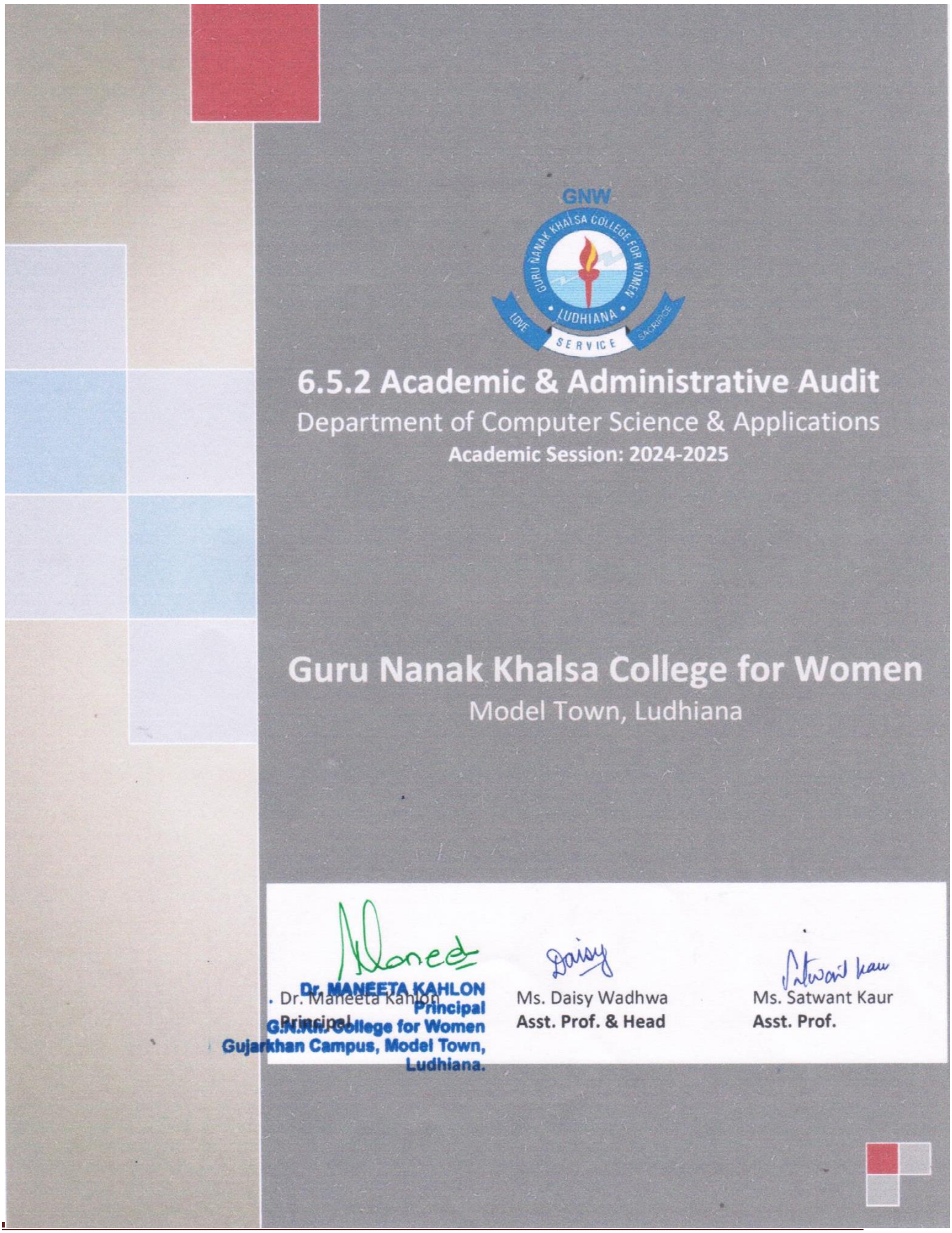


6.5.2 Academic & Administrative Audit

Department of Computer Science & Applications

Academic Session: 2024-2025

Guru Nanak Khalsa College for Women

Model Town, Ludhiana

Dr. Maneeta Kahlon
Principal

Dr. Maneeta Kahlon
Principal
G.N.Kh. College for Women
Gujarkhan Campus, Model Town,
Ludhiana.

Ms. Daisy Wadhwa
Asst. Prof. & Head

Ms. Satwant Kaur
Asst. Prof.

Academic and Administrative Audit

1. **Academic Session:** 2024- 2025
2. **Department:** Department of Computer Science and Applications
3. **Head of the Department:** Ms. Daisy Wadhwa, Assistant Professor
4. **Details of Academic Programmes:**

S.No.	Programme	Number of Admissions
1	BCA I	46
2	BCA II	45
3	BCA III	42
4	PGDCA	12
5	BA I (Computer Science and Applications)	51
6	BA II (Computer Science)	38
7	BA III (Computer Science)	30

(Supporting Document: Link to the Time Table)

5. **Was the Academic Calendar/ Monthly Teaching Plans prepared at the beginning of the session and strictly adhered to? (Yes/No)**_____Yes_____

   (Supporting Document: Link to Academic Calendar/ Monthly Teaching Plans)
6. **Plan of Action chalked by the department at the beginning of the Academic Year towards Quality Enhancement and the Outcome achieved by the end of the Academic Calendar:**

S.No.	Plan of Action	Outcome(s)
1	To conduct admissions for the academic session 2024- 2025 as per the university guidelines	The department conducted admissions to the classes, BCA, PGDCA, for the session 2024-2025 as per the guidelines of Panjab University, Chandigarh. The admission process for the BCA First Year and BA First Year classes was conducted in alignment with the guidelines of the

		National Education Policy (NEP) 2020 and as per the instructions issued by Panjab University, Chandigarh. The process emphasized a holistic and multidisciplinary approach, ensuring inclusivity and transparency at all stages.
	To plan for the academic session 2024-2025	- Department-level syllabus review meeting was conducted on July 16, 2024 at the beginning of the odd semester - Department-level syllabus review meeting was conducted on January 15, 2024 at the beginning of the even semester
3	To conduct Student Induction/ Orientation Program	Student Induction/ Orientation Program was conducted on July 16, 2024
4	To organize an Ice Breaking Session for first year students	Ice-breaking Activity: "Hello World! Meet your CS Clan" was organized on August 3, 2024
5	To generate awareness regarding Cyber security	- Cyber Jagrukta Diwas was organized on the first Wednesday of each month to sensitize and empower students against cyber-crimes and frauds - October was observed as National Cyber Security Awareness Month - Safer Internet Day was organized on February 11, 2025 - An awareness lecture on Safety and Security in Cyber Space was organized on February 24, 2025
6	To make students aware about the job opportunities in Computer Science field	- A visit of BCA and PGDCA students to DBEE was organized on September 17, 2024. - A peer-led session on Unpacking STEM Careers: Her Voice in Science was organized on February 11, 2025
7	To sensitize students about responsible e-waste collection and disposal	An e-waste collection drive was organized on October 29, 2024
8	To identify advanced learners and slow learners and organize special programs to handle the diversity of learners	- Annual Prize Distribution Ceremony to incentivize and encourage the advanced learners was organized on April 27, 2025 - Remedial classes were conducted from November 11-20, 2024 - Remedial classes were conducted from

		April 15-22, 2025
9	To obtain regular feedback from students	Feedback was obtained from the students during the monthly Mentor- Mentee meetings

(Supporting Document: Action Taken Reports (college) - June to December 2024; January to May 2025)

7. List of faculty members with details of Mandatory Key Result Areas

S.No.	Name	Details of Research Publications (Journals, Paper Presentations, Book Chapters, etc.)	Details of FDPs, MOOCs, Training Programs, etc. completed
1	Daisy Wadhwa		
2	Satwant Kaur		
3	Harpreet Kaur		
4	Ashmeet Kaur		
5	Muskan Bhalla		
6	Arshnoor Kaur		
7	Amanpreet Kaur		
8	Harshu Sharma		

(Supporting Document: Faculty achievements are detailed in the Department Reports. Link to Semester-wise Department Reports- June to December 2024; January to May 2025)

8. Students Profiling after Admission:

A. Was the profiling done into Advanced & Slow Learners (Yes/ No): Yes

B. List the initiatives taken for Advanced & Slow Learners

Initiatives for Advanced Learners

1. **Advanced Coding and Project-Based Assignments:** Advanced learners are given complex programming tasks to enhance analytical and problem-solving skills.
2. **Participation in IT Competitions:** Students are encouraged and guided to participate in IT competitions to strengthen competitive skills. Students of the department participated in the several IT events organized as a part Inter-College competitions, details of which are mentioned in the Department Report.

3. **Mentorship for Research and Publications:** Faculty mentors support advanced learners in writing research papers, case studies, and technical articles for conferences. Notable achievements are of Ms. Ashmeet Kaur, a student of PGDCA. She presented a paper titled 'Optimizing Spectrum Access in Cognitive Radio Networks: A Reinforcement Learning Approach with Correlation-Aware Utility Maximization' in the 2nd International Conference on Data Science and Business Systems 2025 (ICDSBS-2025) organized by the Department of Data Science and Business Systems, SRM Institute of Science and Technology, Chennai, Tamil Nadu on April 17-18, 2025. This paper is also published in IEEE Xplore. Link: https://doi.org/10.1109/ICDSBS63635.2025.11032062. She also presented a paper titled 'Cybersecurity Analysis of Modern PLCs: Exploring Data Logging and Performance Metrics Using the AXC F 2152' in the 4th International Conference on Smart Technologies, Communication and Robotics (STCR– 2025) organized by Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu on May 09-10, 2025. This paper is also published in IEEE Xplore. Link: https://doi.org/10.1109/STCR62650.2025.11020265
4. **Industry Expert Sessions and Masterclasses:** Advanced learners are motivated to attend masterclasses, guest lectures, and workshops conducted by IT industry professionals to improve domain knowledge. Aarti (BCA 4th Semester) and Sukhnandan Virdi (BCA 6th Semester) completed a short term course on "Applied Machine Learning using Python" held from January 3-7, 2025, organized by National Institute of Technology (NIT) Kurukshetra, Haryana. Gurnain Kaur (BCA 2nd Semester) completed a 30 hours Live Training Program on Digital Marketing held from February 12, 2025 to March 4, 2025. She completed another 30 hours Live Training Program on Business Intelligence Using Advanced Excel & Power BI held from February 27, 2025 to March 20, 2025. These training programs were organized by ExcelR EdTech Pvt. Ltd.
5. **Value-Added Courses and Certificate Programs:** The department encourages students to enroll in additional certifications like Python, Cloud Computing, Data Analytics, and Cybersecurity to enhance employability. 1. Ashmeet Kaur (PGDCA) completed HTML, CSS, and JavaScript for Web Developers, an online course authorized by Johns Hopkins University offered through Coursera on July 25,2024. Students of BCA 5th Semester, Srishti Sharma and Khushi Gupta, successfully completed a 12-week NPTEL- Swayam course on 'Programming in Java' conducted by IIT Kharagpur from July to October 2024. Srishti secured top rank in the course and received the 'Elite' certificate.
6. **Internship and Live Project Opportunities:** Advanced learners are guided to take up internships, freelancing work, and real-time industry projects to gain practical exposure.
7. **Access to Additional Learning Resources:** They are encouraged to utilize online platforms (NPTEL, SWAYAM, Coursera) for advanced coursework and deeper conceptual understanding.

Initiatives for Slow Learners

1. **Remedial Classes:** Regular remedial sessions are conducted to clarify fundamental concepts in programming, mathematics, and core computer concepts.
2. **Peer Tutoring and Buddy Support System:** High-achieving students mentor slow learners through peer tutoring sessions, promoting collaborative learning.
3. **Simplified Notes and Step-by-Step Learning Resources:** Teachers provide simplified study materials, solved examples, and topic-wise handouts to strengthen their foundational understanding.
4. **Continuous Assessment and Feedback Mechanism:** Frequent short tests, quizzes, and class interactions are conducted to monitor progress and provide timely feedback for improvement.
5. **Use of Audio-Visual Tools for Concept Reinforcement:** Educational videos, animations, coding demonstrations, and online tutorials are used to explain abstract concepts in an easy and interactive manner.
6. **Personalized Academic Support During Labs:** Slow learners receive additional guidance during practical sessions to improve hands-on skills in programming and software tools.
7. **Regular Parent-Teacher Communication:** The department communicates with parents about student progress and suggests strategies to help students improve academically.
8. **Encouragement to Participate in Class Activities:** Slow learners are encouraged to ask questions, participate in discussions, and solve small coding tasks to build engagement and confidence.

   (Supporting Document: Student Profiling Details)

9. **Contribution of Alumni to the development of the department**

The impact of alumni extends far beyond graduation, leaving a lasting imprint on the institution that once nurtured their aspirations. As students move forward to pursue their goals, they carry with them more than just cherished memories—they maintain a deep and enduring bond with their alma mater. When nurtured, this connection becomes a powerful driver of the department's ongoing growth and evolution.

Our alumni, enriched with diverse experiences and accomplishments, are among our most valuable assets. They embody the core values and academic excellence of the department, serving as proud ambassadors of the education and character development fostered within these walls.

The Alumni Association plays a vital role in strengthening this connection, providing a platform that fosters engagement, collaboration, and mutual growth. It ensures that alumni remain an active part of the institution's journey, staying informed about recent developments, achievements, and future initiatives. The annual Alumni Meet serves as a meaningful occasion for this exchange—welcoming feedback, ideas, and support from our former students.

We are especially proud to have two of our own alumni contributing to the department in a professional capacity. **Ms. Arshnoor Kaur** is currently serving as an Assistant Professor, while

Ms. Harleen Kaur plays an integral role as a Computer Lab Assistant. Their presence is a testament to the strength of our academic foundation and the lasting connection shared by our alumni.

As part of this year's academic calendar, the college organized the ***Alumni Carnival*** on **February 8, 2025**. The event provided a vibrant platform for alumni and budding student entrepreneurs to showcase their talents and products through dedicated stalls. More than just a celebration, the carnival reflected the spirit of community and continuity. The Alumni Association stands as a bridge between the past, present, and future—preserving legacy while paving the way forward. Through their informal yet impactful interactions, alumni continue to serve as role models, offering guidance, inspiration, and encouragement to the next generation.

The following are some notable alumni from our department:

Name	Designation	Batch
Pawandeep Kaur	Finance manager, Toronto Canada	2008
Harpreet Saini	Assistant Professor at GNIMT, Ludhiana	2009
Anishma Arora	Senior Manager, Indian Bank, Bangalore	2011
Ravneet Kaur	Senior executive Operations at Aegies Gurgaon	2013
Jasnoor Kaur	Educator at Guru Nanak International Public School, Ludhiana	2015
Rajneet Kaur	Software Engineer at Optym Bangalore	2015
Sadaf	Business Analyst and Project Manager at IMG Endeavor	2015
Rattanjot Kaur	Reporting Manager at Duty Guy Pvt. ltd., Ludhiana	2015
Shanu Saini	Developer at Accenture	2016
Shikha Sharma	Senior Data Analyst at Deloitte Hyderabad (US offices of India)	2017

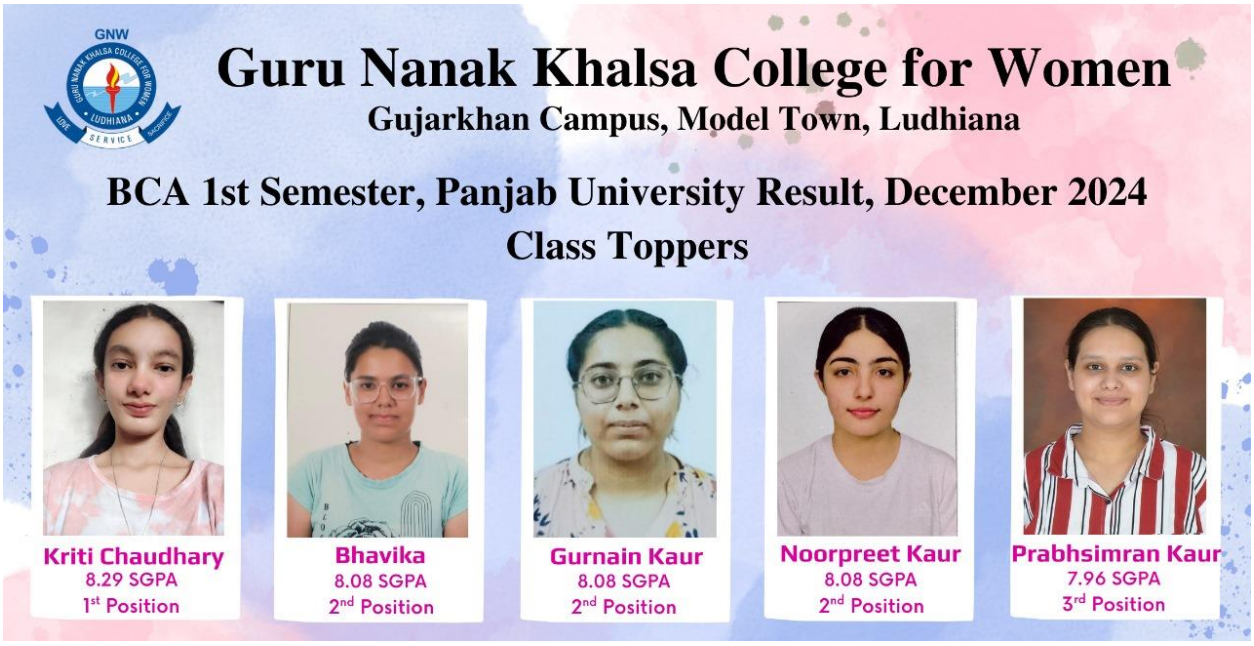
Payal Vadera	Senior Engineer at Mediatek, Noida	2017
Navneet Kaur	Software Engineer at Decision minds India Pvt. Ltd, Bangalore	2017
Dr. Ankita Arora	Assistant Professor, CT University, Ludhiana	2017
Harsimran Kaur	System & Data Analyst, Stanford University, USA	2018
Ashmeet Kaur	Associate Implementation Engineer at Edifecs Chandigarh	2018
Ekpreet Kaur	Software Developer at CodeSpex,	2018
Shruti Bhatti	Product Designer at Open House, Karnataka	2018
Sakshi Sehgal	Software engineer at Maropost Inc	2018
Nishtha	Entrepreneur	2020
Punita	Assistant Professor at PCTE, Ludhiana	2021
Arshnoor	Web Developer at DigiMantra, Ludhiana	2022
Geetika Khatri	Assistant Professor at PCTE, Ludhiana	2022
Simran Ghatore	Assistant Professor at Sri Auribindo College, Ludhiana	2022
Swati Bhatti	React JS Developer at Digimantra Labs	2022
Mahima Sharma	As a Coordinator in ICIC Bank	2024

(Supporting Documents: Link to Semester-wise Department Reports- June to December 2024; January to May 2025; Link to Shining Stars of Computer Science and Applications Department)

10. Exemplary Performance Assessment

S.No.	Programme	No. of students obtaining First Division with distinction	University Positions
1	BCA 1st Semester	13	-
2	BCA 2nd Semester	11	-
3	BCA 3rd Semester	9	-
4	BCA 4th Semester	16	-
5	BCA 5th Semester	7	-
6	BCA 6th Semester	11	-
7	PGDCA 1st Semester	9	-
8	PGDCA 2nd Semester	9	6th, 8th, and 14th Positions in Panjab University, Chandigarh

Class-wise University Results (December 2024)



Guru Nanak Khalsa College for Women

Gujarkhan Campus, Model Town, Ludhiana

BCA 3rd Semester, Panjab University Result, December 2024

Class Toppers

Jiya Garg
85.87%
1st Position

Mehak
85.60%
2nd Position

Kashish Bansal
85.33%
3rd Position

Guru Nanak Khalsa College for Women

Gujarkhan Campus, Model Town, Ludhiana

BCA 5th Semester, Panjab University Result, December 2024

Class Toppers

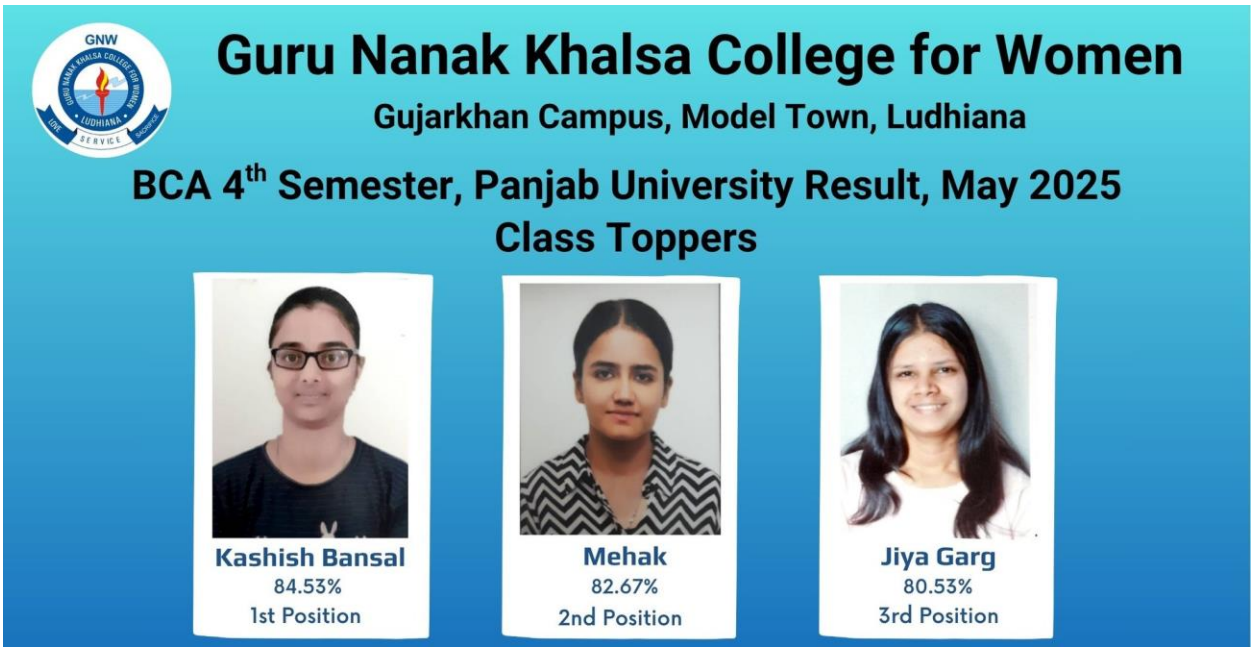
Sana
81.0%
1st Position

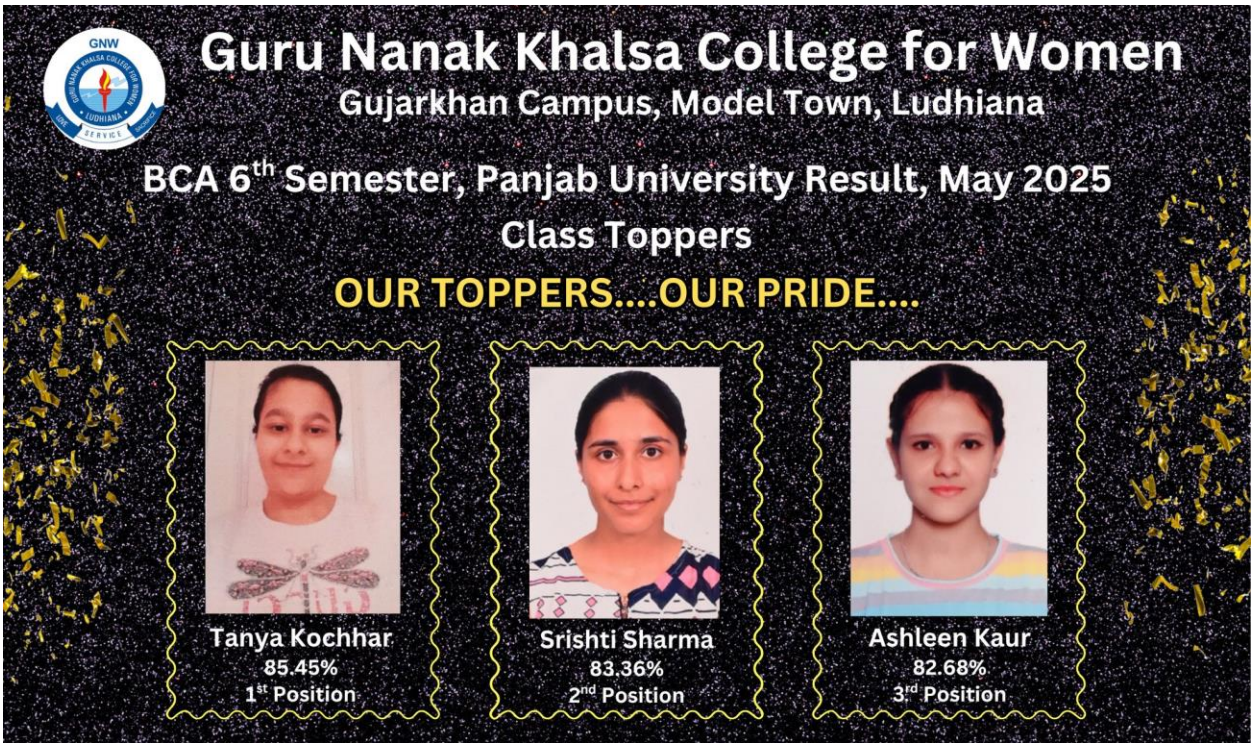
Tanya Kochhar
80.75%
2nd Position

Anchal
77.25%
3rd Position

Class-wise University Results (May 2025)


Guru Nanak Khalsa College for Women
Gujarkhan Campus, Model Town, Ludhiana
BCA 2nd Semester, Panjab University Result, May 2025
Class Toppers
Kriti Chaudhary
7.96 SGPA
2nd Position
Shallu
7.96 SGPA
2nd Position
Noorpreet Kaur
7.88 SGPA
3rd Position


Guru Nanak Khalsa College for Women
Gujarkhan Campus, Model Town, Ludhiana
BCA 4th Semester, Panjab University Result, May 2025
Class Toppers
Kashish Bansal
84.53%
1st Position
Mehak
82.67%
2nd Position
Jiya Garg
80.53%
3rd Position



11. Department support for university examination

The Department of Computer Science and Applications actively contributes to the smooth and efficient conduct of university examinations. Faculty members consistently undertake a wide range of examination-related responsibilities assigned by the university, including duties as internal and external examiners, superintendents, deputy/assistant superintendents, and members of flying squads. Their participation ensures adherence to academic regulations, maintains

examination integrity, and supports the timely and fair evaluation of students. The dedicated involvement of the department's teaching staff reflects a strong commitment to institutional responsibilities and contributes significantly to the overall examination process. The details of the duties performed by the faculty members of the department during the university examinations are listed below.

S.No.	Name	Nature of duty performed in the university examinations
1	Daisy Wadhwa	• Internal and External Examiner for the conduct of practical examinations • Member of Flying Squad
2	Satwant Kaur	• Deputy Superintendent • Internal and External Examiner for the conduct of practical examinations • Member of Flying Squad
3	Harpreet Kaur	• Assistant Superintendent (Outside Duty) • Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations
4	Ashmeet Kaur	• Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations
5	Muskan Bhalla	• Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations
6	Arshnoor Kaur	• Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations
7	Amanpreet Kaur	• Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations
8	Harshu Sharma	• Assistant Superintendent • Internal and External Examiner for the conduct of practical examinations

(Supporting Documents: Link to Semester-wise Department Reports- June to December 2024; January to May 2025)

12. **Placement Activities:** (Please refer report on Placement Activities- June to December 2024; January to May 2025)

13. Assessment of Feedback from stakeholders: (Please refer Feedback Report on the college website)

14. Best practices and Distinctive practices being followed by the department

Best Practices followed by the department

1. Fostering Digital Literacy

The Department of Computer Science and Applications recognizes digital literacy as a foundational competency essential for students' academic progression and professional readiness. To cultivate strong digital competencies among learners, the department follows a structured and multi-dimensional approach encompassing curriculum integration, expert interactions, hands-on experiences, and personalized learning support.

a. Curriculum Integration

The curriculum, aligned with Panjab University, Chandigarh, incorporates essential courses on digital literacy, programming languages, data management, computer networking, and emerging technologies. These courses equip students with practical skills in software development, data analysis, and secure digital practices, enabling them to meet the demands of the modern digital ecosystem.

b. Expert Sessions

To expose students to current technological trends, the department regularly invites experts from the industry. Notable sessions include:

- An interactive session on E-Waste: A seminar and a collection drive on e-waste was organized on February 18, 2025. The initiative aimed to raise awareness about the responsible disposal of electronic waste and its impact on the environment. Ms. Surbhi, a resource person from NGO Pahal, sensitized students on the importance of responsible e-waste management. She elaborated on techniques and processes for the safe disposal and recycling of e-waste, emphasizing its role in environmental conservation and sustainability.
- The Department of Computer Science and Applications and NSS Unit, in collaboration with the Council of Cyber Vigilance and Security Enforcement, organized an awareness lecture on Safety and Security in Cyber Space on February 24, 2025. The session aimed to educate students about cyber threats, online safety measures, and responsible digital behavior. Resource persons Ms.

Jyoti and Ms. Bindu from the Council of Cyber Vigilance and Security Enforcement provided valuable insights into various cyber security threats, including phishing, identity theft, and online fraud. They emphasized the importance of awareness among the masses to combat cybercrime effectively and shared preventive strategies to safeguard personal and professional digital assets.

These expert interactions deepen students' understanding of real-world applications and broaden their technological perspective.

c. Workshops and Seminars

A variety of workshops and seminars are conducted on relevant themes such as software development, artificial intelligence, and web technologies. Significant events include:

- Workshop on AI Tools: The Department of Computer Science and Applications, in collaboration with the Women Development Cell celebrated the International Day of Women and Girls in Science on February 11, 2025 with an insightful session on the theme, "Unpacking STEM Careers: Her Voice in Science." As part of a peer-teaching initiative, students of BCA 2nd semester shared their knowledge with their peers on the role of Artificial Intelligence (AI) tools in enhancing productivity. The interactive session covered AI-powered presentation design tools, AI tools for generating audio from text, Grammar and sentence structure enhancement tools, and AI-based image generation tools. The initiative emphasized the importance of women's participation in science and technology, emphasizing how AI can serve as a powerful tool for academic and professional growth.
- Celebration of Safer Internet Day and Cyber Jagrukta Diwas to promote awareness on digital safety

Such activities help learners stay updated on evolving technologies and understand their societal impact.

d. Practical Applications and Personalized Learning

Students are encouraged to apply classroom learning through projects. In addition, personalized coaching is offered in areas such as programming, software development, AI algorithms, blockchain, and GIMP. This individualized support enables students to:

- Strengthen their technical foundations

- Develop career-oriented projects such as web applications

These practices build problem-solving abilities and foster creativity.

e. IT Competitions

The department organizes academic competitions to enhance student engagement, including:

- WWW Wonders Trivia Quiz on World Wide Web Day
- Inter-College IT competitions under Prof. Gurbir Singh Sarna Memorial Inter-College Events on February 1, 2025

f. Online Courses and Continuous Learning

Students actively pursue online certification courses to expand their knowledge base. It is a matter of great pride for the department that two students of BCA 5th Semester, Srishti Sharma and Khushi Gupta, successfully completed a 12-week NPTEL- Swayam course on 'Programming in Java' conducted by IIT Kharagpur from July to October 2024. Srishti secured top rank in the course and received the 'Elite' certificate. These opportunities foster self-paced learning and broaden students' academic horizons.

2. Financial Support to Students

The Department of Computer Science and Applications ensures that financial constraints do not hinder students' educational aspirations. The department is committed to equity and inclusion through structured financial assistance and skill-building initiatives.

a. Scholarships and Fee Concessions

The college provides scholarships and fee waivers for meritorious and economically disadvantaged students. During the academic session 2024–2025, the ollowing students were awarded the B.R. Ambedkar Scholarship:

- Yagiasha (BCA 1st Year)
- Yugpreet (BCA 2nd Year)
- Simran (BCA 3rd Year)
- Tanisha Lamba (BCA 3rd Year)
- Jashandeep Kaur (PGDCA 1st Year)

b. Earn While You Learn Initiative

Aligned with NEP 2020 and the college's Skill Development programme, the department promotes the Earn While You Learn scheme. Students utilize their technological skills to

develop websites and applications. Additionally, the knowledge of Graphic Designing software like GIMP and Adobe Photoshop allow students to take up designing tasks as freelancers. This initiative provides financial assistance while enhancing students' confidence, employability, and entrepreneurial mindset.

c. *Textbook Distribution and Book Bank Support*

To support financially challenged students, the department maintains a departmental library from where students are issued books for a semester. Faculty members, senior students, and alumni contribute to the college library's book bank and directly provide essential textbooks. This ensures equal access to learning resources and supports academic continuity for all students.

3. Enhancing Learning Opportunities

The department is committed to strengthening academic excellence through enriched learning environments, modern infrastructure, and experiential learning opportunities.

a. *Hands-on Learning Labs*

Well-equipped laboratorie offer students experiential learning opportunities. These labs encourage experimentation, innovation, and practical exposure to the latest technologies, bridging the gap between theoretical knowledge and real-world application.

b. *Technology-Enabled Classrooms*

Smart classrooms furnished with interactive whiteboards, HD projectors, and internet-enabled teaching tools enhance the teaching-learning process. These facilities enable faculty to deliver engaging, multimedia-rich lectures that cater to diverse learning styles and promote interactive learning.

Distinctive practices of the department

The Department of Computer Science and Applications adopts distinctive academic and student-centric practices that go beyond routine curriculum delivery. These practices strengthen the learning environment, promote student well-being, and ensure holistic development. The following key initiatives reflect the department's commitment to academic excellence, personalized support, and continuous improvement.

1. **Remedial sessions for academically weaker students**

To support students who face challenges in understanding core subjects such as programming, mathematics, and database management systems, the department conducts structured remedial sessions. Key features include:

- Personalized attention provided in small groups to address individual learning gaps
- Targeted practice on concepts and topics previously identified as difficult or failed
- Peer-to-peer learning, enabling students to learn collaboratively with guidance from high-performing peers
- Focused exam preparation, resulting in improved academic confidence and performance

This initiative strengthens foundational concepts, reduces academic stress, and supports students in achieving consistent academic progress.

2. Student Feedback Forums

The department promotes a culture of transparency, dialogue, and continuous enhancement through structured student feedback mechanisms. Students feedback is obtained regularly to encourage open communication regarding teaching quality, laboratory experiences, academic difficulties, and departmental events. These forums:

- Provide a platform for students to voice concerns and suggestions
- Enable faculty and administration to understand student needs directly
- Foster collaborative decision-making and participatory governance
- Enhance the overall efficiency and responsiveness of the department

This practice significantly contributes to improving academic processes and strengthening student-faculty relationships.

3. **Mentor-Mentee System**

A distinctive strength of the department is its well-structured Mentor-Mentee System, under which each student is assigned a faculty mentor who supports them throughout their academic journey. The mentorship framework focuses on holistic student development through:

- Academic monitoring, including tracking performance and identifying areas for improvement
- Career and course guidance based on individual interests and aspirations
- Regular well-being check-ins, offering emotional and psychological support
- Periodic meetings to set goals, review progress, and create personalized development plans

This mentoring approach creates an environment of trust, motivates students to perform better, and provides them with clarity regarding career pathways and personal growth.

15. SWOC Analysis of the department and the Future plan of action

Departmental SWOC Analysis

Strengths

1. **Qualified and Experienced Faculty:** The department has a dedicated team of qualified faculty members with expertise in diverse domains such as Artificial Intelligence, Data Science, Computer Programming, Networking, and Web Technologies. Their academic competence and commitment to student development contribute significantly to the department's academic excellence.
2. **Well-Equipped Laboratory Infrastructure:** The presence of modern computer laboratories equipped with updated software, reliable internet access, and high-performance systems facilitates hands-on learning, experimentation, and project development.
3. **Student Participation and Achievements:** Students actively participate in inter-college and intra-college technical events, coding competitions, design contests, and IT-based challenges, often securing high positions and recognition. This reflects their competence, creativity, and strong foundational skills.
4. **Vibrant Academic Environment:** The department regularly organizes workshops, seminars, guest lectures, and technical events to expose students to emerging technologies and industry practices. These activities enrich the learning environment and encourage innovation.

Weaknesses

1. **Infrastructure Limitations:** Despite well-equipped labs, occasional issues arise related to lab maintenance, system upgrades, power backup, or technical glitches, which may affect smooth functioning.
2. **Limited Student–Industry Interaction:** Due to fewer IT companies and internship opportunities in the Ludhiana region, students often rely on online training programs or must relocate to other cities for employment or industrial exposure.

3. **Need for Enhanced Faculty Development:** More Faculty Development Programs (FDPs), industrial visits, and exposure to advanced technologies are needed to keep faculty updated with the latest industry trends and pedagogical practices.

Opportunities

1. **Integration of Emerging Technologies:** There is a strong potential to introduce specialized courses, certifications, and project work in domains such as Artificial Intelligence, Data Science, Cybersecurity, Internet of Things (IoT), and Blockchain.
2. **Industry Collaborations and MOUs:** The department can strengthen ties with technology firms, training institutes, and industry partners through MOUs to provide students with internships, real-time projects, expert sessions, and collaborative research opportunities.
3. **Expansion of Online Learning:** Leveraging online platforms such as Coursera, NPTEL, and SWAYAM offers students flexibility to pursue additional certifications and skill-enhancement courses, broadening their academic and professional horizons.

Challenges

1. Rapid Technological Advancements: Fast-changing industry demands and emerging technologies require continuous upskilling of both faculty and students, making curriculum adaptability a challenge.
2. Retention of Experienced Faculty: Competing offers and better opportunities elsewhere may lead to difficulty in retaining skilled and experienced faculty members.
3. Budgetary Constraints: Limited financial resources for upgrading laboratory infrastructure, procuring advanced tools, and supporting research activities pose challenges to achieving long-term growth objectives.

Future Plan of Action

Based on the SWOC analysis, the Department of Computer Science and Applications has formulated a comprehensive future action plan aimed at strengthening academic quality, enhancing student outcomes, and preparing the department to meet evolving technological requirements.

1. **Academic and Curriculum Enrichment**
    - Introduce value-added and certificate courses based on the latest trends in the areas of Artificial Intelligence, Data Analytics, Cybersecurity, Cloud Computing, and Blockchain Technology.
    - Revise and enrich internal curriculum components to align with emerging industry trends and global standards.
    - Promote interdisciplinary learning through joint projects and collaborative workshops with other departments.
2. **Strengthening Industry Linkages**
    - Establish MOUs with IT companies, training centres, and startup incubators for internships, live projects, and industry-led training.
    - Organize annual industry interaction meets and expert panels to improve student exposure to real-world challenges.
    - Encourage faculty–industry collaboration for consultancy projects and applied research.
3. **Faculty Development and Capacity Building**
    - Facilitate participation in FDPs, workshops, national/international conferences, and online certification courses for faculty.
    - Organize in-house faculty development sessions focusing on pedagogy, research skills, and technological advancements.
    - Encourage faculty to undertake research projects and publish in reputed journals.

4. Improving Infrastructure and Learning Resources

- Upgrade computer labs with high-speed systems, latest software, and improved power backup facilities.
- Enhance smart classrooms with advanced audio–visual tools and digital teaching aids.

5. Enhancing Student Support and Employability

- Strengthen the remedial coaching system, mentorship programs, and career counselling sessions.
- Facilitate skill-based training in coding, aptitude, communication, and interview preparation.
- Expand opportunities for online internships, virtual industry projects, and freelancing platforms.