**MSc- Artificial Intelligence and Data Analytics**

**PROGRAM DETAILS**

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| **Faculty** | Computing and IT (FCIT) |
| **School** | School of Computer Applications (SCA) |
| **Program** | MSc- AI and Data Analytics |
| **Dean of Faculty** | Mrs. Shweta Marigoudar |
| **Director of School** | Ms. Shamina Attar |

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| 1 | **Title of the Award** | MSc-AI and Data Analytics |
| 2 | **Modes of Study** | Full Time |
| 3 | **Awarding Institution /Body** | GM University |
| 4 | **Joint Award** | Not Applicable |
| 5 | **Teaching Institution** | FCIT<br>GM University |
| 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- MSc AI and Data Analytics**<br>The Master of Science in Artificial Intelligence and Data Analytics is a cutting-edge program designed to empower students with advanced skills in two rapidly evolving fields—AI and data analytics. The curriculum integrates foundational principles of artificial intelligence, machine learning, and statistical analysis, providing a comprehensive understanding of the theoretical and practical aspects of these disciplines. Students will engage in rigorous coursework covering topics such as neural networks, natural language processing, and predictive modelling, equipping them with the expertise to solve complex problems across diverse industries.<br>The program places a strong emphasis on hands-on learning, enabling students to apply AI and data | |

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| | analytics techniques to real-world challenges through projects and case studies. In addition to technical proficiency, the curriculum addresses the ethical considerations surrounding AI and data analytics, emphasizing responsible practices and the societal impact of technology. Students will gainpractical experience in utilizing cutting-edge tools and technologies, including big data frameworks and cloud computing platforms.<br>Collaboration and interdisciplinary learning are fostered through group projects, allowing students to work together to address multifaceted problems. Faculty members, often experts in the field, guide students in navigating the dynamic landscape of AI and data analytics. The program also incorporates industry partnerships, providing opportunities for internships and exposure to the latest advancements in the field. Graduates of this program emerge with a versatile skill set, prepared to drive innovation and make data-driven decisions in the rapidly evolving landscape of AI and data analytics. |
| 15 | **Program Educational Objectives (PEOs) for MSc- AI and Data Analytics:**<br>**1. Advanced Technical Proficiency:**<br>Graduates of the Master of Science program in AI and Data Analytics will demonstrate advanced technical proficiency, including a deep understanding of artificial intelligence algorithms, machine learning models, and data analytics techniques. They will be capable of developing innovative solutions to complex problems in diverse domains.<br>**2. Effective Application of AI and Data Analytics:**<br>The program aims to equip graduates with the ability to apply AI and data analytics methodologies effectively to real-world scenarios. This includes the application of advanced techniques in areas such as natural language processing, computer vision, and predictive modelling, enabling graduates to contribute meaningfully to industry challenges.<br>**3. Ethical and Responsible AI Practices:**<br>Graduates will exhibit a commitment to ethical and responsible AI practices. This involves understanding and addressing the ethical implications of AI and data analytics, ensuring privacy, transparency, and fairness in their applications. Graduates will be prepared to navigate the societal impact of AI technologies responsibly. |
| 16 | **Program Outcomes for MSc-AI and Data Analytics:**<br>**1. Algorithmic Expertise:**<br>Graduates will demonstrate a high level of proficiency in designing, implementing, and optimizing algorithms related to artificial intelligence and data analytics, showing competence in developing novel solutions for complex problems.<br>**2. Machine Learning Mastery:**<br>Graduates will exhibit expertise in machine learning, showcasing the ability to select and apply appropriate algorithms for supervised and unsupervised learning, reinforcement learning, and deep learning across various domains. |

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| | 3. **Data-Driven Decision-Making:**<br>Graduates will be capable of leveraging data analytics to make informed decisions, demonstrating proficiency in data preprocessing, exploratory data analysis, and the development of predictive models to extract actionable insights.<br>4. **Advanced Statistical Analysis:**<br>Graduates will have a strong foundation in statistical methods, enabling them to conduct rigorous statistical analyses and interpret results accurately in the context of AI and data analytics applications.<br>5. **Interdisciplinary Collaboration:**<br>Graduates will be adept at collaborating with professionals from diverse disciplines, effectively communicating complex technical concepts to non-experts and contributing to multidisciplinary teams working on AI and data analytics projects.<br>6. **Ethical AI Practices:**<br>Graduates will demonstrate a commitment to ethical considerations in AI and data analytics, understanding the societal impact of their work and implementing responsible practices to ensure fairness, transparency, and privacy.<br>7. **Big Data Technologies Proficiency:**<br>Graduates will showcase proficiency in utilizing big data technologies, including distributed computing frameworks and cloud platforms, to process and analyse large-scale datasets efficiently.<br>8. **Innovation and Research Contribution:**<br>Graduates will be prepared to contribute to the advancement of AI and data analytics through innovative research and development, demonstrating the ability to stay abreast of emerging technologies and make meaningful contributions to the field. |
| 17 | **Program Specific Outcomes (PSOs) for MSc-AI and Data Analytics:**<br>1. **Developing Advanced AI Models:**<br>The program aims to enable students to design and develop advanced artificial intelligence models, including deep learning architectures, reinforcement learning algorithms, and ensemble methods, equipping them with the skills to address complex challenges in AI applications.<br>2. **Integration of AI and Domain Expertise:**<br>Students will work towards a program-specific objective of integrating AI methodologies with domain-specific knowledge. This involves understanding the unique requirements of diverse industries and applying AI and data analytics techniques in a way that aligns with the specific needs and nuances of those sectors. |

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| | **3. Real-time Analytics Implementation:**<br>The program focuses on preparing students to implement AI and data analytics solutions in real-time scenarios. This includes hands-on experience with streaming data, dynamic datasets,and the deployment of models in production environments, ensuring graduates are proficient in creating practical, scalable, and efficient. |

## 18. Credit Requirements

- To complete a postgraduate program- M. Sc., a student is required to earn 80 credits
- Those students who successfully complete only course work (40 Credits) Postgraduate Diploma is awarded
- The credit distribution for M.Sc. Program:

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| Course Work – 14 X 3 Credits = | 42 Credits |
| Course Work Lab – 5 X 2 Credits = | 10 Credits |
| Research Work – 2 X 6 Credits = | 12 Credits |
| Project Work = | 08 Credits |
| Internship = | 08 Credits |
| **Total** | **80 Credits** |

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**19. Programme Structure**

| S. No. | Semester | Course Code | Course Title | Credits |
|---|---|---|---|---|
| 1 | 1 | PC24AI5101 | Mathematical Foundation for Computer Science | 3 |
| 2 | | PC24AI5102 | Computer Network | 3 |
| 3 | | PC24AI5103 | Artificial Intelligence and Neural Networks | 3 |
| 4 | | PC24AI5104 | AI Programming with Python | 3 |
| 5 | | PC24AI5105 | AI Programming with Python Lab | 2 |
| 6 | | PC24AI5106 | Database with NOSQL | 3 |
| 7 | | PC24AI5107 | Database with NOSQL Lab | 2 |
| **Total** | | | | **19** |
| Break | | | | |
| **S. No.** | **Semester** | **Course Code** | **Course Title** | **Credits** |
| 1 | 2 | PC24AI5201 | Research Methodology and IPR | 3 |
| 2 | | PC24AI5202 | Machine Learning Algorithms | 3 |
| 3 | | PC24AI5203/ PC24AI5204/ PC24AI5205 | **Elective - I** | 3 |
| 4 | | PC24AI5206 | R Programming and Statical Modelling | 3 |
| 5 | | PC24AI5207 | R Programming and Statical Modelling Lab | 2 |
| 6 | | PC24AI5208 | Advanced Algorithms and Analysis | 3 |
| 7 | | PC24AI5209 | Advanced Algorithms and Analysis Lab | 2 |
| **Total** | | | | **19** |
| Break | | | | |

| S. No. | Semester | Course Code | Course Title | Credits |
|---|---|---|---|---|
| 1 | 3 | PC24AI6301 | Data Analytics Tools | 3 |
| 2 | | PC24AI6302/ PC24AI6303/ PC24AI6304 | **Elective - II** | 3 |
| 3 | | PC24AI6305 | Digital Image Processing | 3 |
| 4 | | PC24AI6306 | Digital Image Processing using MATLAB | 2 |
| 5 | | PC24AI6307 | Artificial Intelligence in Cloud Computing | 3 |
| 6 | | PC24AI6308 | Internship | 8 |
| **Total** | | | | **22** |
| Break | | | | |
| **S. No.** | **Semester** | **Course Code** | **Course Title** | **Credits** |
| 1 | 4 | PC24AI6401 | Research Paper Review | 6 |
| 2 | | PC24AI6402 | Dissertation | 8 |
| 3 | | PC24AI6403 | Research Paper Publication | 6 |
| **Total** | | | | **20** |

List of **Elective – I** Offered:

1. Business Intelligence
2. Cloud Computing
3. Data Security and Privacy

**Elective – II** Offered:

1. Artificial Intelligence Ethics
2. Big Data
3. Data Visualization

**Suggested Courses**

1. **Foundations of Artificial Intelligence:** Covering the fundamental concepts of AI, this course provides an overview of machine learning algorithms, natural language processing, and computer vision, establishing the groundwork for more advanced topics.

2. **Machine Learning and Deep Learning:** This course delves into supervised and unsupervised learning techniques, neural networks, and deep learning architectures, providing in-depthknowledge

of the algorithms essential for building intelligent systems.

3. **Data Mining and Knowledge Discovery:** Focused on techniques for extracting patterns and knowledge from large datasets, this course explores data pre processing, feature selection, and various data mining algorithms.

4. **Big Data Technologies:** Providing an understanding of big data technologies such as Apache Hadoop and Spark, this course prepares students to handle and analyze massive datasets efficiently, a crucial skill in AI and data analytics.

5. **Natural Language Processing (NLP):** This course explores methods for understanding and processing human language, covering topics like sentiment analysis, text summarization, and language translation using NLP techniques.

6. **Computer Vision:** A specialized course focusing on image and video analysis, object recognition, and visual pattern recognition, essential for applications such as facial recognition and autonomous vehicles.

7. **Predictive Analytics and Time Series Analysis:** This course addresses predictive modelling and time series analysis, providing skills to forecast trends, understand temporal patterns, and make informed decisions based on historical data.

8. **Ethics in AI and Data Analytics:** This course examines the ethical considerations surrounding AI and data analytics, addressing issues related to bias, privacy, and responsible AI practices.

9. **Cloud Computing for AI:** Covering the integration of AI and cloud computing, this course explores the deployment of AI models on cloud platforms, enabling scalable and accessible solutions.

10. **Capstone Project in AI and Data Analytics:** A culminating project where students independently apply their knowledge to solve a significant problem, integrating skills acquired throughout the program and showcasing their readiness for real-world applications.

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| 20 | **Teaching and Learning Methods**<br>1. Face to Face Lectures using Audio-Visuals<br>2. Laboratory work/Fieldwork/Workshop<br>3. Project Based Learning<br>4. Problem Based Learning<br>5. Group Exercises/Assignments<br>6. Demonstrations<br>7. Guest Lectures<br>8. Industry Visit<br>9. Workshops, Group Discussions, Debates, Presentations<br>10. Project Work<br>11. Project Exhibitions<br>12. Technical Competitions |

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| 21 | **Attendance**<br>A minimum of 85% attendance is essential for each module. |
| 22 | **Assessment and Grading**<br>1. Every course will be assessed for a weight of 100<br>2. Assignments- 50% weight<br>3. End of Module Examination-50% weight<br>2. If marks scored is:<br>• 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)<br>• If one scores D grade, the candidate is required to re-register for the module and earn the required credits<br>• **A minimum of overall 40% is required for completion of a Module by acquiring minimum grade (pass) with a minimum of 40% in each component.**<br>**4.** End of each module –grade card will be issued |
| 23 | **Award of Degree**<br>Every student registering for the program need to complete a **minimum of 80 credits, for the award of MSc. Degree**<br>**Award of Degree Certificate:**<br>Students will be issued consolidated grade card with CGPA displayed and GM University Degree Certificate.<br>**Award of Gold Medal:**<br>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 8 semester and completing the program within the specified period of 2 years (4 semesters) will be awarded Gold Medal. |
| 24 | **Student Support for Learning**<br>1. Course Notes<br>2. Reference Books in the Library<br>3. Magazines and Journals<br>4. Internet Facility<br>5. Computing Facility<br>6. Laboratory Facility<br>7. Workshop Facility<br>8. Staff Support<br>9. Lounges for Discussions<br>10. Any other support that enhances their learning |
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| 25 | **Quality Control Measures**<br>1. Review of Course Notes<br>2. Review of Question Papers and Assignment Questions<br>3. Student Feedback<br>4. Moderation of Assessed Work<br>5. Opportunities for students to see their assessed work<br>6. Review by external examiners and external examiners reports<br>7. Staff Student Consultative Committee meetings<br>8. Student exit feedback<br>9. Course Assessment Board (CAB)<br>10. Programme Assessment Board (PAB) |