



# SCHOOL OF BIOMOLECULAR ENGINEERING AND BIOTECHNOLOGY

(An Autonomous University Teaching Department)

**RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA**

(University of Technology of Government of Madhya Pradesh)

[Accredited with Grade 'A' by NAAC]

Airport Road, Bhopal-462033

## Admission Announcement, 2023-24

To offer high quality affordable technical education for devising skilled scholars and professionals accomplished to resolve challenges.

	<b>M.Tech Biomolecular Engineering and Biotechnology</b>	<b>Post Graduate Certificate Programme in Advance Bio-informatics and Computational Biology</b>
<b>Eligibility Criteria</b>	All Streams of Engineering such as BE/B.Tech or equivalent examination approved by AICTE in Biotechnology, Food Technology, Biomedical Engineering, Chemical Engineering, Bio-Informatics, Nanotechnology, Information Technology, Computer Science, B.Pharm & M.Sc. in Biotechnology, Biochemistry, Microbiology, Bio-informatics, Veterinary Sciences, Agricultural Sciences, Life Sciences with at least 55% marks in the aggregate. The reservation will be applicable for SC/ ST/OBC candidates of Madhya Pradesh as per Government of M. P. rules.	Bachelor of Science (B.Sc./B.Tech)/Master of Science (M.Sc./M.Tech) with 55% marks in the aggregate in any branch of life Sciences or B.Pharm/BE/B.Tech Biotechnology, Food Technology, Biomedical Engineering, CS, IT, Bioinformatics or equivalent examination approved by AICTE / UGC. The reservation will be applicable for SC/ST/OBC candidates of Madhya Pradesh as per Government of M. P. Rules.
<b>Intake</b>	18 (As per the AICTE, New Delhi norms)	10
<b>Mode of Selection</b>	On the basis of the GATE score and merit of the eligible degree for the Non-GATE students. The reservation policy as stipulated by Government of Madhya Pradesh.	Eligible students will be selected based on the basis of merit of their eligible degree and the reservation policy as stipulated by Government of Madhya Pradesh.
<b>Duration of the Course</b>	2 years, IV semesters	1 year, II semesters
<b>Start of Admission</b>	1st July 2023	5th July 2023
<b>End of Admission</b>	15th September 2023 till 05:00 PM	20th September 2023 till 05:00 PM
<b>Admission/Counseling Website</b>	<a href="http://dte.mponline.gov.in">http://dte.mponline.gov.in</a>	<a href="http://www.rgpv.ac.in">http://www.rgpv.ac.in</a>

### Glimps of Departmental Labs With Equipments



**Environmental Biotechnology Lab**



**Microbiology Lab**



**DNA/RNA Sequencing Lab**



**Nucleic Acid Detection Lab**



**Microarray Lab**



**Central Lab**



**Bioinformatics Lab**



**Genomics & Genetic Engineering Lab**



**Human Cell Culture Lab**



**Gas Chromatography Lab**



**Plant Tissue Culture Lab**



**FACS Lab**

Web: <https://www.rgpv.ac.in> Email: [sobtrgpv@gmail.com](mailto:sobtrgpv@gmail.com); [archanargpv@gmail.com](mailto:archanargpv@gmail.com); [archana@rgpv.ac.in](mailto:archana@rgpv.ac.in)

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## Courses Offered

### M.Tech Biomolecular Engineering and Biotechnology

**Duration :** Two Years (Four Semesters)

**Intake :** 18 Students per year (As per the AICTE, New Delhi Norms)

**Mode of Selection :** On the basis of GATE score and merit for the Non-GATE students

### Post Graduate Certificate Programme in Advance Bio-informatics and Computational Biology

**Duration :** One Year (Two Semesters)

**Intake :** 10 Students per year (As per the RGPV, Bhopal Norms)

**Mode of Selection :** Eligible students will be selected based on the basis of merit of their eligible degree and the reservation policy as stipulated by Government of Madhya Pradesh

### Doctoral Programme (Ph.D)

**Duration :** Four Years

**Intake :** 08 per Supervisor (As per the RGPV, Bhopal Norms)

**Mode of Selection :** On the basis of the institutional Ph.D. entrance examination followed by interview

### Post Doctoral Programme (Post Doc)

**Duration :** Minimum for a period of two years

**Eligibility :** As per the terms and conditions of the sponsoring Agency.

## Patents

### Patents Awarded

- ◆ Novel clot specific Stretokinase proteins possessing altered plasminogen activation characteristics and a process for the preparation of said proteins. European patent no. 1024192 dated 7-12-04
- ◆ Polynucleotide encoding proteins with clot specific streptokinase activity. US patent no. US2018/0171362 A1 dated 17-07-08.
- ◆ A process for the preparation of clot specific streptokinases possessing useful plasminogen activation characteristics. Indian patent no.-190822.

### Submitted

- ◆ Development of membrane bound expression based DNA vaccine against  $\epsilon$ -Toxin of *Clostridium perfringens*
- ◆ Development of cytosolic expression and heterologous booster based DNA vaccine against  $\epsilon$ -toxin of *Clostridium perfringens*.
- ◆ Development of cytosolic expression based DNA vaccine against  $\epsilon$ -toxin of *Clostridium perfringens*.
- ◆ Development of membrane bound expression and heterologous booster based DNA vaccine against  $\epsilon$ -toxin of *Clostridium perfringens*.
- ◆ Development of vaccine against epsilon toxin of *Clostridium perfringens* employing LTB-epsilon toxin epitopes in translational fusion with LTB.

### Novel Stains Developed For Degradation of Petropolymer

*Pseudomonas citronellolis* EMBS027 with accession number Kf361478

### Upcoming Events:

- ◆ "Bioconcurrency"
- ◆ International Conference on "Translational Research for Reprogramming of the Cell"

### Upcoming Facilities:

- ◆ BioNEST Biocubators Nurturing Entrepreneurship for Scaling Technologies
- ◆ DBT, New Delhi sponsored Hands on Training Programs for Students, Faculties and Staff.

## Research & Development Projects

S. No.	Title of the Project	Funding Agency
<b>I. INTERNATIONAL</b>		
1.	Engineering of novel sheet material from biological sources deciphering bioplastic production	Indo-Mexican Bilateral Collaborative Research Project, Department of Science and Technology (DST), New Delhi and CONACYT, Mexico
<b>II. NATIONAL</b>		
2.	Transcriptome profiling and development of EST-SSR markers for assessment of genetic relationships in <i>Gloriosa superba</i>	DBT, New Delhi under Biocare Scheme for Women Scientist
3.	Quest of molecular mechanisms of biologic responses of thiazolidinediones in Balb/ can.n (I.B.) mice of type -2 diabetes	Indian Council of Medical Research (ICMR), New Delhi
4.	A retrospective and prospective analysis of molecular signature patterns and genomic instability profiles among First and second generation victims of Bhopal gas tragedy diagnosed with gastrointestinal malignancies	University Grants Commission (UGC), New Delhi
5.	Biochemical Degradation of Polyblends and formation of formidable bioplastics by the help of Microbial Tools: A Recent Approach	Department of Science and Technology (DST), New Delhi under SERC Fast Track Proposals for Young Scientists scheme
6.	Bioplastic revolution makes the environment clean: A novel approach	Department of Science and Technology (DST), New Delhi
7.	Cloning, Nucleotide Sequencing and Functional Analysis of a Novel Microbial Cluster of Biodegradation Genes from selected microbial strains	University Grants Commission (UGC), New Delhi
8.	Carrier Detection and Molecular Diagnosis of Beta Globin Gene Mutations in Bhopal India	Indian Council of Medical Research (ICMR), New Delhi
<b>III. STATE</b>		
9.	Exploration of epigenetic signatures of hematological malignancies genes: A Prognostic, Diagnostic & Therapeutic Approach	Madhya Pradesh Council of Science and Technology (MPCST), Bhopal
<b>IV. INSTITUTIONAL</b>		
10.	Tailor- made synthesis of cost effective bioplastic by <i>Cupriavidus necator</i> utilizing industrial wastes as sole carbon source: A novel approach	Collaborative Research Project -TEQIP-III
11.	Development of Prognostic-Diagnostic test for Type 2 Diabetic Retinopathy based on epigenetic signatures: One step towards the personalized medicine	Collaborative Research Project -TEQIP-III

## Events Held



Indo-Mexican Bilateral Collaborative research activity



Work Shop On Flowcytometry



One Student One Tree



AIDS Day



Debate Competition



First National Conference on Cellular & Molecular Medicine



Panel Discussion



Poster Presentation Competition

# SCHOOL OF BIOMOLECULAR ENGINEERING AND BIOTECHNOLOGY

## Information Brochure



School is being developed as Center for Potential Excellence in Biotechnology



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Airport Road, Bhopal-462 033.

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<https://www.rgpv.ac.in>



## About RGPV

Rajiv Gandhi Proudyogiki Vishwavidyalaya (University of Technology of Madhya Pradesh) Bhopal has been established by the Government of Madhya Pradesh vide act no. 13 of 1998 of the Legislative Assembly. Over a sprawling Campus of about 247 acres. Rajiv Gandhi Proudyogiki Vishwavidyalaya is marching towards development into a center of excellence in the arena of Technical Education, Research and Innovations. Under its umbrella there are 05 UTD's, 200 affiliated Engineering Colleges, 98 Pharmacy Colleges, 95 MCA Colleges and 04 Architecture Colleges imparting Graduate level instructions running around 17 under graduate level courses, 85 Polytechnic institutions offering diploma courses in emerging and conventional disciplines.

## About School of Biotechnology

School of Biotechnology was established in 2003, is running under the umbrella of Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal as an autonomous institute with an objective to fulfill the need of excellent research and teaching methodologies in the State of Madhya Pradesh. The School maintains a close liaison with various academic & non-academic institutions, industry and research laboratories to impart training and practical exposure to the students, so that they are thoroughly nurtured to keep abreast of latest technology and comprehensively groomed as professionals.

## Vision

To prepare ourselves for the new knowledge age so as to shape the Indian horizon in respect of Science & Technology capabilities in one of the core sectors of economy to create the much desired change waves to accelerate India's advancement towards becoming a Knowledge Super Power.

## Mission

To build up state of the art infrastructure facilities for world class research and development and balanced innovative teaching programmes commensurate with the need of the nation and Madhya Pradesh, in particular.

## Motto

To expose the students to recent exciting developments in the area of Biotechnology and their exploitation in industry, agriculture and medicine with the main emphasis is on genomics, proteomics and bioinformatics so that we provide education and research in Biotechnology directed towards distinct economic, health and social objectives.

## Thrust areas of research

- ◆ **Medical Biotechnology-Molecular Medicine:** Diabetes and Type 2 Diabetic Retinopathy Vaccine Development for Human Immunodeficiency Virus
- ◆ **Environmental Biotechnology:** Bioremediation, Biosynthesis of Biopolymers Bio-nanotechnology, Industrial Biotechnology, etc.
- ◆ **Plant Biotechnology:** Transcriptome profiling for marker development and genetic diversity studies.



## Glimpses of the Facilities of SOBT at a Glance

The department provides an ideal milieu for interdisciplinary collaborative research and interaction between students and faculty. The research activities are well-funded through extra-mural research funding from government agencies such as University Grants Commission, Department of Biotechnology, Department of Science and Technology and Indian Council of Medical Research. There are number of research projects on Cancer, Diabetes, Type 2 Diabetic Retinopathy and Human Immunodeficiency Virus on going in the department. The department also has collaborative research projects with Mexican laboratories on Biosynthesis of Biopolymers- Material Sciences and Wayne State University from United States of America with Diabetes and Type 2 Diabetic Retinopathy.

### Environmental and Bioprocessing Engineering Lab:

We are involved in the production of Biodiesel from different sources like Jatropa, Karonja and Micro-algae. Our recent findings include the search for alternative sources of bio-adsorbents for removal of heavy metals. The research focused on utilization of plants and microorganisms for the decontamination of contaminated solid and liquid wastes. Moreover, synthesis of biopolymers as the replacement of petropolymers for the waste management and save the environment which is the need of an hour also.



### Cryopreservation Lab:

is the key component of the School and is well equipped with Deep Freezers (-20,-40 &-80°C), Cryocans, LN2 Devices to maintain cell and microbial cultures along with maintenance of biological kits and chemicals.



**Plant Tissue Culture Lab:** is well acquainted with Biosafety Cabinet Level II, Plant Tissue Culture Racks, Trinocular Inverted Microscope, etc. for edible vaccines, transgenics and many more.



**Animal and Human Tissue Culture Lab:** is well set with CO<sub>2</sub> Incubator, Biosafety Cabinet Level II, Cell Countess, Binocular Inverted Microscope and others which are required to work with animal and human cells contentedly.

**Microbial Culture Lab:** School is dealing with the microbial and fungal cultures using Laminar Flow Hoods, Bioreactor, etc. for the various aspects of the industrial production.



**Sterilization Lab:** Consists of autoclaves (Horizontal & Vertical Both) and water purifiers (Mili RO & Mili Q), Hot Air Ovens, etc. to carry out the experiments in the sterile environment.

**High Performance Liquid Chromatography (HPLC) Lab:** Complete set up for the separation of molecules required for further experimentation.



### Gas Chromatography (GC) Lab:

Testing the purity of a particular substance, or separating the different components of a mixture as confirmatory test of biofuels, etc. are carried out on GC.

**Genomics and Genetic Engineering- Epigenetics Lab:** We are studying on understanding the molecular mechanisms underlying cancer, diabetes and Human Immunodeficiency Virus. Different experimental approaches currently are being used in the laboratory, which include genetics, reprogramming of the cell, epigenetics, functional, structural genomics, proteomics, bioinformatics and model systems that range from bacteria to yeast to human cells. We are aggressively working to shrink the timeline toward the discovery of a biological cure for diabetes, Type 2 diabetic retinopathy building upon these promising outcomes by bridging cell-based therapies with emerging technologies.



## Publications



The research outcomes of the various projects of the School are published in the SCI and Referred journals nationally and internationally. These research publications are available on Web of Science, Scopus, Google Scholar, Pubmed, etc.

## Testing and Consultancy

Facilities for Testing of samples of all kinds i.e. at Biochemical, Genetic, Molecular level, etc. and consultancy is also available in the School. The Testing and Consultancy is done under the supervision of the experts. The other details related with Testing and Consultancy is available on [www.rgpv.ac.in](http://www.rgpv.ac.in); [www.sobtrgpv.com](http://www.sobtrgpv.com)



## Collaborations

- ◆ **International Collaborations:** National Institute of Health and Wayne State University from United States of America, CINEVISTAV, Mexico.
- ◆ **National Collaborations:** Indian Institute of Sciences, Bangalore, Center for Cellular and Molecular Biology, Hyderabad, Indian Institute of Technology viz. Madras, Delhi, Banaras and Kanpur, Banaras Hindu University, Varansi, National Environment Engineering Research Institute, Nagpur, Applied Materials Processing Research Institute (AMPRI), Bhopal, etc.
- ◆ **State Collaborations:** All India Institute of Medical Sciences (AIIMS), Bhopal; National Institute of High Security Animal Diseases (NISHAD), Bhopal; Indian Institute of Sciences Education and Research (IISER), Bhopal; Indian Institute of Technology (IIT), Indore; Bhopal Memorial Hospital and Research Center (BMHRC), Bhopal, Gandhi Medical College, Bhopal, etc.

## MOU's

- ◆ ICMR-National Institute of Malarial Research, Jabalpur
- ◆ Indian Institute of Soil Sciences, Bhopal
- ◆ M.P. Council of Science and Technology, Bhopal
- ◆ Applied Materials Processing Research Institute (AMPRI), Bhopal

## Upcoming MOU's

- ◆ Indian Institute of Technology (IIT), Indore
- ◆ National Institute of High Security Animal Diseases (NISHAD), Bhopal
- ◆ All India Institute of Medical Sciences, Bhopal
- ◆ Stellargene Pvt. Ltd., New Delhi

## Awards & Honors

The Faculty and students of the School have received the following prestigious International, National and State level awards

- ◆ University Grants Commission (UGC, New Delhi) Post-Doctoral Research Award
- ◆ Global Bharat Shiksha Ratan Award
- ◆ Glory of India Award
- ◆ DBT Biocare Post-Doctoral Research Award
- ◆ Best paper presentation Award.

## Academic Facilities

- ◆ A digital library is being added to enhance e-learning and self-learning facilities.
- ◆ Classrooms, equipped with the latest media hardware are located in various departments.
- ◆ Air-conditioned seminar halls and reading room.
- ◆ Laboratories are being regularly modernized through the addition of equipment relating to new and emerging technology.

## Visits & Training

The members of the Biotech family is refining their skills, upgradating their knowledge and getting wider exposure through specific visits and trainings of the relevant fields viz.

- ◆ NIHSAD, Bhopal : For Biosafety & Security
- ◆ AMPRI, Bhopal : For Testing of Biomaterials
- ◆ Industrial Training : In various industries to learn several aspects of Entrepreneurship.

## Placement

Our Alumni are very well placed in different sectors of Biotechnology in various Educational/Research Institutes and Companies of high repute viz.

- ◆ University of Reedings,
- ◆ University of Putra Malaysia, Selangor
- ◆ Jazan University Saudi Arabia
- ◆ Tabuk University
- ◆ Kingdom of Saudia Arabia,
- ◆ Centre for Cellular and Molecular Biology, Hyderabad
- ◆ Wockhardt, Aurangabad
- ◆ Biocon, Bangalore
- ◆ Millipore, Bangalore
- ◆ Dr. Reddy's Lab, Hyderabad, etc.

Many of our former students are also successful Entrepreneurs in the field of Biotechnology.

### Faculties & Research Personal

Prof. (Dr.) Archana Tiwari Director	Dr. Mahavir Yadav Assistant Professor	Dr. Dipanjana Ghosh DST INSPIRE Faculty
Dr. Suresh Kumar Jatawa Assistant Professor	Dr. Mritunjai Singh Assistant Professor	
Ms. Aakriti Chouhan Doctoral Fellow	Ms. Riddhi Tiwari Doctoral Fellow	Ms. Divya Kulshreshtha Doctoral Fellow
Mr. Rajkumar Soni Doctoral Fellow	Mr. Avinash Singh Doctoral Fellow	

### Office Staff

Kailash Das Bairagi	Rohit Malviya	
Harikrishna Mishra	Yam Bahadur	Virendra Mali