

MAULANA AZAD NATIONAL URDU UNIVERSITY
SCHOOL OF TECHNOLOGY
DEPARTMENT OF CS&IT
 Revised curriculum for
Under CBCS 2017-18

BACHELOR OF SCIENCES (B.Sc. MPCs)

S. No.	Course Code	Course Title	Hours/Week			Credits	Score		End Exam Duration	Semester
			L	T	P		Internal	External		
1	BSCS101CCT	Programming	3	1	0	4	30	70	3 Hrs	I
2	BSCS150CCP	Programming Lab	0	0	4	2	15	35	3 Hrs	I
3	BSCS201CCT	Advanced Programming	3	1	0	4	30	70	3 Hrs	II
4	BSCS250CCP	Advanced Programming Lab	0	0	4	2	15	35	3 Hrs	II
5	BSCS301CCT	Data Structure	3	1	0	4	30	70	3 Hrs	III
6	BSCS350CCP	Data Structure Lab	0	0	4	2	15	35	3 Hrs	III
7	BSCS401CCT	Database Management System	3	1	0	4	30	70	3 Hrs	IV
8	BSCS450CCP	Database Management System Lab	0	0	4	2	15	35	3 Hrs	IV
9	BSCS501DST	Web Technology	3	1	0	4	30	70	3 Hrs	V
10	BSCS550DSP	Web Technology Lab	0	0	4	2	15	35	3 Hrs	V
11	BSCS502DST	Java Programming	3	1	0	4	30	70	3 Hrs	V
12	BSCS551DSP	Java Programming Lab	0	0	4	2	15	35	3 Hrs	V
13	BSCS601CCT	Operating System	3	1	0	4	30	70	3 Hrs	VI
14	BSCS650CCP	Operating System	0	0	4	2	15	35	3 Hrs	VI
15	BSCS602CCT	Advanced Java Programming	3	1	0	4	30	70	3 Hrs	VI
16	BSCS650CCP	Advanced Java Programming Lab	0	0	4	2	15	35	3 Hrs	VI

Course Code	Course Title	Lecture			Semester: I
		L	T	P	
BSCS101CCT	Programming	3	1	0	
Version:	Date of Approval:				
Scheme of Instruction			Scheme of Examination		
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To provide an overview of computers and problem solving methods using 'C' language.
2. Serve as a foundation for the study of programming languages.
3. Learn to develop program using 'C' language.

Course Outcomes:

1. The student would acquire various problem solving techniques and implement them in 'C' language.
2. Understand the basic terminology used in computer programming and write, compile and debug programs in C language.
3. Develop programs involving decision structures, loops and functions using different data types and data structures.

Detailed Contents:

Unit: 1	Introduction to Computers - Role of computers, Definition, Characteristics and Applications, Generations of Computer, Basic block diagram, CPU, Primary and Secondary storage devices and I/O Devices. Information Concepts: Data and its representation, Information and its characteristics, Categories of information,
Unit: 2	Number System: basic concepts, converting from one system to another , Introduction System software and Application Software. Generation of computer languages, types of languages, Language translators-Assembler, Interpreter, compiler, Link and Loader. Introduction to Computer Networks, History and usage of Internet, Browser and its types, Domain Name System (DNS), WWW, Electronic Mail (e-mail) , Search Engines and Intranets.
Unit: 3	Introduction to Programming - definitions and developing Algorithms and flowcharts for simple programs. Introduction to C Programming: Origin and history of c programming, character set, Identifiers and keywords data types, constants, variables, operators, symbolic constants, Expressions, compound statements, structure of C Program, Input and output function.
Unit: 4	C Statements - selection statements- if ,nested if's, the if-else-if ladder the conditional expressions, switch statement nested switch statements, iteration statements- the for loop, for loop variations, the while loop, ,the do-while loop, declaring variables within selection and iteration statements, jump statement, the return statement, the go to statement, break statement, exit() function, the continue statement, expression statement. Block statements
Unit: 5	Arrays - Array What is an array?-Array Declaration, Array Initialization-Accessing individual elements of an array-Two Dimensional Arrays- -Passing an array element to a function-Rules of using an array What are strings? String I/O, String Manipulation . Functions - The General Form of a Function,elements of function ,function categories, types of functions, Function Arguments Call by Value, Call by Reference , return Statement. Uses of functions. C pre-processor, storage classes-Automatic, Register, Static and external.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:

- 1 Let Us C by Yashwanth Kanetkar.
- 2 Programming in ANSI C by E-Balaguruswamy.

Reference Books:

- 1 Complete Reference of C++ by Herbert Schildt.
- 2 Introduction to Computers with MS-Office -2000 by Alwxis Lecon & Mathew Lecon.
- 3 Introduction to Computers by Peter Norton.
- 4 Introduction to Information Technology -Breaking Wave.

Course Code	Course Title	Lecture			Semester: I
BSCS150CCP	Programming Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 30 Hrs.	Maximum Score		:	50
Periods/ Week	: 4	Internal Evaluation		:	15
Credits	: 2	End Semester		:	35
Instruction Mode	: Practical	Exam Duration		:	3 Hrs.

Course Objectives:

1. To provide an overview of computers and problem solving methods using 'C' language.
2. Serve as a foundation for the study of programming languages.
3. Learn to develop program using 'C' language.

Course Outcomes:

1. The student would acquire various problem solving techniques and implement them in 'C' language.
2. Understand the basic terminology used in computer programming and write, compile and debug programs in C language.
3. Develop programs involving decision structures, loops and functions using different data types and data structures.

Detailed Contents:**I MS-Word****II MS- Excel****III MS-Powerpoint****IV MS-Access****V C Programming**

1. Practice on few Dos commands.
2. Simple programs on data types.
3. Input / Output statements.
4. Various Control statements.
5. Programs on all loops.
6. Programs on break and exit statement.
7. Programs using functions.
8. At least five Programs are using iteration and Recursive Functions using concepts like -factorial, Fibonacci, sum of n-numbers, displaying array elements using recursive functions, display first n numbers.
9. Arrays (Matrix operations).
10. Swapping of two numbers using function.
11. Programs on all function categories
12. Programs on sorting the given numbers
13. Programs on inserting and deleting the numbers using arrays
14. Passing arrays to functions.
15. Programs on string handling function (built-in and user defined).

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

- 1 | Let Us C by YashwanthKanetkar
- 2 | Programming in ANSI C by E-Balaguruswamy

Reference Books:

- 1
- 2

Course Code	Course Title	Lecture			Semester: II
BSCS201CCT	Advanced Programming	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To understand the basic concepts of advanced programming such pointers, file handling, structures and Unions.
2. To provide sufficient understanding of object oriented concepts.
3. To understand key merits of object oriented programming concepts such as Overloading, Inheritance, Polymorphism and Virtual Functions.

Course Outcomes:

1. Explain the principles of the object oriented programming paradigm specifically including abstraction, encapsulation, inheritance and polymorphism.
2. Demonstrate best practices in designing classes and class hierarchies from problem statements using sub-classing, abstract classes, and interfaces to achieve polymorphism in object oriented software.
3. Demonstrate the use of Constructor, Destructor and Dynamic Memory Allocation.

Detailed Contents:

Unit: 1	Pointers – definition, pointer variables, pointer expressions, arithmetic pointers, pointers and arrays, initializing pointers and functions and problems with pointers. Structures – definition, accessing structure members, structure assignments, array of structures, passing structures, structure pointers, uses of structures Unions – definitions, difference between structure and union, type def. Files – introduction to streams and files, basics of files – file pointer, opening and closing files, writing and reading character, file functions.
Unit: 2	Introduction to OOPs concept-The origin of C++, What is OOPs, Introduction to classes features of OOPS concept. Classes and Objects-classes, structures related with classes and unions related with classes, Inline functions, static data members and member functions, constructors and types of constructors, destructors, Array of objects, dynamic memory allocation. Dynamic objects-Introduction, pointers to objects, creating and deleting dynamic objects, pointers to object members, this operator, friend functions and classes.
Unit: 3	Overloading - Creating a Member Operator Function Creating Prefix and Postfix Forms of the Increment and Decrement Operators, Operator Overloading Restrictions, Operator Overloading Using a Friend Function, Using a Friend to Overload ++ or -- Friend Operator Functions, Overloading [], Overloading (), Overloading -, Overloading the Comma Operator.
Unit: 4	Inheritance- Introduction, base classes and derived class, types of inheritance, overloading base classes, virtual base class members, public, protected and private inheritance, constructors and destructors in derived classes, virtual base classes, abstract class.
Unit: 5	Polymorphism and Virtual Functions - Virtual Functions, Calling a Virtual Function Through a Base Class, Reference, The Virtual Attribute Is Inherited, Virtual Functions Are Hierarchical, Pure Virtual Functions, Abstract Classes, using Virtual Functions, Early, vs. Late Binding, C++ streams- stream classes, unformatted I/O operations. formatted I/O operations. manipulators, introduction to templates.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:

- 1 Complete Reference of C++ by Herbert Schilder
- 2 Object Oriented Programming with C++ By E. Balaguruswamy

Reference Books:

- 1 Object Oriented Turbo C Plus Plus by Robert Lafore
- 2 Programming with C Plus Plus by D. Ravi Chandra

Course Code	Course Title	Lecture			Semester: II
BSCS250CCP	Advanced Programming Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 60 Hrs.	Maximum Score		:	50
Periods/ Week	: 4	Internal Evaluation		:	15
Credits	: 2	End Semester		:	35
Instruction Mode	: Practical	Exam Duration		:	3 Hrs.

Course Objectives:

1. Explain the basic concepts of object oriented programming and importance of object oriented modelling.
2. Understand key merits of object oriented programming in comparison with alternative orientations and class design principles.
3. Understand the principles of combining sub-classing and interfaces in designing class hierarchies.

Course Outcomes:

1. Learn the principles of the object oriented programming paradigm specifically including abstraction, encapsulation, inheritance and polymorphism.
2. Demonstrate the use of encapsulation within and across software components and packages.
3. Practice of self-documentation and consistent coding style in writing programs using C++

Detailed Contents:

1. Program on Pointers and structure.
2. Program on typedef.
3. Handling array elements using pointers.
4. Swapping of two numbers using pointers and a function.
5. Sorting of any array using pointers and functions.
6. Pointer Arithmetic.
7. Sorting and array of structures.
8. Passing of individual elements of a structure to a function.
9. Passing of entire structure to a function.
10. Structures- Arrays- Pointers.
11. Inline Function.
12. Function Overloading.
13. Program on Classes.
14. Constructors, Destructor.
15. Static Members.
16. Friend Function, Friend Class.
17. Dynamic Memory Allocation using new and delete.
18. Pointer to object.
19. Overloading unary operator, Overloading binary operators.
20. Overloading binary operators using Friend function.
21. Single and Multiple Inheritance, Multiple Inheritance, Hierarchical Inheritance.
22. Constructors and Destructors in derived classes.
23. Virtual Function.
24. Program on file handling using classes.

Examination and Evaluation Pattern: It includes both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

1. Complete Reference of C++ by Herbert Schilder
2. Object Oriented Programming with C++ By E. Balaguruswamy

Reference Books:

1. Object Oriented Turbo C Plus Plus by Robert Lafore
2. Programming with C Plus Plus by D. Ravi Chandra

Course Code	Course Title	Lecture			Semester: III
BSCS301CCT	Data Structure	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To practice with programming skill and improve the programming logic.
2. To apply various techniques with data such storing, inserting, deleting and traversing of data.
3. To implement data structures such as Linked List Structures, Stack, Queues, Trees and Graphs.

Course Outcomes:

1. To write the code for a large program after overcoming the time and space complexity.
2. Frequent use of various algorithms such as searching, sorting, traversing with data structures.
3. Define the data in an optimal way.

Detailed Contents:

Unit: 1	Introduction to data structures- types of data structures – liner & nonlinear structures, examples -Arrays- operations such as insertion, deletion, searching- traversing - combining arrays – representation of stacks and queues using arrays - programs.
Unit: 2	Stack Applications - Infix, Postfix, Prefix concepts, converting algebraic expressions from infix to postfix, infix to prefix - string manipulation, recursive functions implementations. Queue- creation of queue, insertion and deletion operation in queue. Dequeue creation.
Unit: 3	Linked Lists- dynamic storage management – types of lists - Single, double and circular Linked lists - creation of single and double linked list, operations like insertion, deletion, traversing - representation of stacks and queues using single linked lists – programs.
Unit: 4	Trees- Terminology –Finding Node-Inserting Node- Binary Trees: Strictly Binary Tree, complete Binary tree, Almost Complete Binary tree, Binary Search Tree-Creation , deletion , Insertions, Traversals-Finding Maximum and Minimum Values-deleting Node –Efficiency of Binary trees-Trees represented as Arrays. Graphs- Types of graphs-Directed-Non directed-Weighted Graphs Representations: Adjacency Matrix –Linked Representation - Minimum spanning tree
Unit: 5	Sorting –Efficiency-linear sort-Bubble sort-Quick Sort-Selection sort-Insertion Sort. Advanced Sorting: Quick sort. Searching: Linear Search, Binary Search, Hashing, Binary Search Tree.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:

- 1 Data Structure Through C: A Practical Approach, by G. S. Baluja, Dhanpat Rai Publications.
- 2 Data Structures Using C, by Reema Thareja, Oxford press, 2nd Edition

Reference Books:

- 1 Data Structures using C, by E. Balagurusamy, McGraw Hill, 1st Edition
- 2 Data Structures Through C In Depth, S. K. Srivastava & Deepak Srivastava, BPB Publications, 2nd Edition

Course Code	Course Title	Lecture			Semester: III
BSCS350CCP	Data Structure Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 30 Hrs.	Maximum Score			: 50
Periods/ Week	: 4	Internal Evaluation			: 15
Credits	: 2	End Semester			: 35
Instruction Mode	: Practical	Exam Duration			: 3 Hrs.

Course Objectives:

To develop the program using data structure techniques for management of the memory

Course Outcomes:

Able to solve the problems with data structure for efficiency and performance of programs

Detailed Contents:

1. Program to Create, insert and display operations on single linked list
2. Program to Create, insert and display operations on double linked list
3. Program to Create, insert and display operations on singly circular linked list
4. Program to Create, insert and display operations on doubly circular linked list
5. Program to implement push and pop operations on Stack using arrays method
6. Program to implement insert and delete operations on Queue using array method
7. Program to construct Binary search Tree and implement tree traversing techniques
8. Program to implement Selection sort
9. Program to implement Insertion sort
10. Program to implement Merge sort
11. Program to implement Bubble sort
12. Program to implement Quick Sort

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

- 1 | Data Structure Through C: A Practical Approach, by G. S. Baluja, Dhanpat Rai Publications.
- 2 | Data Structures Using C, by Reema Thareja, Oxford press, 2nd Edition

Reference Books:

- 1 | Data Structures using C, by E. Balagurusamy, McGraw Hill, 1st Edition
- 2 | Data Structures Through C In Depth, S. K. Srivastava & Deepak Srivastava, BPB Publications, 2nd Edition

Course Code	Course Title	Lecture			Semester: IV
BSCS401CCT	Database Management System	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
2. Define the terminology, features, classifications, and characteristics embodied in database systems.
3. Analyse an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary.
4. Understand the concept of data planning and database design for serving different types of users with varying skill levels.
5. Handling different user views of the same stored data, combining interrelated data, setting standards, controlling concurrent updates so as to maintain data integrity.

Course Outcomes:

1. Master the basic concepts and appreciate the applications of database systems.
2. Master the basics of SQL and construct queries using SQL.
3. Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
4. Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
5. Master sound design principles for logical design of databases, including the E-R method and normalization approach.

Detailed Contents:

Unit: 1	Database Environment- Basic concepts and definitions, Traditional file processing System, Database approach, Range of Database Applications, Advantages of Database approach, costs and risks of Database approach, Components of Database Environment, Database Languages – DDL, DML, DCL,TCL, Data base Users Three tier architecture of DBMS, Role of Database administrator.
Unit: 2	Introduction to relational model, structure of relational databases, database schema, keys, Relational Algebra selection, projection, set operations, Different types of joins.
Unit: 3	SQL-History, Data types in SQL, Characteristics of SQL, Basic structure of SQL queries CREATE TABLE command, rules for creating table, inserting data into table, viewing data in the table, eliminating duplicate rows when using SELECT statement, sorting data in table, DELETE operations, UPDATE operations, Modifying the structure of tables, renaming table destroying table, truncating table, Data constraints-PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE, CHECK, joins, processing multiple tables, view definition, Aggregate functions ,creating views.
Unit: 4	Entity-Relationship model, Entities ,Attributes- simple, composed, single valued, multivalued and derived, relationships degree and cardinality Design process, constraints, Keys, Design issues, E-R diagrams, Naming Conventions, weak entity sets, extended E-R features – generalization, specialization, aggregation.
Unit: 5	Introduction to relational database design, Function dependency definition, trivial and non-trivial FD, Dependency preservation, Lossless and lossy decomposition, Multivalued dependencies Normalization - 1NF, 2NF, 3NF, BCNF, 4NF.
Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.	

Text Books:

- 1 Database systems: RamezElmasri and ShamkantB Navathe 5th Edition.
- 2 Database System Concepts : Abraham Silberschatz, Henry F. Korth, S. Sudarshan 6th edition.

Reference Books:

- 1 Database Management System: Raghu Ramakrishnan and Johannes Gehrke 3rd Edition.
- 2 Ivan Bayross SQL/PLSQL The programming Language of Oracle BPB Publications.

Course Code	Course Title	Lecture			Semester: IV
BSCS450CCP	Database Management System Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	50
Periods/ Week	: 4	Internal Evaluation		:	15
Credits	: 2	End Semester		:	35
Instruction Mode	: Practical	Exam Duration		:	3 Hrs.

Course Objectives:

1. Knowledge of DBMS, in terms of use and implementations.
2. Understand the concept of data planning and database design for serving different types of users with varying skill levels.

Course Outcomes:

1. Understand the relational database theory, and be able to write relational algebra expressions for queries, logical design of databases, including the E-R method and normalization approach.
2. Illustrate commercial relational database system by writing SQL.
3. Master the basics of SQL and construct queries using SQL

Detailed Contents:**List of Experiments**

1. Write the queries for Data Definition and Data Manipulation Language.
2. Write SQL queries using logical operations (OR, AND, NOT).
3. Write SQL queries for extracting data from more than one table.
4. Write SQL queries to enforce integrity constraints.
5. Write SQL queries using Aggregate functions.
6. Write an SQL query to create view.

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

- 1 | PL/SQL the Programming Language of Oracle by Ivan Bayross.

Reference Books:

- 1 | DatabaseSystemConcepts, Silberschatz, Korth, McGrawhill, Vedition.

Course Code	Course Title	Lecture			Semester:V
BSCS501DST	Web Technology	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To understand internet and www.
2. To Design dynamic and interactive web pages using HTML, CSS, JavaScript, XML
3. To study the technologies, protocols and architectures of the networks and web based application.
4. To design a web based application using existing tools and techniques.

Course Outcomes:

1. Develop project management skills related to web development.
2. Demonstrate technical skills required of Web Developers through use of W3C standards.
3. Development steps for web application using HTML, CSS, JavaScript.

Detailed Contents:

Unit: 1	Internet Basics-Communicating on the Internet-Internet Domains-Internet server identities-Establishing connectivity on the internet -Client IP address-A Brief overview of TCP/IP and its services-Transmission Control Protocol-(TCP)-.
Unit: 2	Introduction to HTML- Lists -Types of Lists, Tables, Frames
Unit: 3	Introduction to DHTML, Cascading Style Sheets(CSS) - Class - Using Tag - External Style Sheets(ESS) - Using <DIV> Tag - Layers.
Unit: 4	Introduction to JavaScript-The JavaScript Document object model-Forms used by a Website-Cookies
Unit: 5	Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:

1	Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI-IvanBayross-BPB Publications-3 rd Edition.
2	

Reference Books:

1	
2	

Course Code	Course Title	Lecture			Semester:V
BSCS550DSP	Web Technology Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 30 Hrs.	Maximum Score		:	50
Periods/ Week	: 4	Internal Evaluation		:	15
Credits	: 2	End Semester		:	35
Instruction Mode	: Practical	Exam Duration		:	3 Hrs.

Course Objectives:

1. To understand internet and www.
2. To Design dynamic and interactive web pages using HTML, CSS, JavaScript, XML
3. To study the technologies, protocols and architectures of the networks and web based application.
4. To design a web based application using existing tools and techniques.

Course Outcomes:

1. Develop project management skills related to web development.
2. Demonstrate technical skills required of Web Developers through use of W3C standards.
3. Development steps for web application using HTML, CSS, JavaScript.

Detailed Contents:

1. Write a program using tag
2. Write a program using <heading> tags and <pre> tag
3. Write a program using <u><i> and teletype text
4. Write a program using <sub> and <sup>
5. Write a program to scroll text using marquee.
6. Write a program to create a table.
7. Write a program to implement a frame.
8. Write a program using hyperlink.
9. Write a program using ordered list, unordered list, and definition list.
10. Write a program for creating table headings
11. Write a program to create a cascading style sheet
12. Program with JS operators
13. Program using if statement
14. Program to perform arithmetic operations
15. Program using switch statements
16. Write a program to get current time
17. Write an application to create a form using JS
18. Write a program to create student structure using XML
19. Write a program in XML to implement XML schemas.
20. Write a program in XML to implement DOM.

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

- 1 Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI-Ivan Bayross-BPB Publications-3rd Edition.

2

Reference Books:

1

2

Course Code	Course Title	Lecture			Semester:V
BSCS502DST	Java Programming	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To introduces computer programming using the JAVA programming language with object-oriented programming principles.
2. To Emphasize on event-driven programming methods, including creating and
3. To manipulate objects, classes, and using object-oriented tools such as the class debugger.

Course Outcomes:

1. Design, create, build, and debug Java applications and applets.
2. Write Java programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, inheritance, and polymorphism.
3. Write programs using graphical user interface (GUI) components and Java's Event Handling Model.

Detailed Contents:

Unit: 1	Overview - Introduction to Java programming : Features, The Java Virtual Machine, Language fundamentals, Variables and data types, Conditional and looping constructs, Arrays.
Unit: 2	Object-oriented programming with Java Classes and Objects: Fields and Methods, Constructors, Overloading methods, Garbage collection, Nested classes.
Unit: 3	Inheritance: Overriding methods, Polymorphism, Making methods and classes final, Abstract classes and methods, Interfaces Packages, Access protection, importing packages, Exception handling- Exception types, Using try and catch, multiple catch clauses, Nested try statements, throw, throws, finally, Java's Built-in-Exceptions, Creating own exceptions.
Unit: 4	String Handling --- String Constructors, length, Special String operations --- literals, concatenation, conversion and to String (), Character Extraction, Searching, modifying, Changing the case of characters, String Buffer and its methods
Unit: 5	Java.io package ---- file, The Stream Classes, Byte Streams-IO streams, File IO Stream, Byte Array IO Stream, Filtered Byte Streams, Buffered Byte Streams, Sequence I/p Stream, Print Stream, Random access file. Character Streams:- Reader, Writer, File Reader ,FileWriter, CharArray Writer, Buffered Reader, Buffered Writer, Pushback Reader, Print Writer

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:

1	PatricNaughton, Herbert Schildt - The Complete Reference Java 2, 4 th edition
2	

Reference Books:

1	
2	

Course Code	Course Title	Lecture			Semester:V
BSCS551DSP	Java Programming Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 30 Hrs.	Maximum Score			: 50
Periods/ Week	: 4	Internal Evaluation			: 15
Credits	: 2	End Semester			: 35
Instruction Mode	: Practical	Exam Duration			: 3 Hrs.

Course Objectives:**Course Outcomes:****Detailed Contents:**

1. Program to demonstrate types of Constructors.
2. Program to find area of rectangle and volume of cube using method overriding.
3. Program to implement method overloading.
4. Program to perform sorting using arrays.
5. Program to implement inheritance.
6. Program to implement a package.
7. Program to create an Abstract class and its implementation.
8. Program to create an Interface.
9. Program to illustrate try/Catch using multiple catch blocks.
10. Program to illustrate string comparison and concatenation.
11. Program using string Buffer and its methods.
12. Program to illustrate Character Extraction.
13. Program to illustrate Buffered Reader classes.
14. Program to illustrate file class method.
15. Program to display serialization of object.

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

1 | PatricNaughton, Herbert Schildt - The Complete Reference Java 2, 4th edition

2 |

Reference Books:

1 |

2 |

Course Code	Course Title	Lecture			Semester: VI
BSCS601CCT	Operating System	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:

1. To understand overall functionality of Operating System such as Process Management, Memory Management, File Management and Security Issue.
2. To Provide sufficient understanding of operating system design
3. To understand the impact of operating system on application systems design and performance.

Course Outcomes:

1. Exhibit familiarity with the fundamental concepts of operating systems.
2. Apply a mature understanding of operating system design and how it impacts application systems design and performance.
3. Exhibit competence in recognizing operating systems features and issues.

Detailed Contents:

Unit: 1	Introduction: What is an operating system, simple batch systems, multi-programme batched systems, time-sharing, personal-computer systems, parallel systems, Distributed systems, real-time systems, computer-system structures-computer system operation, I/O structure, storage structure, storage hierarchy, Introduction to hardware protection.
Unit: 2	Operating system structures: system components, Operating system services, system calls. Process- process concepts, scheduling criteria, scheduling Algorithms, multiple- processor scheduling.
Unit: 3	Deadlock system model: Deadlock characteristics, methods for handling deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock detection, Recovery from deadlock.
Unit: 4	Memory management: Logical versus physical address space, swapping, contiguous allocation, Paging, Segmentation and Segmentation with paging.
Unit: 5	Virtual memory-: Background, Demand paging, performance of demand paging, page replacement, page-replacement algorithms, Allocation of frame, thrashing, Demand segmentation.

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:

- 1 Silberschatz, Galvin and Gagne, "Operating Systems Concepts", Wiley
- 2 Sibsankar Halder and Alex A Aravind, "Operating Systems", Pearson Education

Reference Books:

- 1 Harvey M Dietel, "An Introduction to Operating System", Pearson Education
- 2 D M Dhamdhare, "Operating Systems :A Concept based Approach", McGraw Hil

Course Code		Course Title		Lecture			Semester:VI
BSCS650CCP		Operating System Lab		L	T	P	
Version:	Date of Approval:			0	0	4	
Scheme of Instruction				Scheme of Examination			
Total Duration	:	30 Hrs.		Maximum Score		:	50
Periods/ Week	:	4		Internal Evaluation		:	15
Credits	:	2		End Semester		:	35
Instruction Mode	:	Practical		Exam Duration		:	3 Hrs.

Course Objectives:

1. To familiarize the students with the Operating System.
2. To demonstrate the process, memory, file and directory management issues under the UNIX/ LINUX operating system
3. To introduce LINUX basic commands.
4. To make students how to make simple programs in LINUX and administrative task of LINUX

Course Outcomes:

1. Able to use various commands on UNIX/LINUX terminal
2. Able to solve various problem using shell scripting

Detailed Contents:**Unix/Linux**

1. Display Good Morning, Evening, Afternoon and Night based on time
1. Calculate gross salary HRA-10%,DA-90% if BASIC \geq 1600 and HRA-15%,DA-95% if BASIC \geq 10000
2. Display grade obtained by student based on Marks
3. Find factorial of a given number
4. Sum of digits of given number
5. Reverse the given number and print
6. Check whether given number is prime or not
7. copy contents from one file to other file
8. concatenate 2 files into a single file
9. convert file contents from lowercase to uppercase and store it on other file
10. convert file contents to sentence case
11. Program to find the GCD of given 2 numbers.

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

1

2

Reference Books:

1

2

Course Code	Course Title	Lecture			Semester:VI
BSCS602CCT	Advanced Java Programming	L	T	P	
Version:	Date of Approval:	3	1	0	
Scheme of Instruction		Scheme of Examination			
Total Duration	: 60 Hrs.	Maximum Score		:	100
Periods/ Week	: 4	Internal Evaluation		:	30
Credits	: 4	End Semester		:	70
Instruction Mode	: Lecture	Exam Duration		:	3 Hrs.

Course Objectives:**Course Outcomes:****Detailed Contents:**

Unit: 1	Multithreaded programming: creating threads, run() method, new thread, thread class, stopping & blocking threads, life cycle of thread- newborn, runnable, running, blocked, dead, waiting sleeping, suspended, blocked, using thread methods, thread exceptions, thread priority, synchronization, implementing the Runnable interface.
Unit: 2	Applet: what is an applet, applet lifecycle, applet class, applet context class, passing parameters to applet, use of java .awt graphics class and its various methods in an applet Graphical user interface(GUI): Layout managers (flow layout, border layout, card layout grid bag layout, grid layout), AWT controls (labels, buttons, canvases, checkboxes, check box group, choices, text fields, text areas, lists, scrollbars, panels, windows, frames, menus, menubars).
Unit: 3	Event Handling: Event delegation model or event class hierarchy, all classes and interfaces of event delegation model, programs related to event handling covering all types of events.
Unit: 4	Java Swing: Working with JFrame, JApplet, JPanel, JPasswordField, Jbutton, Jcheckbox, Jradiobutton, Jlist, Jscrollpane, Jcombobox, Jmenu, Jmenubar, JMenuitem, JpopupMenu, JTree, JTable.
Unit: 5	Introduction to JDBC, architecture, types of statements. Introduction to Servlets: Need for Servlets, Introduction to Servlets, The javax.servlet Package, Life Cycle of a Servlet, Accessing a Servlet using an HTML page. Introduction to JSP: Need for JSP, The JSP RequestResponse class.

Examination and Evaluation Pattern: It include both internal evaluation (30 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (70 marks) which is mainly end semester examination.

Text Books:

1	Java Complete Reference
2	SubrahmanyamAllamaraju etc., - Professional Java Server Programming — J2EE 1.3 edition, Wrox Press 2001.

Reference Books:

1	
2	

Course Code	Course Title	Lecture			Semester:VI
BSCS650CCP	Advanced Java Programming Lab	L	T	P	
Version:	Date of Approval:	0	0	4	
Scheme of Instruction			Scheme of Examination		
Total Duration	: 30 Hrs.	Maximum Score		:	50
Periods/ Week	: 4	Internal Evaluation		:	15
Credits	: 2	End Semester		:	35
Instruction Mode	: Practical	Exam Duration		:	3 Hrs.

Course Objectives:**Course Outcomes:****Detailed Contents:**

1. Program to create a thread.
2. Program to create multiple threads.
3. Program to create an Simple Applet
4. Program to create a Frame.
5. Program to illustrate Scrollbar.
6. Program to implement Flow Layout,
7. Program to implement border layout or card layout.
8. Program to illustrate Checkbox
9. Program to create a simple swing application
10. Program to implement JMenu.
11. Program to implement JTree
12. Program to implement JTable
13. Program to create a JDBC application using Prepared Statement
14. Program to create a Simple Servlet application.
15. Program to create an JSP application.

Examination and Evaluation Pattern: It include both internal evaluation (15 marks) comprising two class sessional exams/ assignments/ quiz/ seminar presentation etc. and external evaluation (35 marks) which is mainly end semester examination.

Text Books:

- 1 SubrahmanyamAllamaraju etc., - Professional Java Server Programming — J2EE 1.3 edition, Wrox Press 2001.

2

Reference Books:

1

2