SCHEME OF STUDY & SYLLABI

BE CSE

Batch 2016 – 2020 & 2017-2020 (LEET)

(With Specializations)

6th SEMESTER/3rd year

S.NO	SUBJECT CODE	SUBJECT NAME	Hours Per Week			Marks			Credits
			L	T	P	INT	EXT	Total	
1	**O-3**	Open Elective-I	3	0	0	40	60	100	3
2	CST-351	Project Based Learning in Java	3	0	0	40	60	100	3
3	CST-352	Theory of Computation	3	0	0	40	60	100	3
4	CST-365	Network Operating Systems	3	0	0	40	60	100	3
5	CST-354	Data Warehousing & Data Mining	3	0	0	40	60	100	3
6	CST-355	Engineering Practice/Technical Training	0	2	0	40	60	100	1
7	CSP-378	Project Based Learning in Java Lab	0	0	4	60	40	100	2
8	CSP-379	Linux Programming Lab	0	0	4	60	40	100	2
9	CSR-387	Project	0	0	6	60	40	100	3
	Total		15	2	9				23

Mandatory Non-Graded Courses:
For TPP Students

S.NO	SUBJECT CODE	SUBJECT NAME	Hours Per Week			Marks			Credits
			L	T	P	INT	EXT	Total	
1	TDY-3XX	Career Specific Course-II	3	0	0	40	60	100	3

For Non-TPP Students

S.NO	SUBJECT CODE	SUBJECT NAME	Hours Per Week			Marks			Credits
			L	T	P	INT	EXT	Total	
1	CSY-359	Artificial Intelligence	3	0	0	40	60	100	3

Scheme Applicable to BE CSE Batch 2016-BE CSE LEET Batch 2017 onwards

CHANDIGARH UNIVERSITY

GHARUAN

Syllabus of B.E.

Computer Science & Engineering [CSE]

6th Semester

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code (CST-351)	Project Based Learning in JAVA	L	T	P	C
	Total Contact Hours : 48Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Knowing Programming Language Java				

Marks-100

Internal-40	External-60

Course Objectives

- To study and learn fundamentals of Java
- To understand the various new technologies in Java.
- To understand the server side programming.

Unit	Course Outcomes
I	• Experience based learning in Core Java • Acquaintance with Eclipse Environment
II	• Annotations and Databases usage in project development
III	• Web Based Java Application Development

Contents of the Syllabus

Unit-I [15H]

Java Fundamentals- Introduction to Java.Difference between C++ and Java.Keywords, Tokens, Data types.Use of public, private and protected. [5]

OOPS using Java – Use of class and method in Java. Inheritance, Abstraction, Polymorphism, Encapsulation and data privacy.Difference between method overloading and method overriding. [4]

Exception Handing - Introduction to Exceptions. Difference between error and exception.Use of try, catch and throw.Difference between throw and throws.Types of Exceptions, Exception handling in Java. [6]

Unit-II [15 H]

Collection Framework- Use of Collections in Java. ArrayList, LinkedList, HashMap,TreeMap,

HashSet in Java.. Multithreading in Java. Thread Synchronization. Thread Priority, Thread LifeCycle. [7]

Wrapper Classes, I/O Streams and Annotations- Use of wrapper classes in Java- Integer, Character, Long, Boolean. Autoboxing and Unboxing. Byte stream, Character stream , Object serialization, cloning. System defined annotations, Custom annotations, application of annotations, Testing using JUnit. [5]

JDBC- Database connectivity, Types of Drivers for connection, Connection Example. CRUD operations using Database, Configuring various types of drivers for Java Database Connectivity, MVC Model for project development, Sequence, Dual table , Date type management in Java.

[3]

Unit-III **[15 H]**

Servlets and JSP: Servlet Lifecycle, Generic Servlet, Http Servlet, Linking Servlet to HTML, HttpServlet Request and Response, Servlet with JDBC, Configuring project using servlet, Servlet Config and Servlet Mapping JSP declaration, JSP directives, JSP Scriptlets, JSP include tag, JSP page tag, JSTL. [8]

XML and Web Services: Structure of XML, Elements of XML 1.0, 2.0, DTDs, XML parser, DOM parser, Web services using REST and HTTP, Creating webservices for database access via remote servers [7]

Text books:

1. Herbert Schildt, Java : The Complete Reference, 9th Edition, Oracle Press.
2. Gary Cornell, Core Java Volume II Advanced Features, 8th Edition, Pearson Education.
3. Jim Keogh, J2ee : Complete Reference, 1st Edition, Tata McGraw Hill.

Reference books:

1. James Gosling, Ken Arnold and David Holmes, Java Programming Langauge!, $th Edition, Pearson Education.
2. Gary Cornell, Core Java Volume I, 3rd Edition, Pearson Education.

CST-351	Project Based Learning in Java										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD	PC		PE	OE	Project/ Training			
				X							
Approval	Date of meeting of the Board of Studies……..										

Instructions for the Paper-Setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60   Time: 3 Hrs

Weight age per unit = 20 marks (excluding over attempt weight age)

1. Question Paper will consist of ten questions.
2. Section A of question paper is compulsory, containing five parts each of 2 marks covering the whole syllabus (short answer type- total 10 marks)
3. Set three questions from each unit I, II and III. Students will attempt 5 questions selecting at least one question from sections B, C & D. Each question carries 10 marks. Questions of Section B will be from unit I, Questions of Section C from unit II and Questions of section D from unit III.

4. In the question paper, distribution of the questions should be by considering 30 % numerical part and 70 % conceptual.

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code (CST-352)	Theory of Computation	L	T	P	C
	Total Contact Hours : 45Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Knowing importance of system programs				

Marks-100

Internal-40	External-60

Course Objectives

- To understand the concept of formal languages and their relation with finite automata.
- To study and design different finite automata.
- To study context free grammars and ambiguity related issues.
- To gain familiarization with Push- Down Automata and Turing Machines.
- To explore relationship between different classes of formal languages.

Unit	Course Outcomes
I	- Classify machines by their power to recognize languages, - Explain deterministic and non-deterministic machines
II	Employ finite state machines to solve problems in computing
III	Comprehend the hierarchy of problems arising in the computer sciences

Contents of the Syllabus

UNIT –I [15h]

Introduction: Basic Terminology: Alphabet, Formal Language and operations on formal languages, Examples of formal languages.

Finite automata : Concept of Basic Machines, Properties and Limitations of Finite State Machines, Deterministic Finite Automata(DFA), Non-Deterministic Finite Automata(NFA), Equivalence of DFA and NDFA , Non-Deterministic Finite automata with Λ-Transitions.

Regular expression: Regular Languages and Regular Expressions, Kleen's Theorem. Arden's Method.

<div align="center">

UNIT –II   **[15h]**

</div>

Properties of Regular sets: The Pumping Lemma for Regular sets, Application of the Pumping Lemma, Closure Properties of Regular Sets, Myhill- Nerode Theorem and Minimization of Finite Automata, Minimization Algorithm.

Finite Automata with output: Moore and Mealy Machines. Equivalence of Moore and Mealy Machines.

Context Free Grammars: Examples and Definitions, Derivation trees and ambiguity, An Unambiguous CFG for Algebraic Expressions. Regular Grammar, Simplified forms and Normal forms: Removal of useless symbols and unit production, Removal of Λ-moves, Chomsky Normal Form (CNF), Griebach Normal Form (GNF).

<div align="center">

UNIT –III   **[15h]**

</div>

Pushdown Automata: Introduction and Definition of Push-Down Automaton, Applications of Push Down Automata.

Turing Machines: Definitions and Examples, Deterministic and Non- Deterministic Turing Machines, Unsolvable Problems: A Non-recursive Language and an Unsolvable Problem, PCP Problem and MPCP Problem.

More General Languages and Grammars: Recursively Enumerable and Recursive Languages, Unrestricted grammars, Context sensitive Language and grammar, Relation between languages of classes, Chomsky hierarchies of grammars.

Text Books:

1. Martin J.C., "Introduction *to Languages and Theory of Computation*", Tata McGraw-Hill Publising Company Limited, 3rd Edition.
2. Hopcroft J.E. and Ullman J.D., "Introduction *to Automata Theory Languages and Computation*", Narosa Publications.

Reference Books:

1. Sipser," *Theory Of Computation*, Cengage Learning.
2. Daniel I.A. Cohen, "*Introduction to computer Theory*", John Wiley.

CST-352	Theory of Computation										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD	PC		PE	OE	Project/ Training			
				X							
Approval	Date of meeting of the Board of Studies……..										

Instructions for the Paper-Setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60   Time: 3 Hrs

Weight age per unit = 20 marks (excluding over attempt weight age)

1. Question Paper will consist of ten questions.
2. Section A of question paper is compulsory, containing five parts each of 2 marks covering the whole syllabus (short answer type- total 10 marks)
3. Set three questions from each unit I, II and III. Students will attempt 5 questions selecting at least one question from sections B, C & D. Each question carries 10 marks. Questions of Section B will be from unit I, Questions of Section C from unit II and Questions of section D from unit III.

4. In the question paper, distribution of the questions should be by considering 30 % numerical part and 70 % conceptual.

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code (CST-365)	Network Operating Systems	L	T	P	C
	Total Contact Hours : 45Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Computer network and operating system				

Marks-100

Internal-40	External-60

Course Objectives

Course Objective:

- This course is indented for students to experience on the technologies included in the Network Operating System.

- Gain in depth knowledge of windows server 2008

Unit	Course Outcomes
I	- To study data communication concepts. - To understand Logical Address and IP Addressing
II	- To understand DNS architecture - To study Installation and configuration of Netmon.
III	- To understand Install Active Directory Domains Services in Windows 2008 R2 - To study Active Directory Administration concepts

Contents of the Syllabus

UNIT –I

Introduction of Computer Networks: Reference Model: OSI Reference Model, TCP/IP reference model, Core protocols of TCP/IP,IP routing, IP routers, Routing Tables.

Introduction to DNS:DNS Architecture, Understanding the DNS Domain Namespace, DNS domain name hierarchy, DNS and Internet domains, DNS delegation

Introduction to DHCP: Introduction to DHCP,DHCP Architecture, Benefits to DHCP,DHCP Terminologies and DHCP Server Responsibility.

Introduction to RPC: Introduction to RPC,RPC Dependencies and Interaction, RPC Architecture, RPC Component and RPC Processes and Interaction.

Introduction to Microsoft Network Monitoring Tool: Introduction to netmon tool, Installation and configuration of Netmon.

Unit-II

Introduction to operating System: Introduction to operating system, Types of operating System: Mainframe, Desktop, Multiprocessor, Distributed, Clustered, Multiprogramming, Real time, Embedded and Time Sharing

Operating System Components: Process Management Component, Memory Management component, i/o Management component, File Management component, Protection System, and Networking management component.

Comparison of Microsoft OS(Desktop, Server and Client),Hardware Requirement for OS(Desktop, Server and client),Workgroups and Domains.

Installing windows server 2008:Plan for a server roles and installing windows server core, configure server core, Add and configure server roles, add backup feature and migrate roles from previous versions of windows server.

Configuring Windows Server 2008:Windows server registry, Control Panel, Delegate administration, Add and removes feature in window server, intial configuration taskes, server manager console, server manager wizards and windows power shell.

Unit-III   [15h]

Hyper-V:Introducing Hyper-V, Virtual Machines

Introducing to Active Directory: role of an AD DS Server, features in AD DS, Common Terminologies and Active Directory Concepts, Active Directory Schema, Active Directory Objects, Active Directory Concepts, Active Directory Data structure and storage architecture, Active Directory Structure and storage components, DNS support for active directory, active directory DNS support components

Install Active Directory Domains Services in Windows 2008 R2: Installing a new forest by using the graphical user interface (GUI), Understanding active directory domain. Servicex functional Levels.

Active Directory Administration: Active Directory Users and Computers. Managing organizational units using Active Directory Users and Computers, Managing Trusts using Active directory domains and trusts and managing forest trusts using active directory domains and trusts snap-in.

Text Books:

1. Data communication & Nwetworking, Frozen Tata Mcgraw Hill Publication computer
2. Data & computer communications, stalling PHI new dehli

Reference Books:

1. Capture netwotk traffic---http://support.microsoft.com/kb/812953
2. About Network Monitor--- http://support.microsoft.com/kb/294818
3. Traces-- http://support.microsoft.com/kb/169292

Subject Code (CST-365)	Network Operating Systems										
Department Teaching the Subject	Department of CSE										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k
Mapping of Course outcome with Program outcome											
Category	BS	ES		PD		PC		PE		OE	Project/ Training
						X					
Approval	Date of meeting of the Board of Studies……..										

Instructions for the Paper-Setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60   Time: 3 Hrs

Weight age per unit = 20 marks (excluding over attempt weight age)

1. Question Paper will consist of ten questions.
2. Section A of question paper is compulsory, containing five parts each of 2 marks covering the whole syllabus (short answer type- total 10 marks)
3. Set three questions from each unit I, II and III. Students will attempt 5 questions selecting at least one question from sections B, C & D. Each question carries 10 marks. Questions of Section B will be from unit I, Questions of Section C from unit II and Questions of section D from unit III.

4. In the question paper, distribution of the questions should be by considering 30 % numerical part and 70 % conceptual.

Subject Code (CST-354)	Data Warehousing & Data Mining	L	T	P	C
	Total Contact Hours : 45Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Studied DBMS/RDBMS in previous semester				

Marks-100

Internal-40	External-60

Course Objectives

Course Objective:

- To understand the concepts of Data warehousing & Data Mining.

- To gain knowledge about various techniques of data mining.

- To study classification and clustering methods.

Unit	Course Outcomes
I	- Apply data warehousing techniques and methods to large data sets. - Use data warehousing tools
II	- Compare and contrast the various classifiers. - Apply data mining techniques and methods to large data sets
III	- Use data mining tools - Compare and contrast the various classifiers

Contents of the Syllabus

UNIT –I **[15h]**

Data warehousing: Introduction , operational data stores , ETL , Data warehouses, design guideleines for data warehouse implementation ,data warehouse metadata; OLAP,introduction ,characteristics , multidimensional view and data cube , data cube operations**.**

Multidimensional Data Model:- Stars, Snowflakes, and Fact Constellations, Examples for Defining Star, Snowflake and Fact Constellation Schemas, Measures: Their Categorization and Computation, Concept Hierarchies, OLAP Operations in the Multidimensional Data Model, A Starnet Query Model for Querying Multidimensional Databases.

<p align="center">**Unit-II**   **[15h]**</p>

Data mining : Introduction , association rules mining , basics , naïve algorithm , apriori algorithm , direct hashing and pruning(DHP) , Dynamic Itemset counting(DIC) , Mining frequent pattern without candidate generation(FP,growth), performance evaluation of algorithms , software for association rule mining.

Data Preprocessing: - Need of Preprocessing, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation. [8]

<p align="center">**Unit-III**   **[15h]**</p>

Classification – introduction , decision tree , tree induction algorithm – split algorithm based on information theory , split algorithm based on Gini index; naïve bayes method; estimating predictive accuracy of classification method; classification software.

Cluster analysis , introduction , partitional methods , hierrarchical methods , density,based methods , dealing with large databases ,cluster software. Introduction to Web data mining and search engines.

Text Books:

3. G.K.Gupta, *Introduction to Data Mining with case studies*, PHI publication.
4. VikramPudi, P.Radhakrishana, *Data Mining*, Oxford University press

Reference Books:

4. Pieter adriaans, dolfzantinge, *Data mining*, Pearson education press.
5. Paulrajpooniah, *Data Warehousing Fundamentals*, A,willey interscience Publication.

CST-354	Data Warehousing & Data Mining										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k

Mapping of Course outcome with Program outcome								
Category	BS	ES	PD	PC		PE	OE	Project/ Training
				X				
Approval	Date of meeting of the Board of Studies……..							

Instructions for the Paper-Setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60 Time: 3 Hrs

Weight age per unit = 20 marks (excluding over attempt weight age)

1. Question Paper will consist of ten questions.
2. Section A of question paper is compulsory, containing five parts each of 2 marks covering the whole syllabus (short answer type- total 10 marks)
3. Set three questions from each unit I, II and III. Students will attempt 5 questions selecting at least one question from sections B, C & D. Each question carries 10 marks. Questions of Section B will be from unit I, Questions of Section C from unit II and Questions of section D from unit III.

4. In the question paper, distribution of the questions should be by considering 30 % numerical part and 70 % conceptual.

Subject Code	Project Based Learning in Java Lab	L	T	P	C
(CSP-378)	Total Contact Hours : 45Hours	**0**	**0**	**6**	**3**
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Studied Programming Language				

Marks-100

Internal-60	External-40

Course Objectives

- To generate analytical and conceptual ability related to fundamentals of Java.
- To understand the concepts of Web application development.
- To understand the concepts of Fundamentals of I/O , Database Connectivity.

Unit	Course Outcomes
I	• Experience based learning in Core Java • Acquaintance with Eclipse Environment
II	• Acquaintance with Collections and Databases
III	• Ability to create Web Application using Java

List of Experiments

UNIT-I

1. Create a application to save the employee information using arrays
2. Design and implement a simple inventory control system for a small video rental store.
3. Create a application to calculate interest for FDs, RDs based on certain conditions using inheritance.

UNIT-II

4. Create a program to set view of Keys from Java Hash table.
5. Create a program to show the usage of Sets of Collection interface.

6. Write a Program to perform the basic operations like insert, delete, display and search in list. List contains String object items where these operations are to be performed.

7. Create a menu based Java application with the following options.1.Add an Employee2.Display All3.Exit If option 1 is selected, the application should gather details of the employee like employee name, employee id, designation and salary and store it in a file. If option 2 is selected, the application should display all the employee details. If option 3 is selected the application should exit.

UNIT-III

8. Create a palindrome creator application for making a longest possible palindrome out of given input string.

9. Create a Servlet/ application with a facility to print any message on web browser.

10. Create JSP application for addition, multiplication and division.

CSP-378	Project Based Learning in Java Lab										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD	PC		PE	OE	Project/ Training			
				X							
Approval	Date of meeting of the Board of Studies……..										

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code	Linux Programming Lab	L	T	P	C
	Total Contact Hours : 45Hours				
(CSP-379)		0	0	2	1
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Studied Computer Architecture & Basics of Computers				

Marks-100

Internal-60	External-40

Course Objectives

- To learn shell programming

- To implement various programs using shell script

Unit	Course Outcomes
I	• Will be able to describe and use the LINUX operating system. • Will be able to describe and use the fundamental LINUX system tools and utilities.
II	• We will able to describe and write shell scripts in order to perform basic shell programming.
III	• Will be able to describe and understand the LINUX file system.

List of Experiments

UNIT-I

1. Introduction to Linux and installation of linux in Virtual BOX.
2. Elaborate the concept of User and Group administration.
3. Demonstrate the use of various Basic Commands in linux.
4. User and group permissions.
5. WAP to show the use of Grep command in:-
    i.   Search and Find Files
    ii.   Display number of lines after and before a search string
    iii.   Search an entire pattern
6. Introduction to various text editors.i.e Vi editor
7. Demonstrate the use of :-
    1. Tr command
    2. Cut Paste command
    3. Sed command

UNIT-II

8. Write shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
9. Write a shell script that deletes all lines containing a specific word in one or more Arguments to it.
10. Write a shell script that displays a list of all files in the current directory to which the userhas read, write and execute permissions.
11. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported
12. Create a file in Linux and sort it using Sort command demonstrating various option of the command
13. Write a shell script accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
14. Write a shell script to list all of the directory files in a directory.

UNIT-III

15. Write a shell script to find factorial of a given number.
16. Write a shell script to show the concept of Control Structures
17. Write an awk script to count the number of lines in a file that do not contain vowels.
18. Write an awk script to count the number of characters, words and lines in a file.
19. Write a C program that makes a copy a file using standard I/O and system calls.
20. Application Management using YUM and RPM.
21. Implementation of Apache Web Server

CSP-379	Linux Programming Lab										
Department Teaching the Subject	Department of CSE										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k
Mapping of Course outcome with Program											

outcome											
Category	BS	ES	PD	PC		PE	OE	Project/ Training			
				X							
Approval	Date of meeting of the Board of Studies……..										

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code (CSR-387)	Project	L	T	P	C
	Total Contact Hours : 45Hours	0	0	3	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Learned a particular programming language in previous semester				

Marks-100

Internal-60	External-40

Course Objectives

- The objective of the project is to enable the students to work on a project of latest topic / research area / industrial applications preferably using the tool or language learnt in previous or current semester. Each student shall have a guide who is a faculty member.

Unit	Course Outcomes
	• Offers our students the opportunity to gain valuable hands-on experience with state-of-the-art processing and analytical equipment.

CSR-387	Project										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	J	K
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD		PC		PE	OE	Project/ Training		
				X							
Approval	Date of meeting of the Board of Studies……..										

Subject Code CSO-390	Open Elective I - Cyber Laws and Security	L	T	P	C
	Total Contact Hours : 45Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: • Basic knowledge for various Cyber Attacks				

Marks-100

Internal-40	External-60

Course Objectives

- To understand the major concepts of Cyber Security and Forensics

- To learn how to avoid becoming victims of cyber crimes.

Unit	Course Outcomes
I	Understand different Cyber Attacks
II	Understand the contemporary techniques used for Cyber Crime
III	Understand various Cyber Laws.

Contents of the Syllabus

UNIT-I   [15h]

Introduction to cyber crime: Introduction to Cybercrime and information security, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses , Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Usenet Newsgroup as the Source of Cybercrimes , Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft.

UNIT-II   [15h]

Cyber offences: Categories of cybercrime, Planning of attacks, Cyber stalking, Types of Stalkers, Real life incident of cyber stalking, Cybercafé, Botnets, Attack vectors, Zero day attack, Proliferation of wireless devices, Credit card frauds, Security challenges posed by mobile devices, Attacks on mobile phones.

Methods Used in Cybercrime: Proxy Servers, Password Cracking, Online and Offline attacks, Types of Viruses, Protection methods against viruses, Phishing, Methods of Phishing, Identify theft, Personally identifiable Information (PII).

UNIT-III [15h]

Cyber Law: Need of Cyber Laws, Advantages of Cyber Laws, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Cyber Forensics, Need of Cyber Forensics, Online Scams:
- Scam No. 1 – Foreign Country Visit Bait
- Scam No. 2 – Lottery Scam
- Scam No. 3 – Fake Job Offer Scam

Cyber security: Roles and Responsibilities of IT Security Organization, Career in cyber security, Assurance and Compliance Security Audit, Types of Assurance and Compliance, Network Security, Computer Forensics, Cyber security Certifications.

Text Books:

1. Godbole," *Information Systems Security*", Willey.
2. Farrera, "Cyber *Law"*, Cengage Learning.
3. Merkov, Breithaupt, "Information *Security*", Pearson Education.

Reference Books:

1. Yadav, "*Foundations of Information Technology*", New Age, Delhi.
2. Sood, "*Cyber Laws Simplified*", McGraw Hill.
3. Furnell, "*Computer Insecurity*", Springer.

Instructions for the paper-setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60   Time: 3 Hrs

The syllabus has been divided into three equal units. The paper setter is required to set ten questions in all, three questions from each unit and a compulsory question consisting of five sub parts and based on the whole syllabus. The candidate will be required to attempt six questions including the compulsory question number no 1 and not more than two questions from each unit.

Course Code- CSO-390	Open Elective I - Cyber Laws and Security										
Department Teaching the Subject	**Department of Computer Science & Engineering**										
Program Outcome	a	b	c	d	E	f	g	h	i	j	K
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD		PC		PE	OE	Project/Training		
								X			
Approval	Date of meeting of the Board of Studies										

Subject Code	Open Elective I – Software Engineering Methodologies		L	T	P	C
CSO-391	Total Contact Hours : 45Hours		3	0	0	3
	Common to all Specializations of CSE 3rd Year					

Marks-100

Internal-40	External-60

Course Objectives

- To study and learn various methods of software engineering.

- To understand the various phases of software development.

- To understand the various testing techniques.

Unit	Course Outcomes
I	• Selection and implementation of different software development process models • Extracting and analyzing software requirements specifications for different projects
II	• Defining the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress. • Identification and implementation of the software metrics • Applying different testing and debugging techniques and analyzing their effectiveness.
III	• Analyzing software risks and risk management strategies • Defining the concepts of software quality and reliability on the basis of International quality standards.

Contents of the Syllabus

Unit-I   [15h]

Introduction- Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, software engineering processes.

Software Development Life Cycle (SDLC) Models- Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models.

Software Requirement Specifications (SRS)-Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, SRS Document, IEEE Standards for SRS.

Unit-II [15h]

Software Design- Basic Concept of Software Design, Architectural Design, Low Level Design: Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures. Design Strategies- Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design.

Software Measurement and Metrics- Various Size Oriented Measures, Function Point (FP) Based Measures, Cyclomatic Complexity Measures: Control Flow Graphs.

Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model.

Unit-III [15h]

Software Testing: Testing levels, Verification and Validation, Unit testing, System testing Integration testing, Validation Testing, Black box and white box testing.

Software Maintenance and Software Project Management- Software as an Evolutionary entity Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance. Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, an Overview of CASE Tools. Estimation of Various Parameters such as cost, efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Software Risk Analysis and Management.

Text Books:

1. Pressman Rogers, *"Software Engineering: A Practitioner's Approach*", Sixth edition.
2. Somerville Ian, *"Software Engineering*", Addison Wesley, 8th Edition.

Reference Books:

1. James F Peters and Pedryez Witold, "Software Engineering – An Engineering Approach", Wiley Student Edition.
2. Rajib Mall, Fundamentals of Software Engineering, PHI Publication.

Instructions for the paper-setter

Please go through these instructions thoroughly and follow the same pattern while setting the paper as the students have been prepared according to this format.

Maximum Marks = 60   Time: 3 Hrs

The syllabus has been divided into three equal units. The paper setter is required to set ten questions in all, three questions from each unit and a compulsory question consisting of five sub parts and based on the whole syllabus. The candidate will be required to attempt six questions including the compulsory question number no 1 and not more than two questions from each unit.

Course Code- CSO-391	Open Elective I – Software Engineering Methodologies										
Department Teaching the Subject	**Department of Computer Science & Engineering**										
Program Outcome	a	b	c	d	E	f	g	h	i	j	K
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD		PC		PE	OE		Project/Training	
								X			
Approval	Date of meeting of the Board of Studies										

ubject Code CSO-392	Open Elective I – E-Banking & Commerce	L	T	P	C
	Total Contact Hours : 45Hours	3	0	0	3
	Common to all Specializations of CSE 3rd Year				

Marks-100	
Internal-40	External-60

Course Objectives

- To study and learn about Electronic Banking & its applications.

- To study and learn about E-commerce & its applications.

- To understand the E-banking & commerce security.

Unit	Course Outcomes
I	• Knowledge of various banking options like E-Banking, Online Banking etc
II	• Knowledge of Security provisions in E-Banking.
III	• Knowledge of Business setup using E-Commerce

Contents of the Syllabus

Unit-I [15h]

Electronic Banking- Traditional Banking Vs E-Banking, Facets of E-Banking, E-Banking transactions, truncated cheque and Electronic cheque, Models for E-banking, complete centralized solution- features & CCS-Cluster approach, Advantages of E-Banking, Constraints in E-Banking.

Online Banking- Introduction, concept and meaning, the electronic delivery channels, need for computerization, Automatic Teller Machine(ATM), Electronic Fund Transfer(EFT) & its uses, computerization in clearing houses, Tele-banking, Banking on home computers, Electronic Money Transfer & its uses.

UNIT –II [15h]

Types of E-Banking: Telephone Banking, Computerized Home Banking, Computerized Corporate Banking, On-Line Banking, Types of Cards: Debit Cards, Credit Cards and Smart Cards.

E-Banking Security- Introduction need for security, Security concepts-Privacy, Survey. Findings on security-Attacks, Cyber crimes, Reasons for Privacy, Tampering, Encryption – Meaning-The encryption process - Cryptogram-Cryptanalyst-cryptography, Types of Cipher systems, Data Encryption Standard (DES).

Unit-III   [15h]

Fundamentals of E-commerce- definition, features, need & essential requirements, Parties to E-commerce transactions, environment, E-commerce & trade Cycle, Internet concepts- Private network, Public network (VPN), Intranet & its applications, Extranet
Business Strategy in an Electronic Age -Value Chain-Competitive Advantage-Business strategies

E-commerce Types- Inter-organizational transaction, Purchasing online, After sales online-internet trading relationship-B2B, EDI & its impact on Business- B2C, Intra-organizational E-commerce, Supply chain management.

Text Books:

1. Efrain Turbans, Jar Lee, David King and Michael H. Chung, E-Commerce: A Managerial Perspective, Pearson Education, Delhi, 2003.
2. Whiteley David *"E-commerce: Strategy- Technologies and Applications"*- Tata McGraw Hill- New Delhi- New York.

Reference Books:

1. C.S. Rayudu, E-Business, Himalaya Publishing House.
2. Chhabra, T.N., Suri, R.K. and Verma, Sanjiv, E-Commerce: New Vistas for Business, Dhanpat Rai & Co. (P) Ltd. Delhi, 2004-05.

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Maximum Marks = 60   Time: 3 Hrs

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Course Code- CSO-392	Open Elective I – E-Banking & Commerce										
Department Teaching the Subject	**Department of Computer Science & Engineering**										
Program Outcome	a	b	c	d	E	f	g	h	i	j	k
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD		PC		PE	OE	Project/Training		
								X			
Approval	Date of meeting of the Board of Studies										

Subject Code	Open Elective I – Enterprise Resource Planning		L	T	P	C
	Total Contact Hours : 45Hours		3	0	0	3
CSO-393	Common to all Specializations of CSE 3rd Year					

Marks-100	
Internal-40	External-60

Course Objectives	

- To understand the importance of Enterprise-wide systems to business operations
- To understand basic concepts, tools and techniques of Enterprise Resource Planning
- To understand the business model and implementing ERP
- To learn to use commercial ERP packages

Unit	Course Outcomes
I	• Knowledge of ERP, Warehousing & Data Mining
II	• Knowledge of Business setup using ERP
III	• Knowledge of various ERP Packages

Contents of the Syllabus

Unit-I [15h]

ERP Introduction- Benefits, Origin, Evolution and Structure**:** Conceptual Model of ERP, Evolution of ERP, Structure of ERP, ERP and Functional Areas. Model: Dynamic and process.

ERP and Technology- Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing(OLAP), Product Life Cycle Management(PLM),LAP, Supply chain Management.

ERP Implementation: Implementation Challenges , Strategies , Life Cycle , Pre – implementation Tasks ,Requirements Definition , Methodologies , Package selection , Project Teams ,Process Definitions , Vendors and Consultants, Data Migration , Project management , Post Implementation Activities.

UNIT – II [15h]

ERP Marketplace and Marketplace Dynamics- Market Overview, Marketplace Dynamics, Changing ERP Market.

ERP Functional Modules- Introduction, Functional Modules of ERP Software, Integration of ERP, Inventory Control – Supply Chain Management and Customer Relationship Applications.

UNIT – III [15h]

ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into organizational culture.

Using ERP Tool- ERP System Package – SAP, People Soft, BAAN and Oracle – as a case study

Text Books:

1. Vinod Kumar Garg and N.K.Venkita Krishnan, "*Enterprise Resource Planning-Concepts and Practice*", Prentice Hall of India.
2. Antonio Fernandz, "*The SAP R/3 Handbook*", Tata McGraw Hill.

Reference Books:

1. Brady, Monk, Wagner, "*Concepts in Enterprise Resource Planning*", Thomson Asia.
2. Alexis Leon, "*ERP DEMYSTIFIED*", Tata McGraw Hill, Second Edition, 2008.
3. Mary Sumner, "*Enterprise Resource Planning*", Pearson Education, 2007.

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Course Code- CSO-393	Open Elective I – Enterprise Resource Planning										
Department Teaching the Subject	**Department of Computer Science & Engineering**										
Program Outcome	a	b	c	d	E	f	g	h	i	J	k
Mapping of Course outcome with Program outcome											
Category	BS	ES	PD	PC		PE	OE	Project/Training			
							X				
Approval	Date of meeting of the Board of Studies										

CHANDIGARH UNIVERSITY, GHARUAN

Subject Code (CSY-359)	**Artificial Intelligence**	L	T	P	C
	Total Contact Hours : 45Hours	**3**	**0**	**0**	**3**
	Common to all Specializations of CSE 3rd Year				
	Prerequisite: Knowing importance of intelligence and its implementation for programming and logic buiding				

Marks-100	
Internal-40	External-60
Course Objectives	

- To study the concepts of Artificial Intelligence
- Methods of solving problems using Artificial Intelligence
- Introduce the concepts of Expert Systems and machine learning.

Unit	Course Outcomes
I	• History and knowledge about intelligence
II	• To represent knowledge representation methods
III	• Comprehend learning problems and various types of intelligent systems.

CONTENTS OF SYLLABUS

UNIT-I

Introduction and Overview: Introduction, Importance of AI and Applications of AI.[6]

Problem Solving Techniques: Problem state spaces, problem characteristics, production system, Search space control: Uninformed search- Depth first search, Breadth first search, Depth first search with iterative deepening, Heuristic search - Simple Hill Climbing, Steepest ascent Hill Climbing, A* algorithm, AO* algorithm, Minimax search procedure for game playing, Alpha beta cutoffs.   [9]

Knowledge Representation: Propositional and predicate logic, resolution in predicate logic, question answering, theorem proving. Semantic networks, Frames and scripts, conceptual graphs, conceptual dependencies.   [9]

Knowledge acquisition: Types of learning, General learning models, learning Automata, Intelligent Editors, Learning by Induction. [6]

UNIT-III

Introduction to: Expert Systems, Pattern recognition, Natural Language Processing, Evolutionary algorithm, Fuzzy logic, Neural Networks. [4]

Languages for AI Problem Solving: Introduction to Prolog- syntax and data structures, representing objects and relationships, built in predicates. Introduction to LISP- basic and intermediate LISP programming. [6]

Machine Learning: Strategic explanations − Why, Why not and how explanations. Learning− Machine learning, adaptivelearning. - Typical expert systems − MYCIN, PIP, INTERNIST, DART, XOON, Expert systems shells. [5]

TEXT BOOKS:

1.Rich E., *Artificial Intelligence*, Tata McGraw Hills.

2.George F. Luger, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, Pearson Education Asia.

REFERENCE BOOKS:

1.D.W.Patterson, *Introduction to AI and Expert Systems*, PHI.
2.N.J.Nilsson, *Principles of Artificial Intelligence*, Kaufmann,1980
3.   Saroj Kaushik,*Logic and Prolog Programming*, New Age International Publications.
4.PH.Winston,*Artificial Intelligence*, Addison Wesley.

CSY-359	Artificial Intelligence										
Department Teaching the Subject	**Department of CSE**										
Program Outcome	a	b	c	d	e	f	g	h	i	j	k

Mapping of Course outcome with Program outcome										
Category	BS	ES	PD	PC		PE	OE	Project/ Training		
				X						
Approval	Date of meeting of the Board of Studies……..									

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