Syllabus for B.Sc - Computer Science

VI Semester

Course Title: Web Technologies	**Course code: 21BSC6C13CSL**
Total Contact Hours: 52	**Course Credits: 4**
Formative Assessment Marks: 40	**Duration of SEE/Exam: 02 Hours**
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- CO1. Understand basics of web technology.
- CO2. Recognize the different Client-side Technologies and tools like, HTML, CSS, JavaScript.
- CO3. Learn Java Servlets and JDBC.
- CO4. Web Technology for Mobiles and Understand web security.

DSC7: Web Technologies

Unit	Description	Hours
1	**Introduction and Web Design:** Introduction to Internet, WWW and Web 2.0,Web browsers, Web protocols and Web servers, Web Design Principles and Web site structure, client-server technologies, Client side tools and technologies, Server side Scripting, URL, MIME, search engine, web server- Apache, IIS, proxy server, HTTP protocol. Introductions to HTML. HTML5 Basics tags, Formatting tags in HTML, HTML5 Page layout and Navigation concepts, Semantic Elements in HTML, List, type of list tags, tables and form tags in HTML, multimedia basics, images, iframe, map tag, embedding audio and video clips on webpage.	11
2	**Introduction to XML:** XML Syntax, XML Tree, Elements, Attributes, Namespace, Parser,XSLT DOM, DTD, Schema. Introduction to CSS, CSS syntax, CSS selectors, CSSBackground Cursor, CSS text fonts, CSS-List Tables, CSS Box Modeling, Display Positioning, Floats, CSS Gradients, Shadows, 2D and 3 Transform, Transitions, CSS Animations.	10
3	**Introduction to JavaScript:** JavaScript Data type and Variables, JavaScript Operators,Conditional Statements, Looping Statements, JavaScript Functions, Number, Strings, Arrays, Objects in JavaScript, Window and Frame objects, Event Handling in JavaScript, Exception Handling, Form Object and DOM, JSON, Browser Object Model.	11
4	**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of aServlets, deploying a Servlets, The Servlets API, Reading Servlets parameters, reading initialization parameters, Handling HTTP Request &Responses, Using Cookies and sessions, connectingto a database using JDBC.	10

5	**Web Security:** Authentication Techniques, Design Flaws in Authentication, Implementation Flaws in Authentication, Securing Authentication, Path Traversal Attacks. Injecting into Interpreted Contexts, SQL Injection, NoSQL Injection, XPath Injection, LDAP Injection, XML Injection, HTTP Injection, Mail Service Injection. Types of XSS, XSS in Real World, Finding and Exploiting XSS Vulnerabilities, Preventing XSS Attacks.	10

References:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley

Dremtech .
2. Java Server Pages – Hans Bergsten, SPD O'Reilly.
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

Course Title: Web Technologies Lab – Java Script, HTMS, CSS Lab	**Course code: 21BSC6C14CSP**
Total Contact Hours: 52	**Course Credits: 2**
Formative Assessment Marks: 25	**Duration of SEE/Exam: 03 Hours**
Summative Assessment Marks: 25	

Practicals:

1. Design web pages for your college containing college name and Logo, departments list using here, list tags.
2. Create a class timetable using table tag.
3. Write a HTML code to design Student registrations form for your college Admission.
4. Design Web Pages with includes Multi-Media data (Image, Audio, Video, GIFs etc.)
5. Create a web page using frame.
6. Write code in HTML to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columnsfill each frame with a different background color.
7. Write CSS code to Use Inline CSS to format your ID Card.
8. Using HTML, CSS create display a text called -Hello India !‖ on top of an image of India- Map using an overlay.
9. Write a JavaScript Program to perform Basic Arithmetic operations.
10. JavaScript Program to Check Prime Number.
11. JavaScript Program to implement Javascript Object Concept.
12. JavaScript Program to Create Array and inserting Data into Array.
13. JavaScript Program to Validate an Email Address.
14. Write a Program for printing System Date & Time using SERVLET.
15. Write a server side SERVLET program for accept number from HTML file and Display.
16. Write a program to Creating the Life-Cycle Servlet Application.

Course Title: Statistical Computing & R Programming	**Course code: 21BSC6C15CSL**
Total Contact Hours: 52	**Course Credits: 4**
Formative Assessment Marks: 40	**Duration of SEE/Exam: 02 Hours**
Summative Assessment Marks: 60	

Course Outcomes (COs):

At the end of the course, students will be able to:

- CO1. Explore fundamentals of statistical analysis in R environment.
- CO2. Describe key terminologies, concepts and techniques employed in Statistical Analysis.
- CO3. Define Calculate, Implement Probability and Probability Distributions to solve awide variety of problems.
- CO4. Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- CO5. Understand, Analyze, and Interpret Correlation Probability and Regressionto analyze the underlying relationships between different variables.

DSC8: Statistical Computing & R Programming

Unit	Description	Hours
1	Introduction of the language, numeric, arithmetic, assignment, and vectors, Matrices and Arrays, Non-numeric Values, Lists and Data Frames, SpecialValues, Classes, and Coercion, Basic Plotting.	10
2	Reading and writing files, Programming, Calling Functions, Conditions and Loops: stand- alone statement with illustrations in exercise 10.1,stacking statements, coding loops, Writing Functions, Exceptions, Timings, and Visibility.	10
3	Statistics And Probability, basic data visualization, probability, common probability distributions: common probability mass functions, bernoulli, binomial, poisson distributions, common probability density functions, uniform, normal, student's t-distribution.	11
4	Statistical testing and modelling, sampling distributions, hypothesis testing, components of hypothesis test, testing means, testing proportions, testingcategorical variables, errors and power, Analysis of variance.	10
5	Simple linear regression, multiple linear regression, linear model selection and diagnostics. Advanced graphics: plot customization, plotting regions andmargins, point and click coordinate interaction, customizing traditional R plots, specialized text and label notation. Defining colors and plotting in higher dimensions, representing and using color, 3D scatter lots.	11

References:

1. Tilman M. Davies, -The book of R: A first course in programming and ststistics‖, San Francisco, 2016.
2. Vishwas R. Pawgi, ―Statistical computing using R software‖, Nirali prakashan publisher, e1edition, 2022.
   https://www.youtube.com/watch?v=KlsYCECWEWE
3. https://www.geeksforgeeks.org/r-tutorial/
   https://www.tutorialspoint.com/r/index.html

Course Title: R Programming Lab	**Course code: 21BSC6C16CSP**
Total Contact Hours: 52	**Course Credits: 2**
Formative Assessment Marks: 25	**Duration of SEE/Exam: 03 Hours**
Summative Assessment Marks: 25	

Practicals:

1. Write an R program for different types of data structures in R.
2. Write an R program that include variables, constants, data types.
3. Write an R program that include different operators, control structures, defaultvalues for arguments, returning complex objects.
4. Write an R program for quick sort implementation, binary search tree.
5. Write an R program for calculating cumulative sums, and productsminima maxima and calculus.
6. Write an R program for finding stationary distribution of markanov chains.
7. Write an R program that include linear algebra operations on vectors and matrices.
8. Write an R program for any visual representation of an object with creating graphs using graphic functions: Plot(), Hist(), Linechart(), Pie(), Boxplot(), Scatterplots().
9. Write an R program for with any dataset containing data frame objects, indexingand sub setting data frames, and employ manipulating and analyzing data.
10. Write a program to create any application of Linear Regression in multivariate context for predictive purpose.