Teaching Scheme & Detailed Syllabus

For

Bachelor of Computer Applications (BCA)

(Total Credits: 120 - 138)

Duration: 3 Years

(2025-26)

School of Computational Sciences and Engineering

Faculty of Engineering, Applied Science and Technology

SHOBHIT INSTITUTE OF ENGINEERING AND TECHNOLOGY

(Deemed to be University)

NH-58 Modipuram, Meerut, (U.P.) 250110
Website: www.shobhituniversity.ac.in

School of Computational Sciences and Engineering
Bachelor of Computer Applications

Vision of the School

To be a recognized leader in quality technical education, fostering extensive research, and equipping students with cutting-edge technological skills and practical experience to tackle challenges in the rapidly evolving computing industry and academia for societal betterment.

Mission of the School

M1. To provide quality education in Computer Science &Engineering.

M2. To deploy students' potential in innovation, multidisciplinary research & development.

M3. To impart professional ethics, social responsibilities and entrepreneur

Program Outcomes (POs)

PO1: Apply mathematics and computing fundamental and domain concepts to find out the solution of defined problems and requirements. (Computational Knowledge)

PO2: Use fundamental principle of Mathematics and Computing to identify, formulate research literature for solving complex problems, reaching appropriate solutions. (Problem Analysis)

PO3: Understand to design, analyze and develop solutions and evaluate system components or processes to meet specific need for local, regional and global public health, societal, cultural, and environmental systems. (Design/Development of Solutions)

PO4: Use expertise research-based knowledge and methods including skills for analysis and development of information to reach valid conclusions. (Conduct Investigations of Complex Computing Problems)

PO6: Exhibiting ethics for regulations, responsibilities and norms in professional computing practices. (Professional Ethics)

PO 7: Enlighten knowledge to enhance understanding and building research, strategies in independent learning for continual development as computer applications professional. (Life- long Learning)

PO8: Establishing strategies in developing and implementing ideas in multi- disciplinary environments using computing and management skills as a member or leader in a team. (Project

Management and Finance)

PO9: Contribute to progressive community and society in comprehending computing activities by writing effective reports, designing documentation, making effective presentation, and understand instructions. (Communication Efficacy)

PO10: Gain confidence for self and continuous learning to improve knowledge and competence as a member or leader of a team. (Individual and Teamwork)

Program Specific Outcomes (PSOs)

PSO1: Students will able to understand, analyze and develop computer programs in the areas related to algorithm, web design and networking for efficient design of computer-based system.

PSO2: Apply standard software engineering practices and strategies in project development using opensource programming environment to deliver a quality of product for business success.

PSO3: Student will able to know various issues, latest trends in technology development and thereby innovate new ideas and solutions to existing problems.

Program Educational Objectives

PEO1: The BCA program imparts comprehensive knowledge in computer applications, emphasizing current trends and technologies in Artificial Intelligence, Data Science, Cyber Security and Machine Learning.

PEO2: This program aims to enhance students' abilities to identify, formulate, and analyze complex problems.

PEO3: Students will engage in multidisciplinary courses and develop entrepreneur skills to work effectively both independently and as part of diverse teams, whether as members or leaders.

PEO4: The program will enable students to develop and demonstrate essential critical thinking and communication skills.

PEO5: The program will equip students with professional skills, preparing them for immediate employment or further studies in advanced areas of computer science and related fields.

BCA
Session (2025-26)
Credits Distribution

GENERAL COURSE STRUCTURE & THEME

1. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

2. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
CC	Core Courses
AEC	Ability Enhancement Courses
MDE	Multi-Disciplinary Elective course
VAC	Value added Courses
SEC	Skill Enhancement courses
DSE	Discipline Specific Elective
OE	Open Elective

Course Level/Duration/System:
Undergraduate Three years / 6 Semesters with multiple entry and exit. The following option will be made available to the students joining BCA Program:

1. **One year:** Under Graduate Certificate in Computer Application
2. **Two years**: Under Graduate Diploma in Computer Application
3. **Three years**: Bachelor in Computer Application (BCA)

Minimum Eligibility Criteria: To apply for the BCA program at Shobhit University, applicants must have passed 10+2 from a recognized board of India or abroad.

Specializations Offered:

1. Artificial Intelligence and Machine Learning
2. Cyber Security
3. Data Science
4. Internet of Things

SEMESTER WISE CREDIT DISTRIBUTION:

SEMESTER WISE CREDIT DISTRIBUTION OF BCA (General) PROGRAM:

Semester	Core Courses	Ability Enhance-ment Courses	Multi-Discipli-nary Elective course	Value added Courses	Skill Enhancement courses	Discipline Specific Elective	Total
I	11	2	-	4	3	-	20
II	15	-	-	2	3	-	20
III	9	-	3	2	3	3	20
IV	9	2	3	-	3	3	20
V	6	-	3	-	8	3	20
VI	9	1	-	-	7	3	20

SEMESTER WISE CREDIT DISTRIBUTION OF BCA (With Specialization)

Semester	Core Courses	Ability Enhancement Courses	Multi-Discipli-nary Elective course	Value added Courses	Skill Enhancement courses	Discipline Specific Elective	Total
I	11	2	-	4	3	3	23
II	15	-	-	2	3	3	23
III	9	-	3	2	3	6	23
IV	9	2	3	-	3	6	23
V	6	-	3	-	8	6	23
VI	9	1	-	-	7	6	23

PROGRAM
Category- wise distribution

Description	Core Courses	Ability Enhancement Courses	Multi-Disciplinary Elective course	Value added Courses	Skill Enhance-ment courses	Discipline Specific Elective	Total
BCA	59	5	9	8	27	12	120
BCA With Specialization	59	5	9	8	27	30	138

3 Years BCA Program	**Total Credits = 120**
3 Years BCA (With Specialization)	**Total Credits = 138**

Note: Students can take extra credit course from their own department or from other department as per the Admitting Body / University norms.

Mandatory Visits/ Workshop/Expert Lectures:

1. It is mandatory to arrange one industrial visit every semester for the students of each branch.
2. It is mandatory to conduct a One-week workshop during the winter break after fifth semester on professional/ industry/ entrepreneurial orientation.
3. It is mandatory to organize at least one expert lecture per semester for each branch by inviting resource persons from domain specific industry.

For Summer Internship / Projects / Seminar etc.

1. Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc.

Note: *The internal assessment is based on the student's performance in mid semester tests (two best out of three), quizzes, assignments, class performance, attendance, viva-voce in practical, lab record etc.*

Semester wise Structure and Curriculum for UG Course in BCA

SEMESTER - 1

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1	Core	T05ASMA0105	Mathematics Foundations to Computer Science - I	3	1	0	4
2	Core	T01BCCA0103	Problem Solving Techniques	3	0	0	3
3	Core	T01BCCA0104	Computer Architecture	3	1	0	4
4	AEC	T05ASEN0152	General English	2	0	0	2
5	VAC	B01BBBM0142	Indian Knowledge System^	2	0	0	2
6	VAC	T0B4TAT0181	Environmental Science and sustainability	2	0	0	2
7	SEC	T01BCCA0162	Problem Solving Techniques Lab	0	0	4	2
8	SEC	T01BCCA0163	Data Analytics Using Excel Lab	0	0	2	1
			TOTAL				20
	Specialization Course						
	Spec.	T01BCCA0130	Emerging Technologies in Computation	2	0	2	3
	TOTAL						23

Note: ^Indian Knowledge System: Indian Culture and Civilization Indian Vision for Human Society Indian Science Indian Town Planning and Architecture Indian Mathematics and Astronomy Indian Aesthetics Indian Health, Wellness

SEMESTER II

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1.	Core	T05ASMA0203	Mathematics Foundations to Computer Science – II	3	0	0	3
2.	Core	T01BCCA0201	Data Structure	3	0	0	3
3.	Core	T01BCCA0204	Operating Systems	3	0	0	3
4.	Core	T01BCCA0202	Problem Solving using Python	3	0	0	3
5.	Core	T01BCCA0206	Web Technologies	3	0	0	3
6.	VAC	L01BALB0280	Indian Constitution	2	0	0	2
7.	SEC	T01BCCA0260	Data Structures using C Lab	0	0	2	1
8.	SEC	T01BCCA0261	Python Programming Lab	0	0	2	1
9.	SEC	T01BCCA0263	Web Technologies Lab	0	0	2	1
	TOTAL						**20**
	Specialization Elective						
	Core (Sp)	T01BCCA02XX	Specialization Electives – I	2	0	2	3
						TOTAL	**23**

After Year 1, Students are advised to take Social Responsibility & Community Engagement - encompassing Community Engagement with an NGO in the vacation time.

Students will have the option to exit the Bachelor of Computer Application (BCA) program after successfully completing the first year. Upon exit, they will be awarded a **UG Certificate in Computer Application**. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/Apprentice- ship / Social Responsibility & Community Engagement – encompassing community engagement with an NGO after the second semester of minimum 08 weeks of duration as decided by the respective University / Admitting Body

The exiting students will clear the subject / submit the Internship Report as per the University schedule.

Re-entry Criteria in to Second Year (Third Semester)

The student who takes an exit after one year with an award of certificate may be allowed to re-enter in to Third Semester for completion of the BCA Program as per the respective University /Admitting Body schedule after earning requisite credits in the First year.

SEMESTER III

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1.	MDC	T05ASMA0303	Probability and Statistics	3	0	0	3
2.	Core	T01BCCA0303	Fundamentals of Database Management System	3	0	0	3
3.	Core	T01BCCA0306	Object Oriented Programming using Java	3	0	0	3
4.	Core	T01BCCA0307	Software Engineering	3	0	0	3
5.	DSE	T01BCCA033X	Department Specific Elective – I	3	0	0	3
6	SEC	T01BCCA0361	Fundamentals of Database Management System Lab	0	0	2	1
7	SEC	T01BCCA0362	Object Oriented Programming using Java Lab	0	0	4	2
8	VAC	TC2PDY00380/	Yoga/Sports/NCC/NSS/Disaster Management	0	0	4	2
						TOTAL	**20**
	Specialization Elective*						
	DSE	T01BCCA032X	Specialization Electives - II	2	0	*2*	3
						TOTAL	**23**

* To be selected from the proposed specialization stream opted - Data Science / Artificial Intelligence and Machine Learning/Cybers Security/IOT

SEMESTER IV

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1	MDC	B01BBBM0480	Entrepreneurship and Startup Ecosystem	2	1	0	3
2	Core	T01BCCA0404	Computer Networks	3	0	0	3
3	Core	T01BCCA0405	Design and Analysis of Algorithm	3	0	0	3
4	Core	T01BCCA0406	Artificial Intelligence	3	0	0	3
5	DSE	T01BCCA043X	Department Specific Elective-II	3	0	0	3
6	SEC	T01BCCA0462	Design and Analysis of Algorithm Lab	0	0	4	2
7	SEC	T01BCCA0463	Artificial Intelligence Lab.	0	0	2	1
8.	AEC	B01BBBM04XX	Design Thinking and Innovation	1	1	0	2
						TOTAL	**20**

	Specialization Elective*						
	DSE (Spec.)	T01BCCA042X	Specialization Electives – III	2	0	2	3
						TOTAL	**23**

* To be selected from the proposed specialization stream opted - Data Science / Artificial Intelligence and Machine Learning/Cybers Security/IOT.

Note:

1.At the end of the Fourth Semester every student shall undergo Summer Training / Internship / Capstone for Eight Weeks in the industry/Research or Academic Institute. This component will be evaluated during the fifth semester.

2.An **UNDER GRADUATE DIPLOMA IN COMPUTER APPLICATION** will be awarded, if a student wishes to exit at the end of Second year.

Exit Criteria after Second Year of BCA Programme

The students shall have an option to exit after 2nd year of Computer Application Program and will be awarded with a **UG Diploma in Computer Application**. Students on exit have to compulsorily complete additional 04 Credits either in a Skill based subject or work based Vocational Course offered during summer term or Internship/Apprenticeship / Social Responsibility & Community Engagement – encompassing community engagement with an NGO / Capstone Project after the fourth semester of minimum 8 weeks of duration as decided by the respective University / Admitting Body.

The exiting students will clear the subject / submit the Internship Report as per the University / Admitting Body schedule.

Re-entry Criteria in to Third Year (Fifth Semester)

The student who takes an exit after second year with an award of Diploma may be allowed to re-enter in to fifth Semester for completion of the BCA Program as per the respective University / Admitting Body schedule after earning requisite credits in the Second year.

SEMESTER V

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1	Core	T01BCCA0503	Data Mining	3	0	0	3
2	Core	T01BCCA0504	Software Project Managemnet	3	0	0	3
3	MDC	L01BALB0842	Ethics in IT and IPR	3	0	0	3
4	SEC	T05ASMA05XX	Quantitative Techniques	3	0	0	3

5	DSE	T01BCCA053X	Discipline Specific Electives – III	3	0	0	3
6	SEC	T01BCCA0561	Data Mining Lab	0	0	2	1
7	SEC	T01BCCA0596	Internship/capstone Project	-	-	-	4
8	SEC	T01BCCA0591	Major Project [evaluation in sixth semester (refer Appendix -5)	-	-	-	0
						TOTAL	**20**
	Specialization Elective						
	DSE (Spec.)	T01BCCA052X	Specialization Electives – IV	2	0	2	3
						TOTAL	**23**

* To be selected from the proposed specialization stream opted - Data Science / Artificial Intelligence and Machine Learning/Cyber Security/IOT.

SEMESTER VI

S. No.	Type	Course Code	Course Title	L	T	P	Credit
1	Core	T01BCCA0604	Generative AI	3	0	0	3
2	Core	T01BCCA0605	Human Computer Interaction	3	0	0	3
3	Core	T01BCCA0602	Advanced Web Technologies	3	0	0	3
4	DSE	T01BCCA063X	Department Specific Elective-IV	3	0	0	3
5	AEC	B01BBBM0660	Soft Skills	0	1	0	1
6	SEC	T01BCCA0662	Generative AI Lab	0	0	4	2
7	SEC	T01BCCA0661	Advanced Web Technologies Lab	0	0	2	1
8	Project	T01BCCA0696	Major Project [Initiated in 5th Semester]	0	0	8	4
						TOTAL	**20**
	Specialization Elective						
	DSE (Spec.)	T01BCCA062X	Specialization Electives – V	2	0	2	3
						TOTAL	**23**

* To be selected from the proposed specialization stream opted - Data Science / Artificial Intelligence and Machine Learning/Cybers Security/IOT

List of Specializations

Artificial Intelligence and Machine Learning				
S.No.	Course Code	Course Title	L-T-P	Credits
1	T01BCCA0130	Emerging Technologies in Computation	2-0-2	3
2	T01BCCA0225	Feature Engineering and Machine Learning	2-0-2	3
3	T01BCCA0325	Soft Computing	2-0-2	3
4	T01BCCA0425	Deep Learning	2-0-2	3
5	T01BCCA0525	Natural Language processing	2-0-2	3
6	T01BCCA0625	Image Processing and Analysis	2-0-2	3

Cyber Security				
S.No.	Course Code	Course Title	L-T-P	Credits
1	T01BCCA0130	Emerging Technologies in Computation	2-0-2	3
2	T01BCCA0226	Cyber Security Essentials	2-0-2	3
3	T01BCCA0321	Security & Data Privacy Laws and Standards	2-0-2	3
4	T01BCCA0421	Digital Security and Forensic Fundamental	2-0-2	3
5	T01BCCA0521	Computer Network Security	2-0-2	3
6	T01BCCA0621	Security to Cloud Application	2-0-2	3

Data Science				
S.No.	Course Code	Course Title	L-T-P	Credits
1	T01BCCA0130	Emerging Technologies in Computation	2-0-2	3
2	T01BCCA0224	Essentials of Data Science	2-0-2	3
3	T01BCCA0323	Exploratory Data Analysis using Python	2-0-2	3
4	T01BCCA0423	R Programming for Data Science	2-0-2	3
5	T01BCCA0523	Big Data Analytics	2-0-2	3
6	T01BCCA0623	Information Visualization	2-0-2	3

Internet of Things				
S.No.	Course Code	Course Title	L-T-P	Credits
1	T01BCCA0130	Emerging Technologies in Computation	2-0-2	3
2	T01BCCA0222	Fundamentals of IOT and Its Applications	2-0-2	3
3	T01BCCA0322	Sensor Technology	2-0-2	3
4	T01BCCA0422	Arduino Programming	2-0-2	3
5	T01BCCA0522	Raspberry Pi with Python	2-0-2	3
6	T01BCCA0622	RFID and Sensor Networks	2-0-2	3

Discipline Specific Electives

S.No.	Course Code	Course Title	L-T-P	Credit Units
1.	T01BCCA0330	Social Media Marketing	3-0-0	3
2.	T01BCCA0331	Graphics & Visualization	3-0-0	3
3.	T01BCCA0332	Cyber Security	3-0-0	3
4.	T01BCCA0430	Blockchain Concepts	3-0-0	3
5.	T01BCCA0431	Cloud Computing Concepts	3-0-0	3
6.	T01BCCA0433	Data Encoding and Compression	3-0-0	3
7.	T01BCCA0533	DevOps	3-0-0	3
8.	T01BCCA0531	Search and Retrieval Systems	3-0-0	3
9.	T01BCCA0532	Software Testing	3-0-0	3
10.	T01BCCA0630	Business Intelligence	3-0-0	3
11.	T01BCCA0631	Search Engine Optimization	3-0-0	3
12.	T01BCCA0633	Green Computing	3-0-0	3