

**NORTH MAHARASHTRA UNIVERSITY,  
JALGAON**

**SYLLABUS FOR**

**T.Y.B.Sc.**

**COMPUTER SCIENCE**

**(With effect from June 2014)**

North Maharashtra University, Jalgaon

T.Y.B.Sc. (Computer Science)

(w.e.f. June-2014)

Structure

Semester –I	Semester-II
UG-CS-311 System Programming	UG-CS-321 Operating System
UG-CS-312 Advanced DBMS	UG-CS-322 SQL Server 2008
UG-CS-313 Software Engineering	UG-CS-323 Internet Computing
UG-CS-314 Computer Aided Graphics	UG-CS-324 Theoretical Computer Science
UG-CS-315 VB.NET	UG-CS-325 Basics of Microprocessor and 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) ASP.NET OR Elective -B UG-CS-326 B) JAVA Programming-II
UG-CS-Lab-301 Lab on System Programming & SQL server 2008	
UG-CS-Lab-302 Lab on VB.NET, Computer Aided Graphics & Internet Computing	
UG-CS-Lab-303 A) Lab on C# & ASP.NET OR UG-CS-Lab-303 B) Lab on JAVA Programming –I & 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 10 marks are for internal assessment and 40 marks are for external.

## **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

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**T. Y. B. Sc. (Computer Science)**

(w.e.f. June -2014)

**System Programming (UG-CS-311)**

**Semester-I**

<b>Unit-1 Introduction</b>	<b>[L:6,M:4]</b>
1.1 What is System Software?	
1.2 Goals of System Software	
1.3 System Programs and Systems Programming	
1.4 View of System Software	
<b>Unit-2 Software Tools</b>	<b>[L:6,M:4]</b>
2.1 What is a Software Tools?	
2.2 Software Tools for Program Developments	
2.3 Editors	
2.4 Debug Monitors	
2.5 Programming Environments	
<b>Unit-3 Overview of Language Processors</b>	<b>[L:10,M:6]</b>
3.1 Programming Languages and Language Processors	
3.2 Language Processing Activities	
3.3 Fundamentals of Language Processing	
<b>Unit-4. Compiler</b>	<b>[L:12,M:8]</b>
4.1 What is Compiler	
4.2 Scanning and Parsing	
4.2.1 Programming Language Grammars	
4.2.2 Scanning	
4.2.3 Parsing	
4.3 Language Processors Development Tools	
<b>Unit-5. Assembler</b>	<b>[L:12,M:8]</b>
5.1 Elements of Assembly Language Programming	
5.2 A simple Assembly Scheme	
5.3 Pass structures of Assemblers	
5.4 Design of a Two Pass Assembler	

## **Unit-6. Macro and Macro Preprocessor**

[L: 8, M: 6]

- 6.1 Macro Definition and Call
- 6.2 Macro Expansion
- 6.3 Nested Macro Calls
- 6.4 Advanced Macro Facilities
- 6.5 Design of Macro Processor

## **Unit-7. Linkers and Loaders**

[L: 6, M: 4]

- 7.1 Introduction
- 7.2 Relocation and Linking Concepts
- 7.3 Self Relocating Programs
- 7.4 Linking for Overlays
- 7.5 Dynamic Linking
- 7.6 Loaders

### **References:**

1. D.M. Dhamdhare, Systems Programming
2. D.M. Dhamdhare, Systems programming and operating system.
3. John Donovan, System programming.
4. Alfred V Aho, Ravi Sethi, Jeffery D. Ullman, Compilers Principals, Techniques and tools, Pearson education, Delhi, 2008.

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(w.e.f. June -2014)

**UG-CS 312 Advanced DBMS**

**Semester I**

**Unit-1. Introduction to Relational Database Design** [L-12, 08 M]

RDBMS terminology, Codd's Rules, Functional Dependency, Data Normalization (1NF, 2NF, 3NF, BCNF)

**Unit-2. Transaction Management and Concurrency Control** [L-12, 08 M]

Transaction Concept, Transaction State, Transaction Properties (ACID), Serializability, Concept of Concurrency Control, Lock Based Protocols, Two phase locking, deadlock.

**Unit-3. Backup and Recovery System** [L-12, 08 M]

Concept of backup ,Importance of Backup, Failure Classification, Recovery &Atomicity, Log Based Recovery, Recovery techniques –Deferred update, Immediate update ,Shadow Paging.

**Unit-4. Distributed Databases** [L-12, 08 M]

Advantages and disadvantages of distributed database, Homogeneous & Heterogeneous Database, Distributed Data Storage, Commit protocols.

**Unit-5. Innovative Database Concepts** [L-12, 08 M]

XML Database, XML Data model, DTD, Mobile Database-Need, Applications, Multimedia Database-Image Database, Text/Document Database, Video Database, Audio Database, Spatial Database, Web Databases, GIS (Geographic Information system).

**Reference Books:-**

1. Database System Concepts- Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw- Hill, 4<sup>th</sup> Edition / 5<sup>th</sup> Edition.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/Addison Wesley, 2007.
3. Database System Concepts – Alexis Leon & Mathews Leon, Vikas Publication House Ltd, New Delhi.

**North Maharashtra University, Jalgaon**  
**T. Y. Bsc. (Computer Science)**  
**(w. e. f. June-2014)**  
**Software Engineering (UG-CS-313)**  
**Semester – I**

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**Unit-1. Software Engineering**

[M 08 L 10]

- 1.1 Definition
- 1.2 Software Process
- 1.3 Software Characteristics
- 1.4 Software Development Life Cycle(SDLC): Requirements, Feasibility Study, Analysis, Design, Coding, Testing, Implementation and Maintenance.

**Unit-2. Software Life Cycle Models**

[ M 06 L 12]

- 2.1 Waterfall Model
- 2.2 Prototype Model
- 2.3 Spiral Model
- 2.4 Rapid Application Development(RAD)

**Unit-3. Software Design**

[M 10 L 12]

- 3.1 What is design.
- 3.2 Objectives of design
- 3.3 Modularity: Module coupling, Module Cohesion, Relationship between coupling and cohesion.
- 3.4 Strategy of design : Bottom up, Top down and Hybrid
- 3.5 Data Flow Diagram(DFD), levels in detail
- 3.6 Data Dictionary

**Unit-4. Software Quality**

[M 05 L 08]

- 4.1 Quality concept
- 4.2 Software Quality Assurance(SQA)
- 4.3 Quality Standards

**Unit-5. Coding and Testing**

[M 06 L 10]

- 5.1 Structured Programming
- 5.2 Programming Style
- 5.3 Internal Documentation
- 5.4 Testing
  - 5.4.1 Definition
  - 5.4.2 Testing objectives

### 5.4.3 Black box and White box Testing

#### **Unit-6. Software Maintenance**

**[ M 05 L 08]**

- 6.1 Definition
- 6.2 Types of Maintenance
- 6.3 Problems during maintenance
- 6.4 Solution to maintenance problem
- 6.5 Maintenance process

#### **References:**

1. Software Engineering(3 edition) by K.K. Aggarwal, Yogesh Singh, new age international publishers
2. Software Engineering A practitioners Approach(6<sup>th</sup> Edition) Roger S. Pressman Mc GRAW HILL International Edition.
3. Software Engineering by Rajib Mall, PHI PUBLICATION.



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**T. Y. B. Sc. (Computer Science**  
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**Computer Aided Graphics (UG-CS-314)**  
**Semester-I**

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**Unit-1. Introduction to Graphics.** **[L:08 M:04]**

- 1.1 The origin of computer graphics
- 1.2 How the interactive graphics display works.
- 1.3 Display types : Random Scan and Raster Scan
- 1.4 Definitions : Pixel, Resolution, Aspect Ratio, Active graphics, Passive graphics ,Interactive, Non interactive graphics
- 1.5 Application of Computer Graphics

**Unit-2. Line Drawing Technique.** **[L:06 M:06]**

- 2.1 Co-ordinate Systems
- 2.2 Incremental method
- 2.3 The Simple DDA
- 2.4 The Symmetrical DDA
- 2.5 Bresenham's Algorithm

**Unit- 3. Two Diamental Transformations.** **[L:08 M:04]**

- 3.1 Transformation principles
- 3.2 Concatenations
- 3.3 Matrix Representation

**Unit- 4. Three Dimensional Transformations** **[L:08 M:04]**

- 4.1 Transformations
- 4.2 Transformation in Viewing
- 4.3 The perspective Transformation

**Unit- 5. Clipping and Windowing** **[L:14 M:10]**

- 5.1 Cohen-Sutherland algorithm
- 5.2 Mid-point Subdivision
- 5.3 Polygon Clipping
- 5.4 Viewing Transformation

- 5.5 The Windowing Transformation
- 5.6 3-D Clipping

## **Unit- 6 . Raster Graphics and Solid Area Scan –Conversion**

**[L:08 M:06]**

- 6.1 Introduction
- 6.2 Scan Converting Line Drawings
- 6.3 Scan Converting Polygons
- 6.4 Coherence
- 6.5 (YX) Algorithm

## **Chapter 7. Hidden Surface Elimination**

**[L:08 M:06]**

- 7.1 Object Space and Image Space Algorithms
- 7.2 The Depth Buffer Algorithm
- 7.3 Warnock's Algorithm

### **Reference:**

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

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**VB.NET (UG-CS-316A)**

**Semester-I**

**Unit 1 The .Net platform & Web**

**[L-12, 08 M]**

Web Client/Server Model, Protocols for Web Client/Server communication  
Components of .NET Framework-Overview of IIS, ISAPI Extensions, ISAPI Filters,-Web Forms  
Common Language Runtime and Class Library, Managed Components, Web Services.

**Unit 2 VB.NET**

**[L-12, 04 M]**

Introduction to VB.NET, Hello World (Your First VB Application), variable Types-  
Declaring and assigning variables,-scope of variables, Constants, and Operators, Functions and  
Subroutine.

**Unit 3 Programming Styles**

**[L-12, 10 M]**

Array in VB.NET, Types of array, controlling program flow, Conditional Statements:- if  
and select-case statements, Looping Statements:- The while, do, for, and for Each statements,  
flow control Statements:- goto, break, continue, and exit statements,  
Exception Handling- Unstructured Error Handling, Structured Exception Handling.

**Unit 4 Object Oriented Programming**

**[L-12, 12 M]**

Class basics, Class Properties, Inheritance, Interface, Polymorphism, Constructors and  
Destructors, Introduction to Multithreaded Programming.

**Unit 5 Data Access with ADO.Net**

**[L-12 M-6]**

What are Database, Overview of ADO.Net, ADO.NET object-Connection object,  
Command Object, Data Adapter Object, Dataset object, Data Reader Object.

**References:-**

1. Visual Basic Programming 2008 Black Book.
2. ASP.Net and VB.Net Web Programming by Crouch MattJ, Addison Wesley 2002.
3. Simple Steps in VB.Net Kogent Learning Solutions Inc.

**T. Y. B. Sc. (Computer Science)**  
**Elective-A**  
**Programming in C# (UG-CS-326A)**  
**Semester-I**

**Unit-1 Introducing C#**

- 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

[L-8 M:6]

**Unit-2 Overview of C#**

- 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

[L-8 M:6]

**Unit-3 Literal, Variables and Data Types**

- 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

[L-8 M:6]

**Unit-4 Operator and Expressions**

- 4.1 Introduction
- 4.2 Various Operators
- 4.3 Arithmetic Expression, Evaluation, Precedence
- 4.4 Type Conversion, Mathematical Function

[L-8 M:6]

**Unit-5 Decision Making, Looping and Methods**

- 5.1 Decision Making Statement
- 5.2 Looping Statement
- 5.3 Declaring Method, Main Method
- 5.4 Nesting Method, Method Parameter

[L-12 M:10]

### **Unit-6 Arrays and Strings**

- 6.1 One Dimensional Array, Two Dimensional Arrays
- 6.2 Variable Size Array, The System.Array Class
- 6.3 ArrayList Class
- 6.4 Creating String, String Methods
- 6.5 Array of String

[L-4, M-4]

### **Unit-7 Structure and Enumeration**

- 7.1 Structure, Structs with method
- 7.2 Nested Structs, Difference between Classes and Structs
- 7.3 Enumeration, Initialization, Basic Type

[L-4, M-4]

### **Unit-8 Class and Object**

- 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

[L-6, M-4]

## **References:**

1. Programming in C# by Balgurusamy
2. Simple Step in C# By Kogent Solutions Inc
3. Black Book of C#

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**T. Y. B. Sc. (Computer Science)**  
**Elective B - JAVA Programming I (UG-CS-316B)**  
**Semester-I**

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**Unit 1. INTRODUCTION TO JAVA**

**L-14, M-08**

Java as programming tool , Advantages of Java - Simple, object oriented Distributed, Robust, Secure, Architecture neutral, Portable, Interpreted, High Performance, Multithreading, dynamic. Java and Internet, Variables, Data Types, Operators, Arrays, Casting, Compiling and running java program, Command line arguments.

**Unit 2. OBJECTS AND CLASSES**

**L-10,M-06**

Introduction - Classes, Objects, Data members, methods, Use of existing classes, Types of Constructors , Overloading, Packages.

**Unit 3. FUNCTIONS IN JAVA**

**L-08, M-06**

String functions - Concatenation, Substring, String editing, Testing for Equality, character extraction function – CharAt, getChars, getByte , Formatting functions, Date and Time functions using Gregorian Calendar Class.

**Unit 4. INHERITANCE**

**L-12, M-10**

Inheritance, Inheritance Hierarchy, Super class, Overriding, Polymorphism, Access modifier, Wrapper classes, Reflection - 'Class' class, Interfaces, Inner classes, Abstract Classes.

**Unit 5. EXCEPTION HANDLING**

**L-08, M-04**

Dealing with errors ,Types of exceptions, How to throw the Exception, Catching Exceptions.

**Unit 6. STREAMS & FILES**

**L-08,M-06**

Streams, The complete stream family - Layering stream files, Data stream, random access file stream, Putting stream to use - writing delimited output, String Tokenizers & delimited input, Object streams.

**References:-**

1. Cay's Horstmann and Gary Cornell. Core Java Volume -1 Fundamentals
2. E. Balaguruswamy ( Tata Mc Graw Hill) Programming with Java – A primer
3. Herbert Schildt (TMH) The complete reference JAVA-2 Fifth Edition
4. Java 6 Programming Black Book

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**T. Y. B. Sc. (Computer Science)**

(w.e.f. June -2014)

**Operating System (UG-CS-321)**

**Semester-II**

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**Unit 1.Introduction**

**L:06 M:06**

- 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:12 M:10**

- 2.1 Multiprogramming Concepts
- 2.2 Basic Concept of CPU scheduling
- 2.3 Scheduling Algorithms

**Unit 3 Memory Management**

**L:12 M:10**

- 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:06 M:04**

- 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:10 M:06**

- 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:04**

- 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. Addison Wesley.
2. Andrew S. Tanenbaum, Modern operating system, P .H.I. New Delhi
3. Achyut S. Godbole, Operating Systems
4. Marko Garaenta, Learning Android ,Oreilly
5. Android developers tools ,Essential,Oreilly.



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(w.e.f. June -2014)

UG-CS 322 SQL Server-2008

Semester II

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**Unit 1 INTRODUCTION TO SQL and SQL Server 2008** [ L : 08 M: 04]

Introduction to SQL

Overview of SQL Server 2008 ,

New Features in SQL Server 2008 ,

Data types in SQL Server 2008

SQL Server 2008 Editions

**Unit 2 DATABASE AND TABLE OPERATIONS** [ L : 06 M: 04]

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: 06]

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 CONSTRAINTS in SQL 2008** [ L : 10 M: 08]

**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 : 14 M: 08]

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: 06]

Introduction, Triggers Vs constraints, DML Triggers, DDL Triggers,

## **Unit 7 ERROR HANDLING**

[ L : 06 M: 04]

Introduction Error Handling,

Function: - Using the @@ERROR Function,

Statement: - RAISERROR, TRY...CATCH Statement

## **REFERENCE BOOKS:**

- 1) Simple Steps in SQL Server 2008
- 2) SQL Server 2008,The complete Reference, TMH
- 3) SQL Server 2008 Black book, BPB Publishers

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**T.Y.B.Sc.( Computer Science)**

**(w.e.f. June-2014)**

**Internet Computing (UG-CS-323)**

**Semester – II**

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<b>Unit 1 Introduction to Internet and Web Site:</b>	<b>[06 M 08L]</b>
1.1 History of Internet	
1.2 Working of Internet	
1.3 Uses and Application of Internet	
1.4 Web Browsers and Search Engines	
1.5 Site Types	
1.6 Site Structure	
1.7 Site Organization Model	
<b>Unit 2 Web Design Process:</b>	<b>[08M 08L]</b>
2.1 What is Web Design	
2.2 Web Design Pyramid	
2.3 Web Process Model	
2.3.a Basic Web Process Model	
2.3.b Modified Waterfall Model	
2.3.c Joint Application Development Model	
2.4 Site Plan and Testing	
<b>Unit 3 Page Types and Navigation Theory:</b>	<b>[06M 06L]</b>
3.1 Page Types	
3.2 Page Size and Margins	
3.3 What is Navigation	
3.4 Placing Navigation	
<b>Unit 4 Introduction to HTML Programming:</b>	<b>[08M 14L]</b>
4.1 Structure of HTML Document	
4.2 Text Formatting Tags and Character Entity References	
4.3 List Tags	
4.4 Image and Anchor Tag	
4.5 Table Tags	

4.6 Frame and Form Tag with Form elements

4.7 Script Tags

### **Unit 5 VB Script**

**[12M 14L]**

5.1 Script and Script Types

5.2 Variables and Data Types

5.3 Conditional Statements

5.4 Control Statements(Looping)

5.5 Procedure and Functions

5.6 Data Conversion Functions

5.7 Math and String Functions

5.8 What is Validation?

5.8.a String Validation

5.8.b Numeric Validation

5.8.c Date and Time Validation

### **References:-**

- 1) The Complete reference –Web Design, Second Edition By Thomas A. Powell, TMH, ISBN-0-07-041186.
- 2) Internet in easy steps By Dremtech press.
- 3) How to become web master in 14 days By James L. Mohler, TechMedia.
- 4) HTML 4.0 By E.Stephen Mack & Janan Platt, BPB publication.
- 5) Web References [www.w3c.org](http://www.w3c.org), [www.sybex.com](http://www.sybex.com)
- 6) Teach yourself Vbscript in 21 days By Keith Brophy, SAMS publishing, ISBN-13:97815752112

**T. Y. B. Sc. (Computer Science)**  
**Theoretical Computer Science(UG-CS-324)**  
**Semester-II**

**Unit-1. Mathematical Preliminaries** **[L-06 M-04]**

- 1.1 Set Notations
- 1.2 Graph & Tree
- 1.3 Strings, Alphabets & Languages
- 1.4 Relations

**Unit-2. Finite Automata** **[L-16 M-10]**

- 2.1 Definition
- 2.2 Descriptions, Transition Systems, Transition Functions
- 2.3 Deterministic Finite Automata(DFA)
- 2.4 Nondeterministic Finite Automata(NFA)
- 2.5 Finite Automata with  $\epsilon$ -Moves
- 2.6 Melay and Moore Models
- 2.7 Minimizations of Finite Automata
- 2.8 Applications of Finite Automata

**Unit-3. Regular Expressions & Regular Sets.** **[L-12 M-08]**

- 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

**Unit-4. Context Free Grammars** **[L-10 M-08]**

- 4.1 Introduction to Context Free Grammars
- 4.2 Derivation Trees
- 4.3 Simplification of Context Free Grammars
  - 4.3.1 Useless Symbols
  - 4.3.2  $\epsilon$ - Production
  - 4.3.3 Unit Production
- 4.4 Normal forms for CFG

- 4.4.1 Chomsky Normal Form (CNF)
- 4.4.2 Greiback Normal Form (GNF)

**Unit-5 Push Down Automata**

**[L-08 M-06]**

- 5.1 Basic Definitions
- 5.2 Acceptance by Push Down Automata
- 5.3 PDA and Context Free Language

**Unit-6 Turing Machine**

**[L-08 M-04]**

- 6.1 Introduction
- 6.2 Turing Machine Model
- 6.3 Representation of Turing Machine

**References:**

- 1) John E. Hopcraft, Jeffery D. Ullman, Introduction to Automata Theory, Languages & Computations
- 2) K. L. P. Mishra, N. Chandrasekaran, Theory of Computer Science.
- 3) Daniel A. Cohen, Introduction to Computer Theory.

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**T. Y. B. Sc. (Computer Science)**  
**(w.e.f. June -2014)**  
**Basics of Microprocessor and Computer Network (UG-CS-325)**  
**Semester-II**

**Unit-1. Introduction to Microprocessor** **[L-10 M:8]**

- 1.1 Microprocessor and its components
- 1.2 Introduction to 8085 [Internal architecture, pin diagram and system bus ]
- 1.3 Introduction to Pentium
- 1.4 Pentium Processor Family

**Unit-2. Reference Model and Data Link Layer** **[L-10 M- 08]**

- 2.1 What is Computer Network?
- 2.2 Transmission Path: Twisted Pair, Coaxial Cable, Fiber Optics, Satellite Communication, Microwave Communication, Submarine Cables.
- 2.3 ISO OSI Reference Models, TCP / IP Reference Model & their Comparison.
- 2.4 Services Provided to Network Layer, Framing, Error Control, Flow Control
- 2.5 Error Correction – Redundancy, Parity Check, Checksum & CRC, Error Detection – Hamming Code.

**Unit-3. Introduction and Security trends** **[L-08 M- 06]**

- 3.1 Introduction,
- 3.2 Need for security,
  - 3.2.1 Security basics: Confidentiality, Integrity, Availability, Authentication, Access Control
- 3.3 Threats to security: Viruses and Worms, Intruders, Insiders,
- 3.4 Types of attack:
  - 3.4.1 Active and Passive attacks, Denial of service, backdoors and trapdoors, TCP/IP Hacking, encryption attacks.

**Unit-4. Cryptography and Public key Infrastructure** **L-10 M-10**

- 4.1 Introduction:
  - 4.1.1 Cryptography, Cryptanalysis, Cryptology, Substitution

- 4.1.2 techniques: Caesar's cipher, monoalphabetic and polyalphabetic,
- 4.1.3 Transposition techniques – Rail fence technique, simple columnar,
- 4.2 Hashing - concept
- 4.3 Symmetric and asymmetric cryptography
- 4.4 Public key infrastructures:
  - 4.1.4 basics, digital certificates, certificate authorities, registration authorities, Digital Signature.

**Unit-5. Network security**

**L-10 M-08**

- 5.1 Firewalls: concept, design principles, limitations,
- 5.2 IP security:
  - 5.2.1 Overview, architecture, IPSec, IPSec configurations, IPSec security
- 5.3 Virtual Private Network
- 5.4 Email security:
  - 5.4.1 Email security standards: Working principle of SMTP, PEM, PGP, S/MIME, spam.

**Ref Book: -**

1. Ramesh Gaonkar, Microprocessor Architecture programming & Applications with 8085.
2. Barry B. Brey, The Intel Microprocessors: 8086/8088, 80186, 80286, 80386 & 80486 Architecture, Programming & Interfacing.
3. 2. Computer Networks – Fourth Edition – By Andrew S. Tanenbaum
4. Data Communication & Networking – Third Edition – By Behrouz A. Forouzan
5. Network Security-Atul Kahate



**T. Y. B. Sc. (Computer Science)**

**ASP.NET (UG-CS-326A)**

**Semester-II**

**Unit 1. Introduction**

**(L-10, 10 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-15, 12 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-10, 08 Marks)**

HttpRequest Object, HttpResponse Object, HttpServerUtility Object, HttpApplicationState Object, HTTP Session state Object, Object Context object.

**Unit 4. Data Access With ADO.Net**

**(L-10, 10 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. .NET 4.0 Programming 6 in 1 Black Book, by Kogent Learning Solutions, Dreamtech Press,2013.
2. Crouch, Matt J, Asp.Net and Vb.Net Web Programming, Addison-Wesley, 2002.
3. Programming ASP.Net,J.Liberty,D.Hurwitz, 3rd Edition.

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

**North Maharashtra University, Jalgaon**

**T. Y. B. Sc. (Computer Science)**

**Elective B - JAVA Programming II (UG-CS-326B)**

**Semester-II**

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**Unit-1. GRAPHICS PROGRAMMING**

**L-10, M-07**

Introduction, frames, frame layouts, Displaying information in a frame, Graphics objects and paint component method, Text and Fonts, Colors, Drawing Shapes, Filling Shapes, Paint mode and Images.

**Unit-2. EVENT HANDLING**

**L-14, M-08**

Basic Event Handling, The AWT event hierarchy, event handling summary, low level events - Focus, window, keyboard, mouse events, Multicasting, event sources and listener, adapter classes.

**Unit-3. USER INTERFACE COMPONENTS USING SWING**

**L-12, M-08**

Introduction to layout management - Panels, Border Layout, Grid Layout, Text Input- Text Field, Input validation, password field, Labels and Labeling components , selecting text, Editing Text, Making choices - Check boxes, Radio buttons, List, Combo boxes, Border, Scrollbars - Scroll panes, Scrolling window, Menus - Building menus, Reacting to menu events, Icons in item menus, checkbox and radio button, menu items, Popup menu, Keyboard mnemonics and Accelerators, enabling and Disabling menus, dialog boxes - opening dialogs using inbuilt dialog box

**Unit- 4. MULTITHREADING**

**L-10,M-05**

What are threads?, Interrupting Threads, Thread states, Thread priority, Synchronization.

**Unit- 5. APPLETS**

**L-08, M-06**

Applet basics -Simple applets, testing applets, security basic, converting application to applets, life cycle of applet, the applet HTML, tags & attributes.

**Unit- 6. INTRODUCTION TO ADVANCED JAVA**

**L-08,M-06**

Database connectivity –JDBC ,Introduction to JavaBeans, Servlets, Java Server Pages (JSP),CORBA.

**References:-**

1. Cay's Horstmann and Gary Cornell Core Java Volume -1 and Volume 2
2. Deitel & Deitel, "Java How to program", Prentice Hall
3. Herbert Schildt (TMH) The complete reference JAVA-2 Fifth Edition
4. E. Balaguruswamy ( Tata Mc Graw Hill) Programming with Java – A primer
5. Java 6 Programming Black Book

## **LAB on System Programming (UG-CS-LAB-301)**

### **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)

## **Semester II**

### **Lab on RDBMS & SQL Server**

1. Demonstration of creating database and table and use of DML statements.
2. Defining different types of database constraint.
3. Manipulation of data in tables
4. Query based on operators and joins
5. Simple and nested query
6. Demonstration of stored procedures and triggers
7. Creating DML & DDL triggers
8. Demonstrate the Use of @@error & RAISERROR

## UG-CS-LAB- 302

### LAB on Computer Aided Graphics & VB.NET Semester-I

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1. Draw the following pattern using standard graphics library :
    - a. Block Diagram of Computer
    - b. Display Flag of India
    - c. Flow Chart Symbols.
  2. Implement Bresenham's Line Drawing Algorithm
  3. Implement Bresenham's Circle Drawing Algorithm
  4. Implement DDA line Drawing Algorithm
  5. Implementing translation, scaling and rotation transformation on polygons with respect to any point.
  6. Implement Cohen-Sutherland line clipping algorithm
- 
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 Single Inheritance.
  7. Write a VB.Net Program to demonstrate Interface.
  8. Write a VB.Net Program to demonstrate Polymorphism.

LAB Course On Internet Computing (UG-CS-LAB-302)  
Semester –II

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1. Creating and handling email accounts.
2. Setting email accounts.
3. Design Web Page showing information of your college using various text formatting tags.
4. Design Web Page to create image gallery using image and link tags.
5. Design Web Page to create calendar of current month using table tags and its attributes.
6. Design a web site on a theme\_\_\_\_\_ using frames.
7. Design Web Page for online admission using form tag and elements
8. Write a VB script for demonstration of various conditional statements
9. Write a VB script for demonstration of various Looping statements
10. Write a VB script for demonstration of various conditional statements
11. Write a VB script for demonstration of various string functions.
12. Write a VB script for demonstration of various date and math functions.
13. Write a VB script for validation of email address.
14. Write a VB script for validation of mobile number.

CS LAB 303,Elective-A) Lab on C#

Sem-I

Practical Assignments

- 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, Destructure
- 10) Demonstrate Polymorphism
- 11) Demonstrate Inheritance

CS LAB 303 A) Lab on ASP.NET

Sem-II

Practical Assignments:-

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 Intrinsic 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.

**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.

**Elective B : JAVA Programming –II(UG-CS-LAB- 303 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