojan , Malware Detection, Cyber Disease versus Biological diseases, Miscellaneous software-based Attacks, Salami Attacks, Linearization, Time bombs	10%	6
3	**Systems Vulnerability Scanning::** Overview of vulnerability scanning, Open Port / Service Identification, Banner / Version Check, Traffic Probe, Vulnerability Probe, OpenVAS, Metasploit. Networks Vulnerability Scanning - Netcat, Socat, understanding Port and Services tools – Datapipe, Fpipe, WinRelay, Network Reconnaissance – Nmap, THC-Amap and System tools. Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping Kismet.	20%	14

4	**Network Defence tools:**: Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System	20%	12
5	**Electronic Mail Security:**: Pretty Good Privacy (PGP); S/MIME **IP Security:** IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations; Key Management	20%	10
6	**Web Security:**: Web security requirements; Secure Socket layer (SSL) and Transport layer Security (TLS); Secure Electronic Transaction (SET)	20%	12

*Continuous Evaluation:

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Cryptography and Network Security
   William Stallings; Pearson Education
2. Anti-Hacker Tool Kit
   Mike Shema; McGrawHill
3. Cyber Security understanding Cyber Crimes, Computer forensics and Legal Perspectives
   Nina Godbole and Sunit Belapure; WILEY
4. Cryptography & Network Security
   Behrouz A. Forouzan; Tata McGraw-Hill
5. 5. Cryptography and Network Security
   Atul Kahate; TMH
6. Cryptography and Security
   C K Shyamala, N Harini, T R Padmanabhan; Wiley-India
7. Information systems security
   Nina Godbole; Wiley Publications,2008

Course Outcome:

After Learning the course the students shall be able to:

1.Understand the concepts of Network
 security and their use.
2.Understand vulnerabilities in software flaws and concept of malware.
3.Understand vulnerability scanning and defense tool.
4.Define the concepts of EMS, IP security and web security.
5.Understand attack, types of cyberattack, cyber laws and also how to protect them self and ultimately society from such attacks.

List of Practical:

1. Introduction of NMAP, list out some NMAP commands and perform TCP port scanning.

2. Perform various network monitoring task using NMAP commands (at least three).

3. Introduction to WireShark and carrying out packet filtering.

4. Carrying out source and destination IP address detection using packet capturing in WireShark.

5.   Introduction to w3af and configuring plugins and target on w3af console.

6.   Perform various vulnerability scans on different target sites using w3af GUI.

8.   (A) Finding out XSS vulnerability on a sample website and exploiting it using w3af. (B) Perform SQL injection on a sample website using w3af.

8.   Perform manual SQL injection on a predefined vulnerable website

9.   Introduction to SQLmap and perform SQL injection attack on a sample website

10.   Perform steganography using steghide.

11.   Introduction and configuration of DVWA

12.   Perform XSS attack on DVWA