



# Annex College

(Centre for technical & Management Studies)

Where success comes first

## COURSE STRUCTURE OF BCA

### SEMESTER 1

Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Computer Fundamentals and Programming in C	<ul style="list-style-type: none"> <li>- Introduction to Computers</li> <li>- C Basics</li> <li>- Operators &amp; Expressions</li> <li>- Control Structures - Functions - Arrays</li> <li>- Pointers</li> <li>- File Handling</li> </ul>	Case study individual for each subject	Live project individual for each subject
2	Mathematics I (Discrete Mathematics)	<ul style="list-style-type: none"> <li>- Sets &amp; Relations</li> <li>- Functions</li> <li>- Logic</li> <li>- Graph Theory</li> <li>- Boolean Algebra</li> <li>- Combinatorics</li> </ul>		
3	Basic Accounting and Management	<ul style="list-style-type: none"> <li>- Accounting Fundamentals</li> <li>- Financial Statements</li> <li>- Management Functions</li> <li>- Business Communication</li> <li>- Principles of Management</li> </ul>		
4	Communication Skills in English	<ul style="list-style-type: none"> <li>- Verbal &amp; Non</li> <li>- Verbal Communication</li> <li>- Writing Skills</li> <li>- Presentation Skills</li> <li>- Listening Skills</li> </ul>		



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		- GD & Public Speaking		
5	Environmental Studies	- Ecosystem & Biodiversity - Pollution - Natural Resources - Environmental Laws - Global Environmental Issues		
6	Practical 1: C Programming	- Arrays - Pointers - File Handling		
<b>SEMESTER 2</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Data Structures	- Arrays: Operations, sorting - Linked Lists: Singly, Doubly - Stacks & Queues - Trees: Traversals - Graphs: BFS, DFS - Searching & Sorting	Case study individual for each subject	Live project individual for each subject
2	Mathematics II (Linear Algebra)	-Matrices & Determinants - Linear Equations - Eigenvalues & Eigenvectors - Vector Spaces - Linear Transformations		
3	Database Management Systems (DBMS)	- DBMS Models - SQL Commands - Normalization - ER Diagrams - Transactions & Concurrency		
4	Software Engineering	-SDLC Phases - Requirement Analysis - Design & Implementation - Testing Methods - Documentation & Maintenance		



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5	Operating Systems	<ul style="list-style-type: none"> <li>- OS Types &amp; Functions</li> <li>- Process Management</li> <li>- Memory Management</li> <li>- File Systems</li> <li>- I/O Management</li> </ul>		
6	Practical 1: Data Structures	<ul style="list-style-type: none"> <li>- Linked Lists</li> <li>- Stacks</li> <li>- Queues</li> </ul>		
<b>SEMESTER 3</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Object-Oriented Programming with C++	<ul style="list-style-type: none"> <li>- Classes &amp; Objects</li> <li>- Inheritance</li> <li>- Polymorphism</li> <li>- Abstraction &amp; Encapsulation</li> <li>- File Handling</li> <li>- Exception Handling</li> </ul>	Case study individual for each subject	Live project individual for each subject
2	Data Communications and Networking	<ul style="list-style-type: none"> <li>- Network Types &amp; OSI Model</li> <li>- Transmission Media</li> <li>- Data Link Layer</li> <li>- Network Layer</li> <li>- Transport Layer</li> <li>- Network Security</li> </ul>		
3	Web Technologies	<ul style="list-style-type: none"> <li>- HTML5</li> <li>- CSS</li> <li>- JavaScript</li> <li>- PHP</li> <li>- MySQL</li> <li>- AJAX</li> </ul>		
4	Discrete Mathematics II	<ul style="list-style-type: none"> <li>- Mathematical Logic</li> <li>- Relations &amp; Functions</li> <li>- Combinatorics</li> <li>- Graph Theory</li> <li>- Boolean Algebra</li> </ul>		
5	Software Testing and Quality Assurance	<ul style="list-style-type: none"> <li>- Testing Basics</li> <li>- Test Case Design</li> <li>- Automated Testing</li> <li>- Performance Testing</li> <li>- Quality Assurance</li> </ul>		
6	Practical 1: Object-Oriented	<ul style="list-style-type: none"> <li>- Classes &amp; Objects</li> <li>- Inheritance</li> </ul>		



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	Programming in C++	- File Handling - Exception Handling		
<b>SEMESTER 4</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Advanced Data Structures	- Heaps - AVL Trees - B-Trees - Hashing - Graphs: Shortest Path - Dynamic Programming	Case study individual for each subject	Live project individual for each subject
2	Artificial Intelligence	- Introduction to AI - Search Algorithms - Knowledge Representation - Machine Learning - Neural Networks - Expert Systems		
3	Computer Graphics	- Basics & Raster Graphics - 2D Transformations - 3D Graphics - OpenGL Programming - Animation Techniques		
4	Operating System Design	- OS Structures - Process Scheduling - Memory Management - File Systems - I/O Systems		
5	Cloud Computing	- Cloud Models - Virtualization - Cloud Security - Cloud Storage - AWS, Azure Platforms		
6	Practical 1: Advanced Data Structures	- AVL Trees - B-Trees - Heaps - Graph Algorithms		
<b>SEMESTER 5</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project



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1	Software Development with Java	<ul style="list-style-type: none"> <li>- Java Basics</li> <li>- OOP Concepts</li> <li>- Collections</li> <li>- Exception Handling</li> <li>- File I/O</li> <li>- Multi-threading</li> </ul>	Case study individual for each subject	Live project individual for each subject
2	Software Project Management	<ul style="list-style-type: none"> <li>- Project Life Cycle</li> <li>- Agile Methodologies</li> <li>- Risk Management</li> <li>- Scheduling &amp; Budgeting</li> <li>- Team Management</li> </ul>		
3	Cyber Security	<ul style="list-style-type: none"> <li>- Cybersecurity Overview</li> <li>- Cryptography</li> <li>- Network Security</li> <li>- Web Security</li> <li>- Ethical Hacking</li> </ul>		
4	Mobile Application Development	<ul style="list-style-type: none"> <li>- Android Basics</li> <li>- UI Design</li> <li>- Activity Lifecycle</li> <li>- SQLite &amp; Preferences</li> <li>- Networking &amp; JSON</li> </ul>		
5	Big Data Technologies	<ul style="list-style-type: none"> <li>- Big Data Overview</li> <li>- Hadoop Ecosystem</li> <li>- NoSQL Databases</li> <li>- Data Analytics</li> <li>- Cloud Integration</li> </ul>		
6	Practical 1: Java Programming	<ul style="list-style-type: none"> <li>- Java Collections</li> <li>- Exception Handling</li> <li>- File I/O</li> <li>- Thread Management</li> </ul>		
<b>SEMESTER 6</b>				
Sl. No.	Subject	Subtopics	Case Study	Live Project
1	Advanced Database Management Systems	<ul style="list-style-type: none"> <li>- Distributed Databases</li> <li>- Database Optimization</li> <li>- Data Warehousing</li> <li>- NoSQL Databases</li> <li>- Big Data Integration</li> </ul>	Case study individual for each subject	Live project individual for each subject
2	Internet of Things (IoT)	<ul style="list-style-type: none"> <li>- IoT Architecture</li> <li>- Sensors and Actuators</li> <li>- Cloud Integration in IoT</li> </ul>		



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		<ul style="list-style-type: none"> <li>- Security in IoT</li> <li>- IoT Applications</li> </ul>		
3	Blockchain Technology	<ul style="list-style-type: none"> <li>- Introduction to Blockchain</li> <li>- Cryptocurrency</li> <li>- Smart Contracts</li> <li>- Blockchain Applications</li> <li>- Blockchain Security</li> </ul>		
4	Advanced Web Technologies	<ul style="list-style-type: none"> <li>- AngularJS/ReactJS</li> <li>- Web Services</li> <li>- Web Security</li> <li>- Responsive Design</li> <li>- Web Performance Optimization</li> </ul>		
5	Data Science and Analytics	<ul style="list-style-type: none"> <li>- Data Mining</li> <li>- Predictive Analytics</li> <li>- Big Data Tools</li> <li>- Data Visualization</li> <li>- Data Ethics</li> </ul>		
6	Practical 1: Database Optimization	<ul style="list-style-type: none"> <li>- Indexing</li> <li>- Query Optimization</li> <li>- NoSQL Database Handling</li> </ul>		

**Key Features:**

Each subject includes 2 real-world case studies and 2 live projects per semester.

Industry-oriented approach combining theory + hands-on learning.

Each semester will end with a live panel presentation to assess student understanding and practical application.

Designed to prepare BCA students for roles in public sector IT, insurance, operations management, data-driven decision-making, and entrepreneurship, combining technical proficiency with practical business insights.

