

1. Name of the department:

Botany

2. Year of Establishment:

1963

3. Names of programmes/ courses offered:

UG (Elective: Environmental Science & Pollution)
 PG (Specialization: Plant Physiology & Biochemistry, Cytogenetics & Plant Biotechnology), M.Sc. by Research, Ph.D.
 Certificate Courses: Flower Arrangement, Food Preservation, Mushroom Cultivation, Tree Appreciation
 PG Diploma in Horticulture and Landscape Gardening

4. Names of Interdisciplinary courses and the departments/ units involved:

Environmental Science, Biotechnology

5. Annual/ semester/ choice based credit system (programme wise):

Credit Based Semester System

6. Participation of the department in the courses offered by other departments:

UG and PG Biotechnology, Environmental Science with Zoology Department

7. Courses in collaboration with other universities, industries, foreign institutions, etc.:

Nil

8. Details of courses/programmes discontinued (if any) with reasons:

Nil

9. Number of teaching posts:

Post	Sanctioned (09) Filled (09)	Details
Professors	01	Principal
Associate Professors	03	
Assistant Professors	05	

10. Faculty profile with name, qualification, designation, specialization, (D.Sc./ D.Litt. /Ph.D./ M. Phil. etc.):

Name	Qualification	Designation	Specialization	Experience (Years)	No. of Ph.D. students guided in last 4 years
Dr. Usha Mukundan	M Sc., D.H.E., Ph.D.	Principal and HOD	Cytogenetics	34	07 (Ph.D. Botany) 02 M.Sc. by Research (Biotechnology) 01 (Ph.D. Biotechnology) 07 registered for Ph.D.
Dr. Himanshu Dawda	M.Sc., Ph.D.	Vice Principal, Associate Professor	Plant Physiology	24	01 completed 05 registered for Ph.D.
Dr. A.K. Bhatnagar	M.Sc., Ph.D.	Associate Professor	Mycology	24	-
Dr. Nishigandha Muni	M.Sc., D.H.E., Ph.D.	Associate Professor	Mycology	19	-
Pravin Nayak	M.Sc., SET	Assistant Professor	Plant Physiology	15	-
Dr. Anil Avhad	MSc, PhD., SET	Assistant Professor	Plant Physiology	12+03	-
Dr. Mrunalini Date	M.Sc., Ph.D.	Assistant Professor	Plant Physiology	10+11	-
Dr. Veena Kelkar	M.Sc., Ph.D.	Assistant Professor	Plant Physiology	04	-
Dr. Dan Bahadur Singh	M.Sc., NET., Ph.D.	Assistant Professor	Ethnobotany	03	-

11. List of senior visiting faculty/Guest:

Nil

- 03 Lab Assistants
- 12 Lab Attendants
- 1 Peon (shared with Zoology Dept.)

12. Percentage of lectures delivered and practical classes handled (programme wise) by temporary faculty:

Nil

13. Qualifications of teaching faculty with DSc/ D.Litt/ Ph.D/ M.Phil./ P.G.:

Ph.D.: 08

M.Sc.: 01

13. Student-Teacher Ratio (programme wise):

42:1

16. Number of faculty with ongoing projects from a) National b) International funding agencies and grants received:**14. Number of academic support staff (technical) and administrative staff sanctioned:**

Dr. Usha Mukundan

- Disruption of microstructure of tea using exogenous enzymes funded by Hindustan Unilever Ltd. (2013-2016) (Rs. 13,02,000)

17. Departmental projects funded by DST-FIST; UGC, DBT, ICSSR, etc. and total grants received:

Dr. Usha Mukundan

- DST-FIST Grant (2003-2009) (Rs. 14,00,000)
- Somatic embryogenesis and studies on genetic variability in *Embllica officinalis* Gaertn. (2006-2009) UGC funded (Rs 9,72,000)
- Studies on peroxidase production by hairy root cultures of *Armoracia rusticana* (2010-2013) UGC funded (Rs. 10, 36,000)
- Studies on theanine production by root cultures of *Camellia sinensis* (2010-2012) funded by Hindustan Unilever Ltd. (Rs. 7,18,000)
- Understanding role of aluminium during callus proliferation and regeneration of tea callus (2012-2013) funded by HUL (Rs. 1,00,000)

Dr. Himanshu Dawda

- Studies on propagation of Mangroves (2009) University of Mumbai (Rs. 25,000)
- Studies on callus and root cultures of *Rubia cordifolia* and identification of marker constituents using HPTLC (2009-2011) UGC funded (Rs. 1,00,000)

Dr. Anil Avhad

- Adaptive measures in some halophytes (2008) University of Mumbai (Rs. 25,000)

Dr. Mrunalini Date

- Conservation and genetic diversity of *Rauwolfia* (2009-2011) UGC funded (Rs. 82,000)

18. Research centre/ facility recognized by the University:

Yes. Recognized research center for registering students for Ph.D. degree

19. Publications:

(Publication per faculty)

Number of papers published in peer reviewed journals (national/ international) by faculty and students

Dr. Usha Mukundan

- Sujata R Kawlekar and Usha Mukundan (2009). Dyeing cotton with Natural Colorant. Textile Trends No.11, February 24, 33-37.
- Sadhana Yadav and Usha Mukundan. (2009). Antioxidants: A new era drug. The Botanica, 57, pp 28-37. ISSN 0045-2629
- Rahul Gavahane and Usha Mukundan (2010).

Somatic embryogenesis in *Tinospora codifolia* using in vitro leaf explants. Research Journal of Biotechnology, 5 (1), pp 39-43. ISSN 2278-4535

- Sadhana Yadav and Usha Mukundan (2011) Antioxidant activity of *Ocimum basilicum* and *Salvia officinalis*. Research Journal of Biotechnology, 6(3): pp 22-25. ISSN 2278-4535
- Sadhana Yadav and Usha Mukundan (2011) In vitro antioxidant properties of *Salvia coccinea* Buc'hoz ex etl. and *Salvia officinalis* L. Indian Journal of Fundamental and Applied Life Sciences, 1(3): pp 232-238. ISSN 2231-6345
- Mugdha Ambatkar and Usha Mukundan (2011) Enzymatic treatment of wastewater containing dyestuffs using different delivery systems. Scientific Reviews and Chemical Communications, 2(1): pp 31-40. ISSN 2277-2669
- Smruti Thombare and Usha Mukundan (2012). Control of *Propionibacterium acnes* using essential oil. Asian Journal of experimental science, 26(2): pp 01-04. ISSN 0971-5444.
- Smruti Thombare and Usha Mukundan (2012). Control of M. furfur using Plant Essential Oil, Journal of Pure and Applied Microbiology, 6(4): pp 1955-1958. ISSN 0973-7510
- Tania Moses and Usha Mukundan (2013). On-line monitoring plant biomass for large-scale production of *Thymus vulgaris*, a medicinal and culinary herb. Asian Journal of Experimental Science, 27(1): 19-28. ISSN 0971-5444
- Dolly K Joshi and Usha Mukundan (2013). Prevalence of HIV and TB Co infection: Mumbai Scenario. Research reviews: A Journal of Biotechnology, 3(2).
- Anuja Bapat, Usha Mukundan, PN Mukhopadhyaya, H Parekh, Nagee and P Kunjadia (2013). Varying influence of different biomarkers related markers to hepato recovery events in liver injured rats treated with extracts of *Andrographis paniculata*, *Phyllanthus amarus* or their active principles individually and combination. International Journal of Phytomedicine, 5(2). ISSN 0975-0185
- Mugdha Ambatkar and Usha Mukundan (2012) Enzyme based strategies for treatment of wastewater containing recalcitrant pollutants. The Botanica, 59-61: pp 53-66. ISSN 0045-2629
- Mugdha Ambatkar and Usha Mukundan (2014) Calcium salts enhance activity and azo dye decolourisation capacity of crude peroxidase from *Armoracia rusticana*. American Journal of Plant Sciences, 5(1A) (IN PRESS). ISSN 2158-2742

Dr. Anil Avhad

- Anil E. Avhad and Himanshu Dawda (2013) Studies on Nitrate uptake by *Sesuvium portulacastrum* (L.), an associate Halophyte. Variorum, 4(1). ISSN 976-

9714

- Anil E. Avhad and Himanshu Dawda (2013) Studies on mineral composition of soil supporting Sesuvium portulacastrum (L.), an associate Halophyte. Entire Research. ISSN 0975-5020

Chapter in Books

Dr. Usha Mukundan

- Tania Mosses and Usha Mukundan (2009). Edible Vaccines. In Biotechnology: Tissue Culture to Proteomics, 232-245, Ed. P C Trivedi, Pointer Publishers, Jaipur, India.
- Jayesh Patil, Manasi Karangutkar, Sadhana Yadav, Mamta Verma, Tania Moses and Usha Mukundan (2012). Micropropagation of some essential oil yielding plants, pg. 14-28. In: Recent Advances in Medicinal Plants and Their Cultivation Ed(s): Aloka Kumari, RK Lal and RK Khajuria. Manglam Publications, Delhi (India).

Books with ISBN/ISSN numbers with details of publishers

Dr. Usha Mukundan

- Indian Medicinal Plants: Study on Laboratory Animals (2013) Anuja Bapat, Usha Mukundan, Pratap N Mukhopadhyaya Lambert Academic Publishing House. ISBN-13 978-3-659-42713-8

20. Areas of consultancy and income generated:

Dr. Anil Avhad

Plant identification and labeling for:

- Naval Park and Material Organization, Vidyavihar Jan-Feb 2011 (Free of cost)
- Yoga Institute, Santacruz. May 2010 (Rs. 6,000)
- Rose Garden Co-op Society. June 2010 (Rs. 5,000)
- Valuable AG-Bio Pvt. Ltd. June 2009 (Rs. 36,000)

Dr. Usha Mukundan

- Dr. Usha Mukundan, Jayesh Patil and Muugdha Ambatkar: Decolorisation of industrial wastewater for Neelikon Pvt Ltd. (Initial amount Rs. 12,000)
- Degradation of cotton waste: Pilot experiments being conducted with faculty and research student of Biotechnology department.
- Mr. Jayesh Patil and Ms. Mugdha Ambatkar: Statistical data analysis using SPSS for Shreya Life Sciences under the guidance of Dr. Usha Mukundan (Rs. 19,990)

Every year the department comes out with a theme based calendar on plants. The design and photography is done by the research students.

21. Faculty as members in

UGC committee for XI plan development grants,

Western Region: 01

Senate: Nil

Board of Studies: 01

Faculty of Science: 01

Academic Council: 01

Syllabus Committee: 05

22. Student projects

a. Percentage of students who have done in-house projects including inter departmental/ programme: 100%

b. Percentage of students placed for projects in organizations outside the institution i.e. in Research laboratories/ industry/ other agencies: 2%

23. Awards/ Recognitions received by faculty and students:

Dr. Usha Mukundan

- AOTS scholarship for TQM training in OSAKA, Japan (2010)
- Best Teacher Award by Maharashtra State Government (2011)
- G.D. Pol Best Principal Award by G.D. Pol Foundation, Mumbai (2012)
- Principal P S Ramaswamy Memorial Best Teacher Award by South Indian Education Society, Mumbai (2013)

Dr. Anil Avhad

- First prize for research paper presentation "Studies of Sesuvium portulacastrum (L.), an associate Halophyte with respect to mineral composition of soil" at Convergence, K.J. Somaiya College, Vidyavihar on 2 Feb., 2012.
- First Prize in the 'Expert Category' and the Prize for Maximum Tree Count, at Dombivali Green Race, organised by NYASS Trust, Dombivali, on 12 Feb. 2012.

University of Mumbai rank holders in the subject of Botany at T.Y. B.Sc.

Ms. Aishwarya Parab	First	2013	87.00%
Ms. Sneha Pillai	First	2012	84.00%
Mr. Omkar Painaik	Third	2011	83%
Ms. Maya Bhanavse	Second	2009	83%

Every year atleast 5 students participate in Avishkar, a State level Research Festival. We have hosted the zonal level of Avishkar for two years.

Mr. Rajkumar Diwakar (M.Sc Botany) won Mumbai round and was selected for State-level Research Festival Avishkar held at Solapur on 14 January 2010 then was

selected for Inter zonal level held at M.S. University, Vadodara.

24. List of eminent academicians and scientists/visitors to the department:

Name	Institute	Year
Dr. Shirish C. Gupta,	Eminent Botanist, University of Delhi	2009
Ms. Manali Gholap	Horticulturist	2009
Dr. Jatin Bhide,	Product Manager, Alkem Laboratories Ltd.	2009
Dr. S.C. Chatterjee	Scientist, IARI	2012
Dr. Vaishali Gode	Senior Executive, Marico	2010
Mr. Asesh Sarkar	GM, AkzoNobel Ltd.	2010
Mr. Bharat Soni	Founder, Go Green Nursery	2010
Mr. Punam Singavi	President, Hariyali Foundation	2011
Ms. Manasi Kesarkar	Export Executive, Subhra Pharmaceuticals	2011
Mr. Nachiket Dighe	Management Executive, Cap Gemini	2011
Dr. Rajendra Shinde	Vice-Principal, St. Xaviers, Mumbai	2012
Mr. Ranjan Karulkar	Chief Horticulturist, Hiranandani Gardens, Powai	2012
Mr. Yatin Mokhal	Consultant horticulturist	2013
Ms. Poonam Hudar	Consultant, Environmental Greenlines	2013

25. Seminars/ conferences/ workshops organized & the source of funding:

- Workshop for revised syllabi (for new credit based semester system) of T.Y. B.Sc. and M.Sc. II Botany in collaboration with BOS, University of Mumbai. 15 June 2013
- Workshop for revised syllabi (for new credit based semester system) of S.Y. B.Sc. and M.Sc. I Botany in collaboration with BOS, University of Mumbai. 16 July 2012
- Refresher Course in "Biosciences: Global Trends in Biological Sciences" sponsored by UGC Academic Staff College and University of Mumbai. 27 August-15 September 2012
- Workshop for revised syllabi (for new credit based semester system) of F.Y. B.Sc. Botany in collaboration with BOS, University of Mumbai. 7 July 2011

26. Student profile programme/ course wise:

Year	Applications received	Selected	Enrolled		Pass percentage
			M	F	
T.Y. B.Sc.					
2012-13	29	29	12	17	100%
2011-12	37	37	15	22	100%
2010-11	34	34	15	19	100%
2009-10	31	31	14	17	96.67%
M.Sc.					
2012-13	Admission through University of Mumbai	15	04	11	100%
2011-12		17	03	14	100%
2010-11		16	02	14	100%
2009-10		11	02	09	100%

27. Diversity of Students:

Name of the Course	% of students from the same state	% of students from other states	% of students from abroad
B.Sc.	95	5	-
M.Sc.	100	-	-
Ph.D.	100	-	-

28. How many students have cleared national and state competitive examinations such as NET, SLET, GATE, Civil services, Defense services etc.?

- Ms. Mugdha Ambatkar (NET, 2011)
Ms. Tania Mosses (NET, 2010)

29. Student progression:

Student progression	Against % enrolled
UG to PG	60%
PG to M.Phil.	Data not available
PG to Ph.D.	2%
Ph.D. to Post-Doctoral	Data not available
Employed	100%
• Campus selection	2%
• Other than campus recruitment	98%
Entrepreneurship/ Self-employment	3%

30. Details of Infrastructural facilities:

- Library: 5860 Books (+ books in central library)
- Internet facilities for Staff & Students: Available
- Class rooms with ICT facility: Available
- Laboratories: 5

31. Number of students receiving financial assistance from college, university, government or other agencies:

Students who belonging to the reserved category get financial assistance from the Government. 1% get financial assistance from college (Annexure IX, pg. 264) and in addition following students are funded through research projects.

Name of the student	Funding agency	Project	Amount
Ms. Mugdha Ambatkar	HUL	Theanine production by <i>Camellia sinensis</i>	Rs. 8000/month (2009-2010)
	UGC	Studies on peroxidase production by hairy root cultures of <i>Armoracia rusticana</i>	Rs. 8000/month (2010-2013)
Ms. Karishma Rajbhar	HUL	Distruption of microstructure of tea leaves by exogenous enzymes	Rs. 8000/month (2013 -2016)

32. Details on student enrichment programmes (special lectures/ workshops/ seminar) with external experts:

Special lectures are organized for students to provide information on current topics and also on issues of National and international significance. To encourage the reading and communication skills the department of Botany has been organizing an intercollegiate elocution competition named Dr D.V. Amonkar Memorial competition for which topics are allotted. Our final year and PG students participate in this competition and also attend the presentations made by other participants. The topic allotted for the last four years are listed below. In addition to the elocution competition from last two years a poster competition is also held for students.

Date	Topics
24 August, 2010	Biodiversity, sacred groves, organic farming,
23 August 2011.	Forest and climate change, modern tools for forest conservation, forest resources of Indian subcontinent today, and tomorrow and rights to harvest minor forest products
23 August 2012.	Green economy, experimental models in biological sciences, nanotechnology in biology, bioethics
24 August 2013.	Trash Management, e-waste, biodegradable solid waste, non-biodegradable solid waste, medical and radioactive waste

33. Teaching methods adopted to improve student learning:

- The department believes in adopting student centric method for the teaching learning process.
- Depending on the student profile and topic to be taught different techniques are used. Some of them are project based, blended learning, to memorize botanical names small games are used. Diagrams are provided as ready reckoners for understanding the biochemical pathways. ICT is also used for presentations, to show animations, videos, topic related films. Field trips complement class room learning.
- Values are imparted to students while teaching topics in Botany.
- Students are encouraged to enhance self learning

skills by allowing them to make presentations on topics allotted or the topic of their choice followed by discussion on the topic by the students of the class. This enhances the soft skills in the students which are essential for employability.

- At the third year level each teacher has four to five students as wards. This tutor ward system has been named as "Sunflower" group which mentors the academic and personal growth of the student.
- All PG students carry out a project for which a teacher is provided as a guide. This enables them to design a problem, define objectives, standardize methods, document, analyse data. It also develops their writing skills and the survey of literature done by them an ability to do reference work.

34. Participation in Institutional Social Responsibility (ISR) and Extension activities:

- Botanica is a annual exhibition organsied by the Department. For Every Botanica Activity a stall is made available free of cost to a Warli tribal people for exhibiting and selling their products.
- A stall is also provided to the local nursery worker
- Botanica invites school children which enables them to see actual specimens, learn the importance of plants, perform experiments. In fund starved schools this is not possible and we felt it would help the school children to explore the world of plants and also create an interest in them towards basic sciences.
- Helping teachers and students in preparing projects for science exhibitions.
- Pavo nature club is a Nature club run by college students under the guidance of Dr. Anil Avhad. Some of the social activities done are as follows,
- A Tree walk was organized on 11 Feb 2012 at 60ft Road, Ghatkopar (W) to create awareness among the students and residents. The walk was attended by 26 participants.
- Workshop of ecofriendly Ganapati festival and Holi
- Photography and Poster making competition
- One staff member Captain Pravin Nayak is in charge of NCC for last ten years.
- Our Staff members train students for the science Olympiad examination in the subject of Biology and one staff member also accompanied the Indian team this year for the International event held at Bonn Switzerland.
- To promote Biological Sciences among the community the Association of teachers in Biological Sciences was established.
- Tree Appreciation Walks: In 2010, a group of seven individuals formed a small informal group called Tree Appreciation Walk with an aim to conduct nature trails at the green spots, like gardens and national

parks, within Mumbai city. Since 2011, Mr. Jayesh Patil - a student from the PhD in Botany programme of the college - has been actively participating and contributing to these walks by helping the organizers conduct the trails. Some staff members of the college also attend the walks.

- Save Ranibagh: Group of citizens helped in saving the green lung of the city Mr. Jayesh Patil assisted the Save Ranibagh Action Committee by collecting information, and providing photographs to be included in the book. He also helped the committee as a resource person for the tree trails conducted at the garden by Sanctuary Asia and by the Municipal Corporation of Greater Mumbai.
- Mr. Jayesh Patil guided two school, St. Stanislaus High School, Bandra and Fort Convent School, Fort with identification and labeling of the plants in their premises to help create nature awareness among the school children.

35. SWOC analysis of the department and future plans:

- **Strengths:**

Highly motivated team of teachers. Emphasis on integrating teaching and research. Student centric department. Teacher Ward system. Teachers believe in lifelong learning.

- **Weakness:**

The staff strength sanctioned is on the basis of undergraduate teaching. Postgraduate teaching and practicals have to be managed additionally and even though teachers are motivated and enthusiastic time is a constraint. Space constraint hampers flexibility for extended time for doing project work.

- **Opportunities:**

Motivating students to learn plant sciences and apply their knowledge in corporate sector like green audit, carbon credits, carbon sequestration, use of plants for mitigating climate change, city farming, organic farming etc.

- **Challenges:**

Sustaining quality. To involve staff and students in research work overcoming the limiting factors of time and space.

- **Future Plans:**

To motivate students to appear for competitive examinations. To develop our campus as a model green campus in space constraint regions.