BSc (Bachelor of Computer Science)

PROGRAMME SPECIFIC OBJECTIVE:

The objective of the BSc (Computer Science) programme is to prepare students for a career in software design, development and testing as well as IT support by training them in the core and emerging areas of computer applications.

BSc (Bachelor of Computer Science)
Course Structure
(effective from June 2022)

BSc (CS) Course Structure for Semester–III

SEMESTER–III					
Paper code & Title	**T/P**	**Credits**	**External marks**	**Internal marks**	**Total marks**
CORE COURSES					
US03CCSC51 : Fundamentals of Computer Programming Using C	**T**	**4**	**70**	**30**	**100**
US03CCSC52 : Web Application Development – I	**T**	**4**	**70**	**30**	**100**
US03CCSC53 : Practicals based on US03CCSC51 & US03CCSC52	**P**	**4**	**100**	**-**	**100**
SKILL ENHANCEMENT COURSE					
US03SICT54 : Information and Communication Technology - I	**T**	**2**	**50**	**-**	**50**
TOTAL CREDITS		**14**	**290**	**60**	**350**

BSc (Bachelor of Computer Science)
Course Structure
(effective from June 2022)

BSc (CS) Course Structure for Semester–IV

SEMESTER–IV					
Paper code & Title	**T/P**	**Credits**	**External marks**	**Internal marks**	**Total marks**
CORE COURSES					
US04CCSC51 : Advanced C Programming and Introduction to Data Structures	**T**	**4**	**70**	**30**	**100**
US04CCSC52 : Web Application Development – II	**T**	**4**	**70**	**30**	**100**
US04CCSC53 : Practicals based on US04CCSC51 & US04CCSC52	**P**	**4**	**100**	**-**	**100**
SKILL ENHANCEMENT COURSE					
US04SICT54 : Information and Communication Technology – II	**T**	**2**	**50**	**-**	**50**
TOTAL CREDITS		**14**	**290**	**60**	**350**

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

Course Code	**US03CCSC51**	Title of the Course	**Fundamentals of Computer Programming Using C**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	To study the fundamentals of 1. To impart basic knowledge on development of algorithms and flow charts. 2. To provide basic understanding of logic development using structured programming concepts, library functions and arrays. 3. To introduce fundamental concepts related to functions and pointers.

Course Content		
Unit	Description	Weightage* (%)
1.	**Development of Algorithms, Flow Charts and Basics of C Language** – Concept of an algorithm and a flow chart, need and definition – Symbols used to draw a flow chart – Typical (primitive) examples of flow charts and algorithms – Introduction to Translators and editors and details about Turbo C editor – History and Importance of C – Basic Structure of C Programming – Problem analysis – Variables, expressions & manipulation – Data types and various operators – I/O statements, Assignment statements	25
2.	**Logic Development, Structured Programming, Arrays** – Formatted I/O statements – Control strategies, Conditions – Loop statements – Method of structured programming – Arrays	25
3.	**Strings, Library Functions and User-Defined Functions** – Common standard library functions	25

	– String handling. – Working with functions – Calling functions, passing arguments – User-defined functions	
4.	**Usage of Pointers** – Introduction and usage of pointers – Declaration, initialization and dereferencing of pointer variables – Pointers and addresses, Pointer arithmetic – Pointers and function arguments – Returning multiple values through pointers, Dynamic memory allocation – Pointers and arrays	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.	the process of development of algorithms and flow charts.
2.	logic development using structured programming concepts, library functions and arrays.
3.	fundamental concepts related to functions and pointers.

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.

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

Course Code	**US03CCSC52**	Title of the Course	**Web Application Development – I**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	To study the fundamentals of 1. fundamental concepts related to Internet and World Wide Web 2. basic knowledge on Web page designing, Frames and Forms 3. basics of HTML5 and DHTML 4. fundamental concepts related to Cascading Style Sheet

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Internet and Basics of HTML** – Introduction to Internet and Basics of HTML – Services provided by the Internet (email, HTTP, FTP, Telnet, WWW) – Basic terminology and concepts (URL, Webpage, Website, Web servers, Web browsers, Search Engines) – Components of a browser window – Use of menus and toolbar buttons – Security and privacy precautions – Introduction to HTML, HTML tags, Structure of HTML document, – Text and Paragraph Formatting, ordered and unordered lists	25
2.	**Web Page Designing, Frames and Forms** – Hyperlink, image tag – HTML tables – Frames, framesets, nested framesets – Designing HTML forms – Webpage layout – Multimedia tags (audio, video), Webpage layout	25
3.	**Introduction to HTML5 and DHTML** – HTML5: HTML5 new elements – ! Doctype, meta, Input Controls (number, date, time, calendar, ranges)	25

	– HTML5 semantics elements: header, footer, article, section. – HTML5 graphics elements: SVG, Canvas – Introduction to DHTML – Uses / Applications of DHTML, Components of DHTML	
4.	**Cascading Style Sheet** – Introduction of Cascading Style Sheet (CSS) – Introduction Way of Specifying Style Inline Internal – Cascading Style Sheet Attributes (font, color, text, background, border, margin, list) – Implement of external style sheet – Advanced CSS (Rounded Corners, Shadows, Text effects, Animations, 2D and 3D transforms)	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	
1.	understand fundamental concepts related to Internet and World Wide Web.
2.	understand Web page designing, Frames and Forms.
3.	understand basics of HTML5 and DHTML.
4.	design web pages using HTML5 and CSS3.
5.	create HTML forms.

6.	understand fundamental concepts related to Cascading Style Sheet.

Suggested References:	
Sr. No.	References
1.	Ivan Bay ross, "Web Enabled Commercial Applications Development using HTML, DHTML, Java script, Perl CGI", BPB, 2004.
2.	Introduction to Internet and HTML scripting 2nd edition, Bhaumik Shroff.
3.	Douglas E Comer: The Internet, PHI, Second Edition, May 2000.

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

Course Code	**US03CCSC53**	Title of the Course	**Practicals based on US03CCSC51 & US03CCSC52**
Total Credits of the Course	**4**	Hours per Week	**8**

Course Objectives:	1. To apply fundamentals knowledge of C programming. 2. To apply the fundamental knowledge of HTML.

Course Content		
Part	Description	Weightage* (%)
I.	Practical Based on US03CCSC51	50%
II.	Practical Based on US03CCSC52	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 programs in C language.
2.	Learn how to implement programs in HTML.

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-III)

Course Code	**US03SICT54**	Title of the Course	**Information and Communication Technology - I**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	To study the 1. basics of computer systems 2. input/output devices 3. storage devices 4. fundamental concepts related to computer networks

Course Content		
Unit	Description	Weightage* (%)
1.	**Basics of Computer System** – Introduction to a Computer System and its characteristics – Basic Terminology: Hardware, Software, Firmware – Components of general purpose computer system: I/O devices, CPU, Memory – Generations of computer languages – Introduction to Operating Systems: Windows, Linux	25
2.	**Input and Output Devices** – Input Devices: Keyboards, Numeric keypads, Pointing Devices (Mouse, touch pad), Joysticks, Touch screen, Scanner, Sensor Magnetic strip reader, Microphone, Barcode reader, Webcam, Light pen – Output Devices: Monitors (CRT, TFT, LCD), Projectors, Printers (laser, desk jet, dot matrix), Speaker, Plotter	25
3.	**Storage Devices** – Importance and need of backup – Storage Devices: Hard Disk, CD, DVD, Pen Drive, Memory Cards – Comparative advantages and disadvantages of using different backing storage media. – Difference between main(internal) memory and backing storage.	25

4.	**Computer Networks** – Introduction to analog and digital data – Need for conversion between analog and digital data – Modem and its purpose – Advantages and disadvantages of Computer Network – Different types of network (LAN, MAN, WAN) – Network Topology: (Bus, Star, Ring, Mesh, Hybrid)	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 of computer systems
2.	input/output devices.
3.	storage devices.
4.	fundamental concepts related to computer networks.

Suggested References:	
Sr. No.	References
1.	Tanenbaum A.S. : Structured Computer Organization, Prentice-Hall of India Pvt. Ltd.
2.	Rajaraman V. : Computer Fundamentals, Prentice-Hall of India Pvt. Ltd.
3	Tanenbaum A. S., Computer Networks, Prentice-Hall of India Pvt. Ltd., New Delhi, 1997.

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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(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,	25%

	onMouseOver, onKeyPress, onReset	

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 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-III)

Course Code	**US04SICT54**	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	25

	– 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.	

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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