

VIKRAM SARABHAI INSTITUTE OF CELL AND MOLECULAR BIOLOGY

FACULTY OF SCIENCE **FIVE-YEAR INTEGRATED M. Sc. in** **Cell and Molecular Biology** **Prospectus and Admission Guidelines** **2021 (Onwards)**



THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA
VADODARA-390002, GUJARAT, INDIA





H. H. Maharaja Sayajirao Gaekwad-III

MISSION STATEMENT

**Vision and mission as perceived by
H. H. Maharaja Sayajirao Gaekwad-III**

*“The progress of a nation requires that its people
should be educated. Knowledge is a necessity of man.*

*It instills in him a desire to question and to investigate,
which leads him on the path of progress. Education, in the
broadest sense, must be spread everywhere.*

*Progress can only be achieved by the spread of
education. Cooperation is necessary to achieve
any worthy end and this readiness to
cooperate will not be found in people*

Prof. Pushpa Robin

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The Institute of Cell and Molecular Biology is a unique venture aiming to integrate physical, chemical, and mathematical sciences for the holistic development of cell and molecular biology, the pivot of life science. Progress in biology in an integrated fashion is the need of the hour and it can influence economy and health in a big way by improving the agriculture and health sector. In addition, the current pandemic has sprung up tremendous opportunities for trained scientists in public health. The rollout of vaccines within a year speaks volumes about the strides with which science has progressed. We are steadfast in our resolve to educate the next generation of scientists with a broader perspective to think creatively and critically to enable them to find scientific solutions to societal problems.

About the Institute:

Dr. Vikram Sarabhai Institute of cell and molecular biology, Faculty of Science, The M.S. University of Baroda, was established in 2012, with a view to introduce interdisciplinary learning and research leading to a degree in Cell and Molecular Biology. Interdisciplinary research in Life science at The M.S. University of Baroda was initiated with a grant of 13.5 crores from DBT, Govt of India in 2010. The impetus for this was the Nobel Prize for Chemistry in 2009 being awarded to Dr. Venkatraman Ramakrishnan, an alumnus of our faculty, whose academic pursuits embody an interdisciplinary approach. The teaching program leading to a five-year integrated MSc degree in Cell and Molecular Biology was introduced from the academic year 2012-2013, under the able leadership of Prof. Sarita Gupta as the Coordinator, with an additional grant of one crore from the Govt of Gujarat. The Institute boasts of state-of-the-art research infrastructure which includes central instrumentation facility with high-end research equipment, excellent laboratory facility, ICT enabled classrooms, seminar rooms, space for student facility etc. True to its interdisciplinary approach teaching is done by Professors of various departments of our university. Students are encouraged to take up summer internships and one full semester dissertation at leading research institutes in India or abroad. Eminent Scientists from national and international institutes like NCBS-TIFR, IISERs, India, Laval University, Canada, University of Tennessee, USA, University of SUNY Buffalo, USA, Cambridge University-UK etc. are part of advisory board. Prof. K. Vijay Raghavan, FRS, Secretary, Department of Biotechnology, Govt, of India and advisor to Prime

minister of India and Prof. L.S. Shashidhara, Coordinator, biological science, IISER Pune are also our strong supporters. Prof. C. V. Ramakrishnan was the main visionary and founder chairperson of advisory board. Prof. Sarita Gupta is the current advisor to the program.

Courses Offered by the Institute: The institute offers a five-year integrated MSc in Cell and Molecular Biology for students.

Course Structure

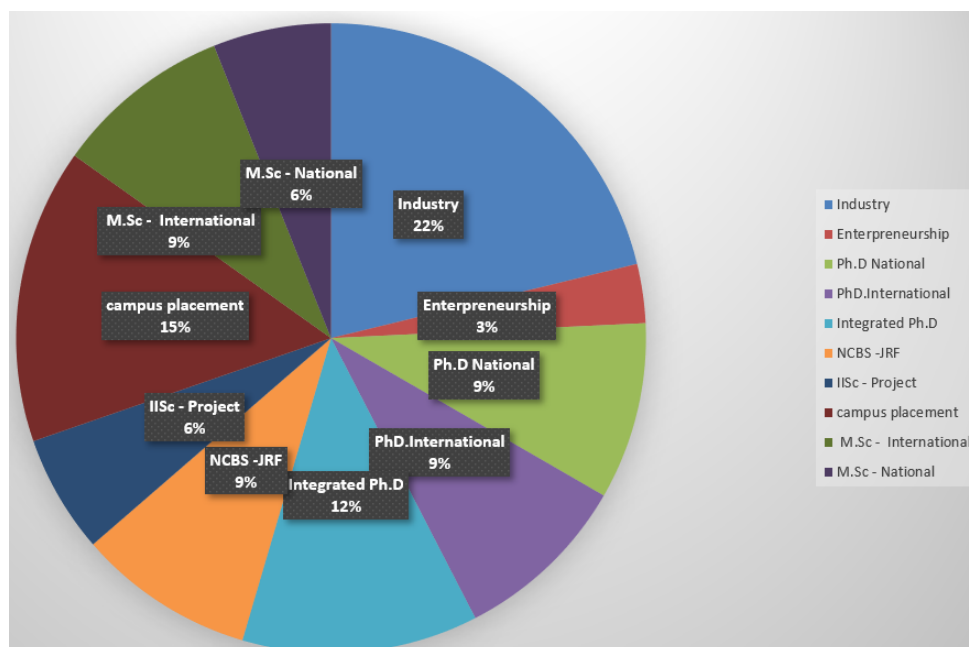
	SEMESTER – I		
	THEORY	CREDITS	Course Code
PAPER I	Diversity of Living Systems	04	
PAPER II	Physics for Biologists	02	
PAPER III	Mathematics for Biologists (Calculus and Differential Equation)	02	
PAPER IV	Physical chemistry	02	
PAPER V	Evolution and Ecology	04	
	Practicals : I	08	
	Foundation Course I – French	02	
	Total Credit	24	
	SEMESTER-II		
	THEORY	CREDITS	Course Code
PAPER I	Cell Biology-I	03	
PAPER II	Genetics	03	
PAPER III	Inorganic Chemistry	02	
PAPER IV	Mathematics-I (Linear Algebra)	02	
PAPER V	Statistics-I	02	
	Practicals -II	08	
	Foundation Course III– Soft skills	02	
	Foundation Course IV – Disaster Management	02	
	Total credits	24	
	SEMESTER-III		
	THEORY	CREDITS	Course Code
PAPER I	Bio-molecules	04	
PAPER II	General Microbiology	03	
PAPER III	Organic Chemistry	02	
PAPER IV	Biophysics I	03	
PAPER V	Mathematics II	02	
	Foundation Course-Environmental Sciences	02	
	Practical-III	08	
	Total Credits	24	
	SEMESTER-IV		
	THEORY	CREDITS	Course Code
PAPER I	Metabolism I	04	
PAPER II	Molecular Biology I	04	
PAPER III	Biophysics II	02	
PAPER IV	Chemical Kinetics and Thermodynamics	02	
PAPER V	Statistics II	02	

	Foundation Course-GLP	02	
	Practical-IV	09	
	Total Credits	25	
	SEMESTER-V		
	THEORY	CREDITS	Course Code
PAPER I	Structural Determination of Organic Molecules	02	
PAPER II	Coordination Chemistry	02	
PAPER III	Bio Analytical Techniques	03	
PAPER IV	Recombinant DNA Technology	03	
PAPER V	Protein Structure and Basic Enzymology	03	
PAPER VI	Cell Biology II	03	
	Practical V	08	
	Total Credits	24	
	SEMESTER-VI		
	THEORY	CREDITS	Course Code
PAPER I	Molecular Biology II	03	
PAPER II	Basic Immunology	03	
PAPER III	Developmental Biology	03	
PAPER IV	Animal and Plant Tissue Culture	03	
	Foundation Course Nano Science	02	
	Comprehensive Viva	02	
	Practical VI	08	
	Total Credits	24	
	SEMESTER-VII		
	THEORY	CREDITS	
PAPER I	Enzyme Mechanism and Regulation	03	
PAPER II	Human Physiology and Genetics	04	
PAPER III	Microbial Physiology	03	
PAPER IV	Plant Physiology	03	
PAPER V	Metabolism II	03	
	Practical VII	08	
	Total Credits	24	
	SEMESTER-VIII		
	THEORY	CREDITS	
PAPER I	Advanced Cell Biology	03	
PAPER II	Advanced Molecular Biology	03	
PAPER III	Advanced Immunology	03	
PAPER IV	Microbial Genetics	03	
PAPER V	Stem Cell and Regenerative Biology	02	
	Practical VIII	08	
	Seminar	01	
	Total Credits	23	
	SEMESTER-IX		
		CREDITS	
	Dissertation	25	
	Total Credits	25	
	SEMESTER-X		

	THEORY	CREDITS	
PAPER I	Genomics	03	
PAPER II	Structural Biology	03	
PAPER III	Elective I	03	
PAPER IV	Elective II	03	
PAPER V	Elective III	02	
	Research Training	08	
	Comprehensive Viva	02	
	Total Credits	24	

Placement Profile of Students:

The first batch of students graduated with the MSc degree in 2017. The placement profile of the four batches of students who passed out is shown in this pie chart.



Facilities:

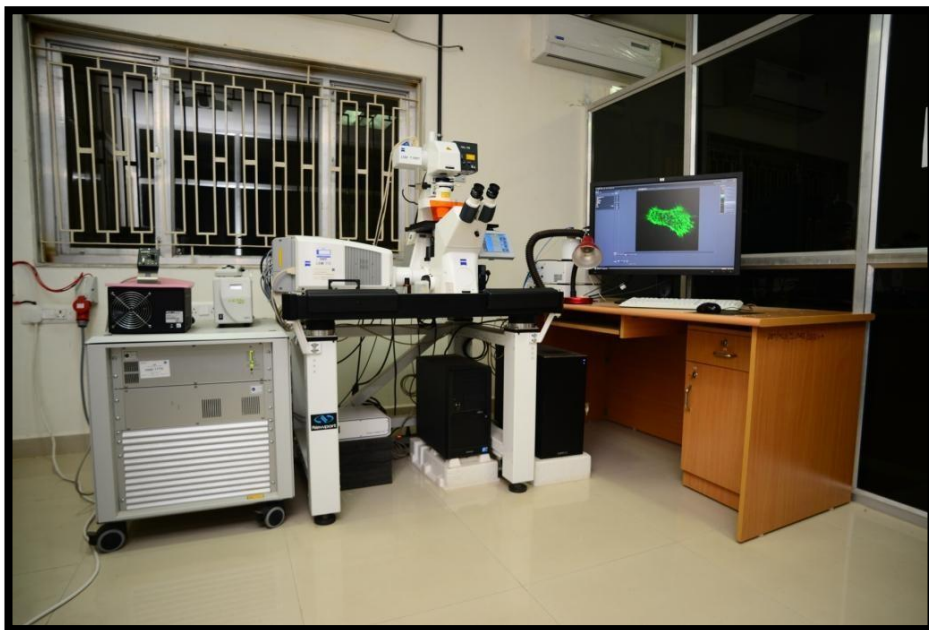
Dr. Vikram Sarabhai Centre for Cell and Molecular Biology provides high end research facilities for Cell Biology, Molecular Biology, Proteomics, Analytical wing

High-end research instruments are:

1. Fluorescent Activated Cell Sorter (FACS):



2. Confocal Microscope



3. Ultracentrifuge:



4. Real Time PCR



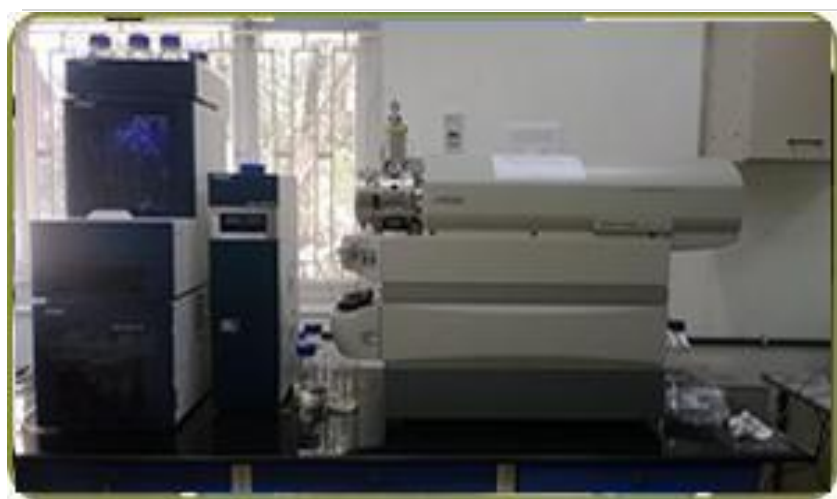
5. Cryopreservation Facility:



6. Western Blotting and 2-Dimensional Proteomic platform:



7. LC-MS/MS (3200 Q Trap and gradient LC):

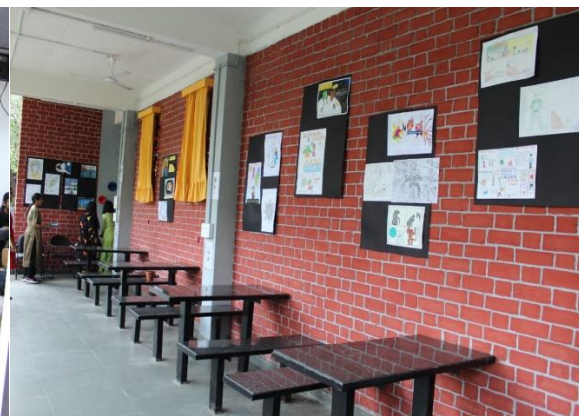


Other Equipment include:

Gradient PCR, CO₂ Incubator, Fluorescent Phase Contrast Microscope, Biosafety Cabinet, Shakers, Nano-drop, Multimode Plate Reader, HPLC etc.

Student facilities

Common Room:



Cultural Program by CMB students



ADMISSION PROCEDURE

The application form is to be filled online only. A student willing to apply for more than one MSc Program should submit separate application for each and **the application form fee in such cases will have to be paid separately for each course/program.** The students who have applied and fulfill the criteria of minimum qualifications for eligibility can appear in the entrance examination. **A written Entrance Test will be conducted for deciding admission to each programme. The admission will be strictly based on the merit of marks obtained in written Entrance Test.**

INTAKE CAPACITY: 41 SEATS

ELIGIBILITY CRITERIA

The admission is based on the merit of entrance test only. To appear in **entrance test**, following **eligibility criteria** is to be fulfilled:

1. A student having cleared the H.S.C. examination from science stream with Biology/Mathematics/Both with English as one of the subjects from any State or Union Territory of India or a global University/ Education Institution recognized by The Maharaja Sayajirao University of Baroda is eligible. The minimum marks/ grade points in qualifying examination shall be as follows:
 - i. **For general category candidates**
50% or equivalent grade points.
 - ii. **For SC/ST candidates**
Must have passed qualifying examination.
 - iii. **For SEBC candidates**
45% or equivalent grade points for applicants from Gujarat and 50 % or equivalent grade points for applicants from other states and Union Territories in India.
2. Candidates who have **appeared for the qualifying examination** may also apply and appear in the Entrance Test. However, their admission will be confirmed only on submitting original marksheet of the qualifying examination and fulfillment of eligibility requirement, at the time of Admission.

CRITERIA FOR CASTE-WISE RESERVATION AND OTHER QUOTA

Government of Gujarat rules for the reservation quota will be applied: SC: 7%, ST: 15%, SEBC: 27%, General: 51%. All original certificates should be produced at the time of document verification and admission.

IF ANY RELEVANT CERTIFICATE IS NOT PRODUCED AT THE TIME OF ADMISSION, THE STUDENT WILL NOT BE CONSIDERED FOR PARTICULAR RESERVATION CATEGORY.

A student, irrespective of her/his reservation category, for admission, will be first considered for GENERAL category.

- a) The **SC and ST students from states other than Gujarat** should produce a certificate from competent authority of Government of Gujarat if their original certificate DO NOT indicate that their caste/Tribe is recognised under such category in Gujarat also.
- b) The **SEBC category** are required to produce a valid **non creamy layer certificate** from competent authority.
- c) There will be **10 %** supernumerary seat **(additional seats over and above the total number of seats)** reservation of the total seats for **Economically Weaker Sections (EWS)**. Within this 10% quota, **33%** seats shall be further sub-reserved for female students belonging to the same Economically Weaker Sections.
- d) **Reservation for physically disabled students: 5%** seats of the total seats (to be included under each different category with in the limit of total reservation under a particular reservation category like SC/ST/SEBC/GEN) are reserved for the persons with benchmark disability in accordance with the provisions of the section 32 of the rights of persons with Disabilities ACT, 2016. They should produce a **current/recent year certificate of Civil Surgeon** stating the type of disability, extent (%) of disability and state (Progressive/ non-progressive) of disability. Only those students who have **minimum 40% disability** are eligible to be considered for the reservation.
- e) **Reservation for Defence & Ex/In- Servicemen: 1%** seats of the total seats (to be included under each different category with in the limit of total reservation under a particular reservation category like SC/ST/SEBC/GEN) are reserved for wards of Defence & Ex/In-Servicemen.
- f) **Reservation for Kashmiri Migrants: 1% supernumerary seat reservation quota** (Additional seats, **NOT** included under each different category with in the limit of

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total reservation under a particular reservation category like SC/ST/SEBC/GEN).

G) ADVANTAGE TO SPORTS PERSONS: PLEASE NOTE THAT THE BENEFIT TO SPORTS PERSONS IS GRANTED ONLY IF THE STUDENT HAS PARTICIPATED/AWARDED MEDALS IN STATE LEVEL OR HIGHER LEVEL COMPETITIONS.

- i. Students who participated at State level: **3%** marks to be added to their eligibility marks
- ii. Students who won medal at State level or participated at National level: **5%** marks to be added to their eligibility marks

Students who have won medal at National level or participated / won medal at International level: to be granted **Direct admission**.

h) **Reservation for wards of MSU Staff: 01% supernumerary seat reservation quota** (Additional seats, **NOT** included under each different category with in the limit of total reservation under a particular reservation category like SC/ST/SEBC/GEN) **only in Regular Payment Fee Category** for the wards of the permanent or temporary employees of The Maharaja Sayajirao University of Baroda. They should produce relevant documents at the time of admission.

i) If the **seats remain vacant** after stipulated admission rounds in the SC or ST reservation categories, then these seats can be **interchanged** among SC and ST.

j) **After granting admission to all the students of any reserve category on respective reserve seats, if the reserved category seats remain vacant then these seats shall be transferred to General (Unreserved) category seats.**

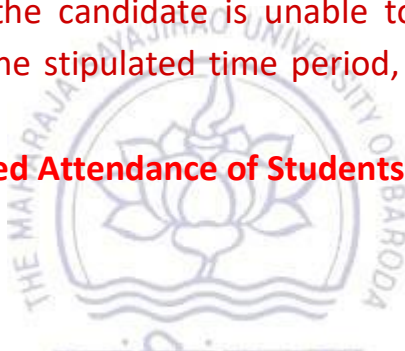
Supernumerary seats which remain vacant shall NOT be transferred to any other category.

Admission Fees is to be paid through online mode only.

CASH/CHEQUE OR ANY OTHER MODE OF TRANSACTION NOT ACCEPTED

INSTRUCTIONS TO THE CANDIDATES

1. **The admissions will be strictly based on the merit.** Just fulfilling the eligibility criteria DOES NOT GUARANTEE admission.
2. The admission to the course is PURELY TEMPORARY and subjected to various scrutiny till the unique Permanent Registration Number (PRN) of the candidate is generated.
3. **If the information provided by the candidate is incorrect or if any unfair practice is followed or the candidate is unable to submit any of the required certificates in the stipulated time period, his/her admission is liable to cancellation.**
4. **Maintenance of Stipulated Attendance of Students** (Ordinance 183) The



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following shall be the minimum attendance necessary:

- a. In a semester an overall attendance of **at least 75%** of the number of lectures delivered and tutorials, seminars etc. arranged in all subjects, provided the total attendance in each of the subjects offered is **at least 60%**.
- b. In a semester an overall attendance of **at least 80%** of the days allotted for practical classes and laboratory work in each subject.
5. General rules governing the conduct of students in the university:
 - i. A student must do nothing either inside or outside the University that will interfere with its orderly working and discipline.
 - ii. This comprehensive rule covers most cases that are likely to arise. It forbids:
 - a. Impolite or unseemly behaviour in classroom or University premises during working hours of the College and the Faculty.
 - b. Attempt to persuade other students to abstain themselves from regular classes.
 - c. Damage to or defacement of University furniture, fittings and property.
 - d. Disobedience of notifications or instructions issued by the Principals/Deans/Heads of the Departments and Members of the staff duly authorized.
 - iii. As per UGC regulation, stipulated attendance (Ordinance 183) is required for permitting students to appear for final examination. If unavoidably absent on account of health, urgent private affairs or other reasons, they must be prepared to state the exact reason for absence.
 - iv. Students are expected to behave with courtesy towards the members of the staff, their fellow students and all visitors to the Institution.
 - v. Sexual harassment will lead to severe punishments like suspension, rustication from the University / College/ Institution. Disciplinary action is as prescribed under The M. S. University of Baroda rules.
 - vi. Ragging is prohibited on MSU Campus, ragging is a criminal offence and is liable to severe punishment, including suspension, rustication and imprisonment.
 - vii. **Compulsory Thalassemia Blood Screening:** Thalassemia blood testing is made compulsory by Government of Gujarat. Final Eligibility of

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any student for admission to any course to this University will be granted ONLY after she/he submits report of the Thalassemia blood screening. Students are encouraged to get the test done and submit the report at the time of Admission. Those students who already have a Thalassemia Test Report done earlier, need not get it done again. They can submit copy of earlier report.

GRADE POINT SYSTEM

- A system comprising of 7 grade points (4 to 10) will be followed for evaluating a candidate in every course. Both mid-semester and end-semester exams are counted for final grade points.

Grade Points	Description	Percentage of Marks	Division/Grade	Range
10	Outstanding	90% - 99%	First / O	Above 9.01
9	Excellent	80% - 89%	First / A	8.01 – 9.00
8	Very Good	70% - 79%	First / B	7.01 – 8.00
7	Good	60% - 69%	First / C	6.01 – 7.00
6	Fair	50% - 59%	Second / D	5.01 – 6.00
5	Average	40% - 49%	Pass / E	4.01 – 5.00
4 – 0	Dropped	Below 40%	F	Below 4.00

CGPA	Class
CGPA < 4	Fail
4 = CGPA < 5	Pass Class
5 = CGPA < 6	2nd Class
6 = CGPA < 7	1st Class
CGPA ≥ 7	Distinction

Grade Point Average = $\sum (\text{Credit} \times \text{Grade Point}) / \text{Total Credits}$

AWARD OF CLASS

Marks-sheets of semester I to IX of integrated M. Sc. will simply indicate result as either Pass or Fail or ATKT but not the class which will be indicated in the last Semester mark sheet.

Cumulative Grade Point Average (CGPA) is computed as:

CGPA = $\sum (\text{Semester credits} \times \text{GPA}) / \text{Total Semester Credits}$

The sum is taken over from Sem-I to Sem-X for M. Sc.

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CRITERION FOR AWARD OF M.SC. IN CELL AND MOLECULAR BIOLOGY DEGREE

For obtaining M.Sc. degree in the subject of Cell and Molecular Biology, a candidate has to earn minimum 241 credits in all during the programme.

Website: www.msubaroda.ac.in

**The M. S. University of Baroda Admission Portal:
admission@msubaroda.ac.in**

The information contained herein is for general guidelines only.

For further information contact Faculty Administration:

Prof. Haribhai Kataria

Dean, Faculty of Science

E-mail: dean-science@msubaroda.ac.in

Dr. R N Jadeja: Dean of Students

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Ms. Shilpa Gupta: Dean of Sports

E-mail: deansports-science@msubaroda.ac.in

Dr. Rupal Shah, Dr. Dharmendra Shah: Teacher Supervisors

E-mail: ts-science@msubaroda.ac.in

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“The full-blown lotus growing out of the lake symbolises the emergence of the mind and its triumph over matter. The flame rising from the center of the lotus is the flame of the human knowledge, spreading light and learning for the coming generations. The motto inscribed below the lotus defines the purpose and existence of life which is love of beauty, goodness and intellectual curiosity.”

महाराजा सयाजीराव विश्वविद्यालय गीत

अमे वडोदराना विद्यापीठना सपना सारवनारा
अमे ज्योत जलावी सृष्टी नवली सहसा सर्जनहारा.

अमे गगमकुसुम कर धरनारा
अमे मगन मगन थई फरनारा
अगन बाथ अमे भरनारा
अमे दैन्यतिमिरने हरनारा.

श्री सयाजी विद्यापीठना ज्ञानदीपने धरनारा
सत्यं शिवं सुन्दरम् नो मंत्र अनंतर भणनारा.

श्री सयाजी विद्यापीठना