# NIPER GUWAHATI

# Information Brochure

## 1 Year Post Graduate(PG) Diploma in Medical Devices

NIPER GUWAHATI

**National Institute of Pharmaceutical Education and Research Guwahati**

Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Govt. of India

Website: www.niperguwahati.ac.in

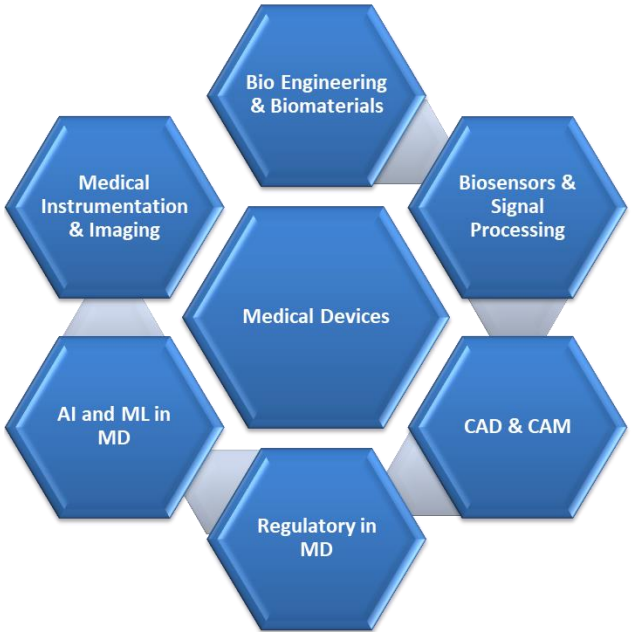
# PG Diploma in Medical Devices

## Program Objectives:

- Develop expertise in medical device design, testing, and quality assurance.
- Foster innovation and research in advanced medical technologies.
- Create a skilled workforce capable of meeting industry standards and regulatory requirements.
- Provide practical exposure to the latest tools and technologies in medical devices.

## Salient Feature

- The designed course will provide an understanding and knowledge about diagnostics, therapeutics, and surgical instruments
- Laboratory classes are designed to understand the application of advanced technology like Biosensors, additive manufacturing, Artificial intelligence, etc. with basic live demos.




**Interdisciplinary Course design**

- Lab on pre-clinical studies will provide hands-on experiments related to anatomical, functional, and molecular imaging in animal models.
- Lab on Basic Electronics will provide hands-on experiments and demonstrations about electronic circuits, their role in building a Medical Device and ignite the minds for prototyping.
- Lab on Mechanical testing will provide the application of Physics in manufacture, testing of Class-B, Class-A medical devices such as Sutures, Syringes, Catheters, Hypodermic needles etc.
- Apart from this, courses on IPR and regulatory requirements related to medical devices are included as per MDR-2017.

## Course Overview

| | Particulars | Description |
|---|---|---|
| 1. | **Course Title** | PG Diploma in Medical Devices |
| 2. | **Duration** | 1 year |
| 3. | **Department** | Department of Medical Devices |
| 4. | **Course Description** | The PG Diploma in Medical Devices is designed to equip students with the advanced knowledge and technical skills required to develop, test, and implement medical devices. The curriculum emphasizes medical imaging, biomaterials, biostatistics, biosensors, signal processing, regulatory aspects, and artificial intelligence in medical devices. It also includes hands-on laboratory work in pre-clinical studies and medical device calibration and testing. |
| 5. | **NHEQF Credits** | 40 Credits |
| 6. | **Course Outcomes** | Upon successful completion of the PG Diploma in Medical Devices, students will be able to:<br>• Apply advanced concepts in medical imaging, instrumentation, and biomaterials in device design and development.<br>• Conduct and interpret biostatistical analysis for medical research and product development.<br>• Design and implement biosensors for clinical and diagnostic applications.<br>• Understand and apply regulatory requirements in the development of medical devices.<br>• Utilize artificial intelligence and signal processing in the design and enhancement of medical devices.<br>• Develop and test medical devices in compliance with international standards for biocompatibility and safety. |
| 7. | **Eligibility Criteria (General Eligibility of entry level students)** | B.Pharm./ M.B.B.S / BDS / B.V.Sc / B.E or B.Tech (Biotechnology / Biomedical / Biophysics / Electronics / Instrumentation / Mechanical / Biochemical / Health Sciences or allied subjects) / 4-year BS course (Chemistry/ Mathematics & |

| | | |
|---|---|---|
| | | computing/Physics/Programming/Data Science) / Post Graduation in Chemical Sciences / Life Sciences / Material Sciences / Physical Sciences / Biotechnology / Biomedical / Biophysics / Electronics / Instrumentation / Biochemical / Health Sciences / Medical science & Technology or allied subjects as applicable in GATE/ NET. |
| **8.** | **Specialized Subjects** | • Medical Imaging & Processing<br>• Medical Instrumentation (Diagnostic, Therapeutic & Surgical)<br>• Biosensors<br>• Biomaterials<br>• Artificial Intelligence in Medical Devices<br>• Bioengineering and Regenerative Devices<br>• Regulatory Affairs in Medical Devices |
| **9.** | **Detailed Course structure** | Divided into semesters (Semester 1 and Semester 2)<br>**Semester I:**<br>• Medical Imaging & Processing (2 Credits)<br>• Medical Instrumentation (2 Credits)<br>• Drug Delivery Engineering (2 Credits)<br>• Computer Applications (CAD/CAM) (2 Credits)<br>• Biostatistics (2 Credits)<br>• Seminar (2 Credits)<br>• Fundamentals of Intellectual Property & Technology Management (2 Credits)<br>• Medical Instrumentation Laboratory (3 Credits)<br>• Bio and Pharmaco-engineering Laboratory (3 Credits)<br>**Semester II:**<br>• Bioengineering and Regenerative Devices (2 Credits)<br>• Biosensors (2 Credits)<br>• Biomaterials (2 Credits)<br>• Biomedical Signal Processing (2 Credits)<br>• Artificial Intelligence in Medical Devices (2 Credits)<br>• Regulatory Affairs in Medical Devices (2 Credits)<br>• Pre-clinical Studies Laboratory (3 Credits)<br>• Medical Devices Testing Laboratory (3 Credits)<br>• Project (3 credits) |

| | | |
|---|---|---|
| **10.** | **Course Content** | Detailed course content includes theoretical modules complemented by practical lab sessions, ensuring a balanced learning approach. Core subjects focus on engineering principles, biosensing, AI applications, and the regulatory landscape in medical devices. |
| **11.** | **Teaching Methodology** | • Lectures and discussions for theoretical foundations.<br>• Case studies, Acdemia, and industry guest lectures.<br>• Laboratory-based hands-on experiments for practical learning.<br>• Research-based assignments and seminars to encourage critical thinking. |
| **12.** | **Assessment Criteria** | • Internal assessment (assignments, quizzes, and presentations): 20%<br>• Mid-semester exam: 20%<br>• Final semester exam: 60% |
| **13.** | **No. of Faculty** | Faculty members including subject matter experts from different departments of NIPER Guwahati and other national institutes like IITs, AIIMS, etc. Further industry professionals deliver guest lectures for the relevant courses. |
| **14.** | **Collaboration** | • IIT Guwahati<br>• AIIMS Guwahati<br>• CSIR-National Physical Laboratory (NPL), New Delhi<br>• CIPET-CSTS, Guwahati<br>• Indian Institute of Science, Bangalore<br>• AGH University, Poland<br>• AMTZ Vizag |
| **15.** | **Facilities** | • Medical devices testing and calibration facility (MDTF, an NABL Accredited Lab).<br>• Biosensor and Devices Lab<br>• Biodesign facility<br>• Additive Manufactruing Facilities<br>• PARAM Embryo Supercomputing Facility<br>• Apart from the above, we have centralized facilities like a Central Animal house facility, In-vitro cell facility, Central Instrumentation facility, etc |

| | | |
|---|---|---|
| **16.** | **Fee Structure** | For GEN/OBC<br>• 1st Semester: Rs. 32,319/-<br>• 2nd Semester: Rs. 20,823<br>• **Total for 1 year: Rs. 53,142/-**<br>For SC/ST<br>• 1st Semester: Rs. 25,319/-<br>• 2nd Semester: Rs. 17,823/-<br>• **Total for 1 year: Rs. 43,142/-** |

*Postgraduate Diploma in Medical Device Design as per the National Education Policy (NEP) 2020.

**Placement:**

Since the Inception of the Department (2020), M.Tech and Ph.D. in Medical Devices course has been running effectively and productively. Till date, 04 batches have come out successfully from the institute. **For consecutively past 02 years, 90 percent Medical Devices students got placement in both International and National repute industries like Stryker, Biotekortho, Innvolution, Maven Profcon, Zenith Quality Assessors, etc. The rest have opted for higher studies.**