SEMESTER-III

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Indus University
Institute of Information and Communication Technology

Master of Computer Applications

Teaching Scheme

Subject Code	Subject Name		Teaching Learning			
		Theory Session (Hours)	Tutorial Session (Hours)	Laboratory Session (Hours)	Total (Hours)	Credit
MCA-301	Object Oriented Technology - I	04	00	02	06	05
MCA-302	Web Development Tools-I	04	00	02	06	05
MCA-303	Advanced Database Management System	04	00	02	06	05
MCA-304	Advanced Networking	04	00	00	04	04
MCA-305	Software Engineering and Quality Assurance	04	00	00	04	04
MCA-306	Mini Project-I	01	00	02	03	02
Total		**21**	**00**	**08**	**29**	**25**

Subject: **Object Oriented Technology-I**

Program: **Master of Computer Application**			Subject Code:**MCA-301**		Semester: **III**			
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I: CONCEPTS OF OOP [12]

Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP

OBJECTS AND CLASSES

Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion

EVOLUTION AND OVERVIEW OF JAVA

Java's Lineage, The creation of Java, How Java changed the Internet, Java's magic : The Bytecode, The Java Buzzwords, The evolution of Java, The Three OOP principles, A First Simple Program, Lexical Issues, Difference between object-oriented programming language and object-based programming language.

DATA TYPES, VARIABLES, ARRAYS AND INBUILT CLASSES

The Primitive types, Integer Types, Floating-Point Types, Character Type, Booleans, Literals, Variables, Type Conversion & Casting, Automatic Type Promotion in Expressions, Arrays, Wrapper Classes, java.util classes: Date, Calander, Math, Scanner

OPERATORS &CONTROL STATEMENTS

Arithmetic operators, Bitwise operators, Relational operators, Boolean Logical operators, Assignment operator, '?' Operator, Operator Precedence, Using Parenthesis Java's Selection Statements, Iteration Statements, Jump Statements

Unit II: INTRODUCING USER DEFINED CLASS [12]

Class Fundamentals, General Form of a Class, Simple Class Example, Declaring objects, Introducing methods, Constructors, The this keyword, Garbage collection, The finalize()

method, Overloading methods, Understanding static, Introducing final, Using command line arguments

INHERITANCE

Inheritance Basics, Using super, Method overriding, Dynamic Method Dispatch, Using Abstract Classes

PACKAGES & INTERFACES

Packages - Defining a Package, Access Protection, Importing Packages, Interfaces – Defining an Interface, Implementing Interfaces

INPUT OUTPUT

I/O Basics, Reading Console Input – Reading characters, Reading Strings, Reading & Writing files, File -Directories.

Unit III: JAVA FEATURES - OTHER TOPICS: [12]

The transient and volatile Modifiers, Using instanceof, strictfp, Using assert, Static Import, Invoking Overloaded Constructor Through this().

INPUT OUTPUT: Exploring java.io

The Stream Classes, The Byte streams – InputStream, OutputStream, FileInputStream, FileOutputStream, Buffered Byte streams- BufferedInputStream, BufferedOutputStream, The Character streams - Reader, Writer, FileReader, FileWriter, BufferedReader, BufferedWriter.

STRING HANDLING

The String Constructors, String Length, Special String Operations - String Literals, String Concatenation, Character Extraction - charAt(), getChars(), String Comparison - equals() and equalsIgnoreCase(), compareTo(), Searching Strings, Modifying a String, StringBuffer – StringBuffer Constructors, length() and capacity(), append(), insert(), delete(), deleteCharAt(), replace().

EXCEPTION HANDLING

Exception handling fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's Built-in exceptions, Creating your own exception sub classes.

Unit IV: MULTITHREADED PROGRAMMING [12]

Java Thread Model, Creating a Thread – Implementing Runnable, Extending Thread, Creating Multiple Threads, Thread Priorities, Synchronization – using synchronized methods, Inter thread Communication, Suspending, resuming and Stopping Threads.

THE COLLECTIONS FRAMEWORK

Generics types, Collections Overview, The Collection Interfaces - The List Interface, The Set Interface - HashSet , TreeSet Map Interface- HashMap, TreeMap, The Collection Classes – ArrayList Class, HashSet Class.

INTRODUCING Applet, AWT & SWING

Applet, AWT Components, A The Origins of Swing, Two Key Swing Features, Components & Containers - Understanding Layout Managers – FlowLayout, BorderLayout, GridLayout, CardLayout, GridBagLayout, The Swing Packages, A Simple Swing Application, differentiate Swing & Applet, GUI Events-Event Delegation Model, and Exploring Swing Components.

Text Book(s):

1. Herbert Schildt, *"The Complete Reference Java*", Seventh Edition, TMH

Reference Books:

1. Hari Mohan Pandey , "*Java Programming"*,Pearson Publication 2.
2. Patrick Naughton, *"The Java Hand Book"*, Eleventh Reprint, TMH, 2002

Digital Learning Resources:

1. www.youtube.com
2. www.tutorialspoint.com/java
3. www.javatpoint.com/java-tutorial

Subject: **Web Development Tools-I**								
Program: **Master of Computer Application**			Subject Code:**MCA-302**				Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
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Unit I: **[12]**

Introduction, Programming and application development, Types of application – Windows application, Web application, Console application, Windows service, Web service, Components and objects. OOPS with C#, Framework,Introduction to C#, Exception handling, Defining classes and class members. Assembly, Components of Assembly, Private and Shared Assembly, Garbage Collector, JIT compiler, Namespaces, Collections

Unit II: **[12]**

Application Development using Controls: Window Base control & web based control, SDI and MDI Forms, ASP.Net page life cycle,Validations,Master page, Themes, Skin, and Introduction to CSS. ASP.NET server controls-Types of control, ASP.NET state management engine, Web.config and global.asax files, Caching, Navigation controls, Telerik Controls, Introduction to user control.

Unit III: **[12]**

Introduction to Database, Using SQL to work with database, Retrieving and manipulating, data with SQL, ADO.Net architecture, ASP.Net data controls,Data Architecture(Two,Three,Ntier),SecurityAuthentication(None,Passport,Windows,Form),Linq , Advanced Linq, Live Hosting, IIS Hosting, Development Server, Crystal Report, reporting with CSV, Word and pdf, WCF Services.

Unit IV: **[12]**

Introdiction to "MVC", Design Engine, Defining Model,Controller and View, Html Helper Classes, MVC Master page, Theme and Design, ViewBag, Viewdata, tempData, MVC state management with Windows and Forms authentication, Actionresult, Jsonresult, Httpresponse, Web API, two model Concept, EDMX, web grid concept, Java scripting and jquery, Kendo implementation

Text Books:

1. Imar Spaanjaars, "*Beginning ASP.NET 4 in C# and VB*".
2. ImarSpaanjaars, Jon Galloway, Brad Wilson, David Matson, "*Beginning ASP.NET 4.5.1 and Professional ASP.NET MVC 5*"

Reference Books:

1. Stephen Walther, Kevin Hoffman, Nate Dudek,*"ASP.Net 4 Unleashed"*, SAMS Publishing.
2. "*ASP.Net 4.0 Programming 6-in-1*", Blackbook, DreamTech Publication.
3. J. Kanjilal, "*ASP.Net 4.0 programming*", Tata McGraw-Hill (Unit III to IV).
4. D.Esposito, "*Programming ASP.Net*," Microsoft Press (Dreamtech), Reprint 2011.
5. Vijay Nicoel, "*ASP.Net Visual C#.NET"*, TMH
6. Patel, "*Advanced .Net Technology*", Dreamtech

Digital Learning Resources:

1. https://msdn.microsoft.com/en-us/library/gg697787%28v=vs.88%29.aspx
2. http://www.w3schools.com/aspnet/
3. http://www.wrox.com/WileyCDA/WroxTitle/Beginning-ASP-NET-4-in-C-and-VB.productCd-0470502215.html

Subject: **Advanced Database Management System**								
Program: **Master of Computer Application**			Subject Code:**MCA-303**				Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Course Objectives:

- To introduce the basics of Database Administration
- To give a detailed understanding of how to maintain a database quickly & accurately.
- The students will be able to design and manage the Database Server to solve the issues related to the database Server.

Prerequisites:

- Knowledge of DBMS.
- Knowledge of SQL & PL/SQL is desirable.

Course Contents:

UNIT I : Getting Started with Database Architecture and Managing Data Storage

Introduction to Database, Database System Environment – an Example, Data Models, Schema and instances, Three Schema Architecture of Database, Component Modules of Database Systems, Database System Utilities, Memory Hierarchy and Storage Devices, Storage of Databases, Buffering of Blocks, Places File Record on Disk, Files of Unordered Records and Unordered Records

Database Tuning and Database Security Physical Database Design in Relational Database, Overview of Database Tuning and Relational Systems, Database Security and its Issues, Granting and Revoking Privileges, Role Based Access Control for Multilevel Security, Encryption and PKI

UNIT II : Backup & Recovery in Database and Database Indexing

Providing Backup and Recovery, Recovery Concepts, Recovery Techniques Based on Deferred Update and Immediate Update, Recovery in Distributed Database, Distributed Database in Oracle, Types of Single Level Ordered Indexes, Primary Index, Cluster Index, Secondary Index, Multilevel Index

UNIT III: Managing Different Databases and Distributed

Databases Overview of Temporal and Deductive Databases, Temporal Database Concepts, Deductive Database, Distributed Database Concepts, Data Fragmentation, Allocation Techniques for Distributed Database Design, Types of Distributed Database Systems

UNIT IV: Emerging Database Technologies and Object-Relational Databases

Overview of Object Relational Features, Current Trends of Database Technology, Implementation and Relational Issues of Extended Type, Nested Relational Model, Mobile Databases, Multimedia Databases, Geographic Information Systems, Genome Database Systems

Text Book(s):

1. Ivan Bayross, "*SQL,PL/SQL The programming language of oracle*", 3rd revised edition, BPB Publication
2. Scott Urman, "*Oracle 9i PL/SQL Programming*", Oracle Press.

Reference Books:

1. Sam R. Alapati, "Expert Oracle9i Database Administration", Apress,
2. Bob Bryla, Kevin Loney, "Oracle Database 11g DBA Handbook", Oracle Press, TMGH Publication
3. S. K. Singh, "Database Systems Concepts, Design & Applications", Pearson Education

Practical:

Lab-1	**A Create the following tables.** Employee(empId, empName, Address,BirthDate,ContactNo,ManagerId) Department(deptId, deptName) Employee_Department(empId, deptId,Salary) **Apply the following Constraints.** 1. Employee name should be NOT NULL 2. Contact No should be of 10 Digits. **Implement the following SQL Queries.** 1. Display names of all the employees and their respective managers. 2. Display names of employees receiving salary greater than average salary distributed in company. 3. Display names of all the employees who are not from sales and admin department. **Create following PL/SQL Blocks.** 1. Write a Function that accepts department name as an argument and returns total salary distributed in that department. 2. Write a trigger that maintains a log of updated or deleted employees in a table Employee_log(empID, date_and_time, status). If any employee record is updated then the status is 'updated' and if any employee record is deletedthen the status is 'deleted'.
Lab-2	Flight(flightId, company_name, flightFrom, flightTo, flightFare, capacity) Passenger(pId, Name,Address, City, BirthDate, Gender, ContactNo) Flight_Scheduled(Transid, flightid, departuredate) Flight_Passenger(Transid, pId) **Apply the following Constraints.** 1. Passenger Id must start with 'P'. 2. Flightfare cannot be NULL. **Implement the following SQL Queries.** 1. Display all the flight details which are flying from 12-Jun-2012 to 15-Jun-2012. 2. Display all Air India flights which flied carrying more than 30 passengers.

	3. Display total males and females travelling in flightid 101 on 12th June 2012. **Create following PL/SQL Blocks.** 1. Create a procedure to display list of passengers whose residence city is always the place from which he/she has boarded flight. For example, A person lives in Mumbai and till today he has travelled only on flights flying from Mumbai to other cities. 2. Write the trigger that checks that flight should not carry passengers more than its
Lab-3	Train(TrainId, Train_name, TrainFrom, TrainTo, departuretime, arrivaltime) Train_fare(Trainid, class, fare) Passenger(pId, Name,Address,City, BirthDate, ContactNo, email_id) Train_Passenger(TrainId, pId) **Apply the following Constraints.** 1. Passenger Id must start with 'P' and Train Fare should be Default 0. 2. Train Class can be either 1AC,2AC,3AC,Sleeper, General. **Implement the following SQL Queries.** 1. Display all the Train details which are travelling from 12-Jun-2012 to 15-Jun-2012. 2. Display all Train details which are not travelling currently. 3. Display all the passenger details which are travelling from Delhi to Mumbai. **Create following PL/SQL Blocks.** 1. Create a SQL/PLSQL Block that displays all the passenger details of a particular train. Display in proper format: PassengerName TrainName TrainFrom TrainTo TrainFare Naman RAJDHANI Delhi Mumbai 4000 TOTAL FARE: 4000 2. Write the trigger that keeps a track of birth date of every passenger. Whenever a passenger record is inserted and if the birth month is the current month then message should be displayed that 'Naman's birthday is in current Month' and if the birth date is current date than message should be displayed that 'Happy Birthday Naman . You are 22 years old'. Note: Also calculate the age of the passenger and then display it.
Lab-4	Vehicle(vId, Name, Type, Price, Description) Customer(cId, cName, Address, BirthDate, ContactNo) Vehicle_Customer(vId, cId, PurchaseDate, DeliveryDate) **Apply the following Constraints.** 1. Vehicle type must be '2w' for two wheeler, '3w' for three wheeler and '4w' for four wheeler. 2. ContactNo should be of 10 digits and Price should be default 0. **Implement the following SQL Queries.** 1. Display details of four wheelers purchased between 14-Jun-2012 to 16-Jun-2012. 2. Find those customers (customer id) who have purchased alteast 3 vehicles. 3. Display vehicles not purchased so far. **Create following PL/SQL Blocks.**

	1. Create a PL/SQL Block that displays all the customer details and Vehicle details. Display in proper format: CustomerName VehicleName VehicleType PurchaseDate Price KUSUM ACTIVA 2w 12-Jul-2012 60,000 TOTAL PRICE: 60,000 --- 2. Write the trigger that allows delivery of only five vehicles per day. For example, if delivery date of five vehicles in mentioned as '12-Jun-2012', sixth record cannot contain 12-Jun-2012.
Lab-5	Product(productId, productName, Quantity, ProductPrice) Salesman(sCode, sName, sAddress, BirthDate, ContactNo) SalesOrder(sCode, productId, qtySold) **Apply the following Constraints.** 1. Product price must be less than 500. 2. Salesman Name must be in lowercase and quantity sold must be default 0. **Implement the following SQL Queries.** 1. Display the product details whose price is greater than average price of all products. 2. Display the salesman details who have not received any order. 3. Display the salesman details that have got orders of more than 3 distinct products. **Create following PL/SQL Blocks.** 1. Create a SQL/PLSQL Block that displays all the Salesman details and Product details. Display in proper format: SalesmanName ProductName QuantitySold ProductPrice TotalPrice NAMAN PEN 20 4 80 2. Write the trigger that keeps a track of birth date of every Salesman. Whenever a Salesman record is inserted and if the birth month is the current month then message should be displayed that 'Naman's birthday is in current Month' and if the birth date is current date than message should be displayed that 'Happy Birthday Naman . You are 22 years old'. Note: Also calculate the age of the passenger and then display it.
Lab-6	**EMP(**EMPNO, ENAME, MANAGER_ID, SALARY, DEPTNO,JOB) **DEPT(**DEPTNO, DNAME, BUDGET) **SALARY_RANGE(**JOB, LOWEST_SAL HIGHEST_SAL**)** **Apply the following Constraint** 1. Create the above given tables with all necessary constraints wherever applicable. (Primary key, foreign key, unique key,. not null and check constraints) and insert minimum 5 appropriate records in each of the tables. Note that manager_id is from one of the employees only. 2. After creation of above tables, modify EMP table by adding a column 'commision' and update its corresponding values. **Implement the following SQL Queries.** 1. Display department names having highest budget

	2. Display total employees whose salary same as that of manager. 3. List names of employees whose salary lies between 20,000 and 50,000 and job is of 'senior executive'. **Create following PL/SQL Blocks.** 1. a) Create a function which inserts new record into emp table. The new empno is created by sequence. b) Write a procedure which which deletes employee records if salary and commission is less than lowest salary range. (pass parameter as deptno and job) c) Write a function to display employee name in proper case and also display its 4th character. **2.** Write a trigger not allowing to delete, update or insert emp records on Sunday
Lab-7	Employee (fname, lname, ssn, bdate, address, salary, super_ssn, dno) Department (dname, dnumber, mgr_ssn) Project (pname, pnumber, plocation, dnum) **Apply the following Constraint** 1. Add foreign key constraint on the column dno belonging to the table employee, which references the table department. 2. Add check constraint that pnumber must be in(p1, p2, p3, p4, p5) **Implement the following SQL Queries.** 1. Retrieve the name and address of all employees who works for the 'research' department. 2. For every project located in 'stafford' list the project number, the controlling department, and the department manager's last name, address and birth date. 3. For each department that has more than three employees, retrieve the department number and the number of its employees who are making more than 40000 salary. **Create following PL/SQL Blocks.** 1. a) Create a view with columns(fname,lname,dname,pname,salary). b) Create PL/SQL Block report displaying Project wise employee details. (Design your own format) 2. Write a database trigger before insert for each row on the table route_detail not allowing transaction on saturday and sunday.
Lab-8	**SERIAL(**Serial_No, Title_serial, Day, time, frequency, duration**)** **ACTOR(**Name, Address, Gender, Birthdate, Serial_No) **Apply the following Constraint** 1. Create the above given tables with all necessary constraints wherever applicable. (Primary key, foreign key, unique key,. not null and check constraints). 2. After creation of above tables, modify table by adding a column 'experience' **Implement the following SQL Queries.** 1. List total number of serials done by Ms. Krutika actor] 2. Display total number of serials that occurs two times in a day . 3. List details of serial with its actor **Create following PL/SQL Blocks.** 1. Write a PL/SQL block/ procedure to print the following report

	Date : dd-mm-yyyy --- Time 9:30 to 12:30 12:30 to 3:30 3:30 to 6:30 6:30 to 9:30 Am pm pm pm --- Serial No. --- 1 Serial Total Name Serial daily A 99 -- 99 99 99 B -- 99 99 -- 99 --- 999 2. Write a trigger to maintain actor count, if any actor is added, deleted or changed in the serial.
Lab-9	**BOOK(**Book_id, Book_title, Publisher, Book_price, edition) **AUTHOR(**Book_id, Author_name, city, gender) **Apply the following Constraint** 1. Create the above given tables with all necessary constraints wherever applicable. (Primary key, foreign key, unique key,. not null and check constraints). 2. After creation of above tables, modify marks table by adding a constraint that gender can be only 'F' and 'M'. **Implement the following SQL Queries.** 1. Display list of books which has more than one edition. 2. Display total number of books published by publisher. 3. List details of book with low price. **Create following PL/SQL Blocks.** 1. A. Write a procedure which finds the details of books whose price is more than average price. B. Write a procedure which gives names of authors who have written for more than 3 publisher. C. Write a function which counts total number of books written by a author for 'Nirav' publisher.(pass author name as parameter) **2.** Write a trigger which restrict the record for book price < 50
Lab-10	Student (studid, studnm, gender, city, branch) Subject (subid, subname, credits) Marks (exam_id, studid, subid, marks, semester) **Apply the following Constraint** 1. Create the above given tables with all necessary constraints wherever applicable. (Primary key, foreign key, unique key,. not null and check constraints). . 2. After creation of above tables, modify marks table by adding a constraint that semester can be from one to six only. **Implement the following SQL Queries.** 1. Display list of subjects with its credits in each semester 2. Display total number of students branchwise

	3. List gender wise list of students who are absent.. **Create following PL/SQL Blocks.** 1. Write a program to print the marks statement (student number wise list) for given exam name, semester no, month and year in the following format. **Marksheet D**ate: Report date MCA Semester examid: xxxx Student Student <----------Marks obtained in subjects -- Total No. Name DS DBMS OOCP CONM Marks --- 999 xxxxxxxxxx 99 99 99 99 999 (i) Print A00 for absent in marks column. (ii) Print Z00 for zero marks. 2. Exam_id is a serial number(which can be generated by creating a sequence). Format for exam id is YYMMnnnnn.
Lab-11	Product(productId, productName, Quantity,ProductPrice) Customer(cId, cName, Address, City, BirthDate,ContactNo) Order(orderId, custId, productId, qtyOrdered) **Apply the following Constraint** 1. Product price must be less than 5000 and greater than 0. 2. Customer Name must be in lowercase and quantity ordered must be default 1. **Implement the following SQL Queries.** 1. Display the product Details whose price is greater than average price of all products. 2. Find those customers(customer id) who have ordered atleast 3 products. 3. Display the Customer details that have received orders from all customers of Ahmedabad. **Create following PL/SQL Blocks.** 1. Create a SQL/PLSQL Block that displays all the Customer details and Product details. Display in proper format: CustomerName ProductName QuantityOrdered ProductPrice TotalPrice AMIT PEN 20 4 80 2. Write the trigger that keeps track of all updation, insertion or deletion in customer table. A new table customer_log(cid, changed_field, date, old_value, new_value) shall be created.
Lab-12	Student (Stud_Id,Stud_name,Address,City, Date_of_Birth) Stud_Edu (Stud_id, DegreeName, Year of passing, Percentage) Hobby(Hid, Hdetails) Stu_Hobby (Stud_id, Hid) **Apply the following Constraints.** 1. Identify Primary keys and foreign keys and reference them properly. 2. Raise exception wherever needed. **Implement the following SQL Queries.**

	1. Display the Student Educational details whose year of passing is the current year. 2. List students of Surendranagar holding more than two degrees. 3. List students with no hobbies. **Create following PL/SQL Blocks.** 1. A function that returns total number of students enrolled in courses(degree name). Write a procedure that displays list of students with atleast three hobbies, out of which one should be 'Playing Cricket'. 2. Write a trigger that maintains a log of students in table Student_Log(studId,degree_name,percentage,Grade,status) after an insertion is done on stu_det table. If the student percentage is below 35 then status should be marked as fail otherwise pass.
Lab-13	Person(pId, pName, pAddress) Hobbies(hId, hName) Trans(pId, hId, pointsAchieved) **Apply the following Constraints.** 1. Person Name should not be Null. 2. hName (Hobby names) should be in upper case letters. **Implement the following SQL Queries.** 1. Make pairs of persons with same hobbies. Pairing with self should not be displayed. 2. List the person who is having more than one hobby. 3. List the all the details of persons securing highest points for each hobby. **Create following PL/SQL Blocks.** 1. Write a procedure that accepts the person code and displays details as shown below. <name of person> DATE: <current date> Total hobbies: <number of hobbies> Hobby Name Points gained ---------- ---------- 2. Write a trigger to ensure that if points achieved is changed, prompt the user with its old and new values. If the change causes the decrement in points achieved the transaction should be disallowed.
Lab-14	custDetail(custId, custName, custAddress, MembershipType) foodDetail(foodId, foodName,Price) bill(billId, foodId, custId, qty, billDate) **Apply the following Constraints.** 1. foodName should not be left blank. 2. billDate should by defaults contain system date **Implement the following SQL Queries.** 1. List all the customers who visited the restaurant today. 2. List the details of food that is being ordered by maximum number of times.

	3. Update price of each food by 10%. **Create following PL/SQL Blocks.** 1. Write a PL block to generate the bill for each Customer. Each customer gets discount on bill depending on membership type. If membership type is 'Platinum', 25% discount is to be give, If membership is 'Gold', 15% discount is to be given and If membership is of type Silver, 10% discount is to be given. However, irrespective of membership type, discounted amount cannot exceed 1000 Rs. BillID should act as parameter to generate bill. 2. Write a trigger that ensures that only increment in price is allowed for each field. If decrement operation is performed in price, transaction should be disallowed.
Lab-15	customerMaster(custId, custName, custAddress, custBranch) fdDetail(fdId, fdPeriod, fdInt) accFdCustDetail(custId, fdId, fdAmount,fdDate) **Apply the following Constraints.** 1. custStartDate should be by default a current date. 2. FdAmout should be greater than 5000. **Implement the following SQL Queries.** 1. List the customers with highest FD amount. 2. List the maximum FD amount of each branch. 3. List the name of customers who have never done Fixed deposits of more than 5 years. **Create following PL/SQL Blocks.** 1. Write a PL block that shows FD details for the given customer. Use procedure to display. Use function to calculate interest on FD which will return amount after calculating interest. Report for the <customer name> DATE: <current date> Branch :< name of branch> FD Start Date: <start date> FD End Date:<end date of FD> FD Maturity value : <Amount calculate as per Rate of Interest > 2. Write a trigger to ensure that no deletion is allowed on accFdCustDetail, and if any updation is performed, an entry should be added in log table, Translog(sysdate, custId, fidid, oldbalance, newbalance)

Subject: **Advanced Networking**								
Program: **Master of Computer Application**			Subject Code:**MCA-304**				Semester: **III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	0	20/40	0	100

Unit 1: Internet Addressing, Mapping Internet Addresses to Physical Addresses (ARP), Internet Protocol: [12]

Connectionless DatagramDelivery (IPv4, IPv6) Introduction, Universal Host identifiers, IP4: classful addressing scheme, dotted decimal, Subnet Addressing, Fixed Length, Variable Length, IPv4address block and CIDR notations, IPv6: addressing scheme, colon, hexadecimal, address space assignment, transition, unicast address, interface identifier and MAC address, Special address, Weakness inInternet Addressing. Introduction to Address resolution problem, Resolution Through Direct Mapping, Resolution In A Direct-Mapped Network, ARP Cache, Timeout, ARP refinements, Relationship with other protocols, ARP implementation, ARP Encapsulation andidentification, ARP protocol format, RARP, Proxy ARP and IPv6 Neighbor Discovery, Introduction, Internet Architecture and Philosophy, Purpose and Importance of IP, IPv4 Datagram, Datagram TOS and Diff.Serv., Time To Live (IPv4) And Hop Limit (IPv6), Optional IP Items, Options Processing During Fragmentation and Network Byte Order.

Unit 2 Internet Protocol: Forwarding IP Datagrams, IP: Error and Control Messages (ICMP), User Datagram Protocol (UDP) [12]

Introduction, Forwarding in the Internet, Indirect and Direct delivery, Table driven IP forwarding, Next hop forwarding, Default routes and a Host specific routes, IP forwarding algorithm, handling incoming datagrams, establishing forwarding tables. Introduction of ICMP, Error Reporting versus Error Correction, ICMP message delivery, ICMP message format, Echo Request And Reply Message Format, Checksum Computation And The IPv6 Pseudo-Header, ICMP Error Reports Regarding Fragmentation and Older ICMP Messages Used At Startup. Introduction of UDP, UDP message format, IPv4 UDP Pseudo header format, IPv6 UDP Pseudo header format, Layering and

UDP Checksum computation, UDP multiplexing, DE multiplexing, and protocol ports & Reserved and Available UDP Port Numbers.

Unit 3 Reliable Stream Transport Service (TCP), Network Virtualization (VPNs, NATs and Overlays), Bootstrap and Autoconfiguration (DHCP, NDP, IPv6-ND) [12]

Introduction, Need for reliable service, Properties of reliable delivery service, Sliding Windows Paradigm, Ports, connections and endpoints,Passive and Active opens, Segments, Streams and sequence numbers,Variable window size and flow control, TCP segment format, Out of banddata, TCP options, TCP Checksum Computation, Acknowledgements,Retransmission, And Timeouts, Responding To High Variance In Delay,Response To Congestion, Explicit Feedback Mechanisms (SACK andECN), Congestion, Tail Drop, And TCP, Initial Sequence Numbers,Closing a TCP Connection, Silly Window Syndrome And Small Packets,Avoiding Silly Window Syndrome, Buffer Bloat And Its Effect OnLatency. Introduction to VPN, Network Address Translation (NAT),NAT translation table creation, An Example Of NAT Translation,Interaction between NAT and ICMP, Interaction between NAT andApplications, NAT in presence of fragmentation, Conceptual addressdomains, Overlay Networks. Introduction to DHCP, History of IPv4bootstrapping, Using IP to determine an IP Add nsmission And Randomization, DHCP Message format, Need for dynamic configuration, DHCP Leases And Dynamic AddressAssignment, Multiple addresses and Relays, Lease renewal States, DHCPoptions and message type, Options overload, DHCP and DNS, IPv6Configuration Options And Potential Conflicts, IPv6 Neighbor DiscoveryProtocol (NDP) and ICMPv6 Redirect Message.

Unit 4 Electronic Mail (SMTP, POP, IMAP, MIME), Voice And Video Over IP (RTP, RSVP, QoS), Network Management (SNMP),Internet SecurityAnd Firewall Design[12]

Introduction to E-mail, Mailbox Names and Aliases, Alias expansion and mail forwarding, SMTP, POP, IMAP, MIME Extensions for non ASCIIdata, MIME Multipart messages. Introduction, Digitizing And Encoding, Audio And Video Transmission And Reproduction, RTP, RTCP, IPTelephony And Signaling, IntServ And Resource Reservation, TrafficScheduling and Policing, Introduction, The Level Of Management Protocols, Protocol Framework, Examples of MIB Variables, The Structure Of Management Information, Structure And Representation OfMIB

Object Names, MIB Changes And Additions For IPv6, Simple Network Management Protocol, SNMP Message Format and Security In SNMPv3, Internet Security, IPsec Authentication Header, IPsec Encapsulating Security Payload, IPsec Tunneling, Required security algorithms, SSL and TLS, Firewalls And Internet Access, Firewall Implementation And Packet Filters, Firewall Rules And The 5-Tuple, Security And Packet Filter Specification, Stateful Firewalls

Text Books:

1. Douglas E. Comer, "*Internetworking with TCP/IP - (Vol. 1) Principles, Protocols, and Architecture*", 6th Edition, Prentice Hall of India (PHI) Publishers.

Chapter & Topics:-

Book 1:-

Unit 1: 5.1 to 5.24, 6.1 to 6.18 and 7.1 to 7.16

Unit 2: 8.1 to 8.16, 9.1 to 9.16, 10.1 to 10.12

Unit 3: 11.1 to 11.33, 19.1 to 19.18 and 22.1 to 22.23

Unit 4: 24.1 to 24.9, 26.1 to 26.17 and 27.1 to 27.13 28.1 to 28.18, 29.1 to 29.21

Reference Book:

1. Behrouz A. Forouzan, "*TCP/IP Protocol Suite*", 4th Edition, McGraw-Hill
2. W. Richard Stevens, G. Gabrani, "*TCP/IP- Illustrated, Vol. 1 (The Protocols)*", Pearson Publishers.

Subject: **Software Engineering and Quality Assurance**								
Program: **Master of Computer Application**			Subject Code:**MCA-305**			Semester:**III**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	00	20/40	00	100

UNIT I: **[12]**

Introduction to Software Engineering and Processes: What is software? – Evolving role of software – Types of software –Various Process Models

Software Engineering Practice and System Engineering: SE practice – Core Principles, Introduction to Agile methodologies for software development, Various Agile Process Models

Unit II: **[12]**

Requirements Engineering, Analysis and Design Modeling,: Requirements Engineering Tasks Inception, Elicitation, Elaboration, Negotiation, Specification , Validation , Management - Design Process and Design Quality – Design Concepts–Software Architecture – Taxonomy of Architectural Styles – Architectural Design

–Conventional view of component – Designing Conventional Components – Golden Rules for User Interface Design – User Interface Analysis and Design – User Interface Design Issues – UI Design Evaluation

Unit III: **[12]**

Software Quality Assurance Fundamentals: Definition of Quality, QA, QC, SQA Planning & Standards, SQA Activities, Software Quality Metrics, Process Improvement- Process and Product Quality - CMM, Six Sigma, Software Reliability, Reliability Measures

Software Verification & Validation Activities: Verification & Validation Concepts, Verification & Validation Planning, Software inspections,

Unit IV: **[12]**

Software Testing Fundamentals: Definition & Objectives, Types of software bugs, Bug life cycle, Testing lifecycle, Test Plan, Test Cases

Types and Levels of Testing: Functional Testing (Black Box) Equivalence partitioning, BVA, Cause-Effect graphing, Structural Testing (White Box) Coverage testing, Statement coverage, Branch & decision coverage, Path coverage Black box vs. White Box, Unit Testing, Integration Testing, Validation Testing, System Testing – Performance, Load, Stress, Security, Recoverability, compatibility testing, Regression Testing, Installation Testing, Usability Testing, Acceptance Testing- Alpha testing & Beta testing, Static vs. Dynamic testing, Manual vs. Automatic testing

Text Book(s):

1. Roger Pressman, "*Software Engineering – A Practitioner's Approach*" , 7th Edition, TMH

Reference Books:

1. Sommerville, "*Software Engineering, Pearson Education*", 8th Edition
2. Louise Tamres, William Perry, "*Introducing Software Testing Effective Methods for software Testing*", 3rd Ed., Wiley Pub.
3. Edward Kit, "*Software Testing in Real World* ", Pearson Pub.
4. Boris Beizer,"*Software Testing Techniques*",2nd Ed., DreamTech Pub.
5. Ron Patton, "*Software Testing*", TechMedia Pub

Digital Learning Resources:

1. http://softwaretestingfundamentals.com
2. http://www.softwaretestinghelp.com
3. http://www.softwaretestingtimes.com
4. http://www.tutorialspoint.com/software_testing/

Subject: **Mini Project-I**								
Program: **Master of Computer Application**			Subject Code:**MCA-306**				Semester:**III**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
1*	0	2	02	00	30/60	00	20/40	100

Course Content

- **Why We Model?:**The importance of modelling, principles of modelling, Introduction of UML: Overview, Conceptual Model of UML , Classes, Relationships, Common Mechanisms of UML.
- **Class Diagrams:**Terms and Concepts, Common Modeling Techniques, Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages Instances, Object Diagrams, Basic Behavioral Modeling: Interactions, Use cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams
- **Advanced Behavioral Modelling:** Events and Signals, State Machines, State Diagrams, Architectural Modelling: Components, Deployment, Collaborations, Component Diagrams, Deployment Diagrams,
- **Case Study** Generate Use-case Diagram, Class Diagram, Sequence Diagram, Collaboration Diagram, Activity Diagram, State Chart Diagram, Component Diagram, Deployment Diagram for the following systems.
  - Student Registration System
  - Online Pizza ordering System
  - Courier Tracking System
  - Online Job Portal System
  - Online Shopping System

Total Sessions: 12

Criteria for Evaluation of Software Projects

Project Definition:	10%
Related project Study Analysis:	20 %
Design& Development:	40%
Implementation & Testing:	20%
Creation of User Manual	10%

Notes:

1. **Reference Book(s):**

   Grady Booch, James Rumbaugh, Ivar Jacobson, "*The Unified Modeling Language User Guide",* Publisher Pearson Education

2. **Suggested Additional Reading:**
   a. Tom Pender, *"UML 2 Bible"*, Publisher Wiley-dreamtech
   b. Jim Arlow, LLaNeustadt, "*UML 2 and the Unified Process Practical Object-Oriented Analysis and Design",* 2nd Edition, Publisher Pearson Education
   c. Web reference: By Object Management Group (OMG) http://www.uml.org/

UML Diagram Tool:

Dia (diagramming software):

Dia is free and open source general-purpose diagramming software, developed originally by Alexander Larsson. Dia uses a controlled single document interface (SDI) similar to GIMP and Inkscape. It can be downloaded from

http://sourceforge.net/projects/dia-installer/?source=typ_redirect

Accomplishment of the student after completing the course:

After successful completion of this course the students will be able to discriminate what the UML is, what it is not, and why the UML is relevant to the process of developing software-intensive systems. They will be master the vocabulary, rules and idioms of the UML and, in general will be able to use the language effectively in System Development process. They will be able to understand how to apply the UML to solve a number of common modeling problems.

SEMESTER-IV

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Indus University
Institute of Information andCommunication Technology

Master of Computer Applications

Teaching Scheme

Subject Code	Subject Name		Teaching Learning			
		Theory Session (Hours)	Tutorial Session (Hours)	Laboratory Session (Hours)	Total (Hours)	Credit
MCA-401	Object Oriented Technology-II	04	00	02	06	05
MCA-402	Big Data & Data Analytics	04	00	02	06	05
MCA-403	Software Project Management	04	00	00	04	04
MCA-404(A)	Mobile Application Development with Android	04	00	02	06	05
MCA-405(A)	Open Source Technology in Web Development (LAMP)	04	00	02	06	05
MCA-406(A)	Mobile Cross Platform Development	04	00	00	04	04
MCA-404(B)	Database Administration	04	00	02	06	05
MCA-405(B)	Performance Tuning and Query Optimization	04	00	02	06	05
MCA-406(B)	Distributed Database	04	00	00	04	04
MCA-404(C)	Wireless Sensor's Networks	04	00	02	06	05

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

MCA-405(C)	Network Security	04	00	02	06	05
MCA-406(C)	Heterogeneous Network	04	00	00	04	04
MCA-407	Mini Project-II	00	00	02	02	01
Total		**24**	**00**	**10**	**34**	29

Subject: **Object Oriented Technology-II**								
Program: **Master of Computer Application**				Subject Code:**MCA-401**			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I: **[10]**

SERVLETS

Building basic servlets, Understanding the Servlet life cycle, Reading form parameters, Using HTTP request headers, Manipulating HTTP status codes and response headers, Redirecting requests, Generating custom JPEG images from servlets, Handling Cookies, Tracking sessions, Difference between browser and server sessions

JSTL:

The Application Events Framework, Tag Library – Basics; Using JSTL – c:out, c:forEach, c:forTokens, c:if, c:choose, c:set, c:remove, c:import, c:url, c:param, c:redirect and c:catch Tags

Unit II: **[14]**

JSP Fundaments:

Overview of JSP, Invoking Java code from JSP pages, Classic JSP scripting elements, Predefined JSP variables, Code structure with the page directive, Controlling multithreading behavior, Pages at request time and compile time , Including Files and Applets in JSP pages

JAVA BEANS:

Understanding the benefits of beans, creating beans, installing bean classes on server, Accessing bean properties, Setting implicit and explicit bean properties, Sharing beans among multiple servlets and JSP pages

Unit III: **[14]**

JDBC

Overview of JDBC , Understanding of ODBC , JDBC driver types, JDBC-ODBC bridge , Driver Manager , Driver , Connection , Statement , ResultSet, Accessing databases with JDBC, Configuring MS Access, MYSQL and Oracle9i , Creating and Processing HTML Forms, Introduction of web-service JSON/REST

Unit IV: **[10]**

MVC Architecture:

Understanding the benefits of MVC, Request Dispatcher to implement MVC, Handling relative URLs, Different display options, Comparing Data Sharing strategies, Collections and Implicit Objects Using EL, Using EL Operators

Text Book for the Subject:

2. Marty Hall, Larry Brown, "*Core Servlets and JavaServer Pages Volume – 1 & 2*", Pearson

Reference Books:

1. Bruce W. Perry, *"Java Servlet & JSP CookBook"* , O'Reilly.
2. James Edward Keogh , "*J2EE: the complete reference*" , McGraw-Hill
3. John O'Donahue, "*Java database programming bible*", Wiley
4. Eric Pugh, Joseph D. Gradecki, "*Professional Hibernate*", Wrox Publication (ISBN 13 :9788126505579, ISBN 10:8126505575, Type: Paperbound)
5. Paul Deitel& Harvey Deitel, "*Java How To Program- Eighth Edition "*, PHI Publication

Digital Learning Resources:

1. www.youtube.com
2. www.tutorialspoint.com
3. www.javatpoint.com
4. www.roseindia.com

Practical: JDK and Netbeans with oracle 10g will be used for practical programs Practical List:

1. Design a text editor similar to notepad using swing
2. Write java applcaiton using slider control to change the current Fahrenheit to centigrade and display the result in Jlabel
3. Write a simple JSP page to display a simple message (It may be a simple html page).
4. Write a JSP page, which uses the include directive to show its header and footer.
5. Create a Java class called Product with the following properties: name, description, price. Create a listener that notifies (through System.out) whenever a user adds a product to a shopping cart (i.e. adds an object to the session object) or removes it again. Hint: check out the class

   HttpSessionAttributeListener. Make it print the name and price of the object (hint: access the session through the HttpBindingEvent object). Also, let the listener print the total price of all objects saved in the session so far (one way to accomplish this could be to keep a collection of all objects saved to the session – or just their keys – in the listener or an associated class).
6. Create a servlet filter that logs all access to and from servlets in an application and prints the following to System.out:
   a. the time the request was received
   b. the time the response was sent
   c. how much time it took to process the request
   d. the URL of the resource requested
   e. the IP address of the visitor
7. Develop a interest calculation application in which user will provide all information in HTML form and that will be processed by servlet and response will be generated back to the user.
8. Develop an application to demonstrate how the client (browser) can remember the last time it visited a page and displays the duration of time since its last visit. (Hint: use Cookie).
9. Develop an application to keep track of one user across several servlet invocations within the same browser session.
10. Develop an application to write a "page-composite" JSP that includes other pages or passes control to another page. (Hint: Use <jsp:include> or <jsp:forward>).

11. You want to reduce the amount of Java coding in your JSP using a JavaBean component. (Hint: Use <jsp:useBean> with the name of your bean).
12. Develop a program to perform the database driven operation like insert, Delete, Update and select. To perform the above operations create one table named Employee.

    Field Name Field Type

    EmpId Integer

    EmpnameVarchar

    Emp_desigVarchar

    Emp_J_DateVarchar

    Emp_Salary Numeric
13. Develop a Java application to perform the database driven operation like insert, Delete, Update and selection using PreparedStatement. To perform the above operations use the table from above exercise.
14. Write a Java application to invoke a stored procedure using a CallableStatement. For this a stored procedure called incrementSalary may be developed to increase all the employees salary by a percentage specified in the parameter.
15. Write a JSP page which uses tags availabe from the standard tag library JSTL. Write a Servlet which uses the concept of Request forwarding & including external source in the current servlet context.
16. Develop a JSP Page to display the personal information and result information of the student in two different tabular formats.
17. Develop a JSP Page to perform database driven operations like insert, Delete, Update and selection with table named Student having fields like StudId, Name, Address, result.
18. Write a JSP Page to use JSP's Page directives.
19. Write a JSP Page to use JSP scripting.
20. Write a JSP Page to which uses Session Tracking for online shopping.

Subject: **Big Data & Data Analytics**								
Program: **Master of Computer Application**			Subject Code:**MCA-402**			Semester: **IV**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit – I **[12]**

What Is Big Data and Why Does It Matter?

Getting an Overview of Big Data : What is Big Data?, History of Data Management – Evolution of Big Data , Structuring Big Data, Elements of Big Data, Big Data Analytics, Advantages of Big Data Analytics

Exploring the Use of Big Data in Business Context : Use of Big Data in Social Networking, Use of Big Data in Preventing Fraudulent Activities, Use of Big Data in Detecting Fraudulent Activities in Insurance Sector, Use of Big Data in Retail Industry

Introducing Technologies for Handling Big Data : Distributed and Parallel Computing for Big Data, Introducing Hadoop, Cloud Computing and Big Data, In-Memory Computing Technology for Big Data

Unit – II **[12]**

Big Data - Hadoop

Understanding Hadoop Ecosystem : Hadoop Ecosystem, Hadoop Distributed File System, HDFS Architecture, Features of HDFS, MapReduce, Features of MapReduce, Hadoop YARN, HBase, Hive

Understanding MapReduce Fundamentals and HBase: The MapReduce Framework, Techniques to Optimize MapReduce Jobs, Uses of MapReduce, Role of HBase in Big Data Processing

Understanding Big Data Technology Foundations : Exploring the Big Data Stack, Data Sources Layer, Ingestion Layer, Storage Layer, Physical Infrastructure Layer, Platform Management Layer, Security Layer, Monitoring Layer, Analytics Engine, Visualization Layer, Big Data Applications, Virtualization and Big Data, Virtualization Approaches, Server Virtualization, Application Virtualization, Network Virtualization, Processor and Memory Virtualization, Data and Storage Virtualization, Managing Virtualization with Hypervisor, Implementing Virtualization to Work with Big Data

Unit – III **[12]**

Business Analytics -Hadoop

Storing Data in Databases and Data Warehouses : RDBMS and Big Data, Non-Relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouses, Big Data Analysis and Data Warehouse, Changing Deployment Models in Big Data Era

Storing Data in Hadoop : Introducing HDFS, HDFS Architecture, Using HDFS Files, Hadoop-Specific File System Types, HDFS Commands,The org.apache.hadoop.io package, HDFS High Availability, Introducing HBase, HBase Architecture, Storing Big Data with HBase, Interacting with the Hadoop Ecosystem, HBase in Operation – Programming with HBase, Installation, Combining HBase and HDFS, Selecting the Suitable Hadoop Data Organization for Applications

Processing Your Data with MapReduce : Recollecting the Concept of MapReduce Framework, Developing Simple MapReduce Application, Building the Application, Executing the Application, Points to Consider while Designing MapReduce

UNIT – IV **[12]**

Industries Example & Social Media data Analytics

Customizing MapReduce Execution : Controlling MapReduce Execution with InputFormat, InputSplit, RecordReader, FileInputFormat, Implementing InputFormat for Compute-Intensive Applications, Implementing InputFormat to control the Number of Maps, Implementing InputFormat for Multiple HBase Tables, Reading Data with Custom RecordReader, Organizing

Output Data with OutputFormats,Customizing Data with RecordWriter, Optimizing MapReduce Execution with Combiner, Controlling Reducer Execution with Partitioners, Implementing a MapReduce Program for Sorting Text Data

Exploring Hive : Introducing Hive, Getting Started with Hive, Data Types in Hive, Built-In Functions in Hive, Hive DDL, Data Manipulation in Hive, Data Retrieval Queries, Using JOINS in Hive,

Social Media Analytics and Text Mining : Introducing Social Media, Introducing Key Elements of Social Media, Introducing Text Mining, Understanding Text Mining Process, Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets, Online Social Media Analysis,

Analyzing Data with Pig : Introducing Pig, The Pig Architecture, Benefits of Pig

Text Book for the Subject:

1. DT Editorial Services, "*Big Data Black Book*", Dreamtech Press Publisher, ISBN 13 : 9789351197577, May, 2015

Reference Books:

1. Bill Franks, "*Taming The Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics*", ISBN: 978-1-118-20878-6, March 2012
2. Michael Minelli, Michele Chambers, AmbigaDhiraj, "*Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses",* ISBN: 978-1-118-14760-3, January 2013
3. Emmanuel Paradis, "*R for Beginners*"

Chapter wise Book coverage:

Chapter 1, Chapter 2, Chapter 3, Chapter 4, Chapter 5, Chapter 6, Chapter 7, Chapter 8, Chapter 9, Chapter 10, Chapter 13, Chapter 14, Chapter 27

Subject: **Software Project Management**								
Program: **Master of Computer Application**				Subject Code:**MCA-403**			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	00	20/40	00	100

UNIT – I **[12]**

Introduction to Software Project Management:

Introduction, Why is Software Project Management Important?, What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Stakeholders, Setting Objectives, Project Success and Failure, What is Management?, Management Control, Traditional versus Modern Project Management Practices

Project Evaluation and Programme Management:

Introduction, Project Portfolio Management, Evaluation of Individual Projects, Cost– benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing the Allocation of Resources within Programmes, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Some Reservations about Programme Management, Benefits Management

An Overview of Project Planning

Introduction to Step Wise Project Planning

UNIT – II **[12]**

Selection of an Appropriate Project Approach

Introduction, Build or Buy?, Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, Managing Iterative Processes, Selecting the Most Appropriate Process Model

Software Effort Estimation

Introduction, Where are Estimates Done? Problems with Over- and Under-Estimates, The Basis for Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Expert Judgement, Estimating by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb

UNIT – III **[12]**

Activity Planning

Introduction, The Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model

Risk Management

Introduction, Risk, Categories of Risk, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts

Resource Allocation

Introduction, The Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, The Scheduling Sequence

Monitoring and Control

Introduction, Creating the Framework, Collecting the Data, Review, Project Termination Review, Visualizing, Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM)

UNIT – IV **[12]**

Managing Contracts

Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance

Managing People in Software Environments

Introduction, Understanding Behavior, Organizational Behavior: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham–Hackman Job Characteristics Model, Stress, Health and Safety, Some Ethical and Professional Concerns

Working in Teams

Introduction, Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership

Software Quality

Introduction, The Place of Software Quality in Project Planning, The Importance of Software Quality, Defining Software Quality, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans

Study References:

Appendix A Prince2—An Overview

Appendix B Project Management Tools

Appendix C Answer Pointers

Text Book for the Subject:

1.Bob Hughes, Mike Cotterell, Rajib Mall, "*Software Project Management*", Fifth Edition, Special Indian Edition (SIE), Tata McGraw Hill, 2012.

Reference Books:

1. S A Kelkar "*Software Project Management A Concise Study*", Third Edition, PHI Learning, 2013.
2. Kathy Schwalbe "*Project Management in IT*", Indian Edition, Cengage Learning, 2009.

3. Teresa Luckey, Joseph Phillips "*Software Project Management for DUMMIES*", Wiley Publishing, Inc., 2006

Subject: **Mobile Application Development with Android**								
Program: **Master of Computer Application**				Subject Code:**MCA-404(A)**			Semester: **IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

UNIT – I **[12]**

Introduction to Android

- History of Mobile Software Development
- The Open Handset Alliance
- The Android Platform Android SDK
- Building a sample Android application
- Anatomy of Android applications
- Android terminologies

UNIT – II [12]

Android Application Design Essentials

- Application Context, Activities, Services, Intents
- Receiving and Broadcasting Intents

- Android Manifest File and its common settings
- Using Intent Filter, Permissions
- Managing Application resources in a hierarchy
- Working with different types of resources

UNIT – III **[12]**

Android User Interface Design Essentials

- User Interface Screen elements
- Designing User Interfaces with Layouts
- Drawing and Working with Animation

UNIT – IV **[12]**

Using Android APIs - 1

- Using Android Data and Storage APIs, Managing data using SQLite, Sharing Data between Applications with Content Providers

Using Android APIs – 2

- Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying (selling)your Android application

Text Book for Subject:

1. Lauren Darcey and Shane Conder, "*Android Wireless Application Development*", 4th edition, PearsonEducation

Reference Books:

1. Reto Meier, "*Professional Android 2 Application Development*", Wiley India Pvt Ltd
2. Mark L Murphy, "*Beginning Android*", Wiley India Pvt Ltd
3. Sayed Y Hashimi and SatyaKomatineni, "*Pro Android*", Wiley India Pvt Ltd

Digital Learning Resources:

4. www.youtube.com
5. www.developer.android.com

Practical List

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the red color with white background.
2. To understand Activity, Intent
    a. Create sample application with login module.(Check username and password)
    b. On successful login, go to next screen. And on failing login, alert user using Toast.
    c. Also pass username to next screen.
3. Create login application where you will have to validate EmailID (UserName). Till the username and password is not validated, login button should remain disabled.
4. Create and Login application as above. On successful login , open browser with any URL.
5. Create an application that will pass some number to the next screen , and on the next screen that number of items should be display in the list.
6. Understand resource folders :
    a. Create spinner with strings taken from resource folder(res >> value folder).
    b. On changing spinner value, change image.
7. Understand Menu option.
    a. Create an application that will change color of the screen, based on selected options from the menu.
8. Create an application that will display toast(Message) on specific interval of time.
9. Create an background application that will open activity on specific time.
10. Create an application that will have spinner with list of animation names. On selecting animation name, that animation should affect on the images displayed below.
11. Understanding of UI :
    a. Create an UI such that, one screen have list of all the types of cars.
    b. On selecting of any car name, next screen should show Car details like : name , launched date, company name, images(using gallery) if available, show different colors in which it is available.
12. Understanding content providers and permissions:
    a. Read phonebook contacts using content providers and display in list.
13. Read messages from the mobile and display it on the screen.
14. Create an application to call specific entered number by user in the EditText 15. Create an application that will create database with table of User credential.

16. Create an application that will play a media file from the memory card.
17. Create an application to make Insert, update, Delete and retrieve operation on the database.
18. Create an application to read file from the sdcard and display that file content to the screen.
19. Create an application to draw line on the screen as user drag his finger.
20. Create an application to send message between two emulators.
21. Create an application to take picture using native application.
22. Create an application to pick up any image from the native application gallery and display it on the screen.
23. Create an application to open any URL inside the application and clicking on any link from that URl should not open Native browser but that URL should open the same screen.

Subject: **Open Source Technology in Web Development**								
Program: **Master of Computer Application**				Subject Code:**MCA-405(A)**			Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I: **[12]**

Introduction to PHP:

Why PHP and MySQL: What is PHP? What is MySQL? Deciding on a Web Application Platform

Server- Side Scripting Overview: Static HTML, Client-Side Technology, Server-Side Scripting.

Getting started with PHP: Installing PHP, Escaping from HTML

Learning PHP Syntax and Variables: PHP's Syntax, Comments, Variables, Types in PHP, Output

Unit II: **[12]**

Control Structures, Arrays and Functions:

Boolean Expression, Branching, Looping, Using functions Passing Information with PHP: HTTP is Stateless; GET and POST Arguments, Formatting Form Variables.

String Handling: Strings in PHP, String Functions

Arrays: Creating, Retrieving and deleting value from array, Multi-dimensional Array, Iteration Number Handing: Numerical Types, Mathematical Operators, and Mathematical Functions

Unit III: **[12]**

MySQL Database Integration and Query Processing and Web Forms:

Introducing Database and MySQL: What is a Database and why database, PHP supported Database. Integrating PHP and MySQL: Connecting to MySQL, Making MySQL Queries, Fetching Data, Multiple connections, Building in error-checking, Creating MySQL database with PHP, MySQL functions. Performing Database Queries: HTML Tables and Database Tables, Complex Mapping. Integrating Web Forms and Databases: HTML Forms, Basic Form Submission to a Database.

Unit IV: **[12]**

Advanced PHP

Introducing Object-Oriented PHP: What is Object-Oriented Programming? Basic PHP Constructs for OOP, Advanced OOP features. Working with Cookies and Sessions: What is a Session? How Session works in PHP, Session Functions, Cookies. Exception with PHP: Error Handling in PHP.

PHP CMS and Framework

WordPress: About WordPress: Why WordPress?, Sites Built with WordPress, Installing and Upgrading WordPress, Dashboard and Settings, Working with Content: Post, Pages, Posts vs. Pages, Media Files, Links, Feeds, Importing Content: Importing Blogs, Importing HTML Files , Creating a Basic Theme.

Text Book for the Subject:

1. Steve Suehring, Tim Converse and Joyce Park , *"PHP6 and MySQL Bible*", Wiley India Edition.

Reference Books:

1. Stephanie Leary, "*Beginning wordpress 3*", APRESS Publication
2. David Upton ,*"CodeIgniter for Rapid PHP Application Development",* PACKT Publication

3. Luke Welling, Laura Thomson, "*PHP and MySQL Web Development",* Pearson
4. Brad Williams, David Damstra, Hal Stern, "*Professional WordPress: Design and Development*", Worx Publication, ISBN: 978-0-470-56054-9

Digital Learning Resources:

1. www.youtube.com
2. www.php.net
3. www.w3schools.com
4. www.wordpress.org

Practical List (Open Source Technology in Web Development (LAMP))

1 Write a program that formats a block of text to be inputted by the user, based on the performances chosen by the user. Give options for color, font and size and display the output.

2 Create a web page and execute a PHP file on submission of the form and display the information using PHP.

3 Create an application that validates the proper email address and turns it into a link.

4 Include the user profile application, where user has to pass all validations.

5 Write a PHP program to perform following string operations:

a) print your name.
b) print the size of a string. Pass string as an argument.
c) concat two strings.
d) convert case of string
f) find one string from another.

6 Write a PHP Program to perform following operation on Array where values in array are entered by user

a) Print the values of array.
b) Reverse an array.
c) merge two arrays in sorted manner.
d) add values of all elements of an array.

7 Write a PHP program to display current date and time and display Good Morning / Good Afternoon / Good Evening message according to current time.

8 Create an application to create a cookie, access a cookie and destroy the cookie.

9 Set a session after user's login; maintain the user's data with session. Destroy the session and its data after a period of time.

10 Build an authentication application and restricts the unauthorized user from loading the page. And redirect the page with appropriate message.

11 Develop an application which stores student's info with following fieldsrno, name, city, gender, percentage. Provide the following facilities like:

a. Search by city

b. Search by Gender

c. Display max and min percentage.

12 Write a program to calculate total weekly pay. If the user enters the number of hours worked and selects the hourly rate of pay from a list box. If overtime has been done, the number of hours is also entered. Over time hours are paid at double rate. A check box displays overtime. Calculate total amount to be paid.

13 Develop an application to add the movie name currently running with following operations: a. To see all the favorite movie

b. To view top 5 and 10movies

14 Create an application which displays the info about a particular institute which enables the user to see the faculty list according to department.

15 Create an application that keeps track of how many times a visitor has loaded the page.

16 Write a program to do the paginating function to allow the user to go to the first page / last page like, <Prev [1] [2] ……. [10] Next>

17 Write a PHP program to calculate interest for loan using user defined class 'loancalculator'.

18 Write a program for online merchants with following operations:

a) Customer login for further transactions

b) Validates the customer's information

c) System should protect customer's information

19 Develop an application for a shopping cart with following operations:

a) Manage and display the catalog

b) Add, Update and delete the products
c) Process the shipping info
d) Stores the order info
e) Display the summary

20 Display the most popular item to your customer which is purchased the most? If the item is in top 5 display the description to the customer.

21 Create a database application for social gathering containing
a) Information about the location (eg: club house, Party venue)
b) Facilities available in the venue
c) Booking for the specific events
d) Display the booking details for current month and also generate the report for the bill to be paid for a particular booking

Subject: **Mobile Cross Platform Development**								
Program: **Master of Computer Application**			Subject Code:**MCA-406(A)**			Semester:**IV**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	00	20/40	00	100

Unit I: **[12]**

Introduction to Xamarin:

How Does Xamarin Forms Fit In Anatomy of an App, Deeper into Text, Scrolling the Stack, Dealing with Sizes, Button Clicks, XAML vs. Code, XAML Basics, XAML Compilation, XAML Previewer, XAML Namespaces, Bindable Properties, Attached Properties, Resource Dictionaries

Unit II: **[12]**

Code and XAML in Harmony**,** Platform-Specific API Calls, XAML Markup Extensions,T heBindable Infrastructure, Styles, Bitmaps, Absolute Layout, The Interactive Interface

Unit III: **[12]**

Data Binding, Mastering the Grid, MVVM, Collection Views, Async and File I/O, Transforms, Animation, Triggers and Behaviors, iOS, Windows, Device Class, Plugins, Introduction to Effects, Creating an Effect, Passing Parameters to an Effect

Unit IV: **[12]**

Page Navigation, Page Varieties, Custom Layouts, Custom renderers, Renderer Base Classes and Native Controls, Customizing an Entry, Behaviors, Introduction to Behaviors, Attached Behaviors, Xamarin, Forms Behaviors, Reusable Behaviors.

Textbook for the Subject:

1. *"Creating Mobile Apps with Xamarin*" Publisher : Microsoft Press

Reference Books :

1. "*Beginning of Xamarin"*
2. *"Mastering Xamarin.Forms"*
3. *"Xamarin Studio for Android Programming: A C# Cookbook"*
4. "*Xamarin Essentials"*

Subject: **Database Administration**								
Program: **Master of Computer Application**			Subject Code:**MCA-404(B)**				Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I: **[12]**

Oracle Overview and Architecture:

An overview of databases and instances

- Components of an Oracle database and detailed architecture
- Oracle Logical Storage Structures (Table spaces, Blocks, Extents, segments)
- Oracle Physical Storage Structures(Data files, Redo Log files, Control Files,
- Archived Log Files, Backup Files, Oracle Managed Files, Password Files)
- Oracle memory structures (System Global Area, Program Global Area, Software Code Area, Oracle background processes)

Software Installation

- Overview of Licensing and Installation Options
- Using OUI to Install the Oracle Software
- Using the DBCA to Create a Database
- Manually Creating a Database

Unit II: **[12]**

User Administration and Security

Non-database Security

- Create and manage database user accounts
- Assign default storage areas (tablespaces)
- Grant and revoke privileges
- Database Authentication Methods(Database Authentication, Database
- Administrator Authentication, Operating System Authentication,
- Network Authentication, 3-tier Authentication, Client-Side Authentication,
- Oracle Identity Management, User Accounts)
- Database Authorization Methods(Profile Management, System Privileges,
- Object Privileges, Creating, Assigning, and Maintaining Roles)

Unit III: **[12]**

Database Tuning

- Brief overview of tuning methodology, General tuning concepts
- Tuning Application Design(Effective Table Design, Distribution of CPU requirements, Effective Application Design)
- Tuning SQL(Impact of Order on Load Rates, Additional Indexing Options, Generating Explain Plans)
- Tuning Memory Usage(Specifying the Size of the SGA, Using the Cost-Based Optimizer)
- Tuning Data Access(Locally Managed Tablespaces, Identifying Chained Rows,
- Increasing the Oracle Block Size, Using Index-Organized Tables)
- Tuning Physical Storage(Using Raw Devices)

Unit IV: **[12]**

Backup and Recovery in Database, Indexing Structures for files

- Database backup,Recovery Concepts
- Recovery Techniques Based on Deferred Update
- Recovery Techniques Based on Immediate Update
- Shadow Paging
- The ARIES Recovery Algorithm
- Recovery in Multi-database Systems
- Database Backup and Recovery from Catastrophic Failures
- Types of Single Level Ordered Indexes (Primary Index, Cluster Index, Secondary Index)
- Multilevel Indexes
- Dynamic Multilevel Indexes Using B-Tress and B+-Tress
- Indexes on Multiple Keys
- Other Types of Indexes

Text Books for the Subject:

1. Kevin Loney, Bob Bryla, "*Oracle 10g, DBA Handbook*", Oracle Press, TMGH Publications
2. Ramesh Elmasari, Shamkant B. Navathe, "*Fundamentals of Database Systems*", 5th Edition, Pearson Education

Chapter wise Coverage from Text book(s):

Book #	Unit#	Contents
1	Unit I	Chp. 1(Pgs. 4-29, 32-36, 47-68)
	Unit II	Chp. 10(Pgs. 325-351)
	Unit IV	Chp. 8(Pgs. 280-297,303)
2	Unit III	Chp. 19(Full)
	Unit V	Chp. 14(Full)

Practical List

1. Create database manually using server manager utility.
2. Create database using Oracle Configuration Assistant
3. Predefined Administrative Accounts
    - Predefined Non-Administrative User Accounts
    - Predefined Sample Schema User Accounts
    - Create User, Roles, Grant different objects and system privileges to users. Grant different roles to users.
4. Managing Table space
    - Creating a Table space
    - Modifying a Table space
    - Dropping a Table space
    - Reclaiming Unused Space
5. Add, Move, and Resize, Datafiles in different table spaces.
6. Managing Rollback Segments
7. Work on different backup & recovery options
8. Work on different Import/Export options.
9. Work of at least 5 tuning options.
    - Use of auto trace
    - Explain plan
    - SQL Tuning Advisory
    - Use Of Indexing

Subject: **Performance Tuning and Query Optimization**								
Program: **Master of Computer Application**			Subject Code:**MCA-405(B)**			Semester:**IV**		
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I **[12]**

Data Base Application Development:

Role of the Database in SDLC and SMLC, Enterprise Modeling, Database Implementation, Database Maintenance

Performance Tuning Methodology: Three levels of Database, Optimization at each level, Process and Metric for performance tuning.

Unit II **[12]**

Tuning the Conceptual level of database:

Three versions of conceptual level, Demoralization of the conceptual level, Optimal indexing of the tables, Integration of views into queries, Portioning of tables and Indices, Data Replication.

Tuning of Memory-Resident Data structures: Memory resident data structure, performance tuning, Data block buffers, Redo log buffers, shared SQL pool, Background process, tuning memory, Tuning CPU

Unit III **[12]**

Oracle Utility for Tuning and Optimization:

Scope of Oracle Utilities, Location and function of Utility scripts, Procedure for running the scripts, Compressive Tuning plan for Internal level, Performance Tracking

UNIT-IV **[12]**

Query Optimization

- Defining Query Optimization
- Centralized Query Optimization
- Join Ordering in fragment queries
- Distributed query optimization algorithms

Text Book:

1. Sitansu S. Mittra*, "Database Performance Tuning and Optimization*"

Subject: **Distributed Database**								
Program: **Master of Computer Application**			Subject Code:**MCA-406(B)**				Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	00	20/40	00	100

UNIT-I **[12]**

Introduction to DDBMS

- Distributed Data Processing
- Defining Distributed Database System
- Promises of DDBMS
- Complicating Factors
- Problem Areas

UNIT-II **[12]**

DDBMS Architecture

- Architectural Models for Distributed DBMSs: Autonomy, Distribution and Heterogeneity.
- Architectural alternatives
- Client/Server Systems
- Peer-to-Peer Distributed System
- Multi-DBMS Architecture (MDBS)

UNIT-III **[12]**

Distributed Database Design

- Alternative Design Strategies
- Distribution design issues
- Fragmentation
- Allocation

UNIT-IV **[12]**

Transaction Management and Concurrency Control in DDBMS

- Types of Transaction
- Serializability
- Locking based Concurrency Control
- Time stamp based Concurrency Control
- Optimistic concurrency control
- Deadlock Management

Text Book(s):

1. Ozsu and Valduriez, "*Principles of Distributed Database Systems*", Prentice Hall.
2. SAEED K. RAHIMI and FRANK S. HAUG, "*DISTRIBUTED DATABASE MANAGEMENT SYSTEMS :A Practical Approach*", A JOHN WILEY & SONS, INC., PUBLICATION

Reference Books:

1. Ceri ,Pelagatti, "*Distributed Databases Principles and Systems*", MGH 2008
2. ChhandRay, *"Distributed Database System",* Pearson
3. Modern Database Management by Jeffery Hoffer, Seventh Edition, PEARSON
4. Database Systems Concepts by Abraham, Korth, S. Sudarsan, Fifth Edition, MGH
5. Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", McGraw Hill.
6. Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.
7. Elmasari ,Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
8. RamaKrishnan ,Gehke, "Database Management System", McGraw Hill

Unit wise coverage from text book(s):

UNIT 1 :	BOOK 1	CH 1 (FULL)
UNIT II	BOOK 1	CH 4 (FULL)
UNIT III	BOOK 1	CH 5 (FULL)

UNIT IV	BOOK 1	CH 9 (FULL)
UNIT V	BOOK 1	CH 10 (10.3) CH 11 (FULL)

List of practicals/case studies for class demonstration will be based on (BOOK 2, BOOK1)

1. Designing Distributed databases (BOOK 2 CH 2, ch 3)
2. Database fragmentation strategies (BOOK 2 CH 2)
3. Database horizontal / vertical partitioning (BOOK 2 CH 2)
4. Data control (BOOK 2 CH 3)
5. Query optimization (BOOK 2 CH 4)
6. Joining multiple tables at different sites

Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE)- Theory	Continuous Internal Evaluation (CIE)- Practical	Total
4	0	2	5	30/60	30/60	20/40	20/40	200

Unit I **[12]**

Introduction and Overview of wireless sensor networks:

Introduction and basic overview of wireless sensor network,Challenges and hurdles, Basic sensor network architectural elements, Wireless communications: Link quality, Shadowing and Fading Effects.Applications of wireless sensor networks:Range of applications,Sensor node technology, Sensor Taxonomy, WN Operating Environment, WN trends, Radio technology primer,Available wireless technologies. Medium access control protocols for wireless sensor networks:Introduction, Fundamentals of MAC protocols, MAC protocol for WSNs, Sensor MAC case study, IEEE 802.15.4 LR-WPANs standardcase study

Unit II: **[12]**

Routing protocols for wireless sensor networks:

Introduction of routing protocols, Data dissemination and gathering, Routing challenges and design issues in wireless sensor networks, Routing strategies in wireless sensor networks, Geographical routing. Transport control protocols for wireless sensor networks: Traditional transport control protocol, Transport protocol designissues, Examples of existing transport control protocols,Performance of transport control protocols.

Unit III: **[12]**

Network management of wireless sensor networks:

Introduction, Network management requirements, Traditional network management models, Network management design issues, other issues: Naming, Localization. Sensor tasking and Control:Introduction, Task-Driven sensing, Roles of sensor nodes and utilities, Information-Based sensor tasking, Joint routing and information aggregation.

Unit IV: **[12]**

Sensor network Platform, Tools and Operating Systems forWSN:

Sensor node hardware, Sensor network programming challenges,Node-level software platforms, and Operating system design issues,Examples of operating systems,Performance and Traffic management:

Introduction, WSN design issues, Performance modeling of WSNs,Case study: Simple computation of the system life span.

Text Book(s):

1. KazemSohraby, Daniel Minoli, Taieb F. Znati – "*Wireless Sensor Networks:technology, protocols and application*", Wiley.
2. Feng Zhao and Leonidas Guibas – "*Wireless Sensor Networks*", Morgan Kaufmann,San Francisco

Practical List

1	To study basic information about network simulator specifically NS 2.34.
2	Write a tcl script to create the dynamic colour and initial location to nodes.
3	Write a tcl script to create fixed wireless topology.
4	Write a tcl script to create mobile wireless topology
5	Write a tcl script to analysis the performance of DSR routing protocol in terms of throughput in fixed and mobile wireless topology(Hint: plot X-Graph throughput vs time and find out average throughput).
6	Write a tcl script to analysis the performance of AODV routing protocol in terms of throughput in fixed and mobile wireless topology(Hint: plot X-Graph throughput vs time and find out average throughput).

7	Write a tcl script to analysis the performance of DSDV routing protocol in terms of throughput in fixed and mobile wireless topology(Hint: plot X-graph throughput vs time and find out average throughput).
8	Make a comparative analysis table for all above protocols.
9	Write a tcl script to create random topology.
10	Write a tcl script to create chain topology.
11	Write a tcl script to create wired cum wireless topology.

Subject: **Network Security**								
Program: **Master of Computer Application**			Subject Code:**MCA-405(C)**				Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	2	5	30/60	30/60	20/40	20/40	200

UNIT – I **[12]**

Network Security and Symmetric Encryption

Security Trends, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanism, A Model for Internetwork Security, Internet Standards the Internet Society, Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Stream Ciphers and RC4, Cipher Block Modes of Operation

UNIT – II **[12]**

Asymmetric key Encryption Techniques

Location of Encryption Devices, Approaches to Message Authentication, Secure Hash Functions, Message Authentication Codes, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures

UNIT – III **[12]**

Authentication Mechanism and IP,Email Security

Key Management. Kerberos, X.509 Directory Authentication Service, Public Key Infrastructure, Distributed Denial of Service Attacks ,Electronic Mail Security ,PGP, S/MIME ,IP Security

UNIT – IV **[12]**

Web Security,Intrusion and System Security

Web Security Considerations, Secure Sockets Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Intrusion Detection. Password Management.

Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

Text Book(s):

1. William Stallings, "*Network Security Essentials: Applications and Standards*", 3rd Edition, Pearson Education

Reference Books:

1. BehrouzForouzan, "*Cryptography and Network Security*", TMH Publication.
2. Nina Godbole, "*Information Systems Security*", Wiley Publication.
3. William Stallings, "*Cryptography and Network Security*", Pearson Education

Practical Programs

Note: - Develop a JAVA program to simulate a Client – Server scenario fulfilling the following conditions

Sr.	Definition
1.	The client should encrypt the input string (plain text) and get cipher text using Transposition cipher. The sender then should send the encrypted text and the key to the server.
2.	The client should encrypt the input string (plain text) and get cipher text using Caesar cipher. The client then should send the encrypted text and the key to the server.
3.	The client should encrypt the input string (plain text) and get cipher text using Mono alphabetic substitution cipher. The client then should send the encrypted text, the plain pattern and the substitution pattern to the server.
4	The client should encrypt the input string (plain text) and get cipher text using DES. The sender then should send the cipher text and the key used, both to the receiver.
5	Write a programs to simulate encryption and decryption technique using One Time Pad, algorithm development and Communication between client and server should be done using Java server socket programming.
6	The client should encrypt the input string (plain text) and get cipher text using DES. The sender then should send the cipher text and the key used, both to the receiver.

7	Write a programs to simulate encryption and decryption technique using AES, algorithm development and Communication between client and server should be done using Java server socket programming.
8	The client should encrypt the input string (plain text) and get cipher text using Triple DES with CFM mode. The sender then should send the cipher text and the key used, both to the receiver.

Subject: **Heterogeneous Network**								
Program: **Master of Computer Application**			Subject Code:**MCA-406(C)**				Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	00	20/40	00	100

Unit-1 **[12]**

Introduction and overview of Heterogeneous Networks

Motivations for Heterogeneous Networks ,Definitions of Heterogeneous Networks ,Heterogeneous ,Networks Use Scenarios ,Aspects of Heterogeneous Network Technology RF Interference Radio ,System Configuration , Network Coupling , User and Device Credential ,Interworking Handover , Data Routing ,Quality of Service , Security and Privacy ,Capacity and Performance Evaluation ,Heterogeneous cellular network nodes ,Remote radio heads , Micro base stations , Pico base stations ,Femoto cell access points ,Relay nodes ,Introduction to 3GPP LTE advanced heterogeneous cellular networks.

Unit-II **[12]**

Multi-tier Network Architecture

Heterogeneous Network Deployment Scenarios. OSG scenario CSG scenario Interference Management ,Multi-radio techniques , Cross-tier interference Deployment Scenarios for LTE-Advanced HetNetMacro-FemtoScenarioMacro-Pico Scenario.

Unit-III **[12]**

Inter-cell interference Management

Introduction ,Conventional inter-cell interference Coordination ,Enhanced inter-cell Interference Coordination , Interference Scenarios Mobility and handover management Mobility Management in RRC-connected state. Mobility Management in RRC-idle state Mobility Management in heterogeneous cellular networks.

Unit-IV **[12]**

Cell Selection Modes in Heterogeneous Deployment

Distinction of cells ,Access Control ,Access Control Scenarios ,Access Control Executor Access Control Mechanism,Cell Selection and Cell Reselection. Cell Reselection in Macro-Femto cells.

Text Books:

1. Rose Qing Hu, Yi Qian, "*Heterogeneous Cellular Networks"* – Wiley Publication, IEE Press
2. Xiaoli Chu, David Lopez-Perez, Yang Yang, FedrikGunnarsson –" *Heterogeneous Cellular Networks – Theory, Simulation and Deployment",* Cambridge University Press.

Subject: **Mini Project-II**								
Program: **Master of Computer Application**			Subject Code:**MCA-407**				Semester:**IV**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
0	0	2	1	00	30/60	00	20/40	100

Course Content

- **Why We Model?:**The importance of modelling, principles of modelling, Introduction of UML: Overview, Conceptual Model of UML , Classes, Relationships, Common Mechanisms of UML.
- **Class Diagrams:**Terms and Concepts, Common Modeling Techniques, Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, Packages Instances, Object Diagrams, Basic Behavioral Modeling: Interactions, Use cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams
- **Advanced Behavioral Modelling:** Events and Signals, State Machines, State Diagrams, Architectural Modelling: Components, Deployment, Collaborations, Component Diagrams, Deployment Diagrams,
- **Case Study** Generate Use-case Diagram, Class Diagram, Sequence Diagram, Collaboration Diagram, Activity Diagram, State Chart Diagram, Component Diagram, Deployment Diagram for the following systems.
  - Student Registration System
  - Online Pizza ordering System
  - Courier Tracking System
  - Online Job Portal System
  - Online Shopping System

Total Sessions: 12

Criteria for Evaluation of Software Projects

Project Definition:	10%
Related project Study Analysis:	20 %
Design& Development:	40%
Implementation & Testing:	20%
Creation of User Manual	10%

Notes:

3. **Reference Book(s):**

   Grady Booch, James Rumbaugh, Ivar Jacobson, "*The Unified Modeling Language User Guide",* Publisher Pearson Education

4. **Suggested Additional Reading:**

   a. Tom Pender, *"UML 2 Bible"*, Publisher Wiley-dreamtech

   b. Jim Arlow, LLaNeustadt, "*UML 2 and the Unified Process Practical Object-Oriented Analysis and Design",*2nd Edition, Publisher Pearson Education

   c. Web reference: By Object Management Group (OMG) http://www.uml.org/

UML Diagram Tool:

Dia (diagramming software):

Dia is free and open source general-purpose diagramming software, developed originally by Alexander Larsson. Dia uses a controlled single document interface (SDI) similar to GIMP and Inkscape. It can be downloaded from

http://sourceforge.net/projects/dia-installer/?source=typ_redirect

Accomplishment of the student after completing the course:

After successful completion of this course the students will be able to discriminate what the UML is, what it is not, and why the UML is relevant to the process of developing software-intensive systems. They will be master the vocabulary, rules and idioms of the UML and, in general will be able to use the language effectively in System Development process. They will be able to understand how to apply the UML to solve a number of common modeling problems.

SEMESTER-V

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Indus University
Institute of Information andCommunication Technology

Master of Computer Applications

Teaching Scheme

Subject Code	Subject Name		Teaching Learning			
		Theory Session (Hours)	Tutorial Session (Hours)	Laboratory Session (Hours)	Total (Hours)	Credit
MCA-501	Cloud Infrastructure and Services	03	02	00	05	04
MCA-502	Web Development Tools-II	04	00	04	08	06
MCA-503	Cyber Security and Forensic Science	04	00	00	04	04
MCA-504	Design Patterns	04	00	00	04	04
MCA-505	Industrial Project - I	00	00	08	08	04
Total		**15**	**02**	**12**	**29**	**22**

Subject: **Cloud Infrastructure and Services**								
Program: **Master of Computer Application**				Subject Code:**MCA-501**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
3	2	0	4	30/60	0	20/40	0	100

UNIT – I **[14]**

Introduction to cloud computing - roots of cloud computing, layers and types of cloud,desired feature of cloud, cloud infrastructure management, challenges and risks. Migratinginto a cloud - introduction, broad approaches, and seven step models. The enterprise cloudcomputing paradigm -issues for enterprise applications on the cloud, transition challenge,enterprise cloud technology and market evolution.

UNIT – II **[14]**

Infrastructure as a Service (IAAS) – Virtual machine provisioning and migration servicesintroductionand inspiration, Management of virtual machine for cloud infrastructure, securedistributed data storage in cloud computing.

UNIT – III **[10]**

Platform and software as a service (PAAS, SAAS) – Aneka-integration of public and private cloud and comet cloud-an autonomic search engine, T-system cloud based solution forbusiness application.

UNIT – IV **[10]**

Organizational readiness and change management in the cloud age, Data security in cloud, legal issues in cloud (with case studies).

Text Book(s):

1. Rajkumar Buyya,James Broberg, AndrzejGoscinski, "*Cloud Computing-Principals and paradigms",* A John Wiley & Sons Publications.

Reference Books:

1. John W rittinghouse and JamesF ransom, **"***Cloud Computing-Implementation, management and security" ,* CEC press publication

Digital Learning Resource

1. ntcap.nic.in
2. www.umiacs.umd.edu/~jimmylin/cloud-2008-Fall/

Subject: **Web Development Tools-II**								
Program: **Master of Computer Application**			Subject Code:**MCA-502**				Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)-Theory**	**Continuous Internal Evaluation (CIE)-Practical**	**Total**
4	0	4	6	30/60	30/60	20/40	20/40	200

UNIT – I **[12]**

A Quick Introduction To Asp.Net MVC, How Asp.Net MVC Fits In With Asp.Net, The MVCPattern, MVC As Applied To Web Frameworks, The Road To MVC 5, MVC 4 Overview, ASP.Net

MVC 5 Overview, One Asp.Net New Web Project Experience, Asp.Net Identity, BootstrapTemplates, Attribute Routing,Asp.Net Scaffolding ,Authentication Filters, Filter Overrides, The

MVC Application Structure,Asp.Net MVC And Conventions, Convention Over Configuration

UNIT – II **[12]**

The controller's role, controller basics, a simple example: the home controller, writing your first controller, parameters in controller actions, views, the purpose of views, viewbasics, understanding view conventions, strongly typed views, how viewbag falls short, understanding viewbag, viewdata, and view data dictionary ,view models ,adding a view ,the razor view engine ,what is razor? ,code expressions ,html encoding ,code blocks ,razor syntax samples layouts, viewstatE ,specifying a partial view

UNIT – III **[12]**

Modeling the Music Store, Scaffolding a Store Manager, What Is Scaffolding? ,Scaffolding and the Entity Framework ,Executing the Scaffolding Template ,Executing the Scaffolded Code ,Editing an Album ,Building a Resource to Edit an Album ,Responding to the Edit POSTRequest ,Model Binding ,The Default Model Binder, Explicit Model Binding, FORMS AND HTMLHELPERS, Using Forms ,The Action and the Method

UNIT – IV **[12]**

HTML Helpers, Automatic Encoding ,Making Helpers Do Your Bidding ,Inside HTML Helpers, Strongly Typed Helpers, Helpers and Model Metadata, Templated Helpers ,Helpers andModelState ,Other Input Helpers, Html.Hidden, Html.Password, Html.RadioButton,Html.ActionLink and Html.RouteLink URL Helpers, Html.Partial and Html.RenderPartial,

Html.Action and Html.RenderAction

Text Book(s):

1. JonGalloway,Brad Wilson ,K. ScottAllen,DavidMatson, "*Professional ASP.NET MVC5"*, John Wiley & Sons, Inc.

Other Reference Books:

1. Dino Esposito, "*Programming ASP.NET MVC*", 2nd Edition (Microsoft Press)

2. Jon Galloway, Phil Haack, Brad Wilson, K. Scott Allen, "*Professional ASP.NET MVC 4"* (Wrox)

3. Jonathan McCracken, "*Test-Drive ASP.NET MVC (Pragmatic Programers)"*

4. Adam Freeman, "*Pro ASP.NET MVC 5*", 5TH Edition,Apress publication

Digital Learning Resources:

1. http://www.howMVCworks.net/Home/Topics

2. http://www.codeproject.com/Articles/207797/Learn-MVC-Model-view-controller-Step-by-Step-in-7

3. http://www.asp.net/MVC

Practical Programs

1 Simple Hello world

2 implementation MVC Routing

3 implementation ViewData, ViewBag, TempData& Session Variables

4 implementation Model and Strongly typed views

5 implementation Model Binders

6 implementation Data Annotations and HTML Helpers classes

7 implementation ViewModel in MVC

8 implementation the use Entity Framework in MVC

9 implementation viewmodel, partial view and webgrid

10 implementation ActionResult and ViewResult in MVC

11 How to implementation AJAX using JSON and jQuery using MVC

12 implementation of ValidateInput and AllowHTML in MVC

Subject: **Cyber Security and Forensic Science**								
Program: **Master of Computer Application**				Subject Code:**MCA-503**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	---	20/40	---	100

UNIT – I **[12]**

Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security,Who are Cybercriminals? Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation,Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, NewsgroupSpam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking,Online Frauds, Pornographic Offenses , Software Piracy, Computer Sabotage, E-Mail Bombing/MailBombs, Usenet Newsgroup as the Source of Cybercrimes , Computer Network Intrusions, PasswordSniffing, Credit Card Frauds, Identity Theft

Cyber offenses: How Criminals Plan Them : Introduction, Categories of Cybercrime, How Criminals Planthe Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information,Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of SocialEngineering, Cyber stalking: Types of Stalkers, Cases Reported on Cyber stalking, How Stalking Works?Real-Life Incident of Cyber stalking, Cybercafé and Cybercrimes, Bonnets: The Fuel for Cybercrime,Bitnet, and Attack Vector Cloud Computing: Why Cloud Computing? , Types of Services, Cybercrime andCloud Computing

UNIT – II **[12]**

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices,Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era: Types

and Techniques ofCredit Card Frauds, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile DevicesAuthentication Service Security: Cryptographic Security for Mobile Devices, LDAP Security for Hand-HeldMobile Computing Devices, RAS Security for Mobile Devices, Media Player Control Security, NetworkingAPI Security for Mobile Computing Applications, Attacks on Mobile/Cell Phones: Mobile Phone Theft,Mobile Viruses, Mashing, Vishing, Smishing, Hacking Bluetooth, Mobile Devices: Security Implications forOrganizations: Managing Diversity and Proliferation of Hand-Held Devices, Unconventional/StealthStorage Devices Threats through Lost and Stolen Devices, Protecting Data on Lost Devices, Educating theLaptop Users Organizational Measures for Handling Mobile Devices-Related Security Issues: EncryptingOrganizational Databases, Including Mobile Devices in Security Strategy, Organizational Security Policiesand Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile ComputingDevices, Operating Guidelines for Implementing Mobile Device Security Policies, Organizational Policies
for the Use of Mobile Hand-Held Devices, Laptops: Physical Security Countermeasures

UNIT – III **[12]**

Tools and Methods Used in Cybercrime & Phishing and Identity TheftIntroduction, Proxy Servers and Anonymizers, Phishing: How Phishing Works? Password Cracking:Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, Key loggersand Spywares: Software Key loggers, Hardware Key loggers, Antikeylogger, Spywares, Virus and Worms:Types of Viruses, Trojan Horses and Backdoors: Backdoor, How to Protect from Trojan Horses andBackdoors, Steganography: Steganalysis, DoS and Dodos Attacks: DoS Attacks, Classification of DoSAttacks, Types or Levels of DoS Attacks, Tools Used to Launch DoS Attack, Dodos Attacks, How to Protectfrom DoS/Dodos Attacks, SQL Injection: Steps for SQL Injection Attack, How to Avoid SQL InjectionAttacks, Buffer Overflow: Types of Buffer Overflow, How to Minimize Buffer Overflow, Attacks onWireless Networks: Traditional Techniques of Attacks on Wireless Networks, Theft of Internet Hours andWi-Fi-based Frauds and Misuses, How to Secure the Wireless Networks

Phishing and Identity Theft: Introduction, Phishing: Methods of Phishing, Phishing Techniques, SpearPhishing, Types of Phishing Scams, Phishing Toolkits and Spy Phishing, Phishing Countermeasures,Identity Theft (ID Theft): Personally Identifiable Information(PII), Types of

Identity Theft, Techniquesof ID Theft, Identity Theft-Countermeasures, How to Protect your Online Identity

UNIT – IV **[12]**

Cybercrimes and Cybersecurity: The Legal Perspectives & Understanding Computer Forensics

Introduction, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act: Admissibility ofElectronic Records: Amendments made in the Indian ITA 2000, Positive Aspects of the ITA 2000, TheWeak Areas of the ITA 2000, Challenges to Indian Law and Cybercrime Scenario in India, Consequencesof Not Addressing the Weakness in Information Technology Act Amendments to the Indian ITA 2008:Overview of Changes Made to the Indian IT Act, Cybercafe-Related Matters Addressed in theAmendment to the Indian IT Act, State Government Powers Impacted by the Amendments to the IndianIT Act, Impact of IT Act Amendments Impact Information Technology Organizations, Cybercrime andPunishment, Cyber law, Technology and Students: Indian Scenario

Understanding Computer Forensics : Introduction, Historical Background of Cyber forensics, DigitalForensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence: The Rules ofEvidence, Forensics Analysis of E-Mail: RFC282, Digital Forensics Life Cycle: The Digital Forensics Process,The Phases in Computer Forensics/Digital Forensics, Precautions to be Taken when Collecting ElectronicEvidence, Chain of Custody Concept, Network Forensics, Approaching a Computer ForensicsInvestigation: Typical Elements Addressed in a Forensics Investigation Engagement Contract, Solving aComputer Forensics Case, Setting up a Computer Forensics Laboratory: Understanding theRequirements, Computer Forensics and Steganography: Root kits, Information Hiding, Relevance of theOSI 7

Text Book(s):

1. NinaGodbole, Sunit Belapur, *"Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives",* Wiley India Publications, April, 2011

Reference Books:

1. Robert Jones, "*Internet Forensics: Using Digital Evidence to Solve Computer Crime*",O'ReillyMedia, October, 2005

2. Chad Steel, "*Windows Forensics: The field guide for conducting corporate computer investigations*", Wiley India Publications, December, 2006

Subject: **Design Patterns**								
Program: **Master of Computer Application**				Subject Code:**MCA-504**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
4	0	0	4	30/60	0	20/40	0	100

UNIT – I **[12]**

Introduction: What is a Design Pattern? Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design patterns, Organizing the Catalog, How Design patterns solve Design problems, How to select a Design Pattern, How to use a Design Pattern

UNIT – II **[12]**

A Case Study: Designing a Document Editor, Design Problems, Document Structure,Formatting Embellishing the User Interface, Supporting Multiple Look and Feel Standards,Supporting Multiple Window systems, User Operations Spelling Checking and Hyphenation,Summary.
Creational Patterns : Abstract Factory, Builder, Factory Method, Prototype, Singleton,Discussion of Creational Patterns. Structural Pattern Part – I: Adaptor, Bridge, andComposite. Structural Pattern Part – II : Decorator, acade, flyweight, proxy

UNIT – III **[12]**

Behavior Patterns Part – I : Chain of Responsibility, Command, Interpreter, Iterator, Behavior Patterns Part – II : Mediator, Memento, Observer

UNIT – IV **[12]**

Behavior Patterns Part – II (cont'd) State, strategy, Template Method, Visitor, Discussion of

Behavioral Patterns. What to Expect from Design Patterns, A brief History, The PatternCommunity An Invitation, A Parting Thought.

Text Book(s):

1. Erich Gamma, "*Design Patterns*", Pearson Education

Reference Books:

1. Eric Freeman, "*Head First Design Patterns*", Oreill - SPD.

2. Peeling Design Patterns, Career MonkPublication.

3. Alan Shallowy,Prof MedaSrinivasaRao, NarsimhaKarumanchi, "*Design Patterns Explained*", Pearson Education.

4. af.Buschman& others, "*Pattern Oriented Software Architecture*", John Wiley & Sons.

5. Steven John Metsker, "*Design Patterns in C#",* Addison-Wesley, 2004

6. Mark Grand, "*Pattern's in JAVA Vol-I*", Wiley Dream Tech.

Subject: **Industrial Project-I**								
Program: **Master of Computer Application**				Subject Code:**MCA-505**			Semester: **V**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
0	0	8	4	---	30/60	---	20/40	100

Guidelines for INDUSTRIAL PROJECT - I:

- Allow **minimum 2 to maximum 3** students per mini project group

- Take the topic from students in **first 15 days** from the start of the semester.

- Follow Software Development Life Cycle Phase for INDUSTRIAL PROJECT – I.

INDUSTRIAL PROJECT - I shall follow the steps below:

1. Define the problem with specifications

2. Define the functionality of the project

3. Design a solution for the project

4. Implement the solution.

(Also keep a record of total number of man hours spent for the miniproject.)

5. Present and evaluate the project.

The report of this INDUSTRIAL PROJECT - I is to be submitted in typed form with Spiral Binding. The report should have all the necessary diagrams, charts, printouts and source code.

The work has to be done in groups.

SEMESTER-VI

Approved Vide Agenda Item No. 03 of Minutes of Meeting of Academic Council held on 11 July 17

Indus University
Institute of Information andCommunication Technology

Master of Computer Application

Teaching Scheme

Subject Code	Subject Name		Teaching Learning			
		Theory Session (Hours)	Tutorial Session (Hours)	Laboratory Session (Hours)	Total (Hours)	Credit
MCA-601	Software Development Project	00	00	00	00	24
Total		**00**	**00**	**00**	**00**	**24**

Subject: **Software Development Project**								
Program: **Master of Computer Application**			Subject Code:**MCA-601**				Semester: **VI**	
Teaching Scheme				**Examination Evaluation Scheme**				
Lecture	**Tutorial**	**Practical**	**Credits**	**University Theory Examination**	**University Practical Examination**	**Continuous Internal Evaluation (CIE)- Theory**	**Continuous Internal Evaluation (CIE)- Practical**	**Total**
00	00	00	24	00	300/600	00	50/100	700

Technical Guidelines

COMMUNICATION OF APPROVAL

Communication regarding the Approval / Non-approval of the project will be sent to you within four weeks after the receipt of the project proposal by the Faculty/Supervisor/Guide of Indus University concerned.

PROJECT REPORT FORMULATION

The project report should contain the following:

1. Original copy of the Approved Synopsis.

2. Certificate of Originality.

3. The Project Report documentation may be about 70 to100 pages (excluding coding) which should include the following topics (as per the project requirements).

Table of Contents / Index with page numbering

- Introduction / Objectives
- System Analysis
- Identification of Need
- Preliminary Investigation

- Feasibility Study
- Technical Feasibility
- Economical Feasibility
- Operational Feasibility
- Software Engineering Paradigm applied
- Software and Hardware Requirement Specifications
- System Design
- Coding
- Code Efficiency
- Optimisation of code
- Validation checks
- Implementation and Maintenance
- Testing (Testing techniques and Testing strategies used along with the test data and the errors listed for each test case).
- System Security measures (Implementation of security for the s/w developed)
- Cost Estimation of the Project
- Reports
- PERT Chart, Gantt Chart
- Future scope and further enhancement of the Project
- Bibliography
- Appendices (if any)
- Glossary.

General Guidelines

1. It is recommended that the team should be of 2-3 students.

2. Coding standards should be followed meticulously. At the minimum, the code should be self documented, modular, and should use the meaningful naming convention.

3. If a student is compelled to follow certain instructions (by the external, i.e. organization's guide) which he/she does not agree to, such a student must prepare a supplementary report to document his/her version and present it to the examiners if such a need arises.

4. Internal guides (i.e. the faculty members) must devote the time allocated as per the time table to guide the students for the project. The time allocation will be in accordance with the scheme for 6th semester project as given.