(B. Sc.) (Computer Science)
B. Sc. (CS) Semester-IV

Course Code	**US04CCSC51**	Title of the Course	**Advanced C Programming and Introduction to Data Structures**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	To provide basic understanding of 1. structures and unions in the C programming language. 2. file handling operations in C. 3. concepts related to data structures. 4. knowledge on stacks, queues and linked lists. 5. sorting and searching techniques.

Course Content		
Unit	Description	Weightage* (%)
1.	**Structures and Unions** – Basics of Structures, Structures and functions, Structures and Arrays – Pointers to structures, Nested structures – Unions, Working and initializing with unions – Structures versus Unions – Typedef and enum keyword	25%
2.	**File Handling** – Introduction to File handling and usage – Operations on files, File access modes, Handling text files – File management I/O functions	25%
3.	**Introduction to Data Structures, Stack and Queue** – Introduction to Data Structures : Introduction to data structures, their usage, applications and advantages, Primitive and non-primitive data structures and operations on them, Linear and non-linear data structures – Stack : Introduction to stacks, operations on stacks, Applications of stacks – Queues : Queues and their uses, Types of queues : Simple queues, Circuler queues, Double ended queues	25%

4.	**Linked Lists, Sorting and Searching Techniques** – Introduction to linked lists : Types of linked lists , Singly linked lists, doubly linked lists, Circular linked lists, Applications of linked lists – Sorting and Searching Techniques : Basic sorting techniques (Bubble, Selection, Insertion), Searching techniques (Sequential and Binary)	25%

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to understand	
1.	Basics of structures and unions in the C programming language.
2.	File handling operations in C.
3.	Fundamental concepts related to data structures.
4.	Basics of stacks, queues and linked lists.
5.	Basic sorting and searching techniques.

Suggested References:	
Sr. No.	References
1.	Balaguruswami: Programming in ANSI C., Tata McGraw Hill Publication.
2.	Cooper H. & Mullish H: The Spirit of C, Jaico Publication House, New Delhi.

3.	Kernighan B., Ritchie D.: The C Programming Language, Prentice Hall.
4.	Tremblay J. & Sorenson P.G.: An Introduction to Data Structures with application, 2nd Edition, McGraw-Hill International Edition, 1987
5.	Singh Bhagat & Naps Thomas: Introduction to Data Structures, Tata McGraw-Hill Publishing Co. Ltd., 1985.

On-line resources to be used if available as reference material
On-line Resources
https://www.w3schools.com/

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(B. Sc.) (Computer Science)
B. Sc. (CS) Semester-IV

Course Code	**US04CCSC52**	Title of the Course	**Web Application Development – II**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	To learn 1. Fundamental knowledge of scripting languages. 2. Basic knowledge of JavaScript and client-side web application development. 3. JavaScript control statements and loops. 4. JavaScript functions and arrays. 5. JavaScript DOM, objects and events.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Scripting Languages and Basics of JavaScript** – Concept of Client-Side and Server-Side scripting – Needs of scripting languages. – Introduction to JavaScript with example – JS datatypes, variable, operators, arithmetic	25%
2.	**JavaScript Control statements and Loops** – Conditional Statements: if statement, if..else, if..elseif..else, Switch – Looping Statements: for, for/in, while, do/while – JS Break and Continue statements	25%
3.	**JavaScript Functions and Arrays** – Defining functions, returning values from functions, user define function – Introduction to array, creating and accessing elements of array – JavaScript Array Methods: toString(), join(), pop(), push(), shift(), unshift(), sort()	25%
4.	**JavaScript DOM, Objects and Events** – Introduction to DOM, Methods, Documents and Elements – JS Object Concept: Definition, Properties, Methods – Concept of events, events: onBlur, onChange, onClick, onFocus, onMouseOver, onKeyPress, onReset	25%

Teaching-Learning	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Methodology	

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to explain	
1.	Fundamentals of scripting languages.
2.	Basics of JavaScript and client-side web application development.
3.	JavaScript control statements and loops.
4.	JavaScript functions and arrays.
5.	JavaScript DOM, objects and events.

Suggested References:	
Sr. No.	References
1.	Beginning Java script, Paul Wilton, Jeremy Mc Peak, 4th edition, Wiley Pub.
2.	Java script Bible, Danny Goodman, Micheal Morrison, 6th edition, Wiley Pub.

On-line resources to be used if available as reference material
On-line Resources
www.w3schools.com

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(B. Sc.) (Computer Science)
B. Sc. (CS) Semester-IV

Course Code	**US04CCSC53**	Title of the Course	**Practical based on US04CCSC51 & US04CCSC52**
Total Credits of the Course	**4**	Hours per Week	**8**

Course Objectives:	1. To apply the concepts of Advanced C programs. Like Structures, Unions and File Handling. 2. To apply the concepts of data structure using C program. 3. To apply the concepts Java Script Programming.

Course Content		
Part	Description	Weightage* (%)
I.	Practical Based on US04CCSC51	50%
II.	Practical Based on US04CCSC52	50%

Teaching-Learning Methodology	Project-based learning in small groups and Hands on training through required ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Learn how to implement Structures, Unions and File Handling programs in C.
2.	Learn how to implement Operations of Stack, Queue and Link list programs in C.
3.	Learn how to implement Java Script Programs.

On-line resources to be used if available as reference material
On-line Resources
w3schools.com

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BSc (Bachelor of Computer Science)
BSc (Computer Science) (Semester-IV)

Course Code	**US04SICT51**	Title of the Course	**Information and Communication Technology - II**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	To study the 1. Internet and communication technology 2. basics of HTML 3. concepts of E-commerce 4. concepts of IT and ICT

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Internet and Communication technology** – Introduction to Internet and web browser – Search Engine, uploading and downloading files – Email: writing and sending to single and multiple users – Concept of CC and BCC, attachment to email – Fax and mobile communication	25
2.	**Introduction to HTML** – Basics of HTML, HTML tags, Structure of HTML document – Text and paragraph formatting, Hyperlink – Ordered and Unordered lists – HTML table – Image tag	25
3.	**Introduction to E-Commerce** – Definition, communication perspective, business process perspective, service perspective – Classification by nature of transaction: B2B, B2C, C2C, C2B, Non business EC, Intra-business EC – Benefits to organization, consumers and society – Limitations and future of EC	25
4.	**Effects of Using IT** – Computer virus and Anti-virus – Effect of ICT: Increasing and Decreasing Employment – Capabilities and Limitations of IT – Issues related to Information found on net: unreliability, undesirability, security of data transfer – Potential health problems: Repetitive Strain Injury (RSI), Neck and Back problems, Eye problems – Simple strategies for preventing health problems.	25

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	University Examination	100%

Course Outcomes: Having completed this course, the learner will be able to understand	
1.	basics if Internet and communication technology.
2.	basics of HTML.
3.	concepts of E-commerce.
4.	concepts of IT and ICT.

Suggested References:	
Sr. No.	References
1.	Ivan Bay Ross, "Web Enabled Commercial Applications Development using HTML, DHTML, Java script, Perl CGI", BPB, 2004.
2.	Bhaumik Shroff., "Introduction to Internet and HTML scripting", 2nd edition
3.	Douglas E Comer: The Internet, PHI, Second Edition, May 2000.
4.	E-Commerce – Business, Technology, Society Kenneth C Laudon, Carol Guercio Traver (Pearson Education) 1014.

On-line resources to be used if available as reference material
On-line Resources
1. https://www.tutorialspoint.com/
2. https://www.w3schools.com/
3. https://www.javatpoint.com/

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