

GURU KASHI UNIVERSITY



B. Tech Computer Science & Engineering (Single Major)

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

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	52
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 Structure

Semester: 1st									
Course Code	Course Title	Type of Course	L	T	P	No. of Credits	Int.	Ext .	Total Marks
BCS1100	Engineering Physics	Major Core Course	3	0	0	3	30	70	100
BCS1101	Engineering Mathematics-I	Major Core Course	3	1	0	4	30	70	100
BCS1102	Engineering Physics Practical	Major Core Course	0	0	2	1	30	70	100
BCS1103	Engineering Graphics & Drawing	DSEC	4	0	0	4	30	70	100
BCS1104	Communication Skills-I	Ability Enhancement Course	2	0	0	2	30	70	100
VAC0001	Environment Education	VAC	2	0	0	2	30	70	100
BCS1105	Principle of Economics	Multidisciplinary Course	3	0	0	3	30	70	100
BCS1106	Basic Electrical Engineering	Minor Course	3	0	0	3	30	70	100
BCS1107	Basic Electrical Engineering Practical	Minor Course	0	0	2	1	30	70	100
BCS1108	Computer Proficiency	Skill Enhancement Course	2	0	0	2	30	70	100
BCS1109	Computer Proficiency Practical	Skill Enhancement Course	0	0	2	1	30	70	100
BCS1110	Entrepreneurship Setup & Launch.	Skill Enhancement Course	0	0	4	2	30	70	100
Total			22	1	10	28	360	840	1200

Semester: 2nd									
Course Code	Course Title	Type of Course	L	T	P	No of Credits	Int	Ext	Total Marks
BCS2150	Engineering Chemistry	Major Core Course	3	0	0	3	30	70	100
BCS2151	Engineering Mathematics-II	Major Core Course	3	1	0	4	30	70	100
BCS2152	Engineering Chemistry Practical	Major Core Course	0	0	2	1	30	70	100
BCS2153	Communication Skills-II	Ability Enhancement Course	2	0	0	2	30	70	100
BCS2154	Manufacturing Practices	Skill Enhancement Course	0	0	6	3	30	70	100
BCS2155	Indian Constitution	Multidisciplinary	3	0	0	3	30	70	100
VAC0002	Human Values and Professional Ethics	VAC	2	0	0	2	30	70	100
BCS2156	Programming for Problem Solving	Minor Course	3	0	0	3	30	70	100
BCS2157	Programming for Problem Solving Practical	Minor Course	0	0	2	1	30	70	100
BCS2158	Entrepreneurship & Marketing Basics	Skill Enhancement Course	0	0	4	2	30	70	100
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 the engineering industry.
	Apply knowledge of reading & writing language skills.
	Identify, formulate and analyze 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	94
Entry requirements	A student can re-enter into the second year of a programme if she/he has taken an exit option after the first year(UG DIPLOMA in CSE).

Semester: 3rd									
Course Code	Course Title	Type of Course	L	T	P	No of Credits	Int.	Ext.	Total Marks
BCS3200	Object Oriented Programming Using C++	Major Core Course	3	0	0	3	30	70	100
BCS3201	Object Oriented Programming Using C++ (Practical)	Major Core Course	0	0	2	1	30	70	100
BCS3202	Data Structure & Algorithms	Minor Core Course	3	0	0	3	30	70	100
BCS3203	Data Structure & Algorithms (Practical)	Minor Core Course	0	0	2	1	30	70	100
BCS3204	Professional Communication	Ability Enhancement Course	2	0	0	2	30	70	100
BCS3205	Numerical Methods and Analysis	DSEC	4	0	0	4	30	70	100
IKS0006	Indian Health Sciences	VAC	2	0	0	2	30	70	100
BCS3206	Sustainable Development	Multidisciplinary Course	3	0	0	3	30	70	100
BCS3207	Operations and Scale	Skill-Based Course	0	0	4	2	30	70	100
Elective Course -1 Skill Enhancement (Any one of the following)									
BCS3208	Digital Electronics	Skill Enhancement Course	2	0	0	3	30	70	100
BCS3209	Digital Electronics (Practical)		0	0	2		30	70	100
BCS3210	Disaster Risk Reduction and Management: Skills for Safety and Resilience		2	0	2	3	30	70	100
BCS3211	Basics of		3	0	0	3	30	70	100

BCS4258	Computer Organization & Architecture	Discipline Specific	4	0	0	4	30	70	100
BCS4259	Network Security	Elective							
Total			22	0	08	26	300	700	1000

Programme learning outcomes: An Bachelor of Vocational in CSE 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	142
Entry requirements	A student can re-enter into third year of a programme if she/he has taken an exit option after 2 nd year(U.G Diploma in CSE).

Semester: 5th									
Course Code	Course Title	Type of Course	L	T	P	Credits	Int.	Ext.	Total Marks
BCS5300	Java Programming	Major Core Course	3	0	0	3	30	70	100
BCS5301	Java Programming (Practical)	Major Core Course	0	0	2	1	30	70	100
BCS5302	Relational Database Management System	Major Core Course	3	0	0	3	30	70	100
BCS5303	Relational Database Management System (Practical)	Major Core Course	0	0	2	1	30	70	100
BCS5304	Web Designing & Development	Vocational Course	3	0	0	3	30	70	100
BCS5305	Web Designing & Development (Practical)	Vocational Course	0	0	2	1	30	70	100
BCS5306	Machine Learning	Major Core Course	3	0	0	3	30	70	100
BCS5307	AI Automation & Finance	Skill Based Course	0	0	4	2	30	70	100
Discipline Specific Elective Course -II(Any one of the following)									
BCS5308	Soft Computing	Discipline Elective Course	4	0	0	4	30	70	100
BCS5309	Software Engineering								
Discipline Specific Elective Course -III (Select any subject with its Practical.)									
BCS5310	Introduction to Quantum Computing	Discipline Elective Course	3	0	0	3	30	70	100
BCS5311	Quantum Programming Practical		0	0	2	1	30	70	100
BCS5312	Design & Analysis of Algorithm		3	0	0	3	30	70	100

BCS5313	Design & Analysis of Algorithm (Practical)		0	0	2	1	30	70	100
Total			20	0	12	25	330	770	1100

Semester: 6th									
Course Code	Course Title	Type of Course	L	T	P	Credits	Int.	Ext.	Total Marks
BCS6350	Formal Language & Automata Theory	Major Core Course	4	0	0	4	30	70	100
BCS6351	Deep Learning	Major Core Course	4	0	0	4	30	70	100
BCS6352	Computer Networks	Major Core Course	4	0	0	4	30	70	100
BCS6353	Design & Development of Applications	Vocational Course	3	0	0	3	30	70	100
BCS6354	Design & Development of Applications (Practical)	Vocational Course	0	0	2	1	30	70	100
Discipline Specific Elective Course -IV (Any one the Following									
BCS6355	Cyber law and Ethics	Discipline Elective	4	0	0	4	30	70	100
BCS6359	Internet of Things								
Discipline Specific Elective Course -V (Any one of the Following									
BCS6357	Digital Forensics	Discipline Elective	4	0	0	4	30	70	100
BCS6358	Foundation of Blockchain Technology								
Total			23	0	2	24	210	490	700

Programme learning outcomes: The Bachelor's degree in B.Tech CSE 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 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	186
Entry requirements	A student can re-enter into fourth year of a programme if she/he has taken an exit option after 3 rd year(B.Voc in CSE).

Semester: 7th									
Course Code	Course Title	Type of Course	L	T	P	No of Credits	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	Big Data	Minor	4	0	0	4	30	70	100
BCS7403	Introduction to Robotics	Minor	4	0	0	4	30	70	100
BCS7404	Project(Experimental 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	Discipline 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

Semester: 7th									
Course Code	Course Title	Type of Course	L	T	P	No of Credits	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	Big Data	Minor	4	0	0	4	30	70	100
BCS7403	Introduction to Robotics	Minor	4	0	0	4	30	70	100
BCS7409	Computer Vision (Practical)		0	0	2	1	30	70	100
Total			18	0	08	23	240	560	800

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	140	2	63/ 64	193/ 194	2070/ 2100	4830/ 4900	6900/ 7000
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