

S-20 & 21 June, 2017 AC after Circulars

- 12 -

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY



CIRCULAR NO.SU/Sci./Model College/Com.Sci./29/2017

It is hereby informed to all concerned that, the syllabus prepared by the Committee & recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor **has accepted the "Revised Syllabus of B.Sc. Honors degree course in Computer Science third year (V & VI semester)** under the Faculty of Science & Technology in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council **at Model College, Ghansawangi, Dist-Jalna as appended herewith.**

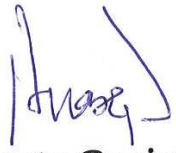
This shall be effective from the Academic Year 2017-2018 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.

REF.NO. SU/SCI/2017/4918-24
Date:- 22.08.2017.

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**Deputy Registrar,
Syllabus Section.**

Copy forwarded with compliments to :-

- 1] **The Principal, Model College, Ghansawangi, Dist- Jalna.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

Copy to :-

- 1] The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.
- 2] The Section Officer, [B.Sc.Unit] Examination Branch, Dr.BAMU,A'bad.
- 3] The Section officer, [Eligibility Unit], Dr.BAMU,A'bad.
- 4] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
- 5] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
- 6] The In-charge, [E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambekar Marathwada University.
- 7] The Public Relation Officer, Dr.BAMU,A'bad.
- 8] The Record Keeper. Dr.BAMU,A'bad.

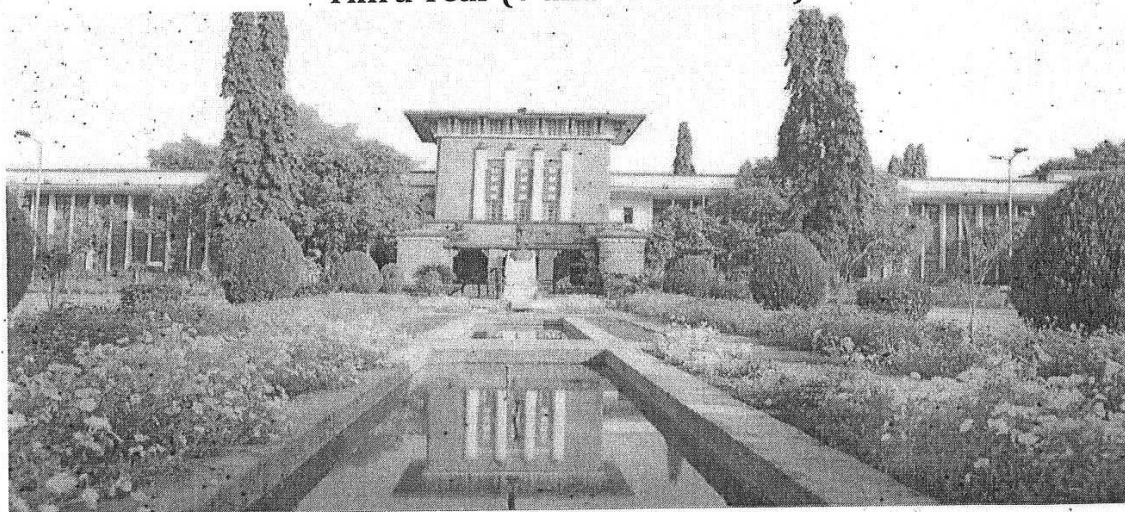
NAAC 'A' Accreditation
Dr. Babasaheb Ambedkar Marathwada University
Aurangabad-431004.

Model College, Ghansawangi



SYLLABUS

B.Sc. Computer Science (Honors)
Third Year (V and VI Semester)



Model College, Ghansawangi.

Tel.No. : 02483-278607, Fax: 02483-278607

**Syllabus for B.Sc.Computer Science (Honors) Third Year, with effective from
2016-17**

Dr. Bhat Gawali
Professor
Department of CS & IT
Dr. B.A.U. University, Aurangabad

Dr. Mayekar Gangur

PATTERN OF EXAMINATION

A) Internal Class Test:

- ✦ A class tests are to be conducted after completion of 15-20 Lecturers for 10 Marks.

B) Tutorial:

- ✦ A tutorial is to be conducted after completion of 15-20 Lecturers for 10 Marks.

C) THEORY:-

- ✦ Each theory paper will carry Maximum 30 marks; duration of examination of theory paper will be 90 Minutes.

D) PRACTICALS: - Total marks 50 marks

- ✦ Each Practical paper will carry Maximum 50 marks, duration of the examination of each practical paper will be 2 hours.
- ✦ Internal Distribution of marks for each practical paper will be as follows.
 - Journal/ Record book (certified): **10 marks.**
 - Oral/ viva: **10 marks.**
 - Practical Exam: **30 marks.**

E) PROJECT:-

- ✦ Students of semester V and VI will have to perform ONE project of 150 marks.
(A group of maximum 3 candidates will allow working on one project work)
- ✦ Internal Distribution of project marks will as follows.
 - Review 1 Report : **25 Marks**
 - Review 2 Report : **25 Marks**
 - Project work (certified): **25 marks.**
 - Project work Presentation: **50 marks.**
 - Viva/ Oral: **25 marks.**

Model College, Ghansawangi, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad.
Curriculum Structure and Scheme of Evaluation: B.Sc(Computer Science.) V th Semester

Curriculum Structure and Scheme of Evaluation: B.Sc(Computer Science.) V th Semester												
Sr. NO	Course Code	Name of the Subject	Scheme of Teaching			Total Credit	Scheme of Evaluation(Marks)					Total Marks
			T hrs/wk	P hrs/week	Total hrs/week		Class Tests + Tutorial	Univ. Th. Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)		
V Semester												
1	Core-A CSC501T	Embedded System	4	-	4	3	10+10 (20)	30	-	2	50	
2	Core-B CSC502T	Basics of Computational Mathematics	4	-	4	3	10+10 (20)	30	-	2	50	
3	Supportive CSC503T	Data Communication and Network-1	4	-	4	3	10+10 (20)	30	-	2	50	
4	Supportive CSC503P	Lab: Basic Computational Method and DCN-I	-	2	2	2	-	-	50	2	50	
5	Applied-A CSC504T	Java-I	4	-	4	3	10+10 (20)	30	-	2	50	
6	Applied CSC504P	Lab: Practical Based on Java-I	-	2	2	2	-	-	50	2	50	
7	Applied-B CSC505T	Elective-I (Select any one from the below list)	4	-	4	3	10+10 (20)	30	-	2	50	
8	Project 1 CSC505P	Project 1	2	2	4	3	-	-	150	2	150	
9	CSC506	Life Skill Curriculum (Job Oriented Soft Skill)	4	-	4	4	10+10 (20)	30	-	2	50	
10	CSC507	Life Skill Curriculum (Value Oriented Courses)	4	-	4	4	10+10 (20)	30	-	2	50	

Model College, Ghansawangi, Dr.Babasaheb Ambedkar Marathwada University, Aurangabad.
Curriculum Structure and Scheme of Evaluation: B.Sc.(Computer Science)

Sr. NO	Course Code	Name of the Subject	Scheme of Teaching			Scheme of Evaluation(Marks)					
			T hrs/wk	P hrs/week	Total hrs/week	Total Credit	Class Tests + Tutorial	Univ. Th. Exam.	Uni. Pract. Exam.	Uni.Exam Duration (in hrs.)	Total Marks
VI Semester											
1	Core-A CSC601T	Hardware Maintenance	4	-	4	3	10+10 (20)	30	-	2	50
2	Core-B CSC602T	Software Engineering	4	-	4	3	10+10 (20)	30	-	2	50
3	Supportive CSC603T	Data Communication and Network-2	4	-	4	3	10+10 (20)	30	-	2	50
4	Supportive CSC603P	Lab: DCN-II and Software Engineering.	-	3	3	2	-		50	2	50
5	Applied-A CSC604T	Java-II	4	-	4	3	10+10 (20)	30	-	2	50
6	Applied CSC604P	Lab: Practical based on Java-II	-	3	3	2	-		50	2	50
7	Applied-B CSC605T	Elective-II (Select any one from the below list)	3	-	3	3	10+10 (20)	30	-	2	50
8	Project 2 CSC605P	Project-2	2	2	4	3	-	-	150	2	150
9	CSC606	Life Skill Curriculum (Job Oriented Soft Skill)	4	-	4	4	10+10 (20)	30	-	2	50
10	CSC607	Life Skill Curriculum (Value Oriented Courses)	4	-	4	4	10+10 (20)	30	-	2	50

List of Elective Subject for V and VI semester

V th Semester (Elective-I)		
Sr. No	Paper Code	Name of Paper
1	CSC505TE1.I	Hypertext Markup Language (HTML)
2	CSC505TE1.II	VB.NET
3	CSC505TE1.III	Python Programming
4	CSC505TE1.IV	Statistical Package for Social Science (SPSS)
VI th Semester (Elective-II)		
Sr. No	Paper Code	Name of Paper
1	CSC605TE2.I	PHP Programming
2	CSC605TE2.II	ASP.NET
3	CSC605TE2.III	Android Technology
4	CSC605TE2.IV	Matlab

References

1. **Introduction to Embedded Systems** - Shibu K.V, Mc Graw Hill.Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.
2. **Embedded Systems** - Raj Kamal, TMH.
3. **Embedded System Design** - Frank Vahid, Tony Givargis, John Wiley.

Course: B.Sc.(C.S.) – V Sem.		(Core –B)	Paper Code: CSC502T	
Basics of Computational Mathematics				
Objective:				
• Students should gain an appreciation for the role of computers in mathematics, science and engineering as a complement to analytical and experimental approaches. • Students should have a basic knowledge of numerical approximation techniques, know how, why, and when these techniques can be expected to work, and have ability to program simple numerical algorithms in MATLAB or other programming environments. • Students should have learned what computational mathematics is about: designing algorithms to solve scientific problems that cannot be solved exactly; investigating the robustness and the accuracy of the algorithms and/or how fast the numerical results from the algorithms converge to the true solutions. This includes a basic understanding of computer arithmetic and round-off errors and how to avoid loss of significance in numerical computations. • Students should be able to use and evaluate alternative numerical methods for the solution of linear and nonlinear systems, basic data fitting problems, and ordinary differential equations. • Students should be able to make appropriate assumptions to come up with a mathematical model that accurately reflects an appropriate scientific theory, and that is amenable to solution with a computer.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Introduction to Computational Mathematics mathematical modeling • review of Taylor series • numerical error (floating-point representation, computer arithmetic, round-off errors, and loss of significance in numerical computations) • programming in MATLAB.	1	05	
Unit-II				
	Solving Systems of Linear Equations Direct methods (LU factorization) • basic iterative methods (Jacobi, Gauss-Seidel and SOR). Interpolation • polynomial interpolation • piecewise polynomial and spline interpolation.	2	10	

Unit-III			
	Locating Roots of Equations Bisection method • Newton's method • secant method • introduction to the solution of systems of nonlinear equations - Newton's method for systems. Least Squares Problems • Motivation and applications • Least squares fitting with polynomials • The QR decomposition • The SVD.	2	10
Unit-IV			
	Numerical Integration • Newton-Cotes methods • adaptive quadrature.	1	05
Unit-V			
	Numerical differentiation and solution of ordinary differential equations • finite differences • Runge-Kutta methods • multistep methods and stiff equations (comparison of various MATLAB stiff solvers) • FFT and spectral methods.	1	15

References

Textbook(s):

1. Cleve Moler, Numerical Computing with MATLAB, SIAM (revised reprint) Also available for FREE at <http://www.mathworks.com/moler/chapters.html> .
2. S. C. Chapra & R. P. Canale, Numerical Methods for Engineers, 5th Edition, McGraw Hill, 2006 (online optional supplementary material).

Other required material: MATLAB, some examples in Maple or Mathematica

WWW: <http://math.iit.edu/~fass/>

Course: B.Sc.(C.S.) – V Sem.		Core-A	Paper Code: CSC501T	
Embedded System				
Objective:				
• Upon successful completion of this course, student will understand the basic concept of embedded system. • The student will elaborate their programming knowledge for hardware and internal architecture of computer. • This subject will support to student for designing and development of large scale hardware based application.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Introduction Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems .	1	10	
Unit-II				
	Typical Embedded System Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces	2	05	
Unit-III				
	Embedded Firmware Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.	3	10	
Unit-IV				
	RTOS Based Embedded System Design Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.	3	05	
Unit-V				
	Task Communication Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers	2	15	



B.Sc. (Computer Science) Semester V

Course: B.Sc.(C.S.) – V Sem.		Supportive	Paper Code: CSC503T	
Data Communication and Networking – I				
Objective: • After successful completion of this course, student will understand the basic concept of Networking. • The student will elaborate their knowledge for network development. • The DCN subject will support to student for designing and development of network for research laboratory and various industries.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Introduction Communication System, Components of communication system, Computer network Advantages and applications of computer networking . point-to-point and multipoint line configuration, LAN, MAN and WAN. Analog and Digital signals, Data Transmission: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex.	1	10	
Unit-II				
	Network Topologies Data Transmission: Parallel and Serial, Synchronous and Asynchronous transmission, Transmission Mode: Simplex, half-duplex and full-duplex.Mesh, Star, Tree, Bus and Ring and Hybrid Topology.(Advantages and disadvantages of each)	2	05	
Unit-III				
	Transmission media Guided and unguided media, Twisted-pair, UTP and STP cable, coaxial cable, Optical Fiber cable, Radio waves, Microwaves, Satellite Communication (Transmission characteristics and advantages of each type)	2	10	
Unit-IV				
	Modulation Concept of modulation and demodulation, Digital-to analog conversion, Amplitude Shift Keying (ASK)/AM, Frequency Shift Keying (FSK)/FM, Phase Shift keying (PSK)/PM. Quadrature PSK, differential PSK.	3	05	
Unit-V				
	Data Networks and Protocols Switching, Circuit Switching, Packet Switching and Message Switching. Network Protocol: syntax, semantics and timings, The OSI model, 7-layers of n/w model., Functions of each layer.	4	15	

References

1. **Introduction to Digital and Data Communications**, Michal A Miller, JAICO, publishing.
2. **Data Communication and Networking**: C.S.V. Murthy, Himalaya Publishing House
3. **Data Communication and Networking** :: Behrouz A. Forouzan; Mc-Graw Hill Pub.
4. **Computer Networks - A Tanenbaum** - 5th edition. TMH

Course: B.Sc.(C.S.) –V Sem.		Supportive	Paper Code: CSC503P	
Lab: Computational Mathematics and DCN-I				
Objective: Student will understand the practical application of computational mathematics and DCN for real time example solving.				
Sr. No.	Topic		Ref	No. of Practical
Unit-I				
1	Computational Mathematics			25
	Minimum two practical on unit 1 to unit 5.			
	Note: Programming is to be done in Matlab Software tool. The department should purchase a license copy of Matlab for practicals.			
2	DCN-I			20
	Minimum two practical on Unit 1 to unit 5.			
	Note: Programming is to be done in any one of programming language such as C, C++ or Java.			

Course: B.Sc.(C.S.) – V Sem.		(Core –B)	Paper Code: CSC504T	
Java-I				
Objective:				
• Create a simple Java Application based on the Java Foundations. • Use of Java forms and controls to create a user interface. • Create and use variables and arrays. • Create and use Class, Interfaces, Packages and predefined utility classes. • Implement decision structures and loops by using conditional expressions. • Validate user input for fields, controls, and forms. • Apply object-oriented programming techniques to create classes, add methods, and add behavior to the classes • Resolve syntax, run-time, and logic errors by using the structured exception handling. • Enhance the user interface by adding menus, status bars, and toolbars.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Java Introduction • The Java Environment - Overview • Writing a Java Program • Obtaining The Java Environment • Setting up your Java Environment • Creating a Class That Can Run as a Program ◦ The main() Method • Useful Stuff Necessary to go Further ◦ System.out.println() • Using the Java Documentation Java Basics • Basic Java Syntax ◦ General Syntax Rules ◦ Java Statements ◦ Blocks of Code ◦ Comments ◦ Variables • Data ◦ Primitive Data Types ◦ Object Data Types ◦ Literal Values ◦ Constants and the final keyword • Mathematics in Java ◦ Expressions ◦ Operator Precedence ◦ Multiple Assignments ◦ Order of Evaluation ◦ Bitwise Operators	1	05	

	○ Compound Operators ○ Expressions that Mix Data Types: Typecasting ● Creating and Using Methods ○ Creating Methods ○ Variable Scope		
Unit-II			
	Java Objects ● Objects ○ Object-Oriented Languages ○ Object-Oriented Programs ○ Encapsulation ○ Creating and Using an Instance of an Object ○ References ○ Defining a Class ○ Constructors ○ Method Overloading ○ The this Keyword ○ static Elements ○ Garbage Collection ○ Java Packages ○ Dealing with Keyboard Input ● String, StringBuffer, and StringBuilder ● Creating Documentation Comments and Using javadoc ○ Javadoc Comments Comparisons And Flow Control Structures ○ Controlling Program Flow ○ Boolean-Valued Expressions ○ Complex boolean Expressions ○ Simple Branching ○ Two Mutually Exclusive Branches ○ Nestedif... elseStatements - Comparing a Number of MutuallyExclusive Options ○ Comparing a Number of Mutually ExclusiveOptions - The switchStatement ○ Comparing Objects ○ Conditional Expression ○ while and do...while Loops ○ for Loops - Additional Loop Control: break and continue ○ Breaking Out of a Loop ○ Continuing a Loop - Classpath, Code Libraries, and Jar files ○ Using CLASSPATH - Creating a jar File (a Library)	2	10

Unit-III			
	Arrays and Vectors ○ Arrays ○ Defining and Declaring Arrays ○ Instantiating Arrays ○ Initializing Arrays ○ Working With Arrays ○ Array Variables ○ Copying Arrays ○ Arrays of Objects ○ Enhanced for Loops - the For-Each Loop ○ Multi-Dimensional Arrays ○ Multidimensional Arrays in Memory ○ Example - Printing a Picture ○ Typecasting with Arrays of Primitives ○ Using Vectors ○ Defining Vectors and using Vectors Packages and Interfaces ○ Interfaces ○ Creating an Interface Definition ○ Implementing Interfaces ○ Implementing Interfaces - Example ○ Reference Variables and Interfaces ○ Calling an Interface Method ○ Interfaces and Inheritance ○ Some Uses for Interfaces ○ Interfaces and Event-Handling ○ Interfaces and "Pluggable Components" ○ Packages ○ Creating and using packages ○ Access	2	10
Unit-IV			
	Inheritance ○ Inheritance ○ Derived Class Objects ○ Polymorphism ○ Inheritance and References ○ Dynamic Method Invocation ○ Creating a Derived Class ○ Inheritance and Access ○ Inheritance and Constructors - the super Keyword ○ Derived Class Methods That Override Base Class Methods ○ Inheritance and Default Base Class Constructors	1	05

	○ The Instantiation Process at Runtime ○ Typecasting with Object References ○ Typecasting, Polymorphism, and Dynamic Method Invocation ○ More on Overriding ○ Object Typecasting Example ○ Checking an Object's Type: Using instanceof ○ Typecasting with Arrays of Objects ○ Other Inheritance-Related Keywords ○ abstract ○ final ○ Methods Inherited from Object		
Unit-V			
	Exceptions ○ Exceptions ○ Handling Exceptions ○ Exception Objects ○ Attempting Risky Code - try and catch ○ Guaranteeing Execution of Code - the finally Block ○ Letting an Exception be Thrown to the Method Caller ○ Throwing an Exception ○ Exceptions and Inheritance ○ Exception Class Constructors and Methods ○ Creating and Using Your Own Exception Classes ○ Rethrowing Exceptions ○ Initializer Blocks ○ Static Initializer Blocks ○ Assertions Inner Classes ○ Inner Classes, aka Nested Classes ○ Inner Class Syntax ○ Instantiating an Inner Class Instance from Within the Enclosing Class ○ Inner Classes Referenced from Outside the Enclosing Class Working with Inner Classes	1	15

References

Books

1. **Understanding Programming in Core Java**, Ramesh Manza, Manjiri Patwari, Yogesh Rajput, Chinmay Prakashan, Aurangabad, ISBN: 936459374-5.
2. **Java 2 Complete Reference** by Herbert Schildt (Sixth Edition)
3. **Core Java Vol 1**: Sun Press

4. **Core Java Vol 2:** Sun Press

Web Reference

<http://www.javapassion.com/javaintro/>

Presentation Slides (Available in .ppt format)

E-book:

1. **Java 2 Complete Reference** by Herbert Schildt (Fourth Edition)

Course: B.Sc.(C.S.) –V Sem.		Applied	Paper Code: CSC504P	
Lab: Java Programming-I				
Objective: Student will understand the practical programming knowledge of basic java programming towards real time software and application development.				
Sr. No.	Topic	Ref	No. of Practical	
	Installation of Java		45	
	Student will download the java software and install successfully on working computer system.			
	List of Programs Minimum two program for unit 1 to unit 5			

Course: B.Sc.(C.S.) – V Sem.		Elective-I.I	Paper Code:CSC505TE1.I	
Hypertext Markup Language (HTML)				
Objective:				
• Upon successful completion of this course, student will understand the basic concept of html based web development. • The student will elaborate their programming knowledge for web design and development. • The HTML subject will support to student for designing and development of large scale websites for real time application.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Basic Concept Internet; Internet Domains world wide web, Protocols definition, Overview of TCP/IP, Telnet. Web page, Web site , web browser , Web server ,web Client, Communication between browser and web server, Web site architecture.	1	05	
Unit-II				
	Introduction to HTML Structure of HTML program HTML paired tags,Text formatting: paragraph, line break, headings , drawing lines.Text styles: Bold, italics,underline. Lists: types of lists viz. unordered, ordered, definition lists	2	10	
Unit-III				
	Links and Image Linking documents (Links) : External document references, internal document references. Introduction to frames: frameset and frame tag. Putting an Image on a Page ,Using Images as Links ,Putting an Image in the Background .	3	10	
Unit-IV				
	Tables and Forms Creating a Table , Table Headers ,Captions, Spanning Multiple Columns ,Styling Table . Introduction to forms, form design and form tag.	3	05	
Unit-V				
	Introduction to DHTML Overview of dynamic HTML. Cascading Style Sheets, font ,color ,background, Text,border.	1	15	

References

1. **Web Enabled commercial Application Development Using HTML, DHTML, JavaScript** by -Ivon Bayross.
2. **Complete reference HTML**, Narosa Publication
3. Cassidy Williams, Camryn Williams **Introduction to HTML and CSS**, O'Reilly, 2015

Course: B.Sc.(C.S.) – V Sem		Elective-I:II	Paper Code: CSC505TE1.II
VB.NET			
Objective: • This five-day instructor-led course provides students with the knowledge and skills needed to develop applications in Microsoft Visual Basic .NET for the Microsoft .NET platform. • The course focuses on user interfaces, program structure, language syntax, and implementation details. • After completing this course, students will be able to create a simple Visual Basic .NET-based application based on the Windows Application template			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Getting Started .NET Concepts, Exploring the Development Environment, Creating a Visual Basic .NET Project, Visual Basic .NET Components, Project explorer Components, Designer and Code Viewer functionalities.	1	10
Unit-II			
	Using Variables and Arrays : Introduction to Data Types, Using Variables, Variable Scope, Converting Data Types, Creating and Using Structures, Storing Data in Arrays, Describe the various data types they can use to declare variables. Name, declare, initialize, and use variables and constants. Declare variables with different levels of scope. Create user-defined structures. Convert variable values from one data type to another. Store data in arrays	2	05
Unit-III			
	Working with Loop and Procedures Create formulas and conditional expressions by using arithmetic, comparison, and logical operators, Conditional Expression, Decision Structures, Conditional Looping structures, using If-then, Select-Case, For-Next, Do - Loop. Restricting User Input, Validating's Field inputs,	1	10

	Validating form Data, writing functions, creating procedures, using procedures, using predefined functions.		
Unit-IV			
	Object Oriented Programming with VB.NET Understanding classes, working with classes, using shared members, inheritance, polymorphism, and Namespaces. Dealing with exception handling, types of error, debugging, handling exceptions. Enhancing user interface by creating dialogs, Single document interfaces, MDI (Multiple Document Interfaces), Windows, Menus, toolbars and Status Bars	1	05
Unit-V			
	Using ADO.NET Database Concepts, Overview of ADO.NET, Working with data, connectors, ADO Classes, ADO.NET with a Windows Forms application to create, read, update, and delete records in Access and SQL Server databases.	2	15

References

1. **Beginning VB.NET**, 2nd Edition, WROX Publication
2. **Visual Basic .NET programming** Black Book by Steven Holzner

Course: B.Sc.(C.S.) – V Sem		Elective-1.III	Paper Code: CSC505TE1.III
Python Programming			
Objective:			
• This course will provide in depth information about programming aspects using Python for highly motivated students with little or no prior experience in programming. • The course will focus on planning and organizing programs, as well as the grammar of the Python programming language. • Student will be able to write python programs and its integration with various python libraries as well as student will be able to write interactive programs using python.			
Sr: No.	Topic	Ref	No. of Lect.
Unit-I			
	Getting started Installation and configuration of IDLE for python, python architecture, feature of python, python technical strengths, Introduction to python interpreter, program execution, working on interactive prompts, dealing with IDLE user interface.	1	10

Unit-II			
	Types and Operations Introduction to python core data types, numbers, String, Lists, Dictionaries, Tuples, Files and other core types. Stings Fundamentals – String basics, literals, methods, formatting expressions, method calls. List and Dictionaries – Defining & using Lists, Lists iterations, indexing, slicing and Matrixes, Changing lists in place with index & Slice assignments, Dictionaries – Basic dictionary operations, changing dictionaries, and dictionary usage.	1	05
Unit-III			
	Statement and Syntax Introduction to python statements, interactive loops (for, while), nesting of loops, Assignments and expressions – different assignment statement forms, sequence assignments, multiple target assignments, augmented assignments, variable name rules. Expression statements, Iteration and comprehension.	1	10
Unit-IV			
	Functions and Generators Function basics, scopes, arguments and returns, advanced function – recursive functions, function objects, anonymous function lambda, Exception Handling – Basics, exception coding and exception objects, built in exception classes, custom data and behaviour.	1	05
Unit-V			
	Classes and OOP using Python Classes coding basics, generate objects, Making instance, multiple instances, classes customized by inheritance, adding behaviour methods, operator overloading, customizing behaviour and subclasses, customizing constructors, Too, Storing objects in a databases	1	15

References

1. **Learning python** – O'reilly publications

Course: B.Sc.(C.S.) –V Sem.		Elective-1.IV	Paper Code: CSC505TE1.IV	
Statistical Package for Social Science (SPSS)				
Objective: • After successful completion of this course, student will understand the basic concept of statistics using SPSS Tool. • The student will elaborate knowledge of SPSS towards the statistical analysis. • This subject will support to student for designing and analysis of large scale statistical problems using SPSS tool.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Basic Concept of SPSS Installation of SPSS, Starting of SPSS, Menu-bar, Syntax Editor, Script Editor, Data Editor , Transform, Analyze and Graph window. SPSS procedure for creating data file.	1	10	
Unit-II				
	Descriptive Statistics Frequency Distribution, Measure of Central tendency, Working example of frequency, Bar Chart, Correlation, Regression and Scatter plot, SPSS procedure for Reliability analysis.	2	10	
Unit-III				
	T-Test and ANOVA(F-Test) Basic T-Test, T-Test for more than one sample, Repetitive Measure, Independent group T-Test. One way ANOVA , Two –Way ANOVA, ANOVA for planned comparison and Post-HOC Comparison.	3	10	
Unit-IV				
	Factor Analysis Decision Procedure, Objective, Assumption, Interpreting and Validation of factor analysis. SPSS procedure for factor analysis.	3	10	
Unit-V				
	Cluster Analysis Hierarchical Cluster Analysis, Dendrogram and Output, K-Mean Cluster Analysis, SPSS procedure for cluster analysis.	1	05	

References

1. S.L.Gupta, Hitesh Gupta, "SPSS 17.0 for researcher ", International Book house PVT. LTD, Pune.
2. Sabine Landa, " Handbook of Statistical Analysis using SPSS", Chapman and Hall, CRC Publication, Delhi
3. Jacqueline Collier, "Using SPSS Syntax: A Beginner's Guide", SAGE, 2009

Course: B.Sc.(C.S.) –V Sem.		Project	Paper Code: CSC505P	
Lab: Project-I				
Objective: Student will understand real time development of software for specific domain. This project will helpful for students to utilize the programming knowledge towards application development.				
Sr. No	Topic		Ref	No. of Practical
1	Project Finalization			
	Students will submit the synopsis, as per synopsis and domain of development head of department will distribute the total students in groups. Note: In case of students want to do a project individually of lack of students in groups. The concern head of department allocates the 02 students in one group.			
2	Review- I			15
3	Review-II			15
4	Final			15



B.Sc. (Computer Science) Semester VI

Course: B.Sc.(C.S.) – VI Sem.		Core-A	Paper Code: CSC601T	
Hardware Maintenance				
Objective:				
- After successful completion of this course, student will understand the basic concept of working of storage device, interfacing of peripheral , technique of devices to port and power supply of computer. - The student will elaborate their programming knowledge for hardware and internal architecture of computer. - This subject will support to student for carrier in hardware engineer for various industries.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Motherboard & Its Component CPU – Concept like address lines, data lines, internal registers. Modes of operation of CPU – Real mode, IA-32 mode, IA-32 Virtual Real Mode. Process Technologies, Dual Independent Bus Architecture, Hyper Threading Technologies & its requirement. Processor socket & slots. Chipset basic, chipset Architecture, North / South bridge & Hub Architecture. Latest chipset for PC ,Overview & features of PCI, PCI –X, PCI express, AGP bus. Logical memory organization conventional memory, extended memory, expanded memory. Overview & features of SDRAM, DDR, DDR2, DDR3. Concept of Cache memory: BIOS – Basics & CMOS Set Up. Motherboard Selection Criteria.	1	10	
Unit-II				
	Storage Devices & Interfacing Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces	2	05	
Unit-III				
	Display Devices Characteristics of CRT Monitor :-DOT Pitch, Resolution, Horizontal Scanning frequency, Vertical scanning frequency, Interlaced Scanning, Non-Interfaced scanning, Aspect ratio. LCD Monitor: - Functional Block Diagram of LCD monitor, working principle, Passive matrix, Active	3	10	

	matrix LCD display. Touch Screen Display – The construction and working principle Plasma Display Technology: - Construction & working principle. Basic Block Diagram of Video Accelerator card		
Unit-IV			
	Power Structure of Computer Block diagram and working of SMPS. Signal description and pin-out diagram of AT and ATX connectors, Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation. , Power problems: Blackout, Brownout, surges and spikes. Symptoms of power problems. Protection devices: circuit breaker, surge suppressor. Uninterrupted Power Supply, Online and Offline UPS, working of UPS: Block diagram, advantages and disadvantages, Ratings –To understand the working of SMPS.	3	05
Unit-V			
	Interfacing of Peripherals Keyboard: Types of key switches: Membrane, Mechanical, Rubber dome, Capacitive, optoelectronic and interfacing. Mouse: Opto-mechanical, optical (New design) Scanner: Flat Bed, Sheet-fed, Handheld: Block diagram of flat Bed and specifications, OCR, TWAIN, Resolution, Interpolation. Modem: Internal and External: Block diagram and specifications. Printer: Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications.	2	15

References

1. Manahar Lotia , Pradeep Nair , Payal Lotia , " **Modern Computer Hardware Course**" MCHall Publication, 2016.
2. Wiley Pathways ,**PC Hardware Essentials** by Groth, David ; Gilster, Ron, Liberty Lake, Washington ; Polo, Russel.
3. **A Guidebook In Pc Hardware, Maintenance And Repair** Ent 284 - Prince George's Community College, London.

Course: B.Sc.(C.S.) – VI Sem.		(Core –B)	Paper Code: CSC602T	
Software Engineering				
Objective:				
- After successful completion of this course, student will understand the basic concept of software engineering. - On the completion of this course student will elaborate their programming knowledge for software designing and implementation. - The software engineering subject will support to student for designing and development of large scale software for real time application.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	Introduction The Nature of Software,. Defining Software, Legacy Software, Software Engineering, Software characteristics, Application software. A process framework, waterfall model, prototyping model, incremental and evolutionary models, spiral model RAD model.	1	05	
Unit-II				
	Requirement Analysis <i>Requirement engineering:</i> Requirement engineering task, initiating the requirement engineering process, eliciting requirements, developing use cases, building analysis model, Negotiating requirements, validating requirements, data modeling, functional modeling and behavioral modeling. <i>Requirements Specification:</i> Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a requirements document.	2	10	
Unit-III				
	Software Design Design within the Context of Software Engineering, The Design Process, Design Concepts, The Design Model. Architectural Design :Software Architecture, Architectural Genres, Architectural Styles Architectural Design, Assessing Alternative Architectural Designs. Component Level Design Designing Class-Based Components Conducting Component-Level Design, Cohesion and Coupling. User Interface Design: The Golden Rules, Interface Analysis and Design, Interface Analysis Interface Design Steps.	2	10	
Unit-IV				
	Software Testing Verification and Validation, Testing Overview: Verification	1	10	

	vs Validation, Design of test cases Black- Box testing: Equivalence Class Partitioning, Graph based testing Boundary Value analysis White- Box Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage, Cycloramic Complexity Metric Data Flow- Based Testing . Integration Testing: Top down Testing, Bottom Up testing, Regression Testing, fazed vs Incremental Integration testing Systems Testing: Stress Testing Recovery Testing Security Testing.		
Unit-V			
	Software Project Management Software Project Management, Cost Estimation , Project Scheduling, Software Configuration Management, Quality Assurance, Project Monitoring, Risk Management.	1	10

References

1. Roger S. Pressman - Software Engineering A Practitioner's Approach - 5th edition, McGraw
2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa
3. Software Engineering – A Programming Approach, D. Belie I. Moray, J. Rough, P.

Course: B.Sc.(C.S.) – VI Sem.		Supportive	Paper Code: CSC603T
Data Communication and Networking - II			
Objective: • After successful completion of this course, student will understand the basic concept of advance Networking. • The student will elaborate their knowledge for network development and setup. • The DCN subject will support to student for designing and development of network for research laboratory and various industries.			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Physical Layer Physical Layer – Signals, Analog, Digital, Analog VS Digital, Transmission impairment, Data Rate Limits, Performance	1	05

Unit-II			
	Data Link Layer Data Link Layer – Error correction & detection. Types of errors. Detection VS Correction, Block Coding, Hamming Distance, Linear Block codes (single parity check, hamming codes), Cyclic codes, CRC Encoder & Decoder, DRC Polynomial and its degree, Checksum.	2	10
Unit-III			
	Network Layer Network layer protocol – internetworking, IPv4, IPv4 protocol packet format, IPv6 Protocol & Packet format, IPv4 VS IPv6, Transition from IPv4 to IPv6, Address Resolution protocols	4	05
Unit-IV			
	Transport and Application Layer Transport Layer – Process to process delivery, UCP, TCP Congestion Control & Quality of Service – Data traffic, Congestion, Congestion Control. Application Layer – DNS, Remote Logging (Telnet), SMTP, FTP, WWW, HTTP.	3	10
Unit-V			
	Mobile Communication System GSM-architecture-Location tracking and call setup- Mobility management- Handover-Security-GSM SMS – International roaming for GSM- call recording functions Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols–Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile, TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective, Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks	2	15

References

1. Introduction to Digital and Data Communications, Michal A Miller, JAICO, publishing.
2. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education, 2003.
3. Data Communication and Networking :: Behrouz A. Forouzan; Mc-Graw Hill Pub.
4. Computer Networks - A Tanenbaum - 5th edition. TMH

Course: B.Sc.(C.S.) –VI Sem.		Supportive	Paper Code: CSC603P
Lab: DCN-II and Software Engineering			
Objective: Student will understand the practical application of embedded system and software engineering towards the development of real time computational application. The main objective is involve students in analytical studies of Computer Networks through network simulation.			
Sr. No.	Topic	Ref	No. of Practical
Unit-I			
1	Computer Network-II		25
	Minimum two practical on unit 1 to unit 5. Note: All Networking practical will be done using Sakshat Virtual Laboratory by IIT, Kharakpur http://vlssit.iitkgp.ernet.in/ant/ant/8/		
2	Software Engineering		20
	Minimum two practical on Unit 1 to Unit 5. Note: All practical will be done by virtual lab by IIT , Kharakpur, http://vlabs.iitkgp.ernet.in/se		

Course: B.Sc.(C.S.) – VI Sem.		Applied	Paper Code: CSC604T
		Java-II	
Objective: - This course assumes that students are aware of core java programming and hence it starts from threading and goes up to web programming. It covers some advance topics of reflection, applets, swings, JDBC, Networking, JSP and Servlet. - After completion of this course students can write good application based on java. Students can appear for java certification examinations. Student can also work on networking and web projects.			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Threading: Threading Basics: Java Thread Model, Creating and Running Threads, Manipulating Thread State, Thread Synchronization, Volatile Fields vs. Synchronized Methods, wait and notify, join and sleep, The Concurrency API, Atomic Operations, Reflection: Uses for Meta-Data, The Reflection API, The Class<T> Class, The java.lang.reflect Package, Reading Type Information, Navigating Inheritance Trees, Dynamic Instantiation, Dynamic Invocation, Reflecting on Generics	1	05
Unit-II			
	Java Database Connectivity: JDBC, JDBC Architecture (type 1, type 2, Type 3, type 4) the java.sql.* package, Connection, ResultSet, Statements	2	10
Unit-III			
	Servlets: Web Application Basics How the Web works, Thin Clients, TCP/IP, HTTP overview, Brief HTML review, Overview of Java EE, servlets & Web applications., Servlet Basics, Servlet API:-HTML Forms, HTTP: Request-response, headers, GET, POST, Overview: How Servlets Work, Servlet Lifecycle: init(), service(), destroy(), Requests and responses, Core Servlet API: GenericServlet, ServletRequest, and ServletResponse, HTTP Servlets: HttpServletRequest, HttpServletResponse and HttpServlet, Accessing Parameters, Additional Servlet Capabilities, HTTP headers and MIME types RequestDispatcher: Including and forwarding, Sharing data with the request object attributes, Sharing data with ServletContext	2	10

	attributes, Error Handling.		
Unit-IV			
	Java Server Pages Basics and Overview, JSP architecture, JSP tags and JSP expressions, Fixed Template Data, Lifecycle of a JSP, Model View Controller (MVC), Model 1/Model 2 Architecture, Data Sharing among servlets & JSP: Object scopes or "buckets"; Request, application, session and page scope, Predefined JSP implicit objects (request, session, application, page), <jsp:useBean>, <jsp:getProperty>, <jsp:setProperty>, <jsp:include>, <jsp:forward>, More JSP Capabilities and Session Management, HTTP as a stateless protocol, Hidden form fields, Cookies: Overview, API, Using cookies, Session overview: Cookies and session tracking, HttpSession, Putting data into a session object, Retrieving data from a session object, Using session data in servlets and JSPs Additional JSP Capabilities, Exception handling and error pages, Directives (page, include, others), Import declarations, Multithreading considerations and data safety, SingleThreadModel interface, Additional JSP Capabilities, JSP Directives, JSP Error Pages, JSP and Java Declarations, Scriptlet overview, Scriptlet syntax	1	05
Unit-V			
	JSTL Using Custom Tags, Custom tags overview, Reducing JSP complexity, Tag Libraries, Tag Library Descriptor (TLD), Loading a tag library in a web app, The JSTL, JSP Expression Language (EL), Using custom tags, The c:url, c:param, c:forEach, c:out tags, Overview of JSTL libraries, The JSTL Expression Language, Expressions, Type Coercion, Operators, String concatenation, Implicit Objects, The Core JSTL Library, General Purpose: c:out, c:set, c:catch, Conditional: c:if, c:choose,, Overview of other capabilities, Additional Topics : Servlet Filter overview, Filtering examples, lifecycle, & filter chains, Filter API, Modifying a request, Modifying a response, Struts Overview Advanced MVC – Struts overview, Command and State patterns, Struts View and Controller elements.	1	15

References

Books:

1. **Java 2 Complete Reference** by Herbert Schildt (Sixth Edition)

2. **Core Java Vol 1:** Sun Press

3. **Core Java Vol 2:** Sun Press

Additional Web Reference

<http://www.javapassion.com/javaintro/>

Presentation Slides (Available in .ppt format), www.manzaramesh.in

Ebook:

1. **Java 2 Complete Reference** by Herbert Schildt (Fourth Edition)

Course: B.Sc.(C.S.) –VI Sem.		Applied	Paper Code: CSC604P	
Lab: Java Programming-II				
Objective: Student will understand the practical programming knowledge of advance java programming towards real time software and application development.				
Sr. No	Topic		Ref	No. of Practical
	Java -II			45
	Minimum two practical on unit 1 to unit 5.			

Course: B.Sc.(C.S.) – VI Sem.		Elective-2.I	Paper Code: 605TE2.I
PHP Programming			
Objective: • Upon successful completion of this course, student will understand the basic concept of PHP based web development. • The student will elaborate their programming knowledge for web design and development. • The PHP subject will support to student for designing and development of large scale websites for real time application.			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Introduction PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.) ,PHP with other technologies, scope of PHP ,Basic Syntax, PHP variables and constants ,Types of data in PHP , Expressions, scopes of a variable (local, global) ,PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator,PHP operator Precedence and associativity .	1	10
Unit-II			
	HTML Form with PHP Capturing Form Data ,GET and POST form methods ,Dealing with multi value fields, Redirecting a form after submission .	2	05
Unit-III			
	Conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else) Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit	3	10
Unit-IV			
	Functions Function, Need of Function , declaration and calling of a function ,PHP Function with arguments, Default Arguments in Function ,Function argument with call by value, call by reference, Scope of Function Global and Local	3	05
Unit-V			
	String Manipulation and Regular Expression Creating and accessing String , Searching & Replacing String ,Formatting, joining and splitting String , String Related Library functions ,Use and advantage of regular	2	15

	expression over inbuilt function ,Use of preg_match(), preg_replace(), preg_split() functions in regular expression		
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References

1. Steven Holzner, "**PHP: The Complete Reference Paperback**", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "**PHP and MYSQL (Create-Modify-Reuse)**", Wiley India Private Limited, 2008.
3. Robin Nixon, "**Learning PHP, MySQL, JavaScript, CSS & HTML5**", 3rd Edition Paperback, O'reilly, 2014.

Course: B.Sc.(C.S.) – VI Sem		Elective-2.II	Paper Code: CSC605TE2.II
ASP.NET			
Objective: • This course provides an exhaustive coverage of basic functionality of active server page and ASP.NET framework and ASP.NET technology features like ASP.NET Architecture, ASP.Net Controls, Validations, State Management, Authentication and Authorization Configurations and Data Access. • At course completion student will be able to Create a rich GUI for web based applications using a rich set of controls.			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Getting Started Understanding HTML Form Tag and elements within it. JavaScript using Sample Programs Understanding role of Web Server and Web Browser. Introduction to ASP. How ASP Works. ASP Objects. Installing Internet Information Server (IIS) on Windows 7 & Windows 8. Importance's of Form tag and how it works. Brief about HTTP Protocol. HTTP Request structure. Form Tag and comparison between Get and Post methods. HTTP Response Structure.	1	10
Unit-II			
	ASP.NET architecture and Introduction to Controls What is AppDomain? Life Cycle of ASP.NET Page. How	2	05

	Control Manages its State, What is EnableViewState, How Control raises events, Event handling in Web Forms, Writing Custom Classes in Web Application, ASP.NET Introduction First ASP.NET Application, Auto Post back Property. Event Handler Parameters. Dynamically initializing ControlsIsPostBack property of Page class ListControlsComparison between HtmlControls and Web Controls Control Properties and Methods File Upload Control.		
Unit-III			
	ASP.NET Validations Base Validator, Required Field Validator, Compare Validator, Range Validator, Regular Expression Validator, Custom Validator, Causes Validation Property, Grouping - Validation Group Property, Page.Validators and Page.IsValid.	3	10
Unit-IV			
	ASP State Management and configuration State Management - Static Members, View State Hidden Field in Form, Query String,HttpContext, Cookies-HttpCookie,Sessions-HttpSessionState, Application-HttpApplicationState,and Summary of All Features. Introduction to Configuration files: Page setting in web.configCustom Errors, URL Re-Writing, Tracing,UsingConfigSource Attribute, Using Location Section,HttpApplication class-Global.asax.	3	05
Unit-V			
	ASP.NET Authentication & Authorization, Database Authentication & Authorization - What is Authentication and Authorization, Types of AuthenticationForms, Authentication - Role based Authentication, Windows and Basic Authentication, What is ASP.NET Impersonation, Using location section in web.config. Databases - Databinding traditional way, SqlDataSource, GridView, DetailsViewFormView, DataList, Repeater, ListView, DataPager	2	15

References:

1. **Beginning ASP.NET 3.5** - Wrox Publication
2. **The Complete Reference ASP.NET** - TMH Publications

Course: B.Sc.(C.S.) – VI Sem.		Elective-2.III	Paper Code:CSC605TE2.III
Android Programming			
Objective: • Upon successful completion of this course, student will understand the basic concept of android based application development. • The student will elaborate their programming knowledge for apps development. • This subject will support to student for designing and development of large scale android based real time application.			
Sr. No	Topic	Ref	No. of Lect.
Unit-I			
	Introduction History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.	1	05
Unit-II			
	Development Tools Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device	1	10
Unit-III			
	User Interface Architecture Application context, intents, Activity life cycle, multiple screen sizes.	1	10
Unit-IV			
	User Interface Design Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.	1	05
Unit-V			
	Database Understanding of SQLite database, connecting with the database..	1	15

References:

1. **Android application development for java programmers.** By James C. Sheusi. Publisher: Cengage Learning, 2013.
2. <http://www.developer.android.com> [online]
3. <http://developer.android.com/about/versions/index.html>

Course: B.Sc.(C.S.) – VI Sem.		Elective-2.IV	Paper Code:CSC605TE2.IV.	
MATLAB				
Objective: At the end of this course student can able learn the basics of MATLAB, it help to learn fundamentals of MATLAB environment, how to use variables, how to write the source code, function, GUI, Mathematical functions, Graphical function for data representation etc. After learning this course student can able to use MATLAB for various scientific applications.				
Sr. No	Topic	Ref	No. of Lect.	
Unit-I				
	INTRODUCTION: What is MATLAB? Advantages and Disadvantages, MATLAB Architecture, MATLAB System, Typical Uses of the MATLAB, Application Areas. Starting with MATLAB: Introduction, Development Environment, MATLAB search path, Typing Commands, Variables and Numbers, Vectors and Matrices.	1	05	
Unit-II				
	Data Types, Operators & Control Statements: Introduction, Data Types, Operator, Flow Control Statements. M-file Programming Introduction, Program Development, M-file programming, M-file Types, Function Arguments, Function Types, Function Handle, P-Code, MATLAB Expression and Regular Expression, Error Handling.	2	10	
Unit-III				
	Advanced capabilities in MATLAB Introduction, Cell Array, Structure, Sparse Array Mathematics Introduction, Matrices, Linear Equation, Factorization, Eigenvalues, Polynomial, Interpolation, Data Analysis, Polynomial Regression, Fourier Approximation, Integration and Differentiation, Differential Equation.	2	10	
Unit-IV				
	Graphics Introduction, 2-D Plotting, Plot style option, How to edit plot, Basic Statistics of the Graph, The Plots Creating, Animation, Graphics Object Handling, 3-D visualization. Graphical User Interface	1	05	

	Introduction, GUI layout tools, Dialog box, List Box, Accessing variables from workspace, GUI Components, Solved Example.		
Unit-V			
	Application Program Interface (API) or External Interfaces Introduction, Import and Export Data, Low level File I/O Functions, Calling C-programs from MATLAB, Calling Java from MATLAB.	1	15

References

1. www.mathworks.com (MATLAB Toolbox)
2. "Understanding MATLAB" by Shroff Publications, 2013, Authors: K V Kale, R R Manza, V T Humbe, P L Yannawar and G. R. Manza, Shroff Publications

Course: B.Sc.(C.S.) –VI Sem.		Project-II	Paper Code: CSC605P
Lab: Project-II			
Objective: Student will understand real time development of software for specific domain. This project will helpful for students to utilize the programming knowledge towards application development.			
Sr. No	Topic	Ref	No. of Practical
1	Project Finalization		
	Students will submit the synopsis, as per synopsis and domain of development head of department will distribute the total students in groups. Note: In case of students want to do a project individually of lack of students in groups. The concern head of department allocates the 02 students in one group.		
2	Review- I		15
3	Review-II		15
4	Final		15

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