

GURU KASHI UNIVERSITY



B.Tech (Computer Science & Engineering- Bioinformatics)

Session: 2025-26

Faculty of Engineering & Technology

Graduate Attributes of the Programme: -

Type of learning outcomes	The Learning Outcomes Descriptors
Graduates should be able to demonstrate the acquisition of:	
Learning outcomes that are specific to disciplinary/interdisciplinary areas of learning	The programme focuses to design and develop computer programs in the areas related to algorithm, networking, web design and cloud computing to understand, analyze, develop and efficiently solve problems related to computer-based systems.
Generic learning outcomes	The generic learning outcomes for graduates typically include: Problem Analysis, Design and Development, Modern Tool Usage, Lifelong Learning
	1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems 2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 3. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

	10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
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Element of the Descriptor	Programme learning outcomes relating to Undergraduate Certificate programme
The graduates should be able to demonstrate the acquisition of:	
Knowledge and understanding	Apply knowledge of electricity and magnetism to explain natural physical processes and related technological advances.
	Understand about engineering applications and its importance in society.
	Understand programming Skills to solve simple numerical method problems
	Identify, formulate and analysis of mathematics, natural sciences, and engineering sciences.
General, technical and professional skills required to perform and accomplish tasks	Design experiments and acquires data in order to explore physical principles, effectively communicate results, and evaluate related scientific studies.
Application of knowledge and skills	Development of tools for job-ready skills, and entrepreneurship skills
Generic learning outcomes	understanding of global change and sustainability while placing the development of physics
Constitutional, humanistic, ethical, and moral values	development of physics in its historical and cultural context.
Employability and job-ready skills, and entrepreneurship skills and capabilities/qualities and mindset	Design new instruments for entrepreneurship skills with practical knowledge. Acquire necessary skills/hand on experience/ working knowledge on live projects and experiments.

Credit requirements	48
Entry requirements	A candidate who has passed Senior Secondary Certificate Examination (Class XII level) of the Board of School Education, Punjab; or any other examination recognized as equivalent thereto with minimum passing marks in aggregate, shall be eligible to join First Semester of the Undergraduate (UG) Programme.

Programme Learning outcomes: An Undergraduate Certificate is awarded to students who have demonstrated the achievement of the outcomes located at level 4.5:

Programme Structure

Semester: I									
Course Code	Course Title	Type of Course	L	T	P	No. of Credits	Int.	Ext.	Total Marks
BCB1100	Engineering Physics	Major Core Course	3	0	0	3	30	70	100
BCB1101	Engineering Physics Lab	Major Core Course	0	0	2	1	30	70	100
BCB1102	Engineering Graphics & Drawing	DSEC	4	0	0	4	30	70	100
BCB1103	Communication Skills-I	Ability Enhancement Course	2	0	0	2	30	70	100
VAC0001	Environment Education	VAC	2	0	0	2	30	70	100
BCB1104	Principle of Economic	Multidisciplinary Course	3	0	0	3	30	70	100
BCB1105	Basic Electrical Engineering	Minor Course	3	0	0	3	30	70	100
BCB1106	Basic Electrical Engineering Lab	Minor Course	0	0	2	1	30	70	100
BCB1107	Computer Proficiency	Skill Enhancement Course	2	0	0	2	30	70	100
BCB1108	Computer Proficiency Lab	Skill Enhancement Course	0	0	2	1	30	70	100
BCB1109	Entrepreneurship Setup & Launch	Skill Enhancement Course	0	0	4	2	30	70	100
Generic Elective Course-1 (Choose any one of the following)									
BCB1110	Introduction to Biology	Major Core Course	3	1	0	4	30	70	100
BCB1111	Applied Mathematics-1								
Total			22	1	10	28	360	840	1200

Semester: II									
Course Code	Course Title	Type of Course	L	T	P	No. of Credits	Int.	Ext.	Total Marks
BCB2150	Engineering Chemistry	Major Core Course	3	0	0	3	30	70	100
BCB2151	Engineering Chemistry Lab	Major Core Course	0	0	2	1	30	70	100
BCB2152	Communication Skills-II	Ability Enhancement Course	2	0	0	2	30	70	100
BCB2153	Manufacturing Practices	Skill Enhancement Course	0	0	6	3	30	70	100
BCB2154	Indian Constitution	Multidisciplinary	3	0	0	3	30	70	100
VAC0002	Human Values and Professional Ethics	VAC	2	0	0	2	30	70	100
BCB2155	Programming for Problem Solving	Minor Course	3	0	0	3	30	70	100
BCB2156	Programming for Problem Solving Lab	Minor Course	0	0	2	1	30	70	100
BCB2159	Entrepreneurship & Marketing Basics	Skill Enhancement Course	0	0	4	2	30	70	100
Generic Elective Course-II (Choose any one of the following)									
BCB2157	Advance Biology	Major Core Course	3	1	0	4	30	70	100
BCB2158	Engineering Mathematics-II								
Total			16	1	14	24	300	700	1000

Programme Learning Outcomes: An Undergraduate Diploma is awarded to students who have demonstrated the achievement of the outcomes located at level 5:

Element of the Descriptor	Programme learning outcomes relating to Undergraduate Diploma programme
The graduates should be able to demonstrate the acquisition of:	
Knowledge and understanding	Understand the advanced and latest manufacturing techniques being used in engineering industry
	Apply knowledge of reading & writing Language skills
	Identify, formulate and analysis of mathematics, natural sciences, and engineering sciences.
General, technical and professional skills required to perform and accomplish tasks	Ability to analyze situations and propose logical solutions.
	Reading & Writing reports, presenting ideas, and articulating thoughts clearly. Keeping up with new concepts and changes in technology or business practice
	Ability to find credible sources, analyze data, and synthesize information.
Application of knowledge and skills	Develop knowledge of applications of algorithms for the creation, insertion, deletion, searching and sorting of each data structure problem.
	Develop solutions for a range of problems using objects and classes.

Generic learning outcomes	Ability to Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
Constitutional, humanistic, ethical, and moral values	Construct the ability to face difficult situations in life boldly and resolve them confidently.
Employability and job-ready skills, and entrepreneurship skills and capabilities/qualities and mindset	Analyze and design various combinational and sequential circuits
Credit requirements	95
Entry requirements	A student can re-enter into second year of a programme if she/he has taken an exit option after first year(UG DIPLOMA in CSE-Bioinformatics)

Semester: III

Course Code	Course Title	Type of Course	L	T	P	No of Credits	Int.	Ext .	Total Marks
BCB3200	Object Oriented Programming Using C++	Major Core Course	3	0	0	3	30	70	100
BCB3201	Object Oriented Programming Using C++ Lab	Major Core Course	0	0	2	1	30	70	100
BCB3202	Data Structure & Algorithms	Minor Course	3	0	0	3	30	70	100
BCB3203	Data Structure & Algorithms Lab	Minor Course	0	0	2	1	30	70	100
BCB3204	Professional Communication	Ability Enhancement Course	2	0	0	2	30	70	100
BCB3205	Engineering Mathematics	DSEC	4	0	0	4	30	70	100
IKS0006	Indian Health Sciences	VAC	2	0	0	2	30	70	100
BCB3206	Sustainable Development	Multidisciplinary Course	3	0	0	3	30	70	100
BCB3207	Operations and Scale	Skill-Based Course	0	0	4	2	30	70	100
Elective Course -1 Skill Enhancement (Any one of the following)									
BCB3208	Basics Bioinformatics	Skill Enhancement Course	3	0	0	3	30	70	100
BCB3209	Disaster Risk Reduction and Management: Skills for Safety and Resilience		2	0	2	3	30	70	100
BCB3210	Basics of Cyber Security		3	0	0	3	30	70	100
Total			19 /20	0	10 /11	24	300	700	1000

Semester: 4th									
Course Code	Course Title	Type of Course	L	T	P	No of Credits	Int.	Ext.	Total Marks
BCB4250	Cell Biology	Major Core Course	4	0	0	4	30	70	100
BCB4251	Operating System	Major Core Course	3	0	0	3	30	70	100
BCB4252	Operating System (Practical)	Major Core Course	0	0	2	1	30	70	100
BCB4253	Python Programming	Major Core Course	3	0	0	3	30	70	100
BCB4254	Python Programming (Practical)	Major Core Course	0	0	2	1	30	70	100
BCB4255	Biostatistics	Vocational Course	4	0	0	4	30	70	100
BCB4256	Report Writing	Ability Enhancement Course	2	0	0	2	30	70	100
IKS0009	Indian Agriculture	VAC	2	0	0	2	30	70	100
BCB4257	Organic Growth	Skill Based Course	0	0	4	2	30	70	100
Discipline Specific Elective Course -1(Any one of the following)									
BCB4258	Computer Organization & Architecture	Discipline Specific	4	0	0	4	30	70	100
BCB4259	Network Security	Elective							
Total			22	0	08	26	300	700	1000

Programme learning outcomes: An Bachelor of Vocational in CSE(Bioinformatics)is awarded to students who have demonstrated the achievement of the outcomes located at level 5.5:

Element of the Descriptor	Programme learning outcomes relating to 3year UG Degree programme
The graduates should be able to demonstrate the acquisition of:	
Knowledge and understanding	An understanding of and apply current theories, models, programming and techniques that provide a basis for the software lifecycle Development & Training.
	Discuss the basic concepts of open-source platform to understand programming skills.
	Identify, formulate and analysis of mathematics, natural sciences, and engineering sciences.
General, technical and professional skills required to perform and accomplish tasks	Develop the logic ability in order to master your programming skills Software Product, Software crisis, Handling complexity through Abstraction and. Decomposition,
Application of knowledge and skills	Develop solutions for a range of problems using different computers-based experimentation and analyze, interpret data.
Generic learning outcomes	Design & develop different applications software of different programming language on different platforms. Organize web media objects using editing software Problem-Solving & Analytical Thinking. Develop an entrepreneurial mindset by identifying market problems and creating tech solutions.

Constitutional, humanistic, ethical, and moral values	Construct the ability to face difficult situations in life boldly and resolve them confidently.
Employability and job-ready skills, and entrepreneurship skills and capabilities/qualities and mindset	Ability to have Technical Skills (Hard Skills) in different fields like cybersecurity, Web Development, App Development: Android. Software Development Life Cycle (SDLC) & Agile Methodologies. Hands-on experience with real-world projects
Credit requirements	143
Entry requirements	A student can re-enter into third year of a programme if she/he has taken an exit option after 2nd year (U.G Diploma in CSE- Bioinformatics)

Semester: 5th									
Course Code	Course Title	Type of Course	L	T	P	Credits	Int.	Ext.	Total Marks
BCB5300	Java Programming	Major Core Course	3	0	0	3	30	70	100

BCB5301	Java Programming (Practical)	Major Core Course	0	0	2	1	30	70	100
BCB5302	Relational Database Management System	Major Core Course	3	0	0	3	30	70	100
BCB5303	Relational Database Management System (Practical)	Major Core Course	0	0	2	1	30	70	100
BCB5304	Molecular Biology	Major Core Course	4	0	0	4	30	70	100
BCB5305	Artificial Intelligence	Major Core Course	3	0	0	3	30	70	100
BCB5306	AI Automation & Finance	Skill Based Course	0	0	4	2	30	70	100
Discipline Specific Elective Course -II(Any one of the following)									
BCB5307	Soft Computing	Discipline Elective Course	4	0	0	4	30	70	100
BCB5308	Software Engineering								
Discipline Specific Elective Course -III (Select any subject with its Practical.)									
BCB5309	Big Data	Discipline Elective Course	4	0	0	4	30	70	100
BCB5310	Machine Learning								
Total			20	0	12	25	330	770	1100

Semester: 6th									
Course Code	Course Title	Type of Course	L	T	P	Credit s	Int.	Ext.	Total Mark s
BCB6350	Formal Language & Automata Theory	Major Core Course	4	0	0	4	30	70	100
BCB6351	Molecular Modelling and Drug Design	Major Core Course	4	0	0	4	30	70	100
BCB6352	Computer Networks	Vocational Course	3	0	0	3	30	70	100
BCB6353	Computer Networks	Vocational Course	0	0	2	1	30	70	100
BCB6354	Biochemistry	Major Core Course	4	0	0	4	30	70	100
Discipline Specific Elective Course -IV (Any one the Following)									
BCB6355	Deep Learning	Discipline Elective	4	0	0	4	30	70	100
BCB6356	Internet of Things								
Discipline Specific Elective Course -V (Any one of the Following)									
BCB6357	Digital Forensics	Discipline Elective	4	0	0	4	30	70	100
BCB6358	Foundation of Blockchain Technology								
Total			23	0	2	24	210	490	700

Programme learning outcomes: The Bachelor's degree in B. Tech CSE(Bioinformatics) is awarded to students who have demonstrated the achievement of the outcomes located at level 6:

Element of the Descriptor	Programme learning outcomes relating to Bachelor's Degree (Honors)
The graduates should be able to demonstrate the acquisition of:	
Knowledge and understanding	Understanding of advanced computer science concepts, industry trends, and research-oriented knowledge.
	focuses on specialization, innovation, and career preparation.
General, technical and professional skills required to perform and accomplish tasks	Advanced technical expertise, professional skills, and general competencies that prepare them for jobs, research, and entrepreneurship.
Application of knowledge and skills	Apply their theoretical knowledge and technical skills to real-world projects, industry-oriented tasks, research, and innovation.
Generic learning outcomes	Students will be Advanced Technical Proficiency. Project Management and Team Collaboration skill. Recognizing the rapid evolution of technology, students should be prepared for continuous learning and professional development throughout their careers.
Constitutional, humanistic, ethical, and moral values	Construct the ability to face difficult situations in life boldly and resolve them confidently.
Employability and job-ready skills, and	Ability to have Technical Skills (Hard Skills) in different fields like cybersecurity, Web Development, App Development: Android. Software Development Life Cycle (SDLC) & Agile Methodologies. Hands-on experience with real-world projects.

entrepreneurship skills and capabilities/qualities and mindset	
Credit requirements	187
Entry requirements	A student can re-enter into fourth year of a programme if she/he has taken an exit option after 3rd year(B.Voc in CSE-Bioinformatics).

Semester: 7th

Course Code	Course Title	Type of Course	L	T	P	No of Cred its	Int.	Ext .	Total Marks
BCS7400	Introduction to Cloud Computing	Major Core Course	4	0	0	4	30	70	100
BCS7401	Natural Language Processing	Major Core Course	3	0	0	4	30	70	100
BCS7402	Natural Language Processing Practical	Major Core Course	0	0	2	1	30	70	100
BCS7403	Biological Databases	Minor	4	0	0	4	30	70	100
	Analytical Bioinformatics	Minor	4	0	0	4	30	70	100
BCS7404	Project(Experim ental Learning)	Minor Course	0	0	4	2	30	70	100
Discipline Specific Elective Course -VI (Select any subject with its Practical.)									
BCS7406	Quantum Computing Applications and Project	Disciplin e Elective	3	0	0	3	30	70	100
BCS7407	Quantum Simulation Practical		0	0	2	1	30	70	100
BCS7408	Computer Vision		3	0	0	3	30	70	100
BCS7409	Computer Vision (Practical)		0	0	2	1	30	70	100
Total			18	0	08	23	240	490	700

Semester: 8th

Course Code	Course Title	Type of Course	L	T	P	No of Credits	Int.	Ext.	Total Marks
BCS8450	Internship	Skill Based	0	0	0	20	30	70	100
Total			0	0	0	20	30	70	100
Grand Total			141	2	63/64	193/194	2070	4760	6800