SHARDA UNIVERSITY
Beyond Boundaries

## Procedure for Introduction of a New Certificate/Diploma/Degree/Doctorate Programme

Various Schools/Departments from Sharda University, Greater Noida Campus are invited to submit proposals for new Certificate/Diploma/Degree/Doctorate programmes that can be initiated under the support of Office of Dean Academic Affairs. Normally a proposal may be mooted by Dean/HoD and it will be submitted in hard copy through the concerned Dean with his/her comments **on or before 10 months from the starting of a new academic session.**

**Format for submission of a Proposal**

| S.No. | Particular | Response |
|---|---|---|
| 1. | **Name(s) of Proposer(s) together with details of associated Department/Centre/ School:** | Dr. Nirupma Gupta<br>Dean<br>Sharda School of Medical Sciences & Research |
| 2. | **Nature of Programme:** specify if the proposal is for a Degree (UG/PG) or Dual degree programme or Doctorate Programme or Diploma (UG/PG) or Certificate Programme: | PG |
| 3. | **Name of the proposed Programme:** | Master of Science in Genomic Medicine |
| 4. | **Proposed number of seats:** | 5 |
| 5. | **Proposed Duration of the Programme:** | 2 Years |
| 6. | **Is the proposed Programme Council based or Non-Council based (UGC Norms) or both:** | Non-Council |
| 7. | **Does the Proposed Programme require any prior approval from the respective Council (Specify Yes/No if Yes, please give the details of Council):** | No |
| 8. | **In which School it is proposed to be introduced:** | Sharda School of Medical Sciences & Research, Greater Noida |
| 9. | **Relevance and Need Assessment:** Provide a statement (300 approx. words) on the need for the proposed programme and how would it be useful for students in respect of their academic pursuit and employability. Also bring out the possibility of international academic collaborations with reputed foreign universities, encompassing student, faculty exchange, dual degree or joint degree and credit transfer between universities. | The proposed M.Sc. Genomic Medicine program addresses the growing demand for expertise in genomics-driven healthcare and biomedical research. Advances in sequencing technologies and the increasing application of precision medicine have transformed diagnosis, prevention, and treatment of diseases such as cancer, rare genetic disorders, and complex multifactorial conditions. National initiatives |

Dr Amit to records with a copy to respective department

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like the Genome India Project and global efforts such as the Human Genome Project have further emphasized the importance of genomics in improving healthcare outcomes. Consequently, there is a critical need to develop a skilled workforce capable of integrating genomic data into clinical and research settings.

From an academic perspective, the program offers a comprehensive and interdisciplinary curriculum that integrates molecular biology, human genetics, bioinformatics, biostatistics, and clinical applications. Students gain hands-on training in next-generation sequencing (NGS), computational genomics, and data interpretation, along with exposure to ethical, legal, and social implications of genomic research. This strong academic foundation prepares graduates for advanced research, doctoral studies, and innovation-driven careers in life sciences and healthcare.

In terms of employability, these professionals will be well-positioned for roles in hospitals, diagnostic laboratories, biotechnology and pharmaceutical companies, contract research organizations, and public health sectors. Career opportunities include genomic analyst, molecular diagnostician, clinical research associate, and genetic counselor. The program's focus on practical training, internships, and industry collaboration enhances students' technical competencies and readiness for the evolving job market.

The program also offers significant potential for international academic collaborations with reputed foreign universities and research institutions. These may include student and faculty exchange programs, joint research projects, co-supervision of dissertations, and participation in global genomics initiatives. Opportunities for dual or joint degree programs and credit transfer mechanisms aligned with international standards will further enhance

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| | | academic flexibility and global mobility. Such collaborations will ensure that students gain exposure to global best practices and emerging trends, thereby strengthening their academic profile and employability worldwide. |
| 10. | **Names of faculty members who would be responsible for the proposed new Programme:** (For a new degree/diploma programme generally at least five faculty members should be identified and their formal consent be obtained) | Prof. Dr. Suman Bala Sharma<br>HOD<br>Department of Biochemistry |
| 11. | **How would the new programme enhance academic excellence at Sharda University:** (state in ~300 words): | Master of Science in Genomic Medicine - Department of Biochemistry |
| 12. | **How is the proposed programme distinct from the existing academic programmes:** (200 words) | |
| 13. | **Budget requirements (Separate annexure must be enclosed for each points):** | Nil |
| i. | **Staff:** (The program should start with existing academic and support staff. Any future requirements may be listed, giving timeline and justification. (Vetting by HR): | Nil |
| ii. | **Fee structure:** (the new programme should be largely self-supporting, without compromising its academic quality; provision for fellowships for meritorious/economically weaker sections should be captured in the proposal. The proposal should also include proposed fee structure for five years, and the expected target group of the prospective students duly considered by the Admission Committee and Finance department. | Nil |
| iii. | **Essential non-recurring and recurring costs required:** (List such requirements together with justification and timeline. | Nil |
| iv. | **Honorarium for Guest Faculty:** (Specify if | Nil |

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| | guest faculty (from within Sharda University or outside) would be essential for the programme and if any honorarium would be payable. Provide a tentative estimate and expenditure on this account from respective School Dean) | |
| 14. | **Space:** The program should be initiated in the existing space available within the school/department/centre. If no, Additional building space may be requested from estate department. **In case of future requirement, demand on Estate Department may be realistically projected** | Existing space available |

**Name & Signature of the HoD/Dean:**

School of Medical Sciences & Research
Dean
Sharda University, Greater Noida

**Date:**

**Dean (Academic Affairs)**

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Sharda University, Greater Noida
(U.P.) 201310

**Vice-Chancellor**

Vice Chancellor
Sharda University
Plot No. 32,34 Knowledge Park III
Greater Noida - 201310 (U.P.)

# Programme Structure

## Sharda School of Medical Sciences & Research

*(Formerly School of Medical Sciences & Research)*

## M.Sc Genomic Medicine

**Programme Code:**

**Batch:**

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## 1.2 Vision and Mission of Sharda School of Medical Sciences & Reserch

### Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence inacademics, research and clinical care

### Mission of the School

- Provide a transformative educational experience in Medical Science
- Develop skills and competencies to create global leaders in clinical care
- Promote innovative and collaborative research through intellectual and technological advancement
- Establish a center for excellence in preventive, promotive and curat

### Core Values

- ***Integrity***
- ***Leadership***
- ***Diversity***
- ***Community***

### 1.3.3 Programme Outcomes

**PO1:** Explain principles of human genetics, molecular biology, and genome organization.

**PO2:** Demonstrate proficiency in molecular and genomic laboratory techniques.

**PO3:** Apply bioinformatics tools for genomic data analysis and interpretation.

**PO4:** Interpret genomic variants and correlate findings with clinical conditions.

**PO5:** Evaluate the role of genomics in precision medicine, pharmacogenomics, oncology, and rare diseases.

**PO6:** Design and conduct research projects in genomic medicine.

**PO7:** Communicate scientific findings effectively.

**PO8:** Recognize ethical, legal and social implications in genomic medicine.

### Programme Specific Outcomes

**PSO1:** Perform genomic diagnostic techniques including PCR, sequencing, and molecular assays.

**PSO2:** Analyse and interpret genomic data using bioinformatics tools and databases.

**PSO3:** Apply genomic knowledge in clinical decision-making and disease diagnosis.

**PSO4:** Demonstrate competency in genetic counselling and patient communication.

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### 1.3.5 Programme Outcome Vs Courses Mapping Table:
### 1.3.5.1 Course Articulation Matrix

| Programme Outcome SEMESTER 1 → | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PSO2 | PSO3 | PSO4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code | Course Name | | | | | | | | | | | |
| GM101 | Molecular Biology & Genetics | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| GM102 | Human Genomics I | 3 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| GM103 | Basic Molecular Techniques | 1 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 1 |
| Programme Outcome → SEMESTER 2 | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PSO2 | PSO3 | PSO4 |
| Course Code | Course Name | | | | | | | | | | | |
| GM201 | Advanced Molecular Biology | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 |
| GM202 | Human Genomics II | 3 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 |
| GM203 | Molecular Techniques | 1 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 1 |

| Programme Outcome → SEMESTER 3 | | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PSO 1 | PSO 2 | PSO 3 | PSO 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Course Code | Course Name | | | | | | | | | | | | |
| GM301 | Genomic Technologies | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| GM302 | Bioinformatics | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 3 | 1 | 1 |
| GM303 | Genomic Lab | 1 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 3 | 2 | 1 | 1 |
| Programme Outcome → SEMESTER 4 | | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PSO 1 | PSO 2 | PSO 3 | PSO 4 |

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| 2. | Practical | Core |
| 3. | | Core |
| 4. | | **AECC** |
| 5. | | **GE** |

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|---|---|---|
| **School** | | **Sharda School of Medical Sciences & Research** |
| **Department** | | **Biochemistry** |
| **Programme Code** | | |
| **Programme Name** | | MSc Genomic Medicine |
| **Specialisation/ Minor** | | |
| **Batch:** | | **Semester: I** |
| 1 | Course Code | GM101, GM102, GM103 |
| 2 | Course Name | GM101: Molecular Biology and Genetics (CORE)<br>GM102: Human Genomics (CORE)<br>GM103: Molecular Techniques (Practical) |
| 3 | Credits | |
| 4 | Contact Hours (L-T-P) | 1-2-2 |
| | Course Type | Core |
| 5 | Course Objective | • To understand fundamental and advanced concepts of molecular biology and genetics<br>• To study structure, organization, and variation of the human genome<br>• To understand gene expression, regulation, and epigenetic mechanisms<br>• To develop proficiency in molecular and genomic laboratory techniques<br>• To correlate genetic mechanisms with disease conditions |
| 6 | Course Outcomes | CO1: Explain structure, function, and regulation of genetic material<br>CO2: Describe mechanisms of replication, transcription, translation, and gene regulation<br>CO3: Understand genome organization, variation, mutations, and genetic disorders<br>CO4: Perform molecular and genomic laboratory techniques<br>CO5: Interpret genomic data in relation to disease conditions<br>CO6: Apply molecular biology and genomics knowledge in clinical and research settings |
| 7 | Course Description | This integrated module combines foundational and advanced concepts of molecular biology and genomics. It covers DNA structure, gene expression, epigenetics, genome organization, mutation mechanisms, and genetic disorders, along with practical exposure to molecular and genomic laboratory techniques. |

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|---|---|---|---|---|---|
| | Mode of Examination | **Formative Examination**<br>Theory / Practical / Viva | | | |
| | Weightage Distribution | CA | MTE | ETE | |
| | | 30% | - | 70% | |
| | Text Book/s* | 1. Molecular Biology of the Cell<br>2. Lewin's Genes XII<br>3. Thompson & Thompson Genetics in Medicine | | | |
| | Other References | 1. Genomes<br>2. Principles of Gene Manipulation and Genomics | | | |

| **Batch:** | | **Semester: II** |
|---|---|---|
| 1 | Course Code | GM201, GM202, GM203 |
| 2 | Course Name | GM201: Genomic Technologies (CORE)<br>GM202: Bioinformatics (CORE)<br>GM203: Genomic Lab (Practical) |
| 3 | Credits | |
| 4 | Contact Hours (L-T-P) | 1-2-2 |
| | Course Type | Core |
| 5 | Course Objective | • To understand principles of genomic technologies including sequencing and genome editing<br>• To develop bioinformatics skills for genomic data analysis and interpretation<br>• To understand genetic basis of diseases and clinical genomics applications<br>• To study immunogenetics and neurogenetics in disease context<br>• To develop practical skills in genomic and clinical laboratory techniques |

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| | B | Diagnostic techniques in clinical genomics | | | |
| | C | Clinical case studies and genomic interpretation | | | |
| | **Unit 5** | | | | |
| | A | Immunogenetics and autoimmune diseases | | | |
| | B | Neurogenetics and neurological disorders | | | |
| | C | HLA system and applications in disease and transplantation | | | |
| | Mode of Examination | **Formative Examination**<br>Theory / Practical / Viva | | | |
| | Weightage Distribution | CA | MTE | ETE | |
| | | 30% | - | 70% | |
| | Text Book/s* | 1. Genomes<br>2. Bioinformatics: Sequence and Genome Analysis<br>3. Principles of Gene Manipulation and Genomics | | | |
| | Other References | • Introduction to Bioinformatics<br>• Next Generation Sequencing Data Analysis | | | |

| **Batch:** | | **Semester: III** |
|---|---|---|
| 1 | Course Code | GM301, GM302, GM303 |
| 2 | Course Name | GM301: Pharmacogenomics (CORE)<br>GM302: Genetic Counselling & Cancer Genomics (CORE)<br>GM303: Clinical Interpretation (Practical) |
| 3 | Credits | |
| 4 | Contact Hours (L-T-P) | 1-2-2 |
| | Course Type | Core |

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|---|---|---|---|---|---|
| | A | Cancer genomics | | | |
| | B | Genomic instability and mutations | | | |
| | C | Tumour genetics and pathways | | | |
| | **Unit 5** | | | | |
| | A | Clinical interpretation of genomic data | | | |
| | B | Risk assessment and case studies | | | |
| | C | Patient communication and reporting | | | |
| | Mode of Examination | **Formative Examination**<br>Theory / Practical / Viva | | | |
| | Weightage Distribution | CA | MTE | ETE | |
| | | 30% | - | 70% | |
| | Text Book/s* | 1. Thompson & Thompson Genetics in Medicine<br>2. Pharmacogenomics: Challenges and Opportunities<br>3. The Biology of Cancer | | | |
| | Other References | 1. Genetic Counseling Practice<br>2. Cancer Genomics: From Bench to Personalized Medicine | | | |

| **Batch:** | | **Semester: IV** |
|---|---|---|
| 1 | Course Code | GM401 |
| 2 | Course Name | GM401: Dissertation (CORE) |
| 3 | Credits | |
| 4 | Contact Hours (L-T-P) | 1-2-4 |

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| | **Unit 4** | | | | |
| | A | Scientific writing and thesis preparation | | | |
| | B | Referencing and plagiarism ethics | | | |
| | C | Preparation of dissertation | | | |
| | **Unit 5** | | | | |
| | A | Presentation skills | | | |
| | B | Thesis submission and evaluation | | | |
| | C | Viva voce and defense | | | |
| | Mode of Examination | **Summative Examination**<br>Theory / Practical / Viva | | | |
| | Weightage Distribution | CA | MTE | ETE | |
| | | - | - | 100% | |
| | Text Book/s* | 1. Research Methodology: Methods and Techniques<br>2. Practical Research: Planning and Design<br>3. Biostatistics: A Foundation for Analysis in the Health Sciences | | | |
| | Other References | 1. Scientific Writing and Communication<br>2. Bioinformatics for Beginners | | | |

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