



Bachelor of Computer Application

L T P - Indicates Theory Lectures (L), Tutorial(T) and Practical (P) classes per week.

1L Earns 1 credits

1P Earns 0.5 credits

1T Earns 1 Credit

Semester III							
Sl. No.	Category	Course Code	Course Name	L	T	P	Credits
Theory							
1	CC6	BCAC301 BCAC391	Object Oriented Programming	4	0	4	6
2	CC7	BCAC302 BCAC392	Database Management System	4	0	4	6
3	CC8	BCAC303 BCAC393	Data Structure and Algorithm using Python	4	0	4	6
4	GE-3			4/ 5	0/ 1	4/ 0	6
Practical							
5	SEC-2	BCAS391	Web Design and Development	0	0	4	2
Total Credit							26

CC: Core Course

GE: General Electives (To be selected from MOOCs Basket listed below)

AEC: Ability Enhancement Course

SEC: Skill Enhancement Course

Bachelor of Computer Application Semester-3

Name of the Course: BCA	
Subject: Object Oriented Programming	
Course Code: BCAC301 + BCAC391	Semester: 3rd

Duration: 48 Hours		Maximum Marks: 100 + 100
Teaching Scheme		Examination Scheme
Theory: 4		End Semester Exam: 70
Tutorial: 0		Attendance : 5
Practical: 4		Continuous Assessment: 25
Credit: 4 + 2		Practical Sessional internal continuous evaluation: 40
		Practical Sessional external examination: 60
Aim:		
Sl. No.		
1	In-depth understanding of various concepts of object oriented programming language.	
2	Ability to read, understand and trace the execution of programs	
3	Skill to debug a program.	
4	Skill to write program code in java to solve real world problems.	
Objective:		
Sl. No.		
1	To introduce students to a powerful programming language	
2	To understand the basic structure of object oriented program	
3	To gain knowledge of various programming errors.	
4	To enable the students to make flowchart and design an algorithm for a given problem.	
5	To enable the students to develop logics and programs	
Pre-Requisite:		
Sl. No.		
1	Understanding of basic programming logic.	

Contents			
Chapter	Name of the Topic	Hours	Marks
01	<p>Object oriented design</p> <p>Concepts of object oriented programming language, Major and minor elements, Object, Class, relationships among objects, aggregation, links, relationships among classes-association, aggregation, using, instantiation, meta-class, grouping constructs.</p>	6	10
02	<p>Object oriented concepts</p> <p>Difference between OOP and other conventional programming – advantages and disadvantages. Class, object, message passing, inheritance, encapsulation, polymorphism</p>	6	10
03	<p>Basic concepts of object oriented programming using Java</p> <p>Implementation of Object oriented concepts using Java. Language features to be covered:</p>	6	10
04	<p>Class & Object properties</p> <p>Basic concepts of java programming – advantages of java, byte-code & JVM, data types, access specifiers, operators, control statements & loops, array, creation of class, object, constructor, finalize and garbage collection, use of method overloading, this keyword, use of objects as parameter & methods returning objects, call by value & call by reference, static variables & methods, garbage collection, nested & inner classes, basic string handling concepts- String [discuss charAt[] , compareTo[], equals[], indexOf[], length[]</p> <p>equalsIgnoreCase[], substring[], toCharArray[] , toLowerCase[], toString[], toUpperCase[] , trim[] , valueOf[] methods] & StringBuffer classes [discuss append[], capacity[], charAt[], delete[], deleteCharAt[], ensureCapacity[], getChars[], indexOf[], insert[], length[], setCharAt[], setLength[], substring[], toString[] methods], concept of mutable and immutable string, command line arguments, basics of I/O operations – keyboard input using BufferedReader & Scanner classes.</p>	8	10
05	<p>Reusability properties</p> <p>Super class & subclasses including multilevel hierarchy, process of constructor</p>	6	10

	calling in inheritance, use of super and final keywords with super[] method, dynamic method dispatch, use of abstract classes & methods, interfaces. Creation of packages, importing packages, member access for packages.		
06	Exception handling & Multithreading [6L] Exception handling basics, different types of exception classes, use of try & catch with throw, throws & finally, creation of user defined exception classes. Basics of multithreading, main thread, thread life cycle, creation of multiple threads, thread priorities, thread synchronization, interthread communication, deadlocks for threads, suspending & resuming threads.	6	10
07	Applet Programming [using swing] Basics of applet programming, applet life cycle, difference between application & applet programming, parameter passing in applets, concept of delegation event model and listener, I/O in applets, use of repaint[], getDocumentBase[], getCodeBase[] methods, layout manager [basic concept], creation of buttons [JButton class only] & text fields.	6	10
	Sub Total:	44	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	48	100

Practical

Course Code: BCAC391

Credit: 2

Skills to be developed:

Intellectual skills:

1. Ability to read, understand and write object oriented programs.
2. Ability to analyze problems and provide program based solutions.

List of Practical:

1. Basic programming structures
2. Class and Objects
3. Constructors
4. Overloading
5. Inheritance
6. Overriding
7. Exception Handling
8. Applets
9. JDBC
10. Mini project

Assignments:

Based on the curriculum as covered by the subject teacher.

List of Books**Text Books:**

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
E. Balaguruswamy	Object Oriented Modelling and Design		Tata McGraw-Hill
Ali Bahrami	Object Oriented System Development		Mc Graw Hill

Reference Books:

Patrick Naughton, Herbert Schildt	The complete reference-Java2		TMH
Kenneth A. Reek	Pointers on C		Pearson
R.K Das	Core Java For Beginners		VIKAS PUBLISHING

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1.	Computer with moderate configuration
2.	A programming language compiler

End Semester Examination Scheme.

Maximum Marks-70.

Time allotted-3hrs.

Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	1 to 5	10	10				
B	1 to 5			5	3	5	70
C	1 to 5			5	3	15	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	All	1	10	10
B	All	5	5	3
C	All	15	5	3

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Five No of Experiments			

External Examination: Examiner-

Signed Lab Note Book(for five experiments)		5*2=10	
On Spot Experiment(one for each group consisting 5 students)		10	
Viva voce		5	

Name of the Course: BCA

Subject: Database Management System

Course Code: BCAC302 + BCAC392

Semester: 3rd

Duration: 48 Hours		Maximum Marks: 100 + 100
Teaching Scheme		Examination Scheme
Theory: 4		End Semester Exam: 70
Tutorial: 0		Attendance : 5
Practical: 4		Continuous Assessment: 25
Credit: 4 + 2		Practical Sessional internal continuous evaluation: 40
		Practical Sessional external examination: 60
Aim:		
Sl. No.		
1	Familiarization with Database Management System.	
2	Comprehensive knowledge of database models.	
3	Ability to code database transactions using SQL.	
Objective:		
Sl. No.		
1	To introduce the students to the database system.	
2	To learn how to design a database by using different models.	
3	To enable the students to understand the database handling during execution of the transactions.	
4	To understand the handling of database by concurrent users.	
5	To gain complete knowledge of SQL and PL/SQL.	
Pre-Requisite:		
Sl. No.		
	None	

Contents			
Chapter	Name of the Topic	Hours	Marks
01	Introduction Concept & Overview of DBMS, Data Models, Database Languages, Database Administrator, Database Users, Data Abstraction, Three Schema architecture of DBMS.	6	5
02	E-R Model Need for E-R Model, Various steps of database design, Mapping Constraints, E-R diagram, Subclass, Generalization, Specialization, Aggregation, Strong Entity-Weak Entity,	6	10
03	SQL Concept of DDL, DML, DCL. Basic Structure, Set operations, Aggregate Functions, Null Values, Domain Constraints, Referential Integrity Constraints, assertions, views, Nested Subqueries, Stored procedures,cursors and triggers.	6	10
04	Relational Model and Relational Database Design Concept of Relational Model, Design Issues, Keys, Closure set, Functional Dependency, Different anomalies in designing a Database., Normalization using functional dependencies, Decomposition, Boyce-Codd Normal Form, 3NF, Normalization using multivalued dependencies, 4NF,5NF, Centralized and distributed database.	8	20
05	File Organization and Query Optimization Concepts of File and Records, Fixed Length-Variable length Record, Query optimization.	6	10
06	Indexing Primary, secondary, clustering, Multilevel Indexes.	6	5
07	Transaction Management Transaction definition, properties, transaction state diagram, commit and rollback, Concurrency control,lock based protocols,two phase locking, Recovery management.	6	10
	Sub Total:	44	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	48	100

Practical
Course Code: BCAC392
Credit: 2
Skills to be developed:

List of Practical:

1. Basics of SQL and different types of queries that should cover major portion of DDL,DML structures.

Assignments:

Based on the curriculum as covered by the subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Henry F. Korth and Silberschatz Abraham	Database System Concepts		Mc.Graw Hill
Ramez Elmasri, Shamkant B.Navathe	Fundamentals of Database Systems		Addison Wesley

Reference Books:

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List of equipment/apparatus for laboratory experiments:

Sl. No.	
1.	Computer with Oracle/ any other DBMS package installed.

End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.

Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	1 to 7	10	10				
B	1 to 7			5	3	5	70
C	1 to 7			5	3	15	

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	All	1	10	10
B	All	5	5	3
C	All	15	5	3

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Five No of Experiments			

External Examination: Examiner-

Signed Lab Note Book(for five experiments)		5*2=10	
On Spot Experiment(one for each group consisting 5 students)		10	
Viva voce		5	

Name of the Course: BCA

Subject: Data Structure and Algorithm with Python

Course Code: BCAC303 and BCAC393	Semester: 3
Duration: 48 Hrs.	Maximum Marks: 100 + 100
Teaching Scheme	Examination Scheme
Theory: 4	End Semester Exam:70
Tutorial: 0	Attendance: 5
Practical: 4	Continuous Assessment: 25
Credit: 4+2	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60

Aim:			
Sl. No.			
1.	The point of this course is to give you a vibe for algorithms and data structures as a focal area of what it is to be a computer science student.		
2.	You ought to know about the way that there are regularly a few calculations for some issue, and one calculation might be superior to another, or one calculation better in certain conditions and another better in others.		
3.	You should have some idea of how to work out the efficiency of an algorithm.		
4.	You will be able to use and design linked data structures		
5.	You will learn why it is good programming style to hide the details of a data structure within an abstract data type.		
6.	You should have some idea of how to implement various algorithm using python programming.		
Objective:			
Sl. No.			
1.	To impart the basic concepts of data structures and algorithms.		
2.	To understand concepts about searching and sorting techniques.		
3.	To understand basic concepts about stacks, queues, lists, trees and graphs.		
4.	To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures		
Pre-Requisite:			
Sl. No.			
1.	Basics of programming language.		
1.	Logic building skills.		
Contents			
Chapter	Name of the Topic	Hours	Marks
01	Introduction to Data Structure Abstract Data Type.	1	2
02	Arrays 1D, 2D and Multi-dimensional Arrays, Sparse Matrices. Polynomial representation.	3	4
03	Linked Lists Singly, Doubly and Circular Lists, Normal and Circular representation of Self Organizing Lists, Skip Lists, Polynomial representation.	6	7
04	Stacks Implementing single / multiple stack/s in an Array, Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another, Applications of stack,	6	10

	Limitations of Array representation of stack.		
05	Queues Array and Linked representation of Queue, Circular Queue, De-queue, Priority Queues.	4	7
06	Recursion Developing Recursive Definition of Simple Problems and their implementation, Advantages and Limitations of Recursion, Understanding what goes behind Recursion (Internal Stack Implementation)	6	5
07	Trees Introduction to Tree as a data structure, Binary Trees (Insertion, Deletion, Recursive and Iterative Traversals of Binary Search Trees), Threaded Binary Trees (Insertion, Deletion, Traversals), Height-Balanced Trees (Various operations on AVL Trees).	6	15
08	Searching and Sorting Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Merge Sort, Quick sort, Shell Sort, Comparison of Sorting Techniques	6	15
09	Hashing Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collision by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, Perfect Hashing Function.	6	5
	Sub Total:	44	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	48	100

Practical:

Skills to be developed:

Intellectual skills:

1. Skill to analyze algorithms and to determine algorithm correctness and their time efficiency.
2. Knowledge of advanced abstract data type (ADT) and data structures and their implementations.
3. Ability to implement algorithms to perform various operations on data structures.

List of Practical:

1. Implementation of array operations.
2. Stacks and Queues: adding, deleting elements.
3. Circular Queue: Adding & deleting elements

		to be set				question	
A	1 to 9	10	10	5	3	5	60
B	1 to 9			5	3	15	
C	1 to 9						

- Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part.
- Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper.

Examination Scheme for end semester examination:

Group	Chapter	Marks of each question	Question to be set	Question to be answered
A	All	1	10	10
B	All	5	5	3
C	All	15	5	3

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Continuous evaluation			40
External Examination: Examiner-			
Signed Lab Note Book	10		
On Spot Experiment	40		
Viva voce	10		60

Name of the Course: BCA

Subject: Web Design and Development

Course Code: BCAS391	Semester: 3rd
Duration: 48 Hrs.	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: 0	End Semester Exam:
Tutorial: 0	Attendance:
Practical: 4	Continuous Assessment:
Credit: 2	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60
Practical:	
Skills to be developed:	
Intellectual skills:	

1. Skill to analyze algorithms and to determine algorithm correctness and their time efficiency.
2. Knowledge of advanced abstract data type (ADT) and data structures and their implementations.

List of Practical:

1. Design basic HTML pages with HTML tags.
2. Enhancing design with CSS
3. Include dynamic contents using javascript.
4. Understanding and working with JQuery.
5. Understanding server side programming.
6. Develop a website with frontend, backend and database connectivity.
7. Mini project.

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1.	Computer with moderate configuration
2.	Javascript enabled browser.
3.	Database package and web service

Examination Scheme for Practical Sessional examination:

Practical Internal Sessional Continuous Evaluation

Internal Examination:

Continuous evaluation			40
External Examination: Examiner-			
Signed Lab Note Book	10		
On Spot Experiment	40		
Viva voce	10		60

Semester IV

Sl. No.	Category	Course Code	Course Name	L	T	P	Credits
Theory + Practical							
1	CC9	BCAC401 BCAC491	Computer Networking	4	0	4	6
2	CC10	BCAC402 BCAC492	Software Engineering	4	0	4	6
3	CC11	BCAC403 BCAC493	Design and Analysis of Algorithms	4	0	4	6

4	GE-4			4/5	0/1	4/0	6
Practical							
5	SEC-3	BCAS481	Minor Project and Entrepreneurship II	0	0	4	2
Total Credit							26

Bachelor of Computer Application Semester-4

Name of the Course: BCA	
Subject: Computer Networking	
Course Code: BCAC401 + BCAC491	Semester: 4th
Duration: 48 Hours	Maximum Marks: 100 + 100
Teaching Scheme	Examination Scheme
Theory: 4	End Semester Exam: 70
Tutorial: 0	Attendance : 5
Practical: 4	Continuous Assessment: 25
Credit: 4 + 2	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60
Aim:	
Sl. No.	
1	To gain Knowledge of uses and services of Computer Network
2	To enhance Ability to identify types and topologies of network.

3	To gain Understanding of analog and digital transmission of data.		
4			
Objective:			
Sl. No.			
1	To deliver comprehensive view of Computer Network.		
2	To enable the students to understand the Network Architecture, Network type and topologies		
3	To understand the design issues and working of each layer of OSI model.		
4	To familiarize with the benefits and issues regarding Network Security.		
Pre-Requisite:			
Sl. No.			
1.	None		
Contents			
Chapter	Name of the Topic	Hours	Marks
01	Introduction Introduction to communication systems, Data, signal and Transmission: Analog and Digital, Transmission modes, components, Transmission Impairments, Performance criteria of a communication system. Goals of computer Network, Networks: Classification, Components and Topology, categories of network [LAN, MAN, WAN]; Internet: brief history, internet today; Protocols and standards; OSI and TCP/IP model.	6	10
02	Data link layer: Types of errors, framing [character and bit stuffing], error detection & correction methods; Flow control; Protocols: Stop & wait ARQ	8	10
03	Medium access sub layer: Point to point protocol, FDDI, token bus, token ring; Reservation, polling, concentration; Multiple access protocols: ALOHA, CSMA, FDMA, TDMA, CDMA; Ethernet	6	10
04	Network layer: Internetworking & devices: Repeaters, Hubs, Bridges, Switches,	6	10

	Router, Gateway; Addressing : Internet address, classful address, Routing : techniques, static vs. dynamic routing , Protocols: IP, IPV6		
05	Transport layer: Process to process delivery; UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, Quality of services [Qos]	6	10
06	Application Layer DNS, SMTP, FTP, HTTP & WWW; Security: Cryptography [Public, Private Key based], Digital Signature, Firewalls [technology & applications]	6	10
07	Physical Layer: Overview of data [analog & digital], signal [analog & digital], transmission [analog & digital] & transmission media [guided & unguided]; Circuit switching: time division & space division switch, TDM bus; Telephone Network	6	10
	Sub Total:	44	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	48	100

Practical

Course Code: BCAC491

Credit: 2

List of Practical:

Implementation of practicals are adhered to the theoretical curriculum.

Assignments:

Based on the curriculum as covered by the subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
B. A. Forouzan	Data Communications and Networking		TMH
A. S. Tanenbaum	Computer Networks		Pearson Education/PHI
W. Stallings	Data and Computer Communications		PHI/ Pearson Education

Reference Books:							
List of equipment/apparatus for laboratory experiments:							
Sl. No.							
1	Computer with moderate configuration						
2	Network simulator package						
End Semester Examination Scheme. Maximum Marks-70. Time allotted-3hrs.							
Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	1 to 7	10	10				
B	1 to 7			5	3	5	70
C	1 to 7			5	3	15	
<ul style="list-style-type: none"> • Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part. • Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper. 							
Examination Scheme for end semester examination:							
Group	Chapter	Marks of each question	Question to be set	Question to be answered			
A	All	1	10	10			
B	All	5	5	3			
C	All	15	5	3			
Examination Scheme for Practical Sessional examination:							
Practical Internal Sessional Continuous Evaluation							
Internal Examination:							
Five No of Experiments							

External Examination: Examiner-			
Signed Lab Note Book(for five experiments)		5*2=10	
On Spot Experiment(one for each group consisting 5 students)		10	
Viva voce		5	

Name of the Course: BCA	
Subject: Software Engineering	
Course Code: BCAC402 + BCAC492	Semester: 4th
Duration: 48 Hours	Maximum Marks: 100 + 100
Teaching Scheme	Examination Scheme
Theory: 4	End Semester Exam: 70
Tutorial: 0	Attendance : 5
Practical: 4	Continuous Assessment: 25
Credit: 4 + 2	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60
Aim:	
Sl. No.	
1	Familiarization with the concept of software engineering and its relevance.
2	Understanding of various methods or models for developing a software product.
3	Ability to analyze existing system to gather requirements for proposed system.
4	Gain skill to design and develop softwares.
Objective:	
Sl. No.	
1	To introduce the students to a branch of study associated with the development of a software product.
2	To gain basic knowledge about the pre-requisites for planning a software project.

3	To learn how to design of software		
4	To enable the students to perform testing of a software.		
Pre-Requisite:			
Sl. No.			
1.	None		
Contents			
Chapter	Name of the Topic	Hours	Marks
01	Overview of Computer Based Information System- TPS, OAS, MIS, DSS, KBS Development Life Cycles- SDLC and its phases Models- Waterfall, Prototype, Spiral, Evolutionary Requirement Analysis and Specification, SRS System analysis- DFD, Data Modeling with ERD	12	20
02	Feasibility Analysis System design tools- data dictionary, structure chart, decision table, decision tree. Concept of User Interface, Essence of UML. CASE tool.	12	15
03	Testing- Test case, Test suit, Types of testing- unit testing, system testing, integration testing, acceptance testing Design methodologies: top down and bottom up approach, stub, driver, black box and white box testing.	10	20
04	ERP, MRP, CRM, Software maintenance SCM, concept of standards [ISO and CMM]	10	15
	Sub Total:	44	
	Internal Assessment Examination & Preparation of Semester Examination	4	
	Total:	48	70
Practical: BCAC492 Credit: 2 List of Practicals: 1: Develop requirements specification for a given problem (The requirements specification			

should include both functional and non-functional requirements).

2: Develop Structured Design for a given software in its requirement phase

3: Develop Object Modelling Using UML for a given software in its requirement phase

4: Develop Use Case Diagram for a given software in its requirement phase

5: Develop Class Diagrams for a given software in its requirement phase

6: Develop Interactive Diagram for a given software in its requirement phase

7: Develop Activity and State Chart Diagram for a given software in its requirement phase

8: Use of any testing tool and how to handle it.

9: Use of any configuration management tool and how to handle it

10: Use of any one project management tool and how to handle it

11: Complete documentation of developing the software using SDLC model -1

12: Complete documentation of developing the software using SDLC model -2

Assignments:

Based on the curriculum as covered by the subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Igor Hawryszkiewicz	System analysis and design		PEARSON
V Rajaraman	Analysis and design of Information System		PHI
Ian Sommerville	Software Engineering		Addison-Wesley

Reference Books:

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1	Computer with moderate configuration

2		MS-Project or similar software.					
End Semester Examination Scheme.		Maximum Marks-70.			Time allotted-3hrs.		
Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	1 to 4	10	10				
B	1 to 4			5	3	5	70
C	1 to 4			5	3	15	
<ul style="list-style-type: none"> Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part. Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper. 							
Examination Scheme for end semester examination:							
Group	Chapter	Marks of each question	Question to be set	Question to be answered			
A	All	1	10	10			
B	All	5	5	3			
C	All	15	5	3			
Examination Scheme for Practical Sessional examination:							
Practical Internal Sessional Continuous Evaluation							
Internal Examination:							
Five No of Experiments							
External Examination: Examiner-							
Signed Lab Note Book(for five experiments)			5*2=10				
On Spot Experiment(one for each group consisting 5 students)			10				
Viva voce			5				

Name of the Course: BCA	
Subject: Design and Analysis of Algorithms	
Course Code: BCAC403 + BCAC493	Semester: 4th
Duration: 48 Hours	Maximum Marks: 100 + 100
Teaching Scheme	Examination Scheme
Theory: 4	End Semester Exam: 70
Tutorial: 0	Attendance : 5
Practical: 4	Continuous Assessment: 25
Credit: 4 + 2	Practical Sessional internal continuous evaluation: 40
	Practical Sessional external examination: 60
Aim:	
Sl. No.	
1	To gain knowledge of algorithm complexity analysis.
2	To understand and apply several algorithm design strategies.
3	
Objective:	
Sl. No.	
1	To be familiar with algorithm complexity analysis.
2	To understand and apply several algorithm design strategies.
3	
4	
Pre-Requisite:	
Sl. No.	
1.	Basic knowledge of mathematics.
2.	Basic Knowledge of programming.
Contents	

Chapter	Name of the Topic	Hours	Marks
01	Complexity Analysis Time and Space Complexity, Different Asymptotic notations big O,Ω,Θ, Little o,ω and their mathematical significance and proof.	8	10
02	Algorithm Design by Divide and Conquer Basic concept of divide and conquer, Merge sort, Quick sort ,heap sort and their complexity analysis in best case, worst case and average case.	8	15
03	Disjoint Set Data Structure Set Manipulation Algorithm by Union-Find, Union by Rank, Path Compression	8	10
04	Algorithm Design by Greedy Strategy Basic concept, Activity Selection Problem, Fractional Knapsack problem, Job sequencing with deadline,Prims, Kruskal.	6	10
05	Algorithm Design by Dynamic Programming Basic concept, 0/1 Knapsack Problem, Matrix Chain Multiplication, All Pair Shortest Path - Floyd Warshall Algorithm, Dijkstra's.	6	15
06	Algorithm Design by Backtracking Basic concept, Use - N-Queen Problem, Graph Coloring Problem, Hamiltonian Path Problem	8	10
	Sub Total:	44	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	48	100

Practical

Course Code: BCAC493

Credit: 2

Skills to be developed:

Intellectual skills:

1. Skill to analyze algorithms and to determine algorithm correctness and their time efficiency.
2. Knowledge of advanced abstract data type (ADT) and data structures and their implementations.
3. Ability to implement algorithms to perform various operations on data structures.

List of Practical:

1. Implement Merge sort, Implement Quicksort.
2. Find maximum and minimum elements from an array of integers using divide and conquer strategy.
3. Implement fractional knapsack,
4. Implement Job sequence with deadline
5. Implement Dijkstra's algorithm,
6. Implement Prim's algorithm
7. Implement Kruskal's algorithm.
8. Implement Matrix Chain Multiplication
9. Implement Floyd Warshall Algorithm
10. Implement Dijkstra's Algorithm

Assignments:

Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
E.Horowitz and Sahni	Fundamentals of Computer Algorithms		
T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein	Introduction to Algorithms		

Reference Books:

List of equipment/apparatus for laboratory experiments:

Sl. No.	
1	Computer with moderate configuration
2	Softwares as required.

End Semester Examination Scheme.		Maximum Marks-70.		Time allotted-3hrs.			
Group	Unit	Objective Questions (MCQ only with the correct answer)		Subjective Questions			
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
A	1 to 6	10	10				
B	1 to 6			5	3	5	70
C	1 to 6			5	3	15	
<ul style="list-style-type: none"> Only multiple choice type question (MCQ) with one correct answer are to be set in the objective part. Specific instruction to the students to maintain the order in answering objective questions should be given on top of the question paper. 							
Examination Scheme for end semester examination:							
Group	Chapter	Marks of each question	Question to be set	Question to be answered			
A	All	1	10	10			
B	All	5	5	3			
C	All	15	5	3			
Examination Scheme for Practical Sessional examination:							
Practical Internal Sessional Continuous Evaluation							
Internal Examination:							
Five No of Experiments							
External Examination: Examiner-							
Signed Lab Note Book(for five experiments)			5*2=10				
On Spot Experiment(one for each group consisting 5 students)			10				
Viva voce			5				

