

BCA - Cyber Security

PROGRAM DETAILS

Faculty	Computing and IT (FCIT)
School	School of Computer Applications (SCA)
Program	BCA-Cyber Security
Dean of Faculty	Dr. Shweta Marigoudar
Director of School	Ms. Shamina M Attar

1	Title of the Award	BCA- Cyber Security
2	Modes of Study	Full Time
3	Awarding Institution /Body	GM University
4	Joint Award	Not Applicable
5	Teaching Institution	Faculty of Computing and IT (FCIT)
6	Date of Program Specifications	November -2023
7	Date of Course Approval by the Academic Council of GMU	---
8	Next Review Date:	---
9	Program Approving Regulating Body and Date of Approval	---
10	Program Accredited Body and Date of Accreditation	---
11	Grade Awarded by the Accreditation Body	---
12	Program Accreditation Validity	---
13	Program Benchmark	N/A
14	Program Overview: Bachelors in Cyber Security The Bachelor's in Cyber Security program is an in-depth and forward-thinking curriculum designed to equip students with a robust foundation in cyber security principles and practices. Spanning three to four years, the program encompasses a broad spectrum of subjects, including network security, cryptography, secure software development, and ethical hacking. Students will engage in hands-on learning through real-world projects, fostering critical problem-solving skills and proficiency in programming languages such as Python, C++, and Java. The curriculum is designed to address the rapidly evolving challenges of the cyber security field, incorporating advanced topics such as cloud security, incident response, digital forensics, and artificial	

intelligence-driven threat detection. Students will explore the legal, ethical, and social implications of cyber security, ensuring a well-rounded understanding of data privacy, compliance regulations, and responsible technology use.

In addition to technical expertise, the program emphasizes practical application through industry-relevant projects, internships, and collaborations with professionals in the cyber security domain. Students will develop effective communication and teamwork skills, essential for coordinating security strategies in diverse environments. By integrating theoretical knowledge with hands-on experience, the program prepares graduates to tackle emerging cyber threats in both private and public sectors.

Upon completion, graduates will be equipped for roles such as cyber security analyst, penetration tester, security consultant, and incident response specialist. They will be well-prepared to protect critical infrastructure, safeguard sensitive data, and address the growing demand for skilled cyber security professionals across various industries.

15 **Program Educational Objectives (PEOs) for BCA- Cyber Security Program:**

1. Technical Proficiency and Innovation:

Objective: Graduates will demonstrate advanced technical proficiency in cyber security, including in-depth knowledge of cryptography, network security, secure software development, and incident response. They will continuously innovate and adapt to the evolving cyber security landscape by integrating emerging Technologies like artificial intelligence, block chain, and cloud security.

2. Problem-Solving and Critical Thinking:

Objective: Graduates will be skilled in critical thinking and problem-solving, enabling them to identify, analyze, and mitigate cyber threats. They will use advanced techniques, tools, and methodologies to address both current and future cyber security challenges, remaining agile in the face of constantly evolving threats.

3. Ethical Hacking and Professional Responsibility:

Objective: Graduates will uphold high ethical standards and understand the legal and social responsibilities of cyber security professionals. They will apply ethical hacking techniques to safeguard systems and networks while complying with industry regulations and best practices.

4. Effective Communication and Collaboration:

Objective: Graduates will develop strong communication skills to articulate complex cyber security issues to diverse audiences, including stakeholders, executives, and technical teams. They will collaborate effectively in cross-functional teams to design and implement secure systems and respond to cyber incidents.

5. Lifelong Learning and Adaptability:

Objective: Graduates will recognize the importance of continuous learning to stay current with cyber security trends, emerging technologies, and evolving threats. They will demonstrate adaptability in acquiring new skills and knowledge to remain relevant in the rapidly changing cyber security domain.

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Program Outcomes for Bachelor's Program in Cyber Security:

1. Proficient Data Analysis:

- *Outcome:* Graduates will demonstrate proficiency in collecting, cleaning, and analyzing diverse datasets, applying statistical and computational methods to extract meaningful insights.

2. Advanced Machine Learning Applications:

- *Outcome:* Graduates will apply machine learning algorithms for predictive modeling, showcasing competence in supervised and unsupervised learning techniques.

3. Effective Data Visualization:

- *Outcome:* Graduates will communicate complex technical findings through clear data visualizations, reports, and presentations, ensuring effective dissemination of insights.

4. Programming and Algorithmic Skills:

- *Outcome:* Graduates will exhibit advanced programming skills and algorithmic competence, optimizing data science solutions using contemporary languages and methodologies.

5. Database Management Proficiency:

- *Outcome:* Graduates will possess specialized skills in designing, implementing, and optimizing databases, ensuring efficient data storage and retrieval.

6. Big Data Handling and Technologies:

- *Outcome:* Graduates will apply principles of distributed computing and utilize big data technologies, demonstrating proficiency in handling large-scale datasets.

7. Ethical Data Practices and Privacy Compliance:

- *Outcome:* Graduates will uphold ethical standards in data science practices, demonstrating awareness of legal and ethical implications related to data privacy.

8. Real-world Application through Project-Based Learning:

- *Outcome:* Graduates will apply theoretical knowledge to practical settings, successfully completing industry-relevant projects and collaborating with industry partners on data science challenges.

17	<p>Program Specific Outcomes (PSOs) for Bachelor's Program in Cyber Security:</p> <p>1. Expertise in Cyber Threat Detection and Response: <i>Outcome:</i> Graduates will possess advanced skills in identifying, analyzing, and mitigating cyber threats, using state-of-the-art tools and techniques to safeguard systems and respond effectively to security incidents.</p> <p>2. Secure Software Development and Vulnerability Mitigation: <i>Outcome:</i> Graduates will demonstrate proficiency in secure coding practices, designing and developing software solutions that are resilient to cyber-attacks by integrating robust security measures throughout the software development lifecycle.</p> <p>3. Compliance with Cyber security Regulations and Data Privacy: <i>Outcome:</i> Graduates will ensure that security practices comply with national and international cyber security laws and data privacy standards, applying industry frameworks such as GDPR, HIPAA, and ISO to protect sensitive information.</p>
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Programme Structure

A. Definition of Credit:

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

Sl. No.	Program -Category	Credits
1	Program-Core courses, elective Courses, open electives	100/130
2	Technical Skills	10 (SDTCD)
3	Life Skills	3(CASP)
4	Innovation and Entrepreneurial Skills	3(CIPI)
5	Environmental Awareness and Community Services	3(SA)
6	Athletics, Sports, Yoga, Gymnasium	3(SA)
7	Cultural & Literary Activities	3(SA)
8	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	2(SA&SP)
9	Placement Training	3(CASP)
Total		130+30=160

3-year degree program: 100 + 30= 130

4 Year Honors Program: 130+30= 160

18. Courses and Credits:

Semester-1			
Sl. No.	Course Code	Course Title	Credits
1	UL25FHK11 UL25FHH13	Kannada Siri-1 Katha Saritha	02
2	UL25FHE12	Insight-1	02
3	UC25CY1104	C Programming	03
4	UC25CY1105	C Programming Lab	02
5	UC25CY1106	Computer Fundamental	03
6	UC25CY1107	Computer Fundamental Lab	02
7	UC25CY1108	Mathematical Foundation	03
8	UM25BC1142	OEC-1	03
9	U25TS01	Technical Skills	00
10	U25LS02	Life Skills	00
11	U25ES03	Innovation and Entrepreneurial Skills	00
12	U25VS04	Environmental Awareness and Community Services	00
13	U25AS05	Athletics, Sports, Yoga, Gymnasium	01
14	U25CL06	Cultural & Literary Activities	00
15	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
16	U25PT08	Placement Training	00
		Total	21

Semester-2			
Sl. No.	Course Code	Course Title	Credits
1	UL25FHK21 UL25FHH23	Kannada Siri-2 Katha Sourabha	02
2	UL25FHE22	Insight- 2	02
3	UC25CY1204	Object Oriented Programming Using Java	03
4	UC25CY1205	Java Lab	02
5	UC25CY1206	Data Structures using C	03
6	UC25CY1207	Data Structures using C Lab	02
7	UM24BC1241	OEC-2	03
8	U25TS01	Technical Skills	02
9	U25LS02	Life Skills	00
10	U25ES03	Innovation and Entrepreneurial Skills	00
11	U25VS04	Environmental Awareness and Community Services	01
12	U25AS05	Athletics, Sports, Yoga, Gymnasium	01
13	U25CL06	Cultural & Literary Activities	00
14	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
15	U25PT08	Placement Training	00
		Total	21

Semester-3

Sl. No.	Course Code	Course Title	Credits
1	UC25CY2301	Python Programming	03
2	UC25CY2302	Python Programming Lab	02
3	UC25CY2303	Web Technology	03
4	UC25CY2304	Web Technology Lab	02
5	UC25CY2305	Fundamentals of Cyber Security	03
6	UC25CY2306	Cloud Computing and Security	03
7	UM25BC2341	OEC-3	03
8	U25TS01	Technical Skills	02
9	U25LS02	Life Skills	00
10	U25ES03	Innovation and Entrepreneurial Skills	01
11	U25VS04	Environmental Awareness and Community Services	00
12	U25AS05	Athletics, Sports, Yoga, Gymnasium	00
13	U25CL06	Cultural & Literary Activities	00
14	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
15	U25PT08	Placement Training	00
		Total	23

Semester-4

Sl. No.	Course Code	Course Title	Credits
1	UC25CY2401	Database Management System	03
2	UC25CY2402	Database Management System Lab	02
3	UC25CY2403	Unix and Shell Programming	03
4	UC25CY2404	Unix and Shell programming Lab	02
5	UC25CY2405	International Cyber Law and Security	03
6	UC25CY2406	IOT Security	03
7	U25TS01	Technical Skills	02
8	U25LS02	Life Skills	02
9	U25ES03	Innovation and Entrepreneurial Skills	00
10	U25VS04	Environmental Awareness and Community Services	01
11	U25AS05	Athletics, Sports, Yoga, Gymnasium	00
12	U25CL06	Cultural & Literary Activities	01
13	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
14	U25PT08	Placement Training	01
		Total	23

Semester-5

Sl. No.	Course Code	Course Title	Credits
1	UC25CY3501	Computer Networks and Security	03
2	UC25CY3502	Computer Networks and Security Lab	02
3	UC25CY3503	Ethical Hacking	03
4	UC25CY3504	Ethical Hacking Lab	02
5	UC25CY3505	Digital Forensics	03
6	UC25CY3506	Software Engineering	03
7	U25TS01	Technical Skills	02
8	U25LS02	Life Skills	01
9	U25ES03	Innovation and Entrepreneurial Skills	01
10	U25VS04	Environmental Awareness and Community Services	00
11	U25AS05	Athletics, Sports, Yoga, Gymnasium	01
12	U25CL06	Cultural & Literary Activities	00
13	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
14	U25PT08	Placement Training	01
		Total	23

Semester-6

Sl. No.	Course Code	Course Title	Credits
1	UC25CY3601	Artificial Intelligence for Cyber Security	03
2	UC25CY3602	Cyber Security Attacks	03
3	UC25CY3603	Capstone Project	06
5	U25TS01	Technical Skills	02
4	U25LS02	Life Skills	01
6	U25ES03	Innovation and Entrepreneurial Skills	01
7	U25VS04	Environmental Awareness and Community Services	00
8	U25AS05	Athletics, Sports, Yoga, Gymnasium	01
9	U25CL06	Cultural & Literary Activities	00
10	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
11	U25PT08	Placement Training	01
		Total	19

Semester-7

Sl. No.	Course Code	Course Title	Credits
1	UC25CY4701	Research Methodology and IPR	03
2	UC25CY4702	Research Paper – 1	03
3	UC25CY4703	Dissertation	08
4	U25TS01	Technical Skills	00
5	U25LS02	Life Skills	00
6	U25ES03	Innovation and Entrepreneurial Skills	00
7	U25VS04	Environmental Awareness and Community Services	00
8	U25AS05	Athletics, Sports, Yoga, Gymnasium	00
9	U25CL06	Cultural & Literary Activities	00
10	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
11	U25PT08	Placement Training	00
		Total	14

Semester-8

Sl. No.	Course Code	Course Title	Credits
1	UC25CY4801	Industrial Excursion	03
2	UC25CY4802	Research Paper - 2	03
3	UC25CY4803	Internship	10
4	U25TS01	Technical Skills	00
5	U25LS02	Life Skills	00
6	U25ES03	Innovation and Entrepreneurial Skills	00
7	U25VS04	Environmental Awareness and Community Services	00
8	U25AS05	Athletics, Sports, Yoga, Gymnasium	00
9	U25CL06	Cultural & Literary Activities	00
10	U25CC07	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
11	U25PT08	Placement Training	00
		Total	16

List of **Open Elective Courses** Offered:

1. **Semester – 1:** Fundamentals of Computers
2. **Semester – 2:** Digital Fluency
3. **Semester – 3:** Internet Security

19	<p>Program Delivery and Program Attainment</p> <p>The program comprises several courses, each delivered according to the specifications outlined in the course documents. At the conclusion of each course, both course attainments and program attainments are computed. These attainments undergo analysis during Course Assessment Board and Program Assessment Board meetings, leading to recommendations for enhancements in subsequent offerings.</p>
20	<p>Teaching and Learning Methods</p> <ol style="list-style-type: none"> 1. Face to Face Lectures using Audio-Visuals 2. Laboratory work/Fieldwork/Workshop 3. Project Based Learning 4. Problem Based Learning 5. Group Exercises/Assignments 6. Demonstrations 7. Guest Lectures 8. Industry Visit 9. Workshops, Group Discussions, Debates, Presentations 10. Project Work 11. Project Exhibitions 12. Technical Competitions
21	<p>Attendance</p> <p>A minimum of 85% attendance is essential to appear for semester end examinations. Condoning of attendance shortage is as per the Academic Regulations of BCA Programme.</p>
22	<p>Assessment and Grading</p> <ol style="list-style-type: none"> 1. Every course will be assessed for a weight of 100 2. There are 4 components: <ol style="list-style-type: none"> a. Quiz -15% b. Class Tests: 25% c. Application Based open assignments/ Activity/project-based learning/problem-based learning and any such assessment: 20% d. Semester End Examination: 40% 3. Based on total marks scored grade is Awarded. <p>If marks scored is:</p> <ul style="list-style-type: none"> • 91 and above O (outstanding); 81-90 : A+ (Excellent); 71-80: A (Very Good); 61-70: B+ (Good); 51-60 : B (Above Average); 40 -50: C (Average); below 40: D (Not satisfactory) • If one scores D grade, the candidate is required to re-register for the course (for core courses only, students can exercises their choice in case of electives or open electives –means they can re-register or register for a different elective course) and earn the required credits • A minimum of overall 40% is required for completion of course by acquiring minimum grade (pass) with a minimum of 40% in each component. <ol style="list-style-type: none"> 4. End of each semester –grade card will be issued with SGPA displayed
23	<p>Award of Degree</p>

	<p>Every student registering for the program need to complete a minimum of 120 credits for the award of Bachelor’s degree and 160 credits for the award of honors degree.</p> <p>Award of Degree Certificate:</p> <p>Students will be issued consolidated grade card with CGPA displayed and GM University Degree Certificate.</p> <p>Award of Gold Medal:</p> <p>A student with highest CGPA (Not less than 9.0 on a scale of 10) in the class without getting a D grade in any course over 6/8 semester and completing the program within the specified period of 3/4 years (6/8 semesters) will be awarded Gold Medal.</p>
24	<p>Student Support for Learning</p> <ol style="list-style-type: none"> 1. Course Notes 2. Reference Books in the Library 3. Magazines and Journals 4. Internet Facility 5. Computing Facility 6. Laboratory Facility 7. Workshop Facility 8. Staff Support 9. Lounges for Discussions 10. Any other support that enhances their learning
25	<p>Quality Control Measures</p> <ol style="list-style-type: none"> 1. Review of Course Notes 2. Review of Question Papers and Assignment Questions 3. Student Feedback 4. Moderation of Assessed Work 5. Opportunities for students to see their assessed work 6. Review by external examiners and external examiners reports 7. Staff Student Consultative Committee meetings 8. Student exit feedback 9. Course Assessment Board (CAB) 10. Programme Assessment Board (PAB)

26. Mapping of POs with Cos.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Course-1												
CO1												
CO2												
CO3												
CO4												
CO5												
CO6												
Course-2												
CO1												
CO2												
CO3												
CO4												
CO5												
CO6												