BCA – Data Science

PROGRAM DETAILS

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

1	**Title of the Award**	BCA-Data Science
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 Data Science** The Bachelor's in Data Science is a dynamic and interdisciplinary program designed to equip students with the skills and knowledge necessary for navigating the evolving landscape of data-driven decision-making. Spanning three to four years, this program integrates principles from computer science, statistics, and domain-specific applications. Students engage in core areas such as data analysis, machine learning, programming, and the ethical considerations of data practices. Emphasis is placed on hands-on experience, with students participating in real-world projects and internships that allow them to apply theoretical knowledge to practical scenarios. The curriculum covers a broad range of subjects, including advanced statistical techniques, machine learning algorithms, big data technologies, and data visualization. Students will develop programming proficiency in languages like Python and R, ensuring they can implement and optimize data science solutions effectively. The program also includes a focus on database management, enabling students to efficiently store and retrieve	

	data. A strong ethical foundation is embedded within the program, emphasizing responsible data practices and compliance with privacy regulations. Upon completion, graduates will be well-prepared to pursue careers as data scientists, analysts, or machine learning engineers, contributing meaningfully to industries where data-driven insights are vital. The program aims to produce professionals who excel not only in technical skills but also in understanding the ethical implications and real-world applications of data science.
15	**Program Educational Objectives (PEOs) for BCA-Data Science Program:** **1. Advanced Data Analysis Proficiency:** Graduates of the program will demonstrate advanced proficiency in data analysis, showcasing the ability to employ sophisticated statistical and computational methods to extract meaningful insights from diverse and complex datasets. **2. Effective Communication of Technical Insights and Collaborative Teamwork:** Graduates will possess effective communication skills to convey complex technical insights clearly to diverse audiences and excel in collaborative team environments. **3. Effective Communication of Technical Insights and Collaborative Teamwork:** Graduates will possess effective communication skills to convey complex technical insights clearly to diverse audiences and excel in collaborative team environments.
16	**Program Outcomes for Bachelor's Program in Data Science:** **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 modelling, 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	**Program Specific Outcomes (PSOs) for Bachelor's Program in Data Science:** 1. Advanced Data Analysis Competence: • *Outcome:* Graduates will demonstrate advanced proficiency in employing sophisticated statistical and computational methods to extract meaningful insights from diverse datasets, showcasing expertise in feature engineering and predictive modelling. 2. Programming and Algorithmic Excellence: • *Outcome:* Graduates will exhibit advanced programming skills and algorithmic competence, enabling them to implement and optimize data science solutions using contemporary languages, design patterns, and debugging techniques. 3. Effective Communication through Data Visualization: • *Outcome:* Graduates will possess strong communication skills, effectively conveying complex technical insights through clear data visualizations, reports, and presentations, catering to both technical and non-technical stakeholders.

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	UL24FHK11 UL24FHH13	Kannada Siri-1 Katha Saritha	**02**
2	UL24FHE12	Insight-1	**02**
3	UC24DS1104	C Programming	**03**
4	UC24DS1105	C Programming Lab	**02**
5	UC24DS1106	Computer Fundamental	**03**
6	UC24DS1107	Computer Fundamental Lab	**02**
7	UC24DS1108	Mathematical Foundation	**03**
8	UM24BC1142	OEC-1	**03**
9	UC24HGT11	Technical Skills	00
10	UC24HGL12	Life Skills	00
11	UC24HGE13	Innovation and Entrepreneurial Skills	00
12	UC24HGV14	Environmental Awareness and Community Services	00
13	UC24HGA15	Athletics, Sports, Yoga, Gymnasium	01
14	UC24HGC16	Cultural & Literary Activities	00
15	UC24HGR17	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
16	UC24HGP18	Placement Training	00
		Total	**21**

Semester-2			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UL24FHK21 UL24FHH23	Kannada Siri-2 Katha Sourabha	**02**
2	UL24FHE22	Insight– 2	**02**
3	UC24DS1204	Programming Fundamental using C++	**03**
4	UC24DS1205	C++ Lab	**02**
5	UC24DS1206	Data Structures using C++	**03**
6	UC24DS1207	Data Structures Lab	**02**
7	UM24BC1241	OEC-2	**03**
8	UC24HGT21	Technical Skills	02
9	UC24HGL22	Life Skills	00
10	UC24HGE23	Innovation and Entrepreneurial Skills	00
11	UC24HGV24	Environmental Awareness and Community Services	01
12	UC24HGA25	Athletics, Sports, Yoga, Gymnasium	01
13	UC24HGC26	Cultural & Literary Activities	00
14	UC24HGR27	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
15	UC24HGP28	Placement Training	00
		Total	**21**

Semester-3			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS2301	Fundamentals of Data Science	**03**
2	UC24DS2302	Object Oriented Programming Using Java	**03**
3	UC24DS2303	Java Lab	**02**
4	UC24DS2304	Cloud Computing	**03**
5	UC24DS2305	Designing of Algorithm	**03**
6	UC24DS2306	Designing of Algorithm Lab	**02**
7	UM24BC2341	OEC-3	**03**
8	UC24HGT31	Technical Skills	02
9	UC24HGL32	Life Skills	00
10	UC24HGE33	Innovation and Entrepreneurial Skills	01
11	UC24HGV34	Environmental Awareness and Community Services	00
12	UC24HGA35	Athletics, Sports, Yoga, Gymnasium	00
13	UC24HGC36	Cultural & Literary Activities	00
14	UC24HGR37	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
15	UC24HGP38	Placement Training	00
		Total	**23**

Semester-4			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS2401	Database Management System	**03**
2	UC24DS2402	Database Management System Lab	**02**
3	UC24DS2403	Python Programming	**03**
4	UC24DS2404	Python Programming Lab	**02**
5	UC24DS2405	Cyber Ethics	**03**
6	UC24DS2406	Internet of Things	**03**
7	UC24HGT41	Technical Skills	02
8	UC24HGL42	Life Skills	02
9	UC24HGE43	Innovation and Entrepreneurial Skills	00
10	UC24HGV44	Environmental Awareness and Community Services	01
11	UC24HGA45	Athletics, Sports, Yoga, Gymnasium	00
12	UC24HGC46	Cultural & Literary Activities	01
13	UC24HGR47	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
14	UC24HGP48	Placement Training	01
		Total	**23**

Semester-5			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS3501	R Programming and Statistical Skills	**03**
2	UC24DS3502	R Programming Lab	**02**
3	UC24DS3503	Data Visualization	**03**
4	UC24DS3504	Data Visualization Lab using Power Bi and Tableau	**02**
5	UC24DS3505	Data Mining	**03**
6	UC24DS3506	Software Engineering	**03**
7	UC24HGT51	Technical Skills	02
8	UC24HGL52	Life Skills	01
9	UC24HGE53	Innovation and Entrepreneurial Skills	01
10	UC24HGV54	Environmental Awareness and Community Services	00
11	UC24HGA55	Athletics, Sports, Yoga, Gymnasium	01
12	UC24HGC56	Cultural & Literary Activities	00
13	UC24HGR57	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
14	UC24HGP58	Placement Training	01
		Total	**23**

Semester-6			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS3601	Big Data Analytics	**03**
2	UC24DS3602	Web Development using PHP-MySQL	**03**
3	UC24DS3603	Project Work	**06**
5	UC24HGT61	Technical Skills	02
4	UC24HGL62	Life Skills	01
6	UC24HGE63	Innovation and Entrepreneurial Skills	01
7	UC24HGV64	Environmental Awareness and Community Services	00
8	UC24HGA65	Athletics, Sports, Yoga, Gymnasium	01
9	UC24HGC66	Cultural & Literary Activities	00
10	UC24HGR67	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	01
11	UC24HGP68	Placement Training	01
		Total	**19**

Semester-7			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS4701	Research Methodology and IPR	**03**
2	UC24DS4702	Research Paper - 1	**03**
3	UC24DS4703	Internship	**08**
4	UC24HGT71	Technical Skills	00
5	UC24HGL72	Life Skills	00
6	UC24HGE73	Innovation and Entrepreneurial Skills	00
7	UC24HGV74	Environmental Awareness and Community Services	00
8	UC24HGA75	Athletics, Sports, Yoga, Gymnasium	00
9	UC24HGC76	Cultural & Literary Activities	00
10	UC24HGR77	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
11	UC24HGP78	Placement Training	00
		Total	**14**

Semester-8			
Sl. No.	**Course Code**	**Course Title**	**Credits**
1	UC24DS4801	Industrial Excursion	**03**
2	UC24DS4802	Research Paper - 2	**03**
3	UC24DS4803	Dissertation	**10**
4	UC24HGT81	Technical Skills	00
5	UC24HGL82	Life Skills	00
6	UC24HGE83	Innovation and Entrepreneurial Skills	00
7	UC24HGV84	Environmental Awareness and Community Services	00
8	UC24HGA85	Athletics, Sports, Yoga, Gymnasium	00
9	UC24HGC86	Cultural & Literary Activities	00
10	UC24HGR87	Co-Curricular Activities (Seminar/Conference/Exhibition/Technical Competition)	00
11	UC24HGP88	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	**Program Delivery and Program Attainment** 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.
20	**Teaching and Learning Methods** 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	**Attendance** 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.
22	**Assessment and Grading** 1. Every course will be assessed for a weight of 100 2. There are 4 components: 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. If marks scored is: • 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.** 4. End of each semester grade card will be issued with SGPA displayed
23	**Award of Degree**

	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**. **Award of Degree Certificate:** Students will be issued consolidated grade card with CGPA displayed and GM University Degree Certificate. **Award of Gold Medal:** 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.
24	**Student Support for Learning** 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	**Quality Control Measures** 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												