NORTH MAHARASHTRA UNIVERSITY,

JALGAON

SYLLABUS FOR

T.Y.B.Sc.

COMPUTER SCIENCE

(With effect from June 2017)

North Maharashtra University, Jalgaon
T.Y.B.Sc. (Computer Science)
(w.e.f. June-2017)
Structure

Semester –I	Semester-II
UG-CS-311 System Programming	UG-CS-321 Operating System
UG-CS-312 Database Management System	UG-CS-322 MS SQL Server
UG-CS-313 Software Engineering	UG-CS-323 Internet Programming using PHP
UG-CS-314 Computer Aided Graphics	UG-CS-324 Theoretical Computer Science
UG-CS-315 Programming in VB.NET	UG-CS-325 Computer Network
Elective -A UG-CS-316 A) Programming in C# OR Elective -B UG-CS-316 B) JAVA Programming-I	Elective - A UG-CS-326 A) Web Programming using ASP.NET OR Elective - B UG-CS-326 B) JAVA Programming-II
UG-CS-Lab-301 Lab on System Programming	UG-CS-Lab-304 Lab on MS SQL Server
UG-CS-Lab-302 Lab on Programming in VB.NET, Computer Aided Graphics	UG-CS-Lab-305 Lab on Internet Programming using PHP
Elective -A UG-CS-Lab-303 A) Lab on Programming in C# OR Elective -B UG-CS-Lab-303 B) Lab on JAVA Programming –I	Elective -A UG-CS-Lab-306 A) Lab on ASP.NET OR Elective -B UG-CS-Lab-306 B) Lab on JAVA Programming II

Note :-

1. Each period is of 48 minutes duration.
2. Each course is of four periods per week
3. Each practical is of four periods per week
4. For each paper 40 marks are for internal assessment and 60 marks are for external assessment

Career Opportunities

The career opportunities after B.Sc. (Computer Science) are quite huge. Many major national and multinational firms take in aspirants who have accomplished their graduation in these fields. The top IT firms in India such as Wipro, TCS, and Infosys etc. offer aspirants very attractive packages. Jobs for professionals in these fields can also be got with management consultancy organizations, power plants, Manufacturing plants, Government organizations, Banks and other organizations that use computers and computer-aided systems are but not limited to:

- Programmer or Software Engineer
- Computer Engineer
- Hardware Designer/Engineer
- Systems Engineer, System integrator
- System Administration
- Technical Support
- Support Engineer
- Technical Writer
- Consultant
- Management
- Administration
- IT Sales and Marketing
- IT Officer
- DTP Operator
- Web Designer

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
System Programming (UG-CS-311)
Semester-I

Total lectures: 60
Total Marks: 90

Unit-1 Introduction   **[L:06,M:10]**

      2.1 System Software
      2.2 Goal of system software
      2.3 System program and system programming
      2.4 View of system software

Unit-2 Software Tools   **[L:06,M:10]**

      2.5 What is a Software Tools?
      2.6 Software Tools for Program Developments
      2.7 Editors
      2.8 Debug Monitors
      2.9 Programming Environments

Unit-3 Overview of Language Processors   **[L:10,M:12]**

      3.1 Programming Languages and Language Processors
      3.2 Language Processing Activities
      3.3 Fundamentals of Language Processing

Unit-4. Assembler   **[L:12,M:16]**

      4.1 Definition.
      4.2 Features of assembly language, advantages
      4.3 Statement format, types of statements
      4.4 Constants and Literals.
      4.5 Advanced assembler directives
      4.6 Design of assembler – Analysis Phase and Synthesis Phase.
      4.7 Overview of assembly process
      4.8 Pass Structure of Assembler – One pass, Two pass assembler.
      4.9 Problems of One-pass assembler
      4.10 Design of Two-pass Assembler

Unit-5. Macro and Macro Preprocessor   **[L: 08,M:14]**

      5.1 Macro Definition and Call
      5.2 Macro Expansion
      5.3 Nested Macro Calls
      5.4 Tables used in Macro
      5.5 Advanced Macro Facilities
      5.6 Design of Macro Preprocessor

Unit-6. Compiler   **[L:12,M:14]**

      6.1. What is Compiler
      6.2. Scanning and Parsing
          6.2.1.Programming Language Grammars

References:

1. D.M. Dhamdhere, "Systems Programming", ISBN : 9780071333115, Tata McGraw-Hill Education ,2011

2. D.M. Dhamdhere, "Systems programming and operating system". ISBN: 978-0074635797, Tata Mcgraw Hill Education Private Limited

3. John Donovan, "System programming.", ISBN: 978-0-07-460482-3, Tata Mcgraw Hill Education Private Limited

4. Alfred V Aho, Ravi Sethi, Jeffery D. Ullman, " Compilers Principals and tools" , ISBN: 81-7808-046-X , Pearson education, Delhi, 2008.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
UG-CS 312 Database Management System
Semester I

Total lectures: 60
Total Marks: 90

1. **Introduction of DBMS**   **L 12: M 16**
   1.1. Overview, Definition
    1.2. Types of DBMS
   1.3. Describing & storing data (Data models (relational,hierarchical, network)),
    1.4. Levels of abstraction , data independence,
   1.5. Queries in DBMS (SQL : DDL,DML,DCL,TCL), Users of DBMS, Advantages of
        DBMS

2. **Conceptual Design (E-R model)**   **L 12 : M 16**
   2.1. Overview of DB design,
   2.2. ER data model (entities, attributes, entity sets, relations, relationship sets) ,
   2.3. Conceptual design using ER (entities VS attributes, Entity Vs relationship, binary Vs
ternary)

3. **Relational data model**   **L 12 : M 18**
   3.1. Relations (concepts, definition),
   3.2. Conversion of ER to Relational model ,
   3.3. Integrity constraints (key, referential integrity, general constraints)
   3.4 Codd's Rules, Functional Dependency, Data Normalization (1NF,
        2NF, 3NF, BCNF)

4. **Relational algebra**   **L 08 : M 15**
   4.1. Preliminaries
   4.2. Relational algebra (selection, projection, set operations, renaming, joins,
        division)

5. **Database Implementations**   **L-08 M:12**
   Database security, Database integrity, Transaction Concept, Transaction State,
   Transaction Properties (ACID)

6. **Concurrency control, Backup & recovery:-**   **L-08 M-12**
   Lock-Based protocol, Timestamp-Based protocol ,Log base Recovery, Shadow
   Paging, Differed Updates.

Reference Books:-

1. Abraham Silberschatz , Henry F. Korth & S.Sudarshan, "Database System
   Concepts" , ISBN 0-07-228363-7, McGraw- Hill, 4th Edition .
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", ISBN-13: 978-
   0136086208 Sixth Edition, Pearson Education
3. Alexis Leon & Mathews leon , "Database System Concepts "–,Vikas Publication
   House   Ltd, New Delhi.

North Maharashtra University, Jalgaon
T.Y.B.Sc. Computer Science
(w.e.f. June 2017)
Software Engineering (UG-CS-313)
Semester-I

Total lectures: 60
Total Marks: 90

1. **Introduction to Software Engineering:**   **L-10   M-12**
   1.1 Software and Software Engineering
   1.2 Evolution of Software
   1.3 Software Characteristics
   1.4 Software Applications
   1.5 Software Myths
   1.6 Software Process
   1.7 Software Development Life Cycle (SDLC)
2. **Software Development Model:**   **L-12   M-14**
   2.1 Waterfall Model
   2.2 Prototyping Model
   2.3 Incremental Development Model
   2.4 RAD model
   2.5 Spiral Model
3. **Requirement Analysis and Specification:**   **L-10   M-12**
   3.1 Requirements Engineering
   3.2 Fact finding Techniques
   3.3 Introduction to Types of Requirement Modeling
   3.4 Data Modeling Concepts- Data Objects, Data Attributes & Relationship.
4. **Design Engineering:**   **L-10   M-14**
   4.1 Characteristics of good Software Design
   4.2 Design Concepts- Architecture, Modularity, Information Hiding
   4.3 Cohesion & Coupling
   4.4 Decision Table & Decision Tree
   4.5 Data flow Diagram
   4.6 Data Dictionary
5. **Software Coding & Testing:**   **L-8   M-12**
   5.1 Coding standards & Guidelines
   5.2 What is testing?
   5.3 Testing Activities
   5.4 Black box testing
   5.5 White box testing
   5.6 Introduction to Debugging Approaches – Brute force Method, Backtracking, Case
       Elimination Method, Programming Slicing.

6. Software Quality: **L-10 M-12**

    6.1 What is Quality?

    6.2 Software Quality - Garvin's quality dimensions, Mc Calls quality factors, ISO 9125 quality factors

    6.3 Elements of Software Quality Assurance

    6.4 ISO 9000 & Certification

References –

1. Roger S. Pressman , "Software Engineering a Practitioners Approach", ISBN 13: 9780071267823, 7th edition, McGraw Hill International Edition.
2. Rajib Mall , "Fundamental of Software Engineering", ISBN- 978-81-203-3819-7 3RD Edition, , PHI Learning Private Limited.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Computer Aided Graphics (UG-CS-314)
Semester-I

Total lectures: 60
Total Marks: 90

Unit-1: Introduction to Graphics   **[L:08 M:16]**
1.1 The origin of computer graphics
1.2 Application of Computer Graphics How the interactive graphics display works.
1.3 Definitions: Pixel, Resolution, Interactive, Non interactive graphics, Aspect Ratio, Active
      graphics, Passive graphics,
1.4 How the interactive graphics display works.
1.5 Display types: Random Scan and Raster Scan

Unit-2: Line Drawing Technique   **[L:06 M:12]**
2.1 Co-ordinate Systems
2.2 The Simple DDA
2.3 The Symmetrical DDA
2.4 Bresenham's line drawing Algorithm
2.5 Bresenham's circle drawing Algorithm

Unit-3: Two Dimensional and Three Dimensional Transformations   **[L:16 M:20]**
3.1 Transformation principles
3.2 Concatenations
3.32D Matrix Representation
3.4 3D Transformations
3.5 Transformation in Viewing
3.6 The perspective Transformation

Unit-4: Clipping and Windowing   **[L:14 M:16]**
4.1 Define: Clipping, Window, view port
4.2 Cohen-Sutherland algorithm
4.3 Mid-point Subdivision
4.4 Polygon Clipping and flowchart to clip each polygon vertex and closing routine
4.5 The Windowing Transformation
4.6 3-D Clipping

Unit-5: Raster Graphics and Solid Area Scan-Conversion   **[L:08 M:12]**
5.1 Introduction
5.2 Scan Converting Line Drawings
5.3 Scan Converting Polygons
5.4 Coherence

5.5 (YX) Algorithm
5.6 Priority: Painter's Algorithm

Unit-6: Hidden Surface Elimination   **[L:08 M:12]**
6.1 Object Space and Image Space Algorithms
6.2 The Depth Buffer Algorithm
6.3 Warnock's Algorithm

Reference:
1. William M. Newman and Robert F. Sproull, "Principles of Interactive Computer
   Graphics", ISBN : 9780074632932 (Second Edition), Tata-McGraw Hill Publication
2. Rogers," Procedural Interactive Computer Graphics", ISBN- 978-070486775, McGraw
   Hill Book Company Ltd.
3. Mathematical Elements of Interactive C.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Programming in VB.NET (UG-CS-315)
Semester I

Total lectures: 60
Total Marks: 90

Unit 1 Introduction to .Net platform   **[L-10 M-16]**

1.1 Web Client/Server Model

1.2 Protocols for Web Client/Server communication,

1.3 Introduction to .NET Framework

1.4 Components of .NET Framework

1.5 Overview of IIS, ISAPI Extensions, ISAPI Filters,

1.6 Common Language Runtime and Class Library.

Unit 2 VB.NET   **[L-12 M-16]**

2.1 Introduction to VB.NET,

2.2 Hello World (Your First VB Application),

2.3 Variable: Declaring and assigning variables, scope of variables

2.4 Constants

2.5 Operators

2.6 Functions and Subroutine.

Unit 3 Programming Styles   **[L-14 M-20]**

3.1 Array in VB.NET, Types of array

3.2 Controlling program flow

3.3 Conditional Statements: if, if else , select-case statements,

3.4 Looping Statements:- The while, do, for, and for Each statements

3.5 Flow control Statements: goto, break, continue and Exit statement

3.6 Exception Handling- Unstructured Error Handling, Structured Exception Handling

Unit 4 Object Oriented Programming   **[L-12 M-20]**
4.1 Class basics
4.2 Class Properties
4.3 Constructors and Destructors
4.4 Inheritance
4.5 Interface
4.6 Polymorphism

4.7 Operator Overloading
4.8 Introduction to Multithreaded Programming.

Unit 5 Data Access with ADO.Net   **[L-12 M-18]**
5.1 What is Database?
5.2 Overview of ADO.Net
5.3 ADO.NET object –
      5.3.1 Connection object,
      5.3.2 Command Object,
      5.3.3 Data Adapter Object,
      5.3.4 Dataset object,
      5.4.5 Data Reader Object.

References:-
1. Steven Holzner, "Visual Basic Programming 2008 Black Book", ISBN-978-1576102831, Coriolis Group,U.S.
2. Crouch Matt J , "ASP.Net and VB.Net Web Programming ", **ISBN:** 978-0201734409, Addision Wesley 2002.
2. Kogent Learning Solutions Inc.," In design Cs6 In Simple Steps", **ISBN: 9788183334792**

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective A - UG-CS-316 A) Programming in C#
Semester-I

Total lectures: 60
Total Marks: 90

Unit-1 Introducing C#   **[L-8 M: 16]**
1.1 What is C#, Characteristics of C#, Applications
1.2 How does C# differ from C++ and Java
1.3 The .NET Framework
1.4 The Common Language Runtime, User and Program Interfaces

Unit-2 Overview of C#   **[L-8 M: 10]**
2.1 Introduction, A Simple C# program
2.2 Namespaces, Adding Comments, Main Returning a value
2.3 Using Aliases for Namespace Classes
2.4 Passing String Objects to Write Line Method, Command Line arguments
2.5 Main with a Class, Providing Interactive Input, Using Mathematical Functions
2.6 Multiple Main Methods, Program Structure

Unit-3 Literal, Variables and Data Types   **[L-8 M:10]**
3.1 Introduction
3.2 Literal
3.3 Variables
3.4 Data Types, Values Type, References Types
3.5 Declaration of variables, Initialization of variables
3.6 Default values, Constant Variables, Scope of Variables
3.7 Boxing and Unboxing

Unit-4 Operator and Expressions   **[L-8 M: 10]**
4.1 Introduction
4.2 Various Operators
4.3 Arithmetic Expression, Evalution, Precedence
4.4 Type Conversion, Mathematical Function

Unit-5 Decision Making, Looping and Methods   **[L-12 M: 10]**
5.1Decision Making Statement
5.2 Looping Statement
5.3Declaring Method, Main Method
5.4 Nesting Method, Method Parameter

Unit-6 Arrays and Strings   **[L-6, M-14]**
6.1 One Dimensional Array, Two Dimensional Arrays
6.2 Variable Size Aray, The System.Array Class

6.3 ArrayList Class
6.4 Creating String, String Methods
6.5 Array of String

Unit-7 Structure and Enumeration   **[L-4, M-10]**
7.1 Structure, Structs with method
7.2 Nested Structs, Difference between Classes and Structs
7.3 Enumaration,Initialization, Basic Type

Unit-8 Class and Object   **[L-6, M-10]**
8.1 Basic Principal of OOP, Defining Class
8.2 Adding Method, Adding Variables, Access Modifiers
8.3 Creating Object, Accessing Class Member
8.4 Constructors, Overloaded Constructors, Destructors
8.5 Inheritance, Classical Inheritance, Containment Inheritance
8.6 Polymorphism

References:
   1. Balgurusamy, "Programming in C# ", ISBN: 9781259084034, Tata McGraw-Hill Education
   2. Kogent Solutions Inc "Simple Step in C#", ISBN: 978-81 7722-917-2 , Dreamtech press, Edition 2009
   3. Matthew A. Telles, "Black Book of C#",ISBN: 9781588801920, Coriolis Group Books, 2002

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective B - JAVA Programming I (UG-CS-316B)
Semester-I

Total lectures: 60
Total Marks: 90

Unit 1. INTRODUCTION TO JAVA   L-14, M-18
1.1 History of Java,
1.2 Features - Simple, Object Oriented Distributed, Robust, Secure, Architecture neutral, Portable, Interpreted, High Performance, Multithreading, dynamic.
1.3 Java and Internet,
1.4 JDK Environment (Java, Javac, AppletViewer, Javadoc),
1.5 Basics of Java- Variables, Data Types, Casting, Operators, Compiling and running java program, Command line arguments.
1.6 Arrays

Unit 2. OBJECTS AND CLASSES   L-10, M-14
2.1 Introduction – Classes and Objects
         2.1.1 Data members, methods
2.2 Types of Constructors
2.3 Overloading
2.4 Packages
2.5 Access modifier
2.6 Abstract Class.

Unit 3. FUNCTIONS IN JAVA   L-08, M-14
3.1 String functions - Concatenation, Substring, String editing, Testing for Equality,
3.2 character extraction functions – CharAt, getChars, getByte ,
3.3 Formatting functions,
3.4 Date and Time functions using Gregorian Calendar Class.

Unit 4. INHERITANCE   L-12, M-20
4.1 Inheritance- Inheritance Hierarchy, Super class, Overriding, Polymorphism,
4.2 Wrapper classes,
4.3 Reflection - 'Class' class,
4.4 Interfaces
4.5 Inner classes

Unit 5. EXCEPTION HANDELING   L-08, M-10
5.1 Dealing with errors - Types of exceptions
5.2 How to throw the Exception
5.3 Catching Exceptions.

Unit 6. STREAMS & FILES   **L-08, M-12**

6.1 Streams- Stream family - Layering stream files, Data stream,

6.2 Random access file stream,

6.3 String Tokenizers

6.4 Object streams.

References:-

1. Cay's Horstmann and Gary Cornell, " Core Java Volume -1 Fundamentals", ISBN: 81-7808-277-2

2. E. Balaguruswamy ,"Programming with Java – A primer", ISBN: 978-0-07-061713-1

3. Herbert Schildt, "The complete reference JAVA-2", ISBN: 978-0-07-049543-2, Fifth Edition, (TMH)

4. Java 6 Programming Black Book

Semester-I

1. To create line editor with features like create a new file, open existing file, Append in the file, Save and print file as well as to insert, delete, copy & move Lines in the file.
2. Write a program to isolate each lexical unit of source program statement and Create Descriptor.
3. Write lexical analyzer to remove blanks and tabs.
4. Write lexical analyzer to deleting comments.
5. Simulate CPU for SMAC0 (Small Computer)
6. SMAC0 Programming:-
    1. Addition of two numbers
    2. Subtraction of two numbers,
    3. Multiplication of two numbers
    4. Division of two numbers
    5. Find MOD
    6. GCD of two numbers
    7. LCM of two numbers
    8. Factorial of given number
    9. Square & Cube of given number.
    10. Fibonacci series
        (Do not use op-codes for MULT, MOD and DIV operation)
7. Interrupt handler in C

(Keyboard interrupt should be disabled and alt-C should be used to toggle CAPS Lock and alt- N should be used to toggle NUM lock)

LAB on Computer Aided Graphics & Programming in VB.NET

Semester-I
Computer Aided Graphics
1. Draw the following pattern using standard graphics library:
   a. Block Diagram of Computer
   b. Display Flag of India
   c. Flow Chart Symbols / DFD Symbols / ER-Diagram Symbols
2. Implement Bresenham's Line Drawing Algorithm
3. Implement Bresenham's Circle Drawing Algorithm
4. Implement DDA line Drawing Algorithm
5. Implementing translation transformation on polygon
6. Implementing scaling transformation on polygons
7. Implementing rotation transformation on polygons
8. Implement Cohen-Sutherland line clipping algorithm

VB.NET
1. Write a VB.Net Program to demonstrate Array.
2. Write a Window based application to find maximum of three numbers.
3. Write a Window based application to find factorial of a given numbers.
4. Write a Window based application for Armstrong numbers.
5. Write a VB.Net Program to demonstrate Exception Handling.
6. Write a VB.Net Program to demonstrate Constructor.
7. Write a VB.Net Program to demonstrate Single Inheritance.
8. Write a VB.Net Program to demonstrate Interface.
9. Write a VB.Net Program to demonstrate Polymorphism.
10. Design GUI and write Code for the following in VB.Net (ADO.Net) without wizard:
Accept employee details like emp_no, emp_name, emp_age and save these details in
emp_TBL.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective A: LAB on Programming in C# c
(UG-CS-LAB-303 - A)

Semester-I

1) Demonstrate Simple Console Application

2) Demonstrate Arithmetic Operator

3) Demonstrate Control Statement

4) Demonstrate Looping Statement

5) Demonstrate Array

6) Demonstrate different String Operation

7) Demonstrate structure and Enumeration

8) Demonstrate use of Class

9) Demonstrate Constructor, Destructor

10) Demonstrate Polymorphism

11) Demonstrate Inheritance

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective B: JAVA Programming–I
(UG-CS-LAB-303 B)

Semester – I

1.Write a simple program in Java to print first fifty prime number.

2.Write a program in Java to print factorial of given number using recursion

3.Write a program in Java to print Fibonacci series in given series

4.Write a program in Java to demonstrate command line arguments.

5.Write a program in Java to create student information using array

6.Write a program in Java to implement user defined package.

7.Write a program in Java to implement default & parameterized constructor.

8.Write a program in Java to demonstrate various operations on string functions.

9.Write a program in Java to demonstrate wrapper classes

10.Write a program in Java to demonstrate abstract class.

11.Write a program in Java to implement inheritance.

12.Write a program in Java to demonstrate inner class.

13.Write a program in Java to demonstrate reflection.

14.Write a program in Java to demonstrate exception handling.

15..Write a program in Java to demonstrate text stream object that take input from user & write it into text file.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Operating System (UG-CS-321)
Semester-II

Total lectures: 60
Total Marks: 90

Unit 1.Introduction   L:06M:08
    1.1 What is an operating system?
    1.2 Types of Operating System
    1.3 Services of Operating System
    1.4 Functions of operating system.

Unit 2.CPU scheduling   L:12M:16
    2.1 Multiprogramming Concepts
    2.2 Basic Concept of CPU scheduling
    2.3 Scheduling Algorithms

Unit 3.Memory Management   L:12M:20
    3.1 Logical versus Physical Address space
    3.2 Swapping
    3.3 Multiple partition allocation MFT , MVT
    3.4 Paging
    3.5 Segmentation

Unit 4. Disk and Drum Scheduling   L:12M:18
    4.1 First Come first serve scheduling
    4.2 Shortest Seek Time First Scheduling
    4.3 SCAN Scheduling
    4.4 C-SCAN Scheduling

Unit 5 Deadlocks   L:12M:18
    5.1 Concept of Deadlock
    5.2 Deadlock Characterization
    5.3 Deadlock Prevention
    5.4 Deadlock Avoidance
    5.5 Deadlock Detection
    5.6 Recovery from Deadlock

Unit 6 Overview of Android Operating system   L:06M:10
    6.1 What is android operating system.
    6.2 Android Architecture
    6.3 Features of Android operating system
    6.4 Applications of android operating system
    6.5 What is Google play store

Reference books:

1. Peterson Silberschatz, "Operating system concepts", ISBN: 0-201-35251-6, Addison Wesley, 1ST Edition
2. Andrew S. Tanenbaum, "Modem operating system", ISBN: 81-203-0974-X,   P .H.I. New Delhi 3.
3. Achyut S. Godbole, "Operating Systems" ISBN: 9780070702035, McGraw Hill Education, 2010, Third Edition

4. .Marko Garaenta, "Learning Android ,Oreilly ", ISBN: 978-1449319236, O'Reilly, second edition
5. 5 Mike Wolfson, "Android developers tools ,Essential,Oreilly" ISBN:978-1-4493-2821-4

Total lectures: 60
Total Marks: 90

Unit 1 INTRODUCTION TO SQL and MS SQL Server   [L : 10 M: 12]
Introduction to SQL
Overview of MS SQL Server   ,
New Features in MS SQL Server   ,
Data types in MS SQL Server
MS SQL Server Editions

Unit 2 DATABASE AND TABLE OPERATIONS   [L : 06 M: 10]
Database Operations - 1.Creating a Database 2.Dropping the Database
Table Operations – 1.Create 2. Alter 3.Truncate 4. Drop

Unit 3 SQL – Statements, Operators, Functions.   [L : 10 M: 16]
Opening the Query Editor Window
SQL Data Statements - SELECT, INSERT, UPDATE, DELETE
Operators - Arithmetic, Logical, Comparison, Assignment, Bitwise, Relational
String - Concatenation, Unary, Compound Assignment
Functions - Aggregate functions, Date and Time functions, String functions
Control -Control Flow Statements, BEGIN…END, GOTO, IF…ELSE, WHILE

Unit 4 VIEW, JOIN and DATA CONSTRANTS in SQL   [L : 10 M: 16]
Constraints - Data Integrity, Entity Integrity
Keys - PRIMARY KEY, UNIQUE, FOREIGN KEY, CHECK
Views - Create, Alter, Drop
Join - Joins, Cross Join, Inner Join, Outer Join, Self-Join
Statement - MERGE Statement

Unit 5 STORED PROCEDURES   [L : 10 M: 14]
Benefits of Stored Procedures
Types of Stored Procedures - System Stored Procedures, User-Defined Stored
Procedures ,Creating and Altering Stored Procedure
Indexing:-Creating an Index, Optimizing the Index Performance, Removing the
Index

Unit 6 TRIGGERS   [L : 06 M: 10]
Introduction, Triggers Vs constraints, DML Triggers, DDL Triggers,

Unit 7 ERROR HANDLING   [L : 07 M: 10]
Introduction Error Handling,
Function: - Using the @@ERROR Function,
Statement: - RAISERROR, TRY…CATCH Statement

REFERENCE BOOKS:

1. Kogent Learning Solutions Inc. (Author), " Simple Steps in SQL Server 2008", ISBN: 978-8177229554, Dreamtech press 2009.
2. Danielle Ruest and Nelson Ruest, " SQL Server 2008,The complete Reference" ISBN: 978-0072263657, McGraw-Hill Education; 1 edition.
3. SQL Server – Black Book", Dalton Patrik, DreamTech Press

Total lectures: 60
Total Marks: 90

Unit – 1   The Basics of PHP   **L:16 M:24**

1.1   Introduction to PHP
1.2   Features & Drawbacks of PHP, How PHP Works?
1.3   Version of PHP
1.4   Lexical Structure of PHP
        1.4.1   Structure & Syntax of PHP
        1.4.2   PHP with HTML
        1.4.3   Comments
        1.4.4   Data Types and Variables
        1.4.5   Operator
1.5   Flow Control Statements
        1.5.1   Conditional Statements
        1.5.2   Looping Statements
        1.5.3   Exit, Return, Die, Include and Require Statements

Unit – 2 Arrays, Function and String   **L: 12 M: 20**

2.1   Introduction to Array
        2.1.1   Index Vs Associative Array
        2.1.2   Multidimensional Array
        2.1.3   Different array function in PHP
        2.1.4   Traversing arrays, Sorting arrays
2.2   Introduction to Function
        2.2.1   Defining and Calling a function
        2.2.2   Scope of variables in function
        2.2.3   Function Parameters
        2.2.4   Returning Values from a function
        2.2.5   Recursive Functions
2.3   Types of strings in PHP
2.4   Printing functions
2.5   Comparing strings
2.6   Manipulating and Searching strings
2.7   Regular Expressions

Unit – 3 Object-Oriented PHP   **L: 12 M: 16**

3.1   Introduction and Benefits of OOPs
3.2   Creating a Class
3.3   Creating an Object
        3.3.1   Adding a Method
        3.3.2   Adding a Properties

        3.3.3   Visibility (Public, Private and Protected)
- 3.4   Constructor and Destructors
- 3.5   Inheritance (Extending a class)
- 3.6   Abstract classes, Final classes
- 3.7   Interfaces
- 3.8   Exception handling
- 3.9   Serialization

Unit – 4 Web Techniques   L: 10 M: 14

- 4.1   Introduction
- 4.2   HTTP Basics
- 4.3   Processing Forms
        4.3.1   Methods (Get and Post Method)
        4.3.2   Parameters ($_GET and $_POST)
        4.3.3   Self Processing Pages
        4.3.4   File Uploads
- 4.4   Maintaining State
        4.4.1   Cookies
        4.4.2   Sessions
        4.4.3   Combining Cookies and Sessions

Unit – 5 PHP with MySQL   L: 10 M: 14

- 5.1   Introduction to MySQL
- 5.2   Interaction between PHP and MySQL, PHP , PHP functions to manipulate MYSQL database
- 5.3   Error Checking
- 5.4   Execute DDL Statements
- 5.5   Execute DML Statements

References Books:

1. RasmusLerdorf and Kevin Tatroe, " Programming PHP" ,ISBN: 978-1-56592-610-3, O'Reilly publication,2002
2. Dave W. Mercer, Allan Kent, "Beginning PHP 5" ,ISBN: 978-0-7645-5783-5, Wrox publication , July 2004.
3. W. Jason Gilmore , "Beginning PHP and MySQL",ISBN: 978-1-4302-3115-8, 3rd edition, Apress Publication.
4. Ivan Bayross and Sharnam Shah , "PHP 5.1 for Beginners", ISBN: 9788184040753 SPD Publication 2007

Websites:
1. http://www.php.net.in
2. http://www.w3schools.com
3.http://www.tutorialpoints.com

Total lectures: 60
Total Marks: 90

Unit-1. Mathematical Preliminaries   **[L-06 M-12]**
1.1 Symbol, Alphabet, String, Formal Language, Operation on languages
1.2 Sets, Relations
      1.2.1   Sets and Subsets
      1.2.2   Relations
      1.2.3   Closure of Relations
1.3 Graphs & Trees
      1.3.1 Graphs
      1.3.2 Trees
1.4 Principal of Induction
      1.4.1 Method of Proof by Induction

Unit-2. Finite Automata   **[L-16 M-20]**
2.1 Definition of Automata
2.2 Why study Automata Theory?
      2.2.1 Introduction to finite Automata
      2.2.2 Structural representations
      2.2.3 Automata and Complexity
2.3 Descriptions of Finite Automata, Transition Systems, Transition Functions
2.4 Deterministic Finite Automata (DFA)
2.5 Nondeterministic Finite Automata (NFA)
2.6 The Equivalence of DFA and NFA
2.7 Finite Automata with ε-Moves
2.8 Melay and Moore Machines: Definition and Examples
2.9 Applications of Finite Automata

Unit-3. Regular Expressions & Regular Sets   **[L-12 M-16]**
3.1 Regular Expressions
3.2 FA & Regular Expressions
      3.2.1 Convert Regular Expression to FA
      3.2.2 Construct FA from Regular Expression
3.3 Pumping Lemma for Regular Sets and applications

Unit-4. Context Free Grammars   **[L-10 M-18]**
4.1 Introduction to Context Free Grammars
4.2 Derivation Trees
      4.2.1 Ambiguity in CFG
4.3 Simplification of Context Free Grammars
      4.3.1 Useless Symbols
      4.3.2 Null Production
      4.3.3 Unit Production
4.4 Normal forms for CFG
      4.4.1 Chomsky Normal Form (CNF)

4.4.2 Greibach Normal Form (GNF)

Unit-5 Pushdown Automata   **[L-08 M-12]**
5.1 Basic Definitions
5.2 Acceptance by Pushdown Automata
5.3 PDA and Context Free Language

Unit-6 Turing Machine   **[L-08 M-12]**
6.1 Introduction
6.2 Turing Machine Model
6.3 Representation of Turing Machine
6.4 Design of Turing Machine

References:

1. John E. Hopcraft,Rajeev Motwani, Jeffery D. Ullman, "Introduction to Automata Theory,Languages & Computations", ISBN: 978-0321455369 , Pearson publication, Third edition
2. K. L. P. Mishra, N. Chandrasekaran, "Theory of Computer Science", ISBN: 9788120329683 , Published by Prentice-Hall of India Pvt.Ltd , Third edition.
3. Daniel A. Cohen, "Introduction to Computer Theory",ISBN: 978-0471137726, John Wiley & Sons; 2nd Revised edition edition.

Total lectures: 60
Total Marks: 90

Unit-1. **Introduction to Computer Network and Network Model**   [L-10 M- 12]
    1.1 What is Computer Network?
    1.2 Application Of Computer Networks
    1.3 Transmission Mode , Network Structure
    1.4 Network Topologies
    1.5 ISO OSI Reference Models, TCP / IP Reference Model & their Comparison.

Unit-2. **Physical Layer**   [L-10 M- 15]
    2.1 Guided Media:
        2.1.1 Twisted Pair
        2.1.2 Coaxial Cable
        2.1.3 Fiber Optics
        2.14   Satellite Communication
        2.15   Microwave Communication
        2.1.6 Submarine Cables.
    2.2 Unguided Media
        2.2.1. Electromagnetic Spectrum
        2.2.2. Radio Transmission
        2.2.3. Microwave Transmission
        2.2.4. Infrared & Millimeter Waves
        2.2.5. Light wave Transmission

Unit 3. The Data link Layer   [L-10 M- 15]
    3.1 Services Provided to Network Layer
    3.2 Framing, Error Control , Flow Control
    3.3 Error Detection – Redundancy, Parity Check, Checksum & CRC,
    3.4 Error Correction – Hamming Code.

Unit 4. The Network Layer   [L-10 M- 18]
    4.1 Logical Addressing
        4.1.1 IP v4 Addresses
          - Address Space
          - Classful Addressing
          - Classless Addressing
    4.2. Routing Algorithm
        4.2.1. Shortest Path
        4.2.2. Multicast Routing
    4.3. Congestion Control
        4.3.1. Introduction to Congestion Control
        4.3.2. Deadlocks

Unit-5. Transport Layer   **[L-10 M- 15]**
    5.1 Process to Process Delivery
          5.1.1   Client-Server Paradigm
          5.1.2   Multiplexing and Demultiplexing
          5.1.3   Connectionless v/s Connection Oriented Services
          5.1.4   Reliable v/s Unreliable Transmission
    5.2 UDP and TCP
          5.2.1   UDP – Operations and uses
          5.2.2   TCP – Services and features

Unit-6. Cryptography and Public key Infrastructure   **[L-10 M-15]**
6.1 Introduction:
        6.1.1 Cryptography, Cryptanalysis, Cryptology, Substitution
        6.1.2 Techniques: Caesar's cipher, Monoalphabetic and Polyalphabetic,
        6.1.3 Transposition techniques – Rail fence technique, Simple Columnar
6.2 Public key infrastructures:
        6.2.1 basics, digital certificates, certificate authorities, registration
              authorities, Digital Signature.

Reference Books: -
1. Andrew S.Tanenbaum , "Computer Networks " ISBN: 978-0130661029, Prentice Hall, Fourth Edition .
2. Behrouz A. Forouzan , "Data Communication & Networking", ISBN: 978-0071232418 , McGraw Hill Higher Education , Third Edition
3. 3.U.D. Black , "Data Communication & Distributed Networks", ISBN: 9780835913416, Published by Prentice-Hall, Englewood Cliffs, N.J., 1987 , Second Edition ,

Elective A - Web Programming using   ASP.NET

(UG-CS-326 A)
Semester-II

Total lectures: 60
Total Marks: 90

Unit 1. Introduction   (L-10, 20 Marks)
- History of Asp.Net,
- Introduction to Asp.Net,
- Features of Asp.Net,
- Structure of Asp.Net Page,
- ASP.Net Compilation Model,
- Code Behind Model
- Execution Stages and Event Model for the Page Class.

Unit 2. ASP.NET Controls   (L-10, 20 Marks)
- Introducing Web Forms,
- HTML Controls,
- Web Controls,
- Miscellaneous Basic Controls.
- ASP.Net Rich Controls,
- Validation Controls,
- ASP.Net Page Directives, User Controls.

Unit 3. ASP.Net Intrinsic Objects   (L-20, 20 Marks)
- HTTPRequest Object,
- HTTPResponce Object,
- HTTPServerUtility Object,
- HTTPApplicationState Object,
- HTTP Session state Object,
- Object Context object.

Unit 4. Data Access with ADO.Net   (L-20, 30 Marks)
- ASP.Net Data List Controls,
- Working With ADO.Net,
- Using Basic SQL,
- Working With ASP.Net Object,
- Data Reader Object,
- Data Table Object,
- DataRow Object,
- DataColumn Object,

- DataRelation Object.

Books References: -

1. Kogent Learning Solutions, ".NET 4.0 Programming 6 in 1 Black BoOK", ISBN: 9789350045107, by Dreamtech Press,2013.
2. Crouch, Matt J, "Asp.Net and Vb.Net Web Programming"ISBN: 9780201734409, Addison-Wesley, 2002.
3. J.Liberty,D.Hurwitz , Programming ASP.Net, ISBN: 978-0596529567, O'Reilly Media ,4TH Edition.

WEB References:- 1. http://www.tutorialspoint.com

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective B - JAVA Programming II (UG-CS-326B)
Semester-II

Total lectures: 60
Total Marks: 90

Unit-1. GRAPHICS PROGRAMMING   **L-10, M-14**
1.1 Introduction- frames, frame layouts,
1.2 Displaying information in a frame, Graphics objects and paint component method,
1.3 Text and Fonts,
1.4 Colors,
1.5 Drawing Shapes, Filling Shapes,
1.6 Paint mode and Images.

Unit-2. EVENT HANDLING   **L-14, M-16**
2.1 Basic Event Handling,
2.2 The AWT event hierarchy,
2.3 Event handling summary- event sources and listener, adapter classes.
2.4 Low level events - Focus, window, keyboard, mouse events.
2.5 Multicasting

Unit-3. USER INTERFACE COMPONENTS USING SWING   **L-12, M-18**
3.1 Introduction to layout management - Panels, Border Layout, Grid Layout,
3.2 Text Input- Text Field, Text Area, Password field
3.3 Labels and Buttons
3.4Making choices - Check boxes, Radio buttons, List, Combo boxes

Unit-4 Menu and Dialog Box   **L-10, M-14**
4.1 Menus - Building menus
4.2 Menu events,
4.3 Popup menu,
4.4 Keyboard mnemonics and Accelerators, enabling and disabling menus
4.5 Dialog boxes - opening dialogs using inbuilt dialog box

Unit- 5. APPLETS   **L-07, M-13**
5.1 Applet basics -Simple applets, testing applets,
5.2 Security basic,
5.3 Converting application to applets,
5.4 Life cycle of applet
5.5 Param Tag

Unit- 6. INTRODUCTION TO ADVANCED JAVA   **L-07,M-13**
6.1Collections
        6.1.1 Interfaces- List, Set,
        6.1.2 Classes- Array List, Vector
6.2 Database connectivity –JDBC
6.3 Introduction to JavaBeans- Servlets, Java Server Pages (JSP)

References:-

1. 1. Cay's Horstmann and Gary Cornell , "Core Java   Volume 2", ISBN: 978-0-13-708160-8, 9TH edition, published by Prentice Hall
2. E. Balaguruswamy ,"Programming with Java – A primer", ISBN: 978-0-07-061713-1
3. 3.Herbert Schildt, "The complete reference JAVA-2", ISBN: 978-0-07-049543-2, Fifth
4. Edition, (TMH)
5. Java Programming Black Book.
6. Buyya, Selvi, Chu, , "Object Oriented Programming with Java", ISBN: 978-0070678835, Tata McGraw Hill Education 2010

Semester-II

1. Demonstration of creating database and table and use of DML statements.
    i.   Create and Alter Database
    ii.   Create, Alter and Drop Table
    iii.   Select,Insert,Update,Delete,Group By,Having etc. Statements
    iv.   Use of Functions – Group,String,Matematical,Date

2. Defining different types of database constraint.
    Create Table using Primary, Foreign,Unique keys, Check Constraints, Not Null
    Constraints using single and multiple tables.

3. SQL : Simple, Subquery ,Join and Operators
    i.   Write Simple Queries
    ii.   Use of Logical operators like Between,Like,Any,In,Some, ALL
            ,AND,OR,NOT
    iii.   Use of Merge, Index statement
    iv.   Cross, Inner, Outer and Self Join
    v.   Create, Alter and Drop View

4.. Demonstration of stored procedures and triggers
    i. Create and Alter Stored Procedure using INPUT , OUTPUT & TABLE
       Valued   parameters
    ii. Creating DML & DDL triggers

5. Demonstrate the Use of @@error & RAISERROR
    1. Use of @@error by error numbers : 515,2627 and 547
    2. Use of TRY..CATCH ststement

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
Lab on - Internet Programming using PHP
UG-CS-LAB- 305

Semester-II
1. Design web pages using HTML that will contain online admission forms.
2. Write PHP scripts that demonstrate fundamentals PHP.
3. Write PHP script that will display grade based on criteria given below using the marks obtained in T.Y.Bsc. Examination.
    a. Distinction (70 and above)
    b. First Class (60 - 69)
    c. Pass (40 - 59)
    d. Fail (below 40)
4. Write a PHP script to demonstrate different String functions.
5. Write a PHP script to demonstrate array.
6. Write a PHP script to use Functions (Call by Value, Call by reference).
7. Write a PHP script to Demonstrate OOPS Concept in PHP.
8. Write a PHP script to demonstrate Exception Handling.
9. Write a PHP script to demonstrate Form Data Handling using Get and Post methods.
10. Design a database in MYSQL using PHP. Create table in database. Store, Update, Delete and Retrieve data from the table. Display the data from the table.
11. Write a PHP script to store, retrieve and delete cookies on your local machine.
12. Write a PHP script to store, retrieve and delete data using session variables.

North Maharashtra University, Jalgaon
T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective A - LAB on Web Programming using ASP.NET

(UG-CS-LAB-306 A)
Semester-II

1. Write an ASP .net program that demonstrate use of HTML Controls
2. Write an ASP .net program that demonstrate use of web controls.
3. Write an ASP .net that return the windows name of your computer and URl of the page that you are visiting.
4. Write an ASP .net program that demonstrate use of Validations Controls.
5. Write an ASP .net program that demonstrate use of Intrisic Objects.
6. Write an ASP .net program that demonstrate Application and Session Scope Variables using Global.Asax
7. Write an ASP .net program that demonstrate Page directives.
8. Write an ASP .net page that used the connection object to connect the database and display information using datagrid Controls.

North Maharashtra University, Jalgaon

T. Y. B. Sc. (Computer Science)
(w.e.f. June -2017)
Elective B - LAB on JAVA Programming – II
(UG-CS-LAB-306 B)
Semester-II

1. Write a program in Java to display messages in various fonts in a frame

2. Write a program in Java to draw various geometric shapes like circle, line, rectangle etc.

3. Write a program in Java to demonstrate paint mode.

4. Write a program in Java to demonstrate window events.

5. Write a program in Java to demonstrate Mouse events.

6. Write a program in Java to demonstrate Keyboard events.(key pressed, key released)

7. Write a program in Java to demonstrate multicasting

8. Write a program in Java to demonstrate user interface component list boxes and combo box.

9. Write a program in Java to demonstrate user interface component radio button and check box.

10. Write a program in Java to demonstrate menus as interface component.

11. Write a program in Java to demonstrate multithreading.

12. Write an Applet to display human face.

13. Write a program in Java to demonstrate Java Applet with parameter

14.Write a program in java to demonstrate collection interfaces. (List and Set).