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:**

<table>
<thead>
<tr>
<th>Post</th>
<th>Sanctioned (09)</th>
<th>Filled (09)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors</td>
<td>01</td>
<td>Principal</td>
<td></td>
</tr>
<tr>
<td>Associate Professors</td>
<td>03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Professors</td>
<td>05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

11. **List of senior visiting faculty/Guest:**
   - Nil

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

13. **Student-Teacher Ratio (programme wise):**
   - 42:1

14. **Number of academic support staff (technical) and administrative staff sanctioned:**

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

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

- Ph.D.: 08
- M.Sc.: 01

16. **Number of faculty with ongoing projects from a) National b) International funding agencies and grants received:**
17. **Departmental projects funded by DST-FIST; UGC, DBT, ICSSR, etc. and total grants received:**

**Dr. Usha Mukundan**
- Disruption of microstructure of tea using exogenous enzymes funded by Hindustan Unilever Ltd. (2013-2016) (Rs. 13,02,000)
- Somatic embryogenesis and studies on genetic variability in *Emblica 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 *Rauvolfia* (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**
- Rahul Gavahane and Usha Mukundan (2010).

**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-
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

Books with ISBN/ISSN numbers with details of publishers
Dr. Usha Mukundan

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. Muugdha Ambatkar: Statistical data analysis using SPSS for Shreya Life Sciences under the guidance of Dr. Usha Mukundan (Rs. 19,990)

21. Faculty as members in
UGC committee for XI plan development grants,

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 at least 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:

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

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:

<table>
<thead>
<tr>
<th>Year</th>
<th>Applications received</th>
<th>Selected</th>
<th>Enrolled</th>
<th>Pass percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>T.Y. B.Sc.</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>2012-13</td>
<td>29</td>
<td>29</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>2011-12</td>
<td>37</td>
<td>37</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td>2010-11</td>
<td>34</td>
<td>34</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>2009-10</td>
<td>31</td>
<td>31</td>
<td>14</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.Sc.</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>2012-13</td>
<td>15</td>
<td>04</td>
<td>11</td>
<td>100%</td>
</tr>
<tr>
<td>2011-12</td>
<td>17</td>
<td>03</td>
<td>14</td>
<td>100%</td>
</tr>
<tr>
<td>2010-11</td>
<td>16</td>
<td>02</td>
<td>14</td>
<td>100%</td>
</tr>
<tr>
<td>2009-10</td>
<td>11</td>
<td>02</td>
<td>09</td>
<td>100%</td>
</tr>
</tbody>
</table>

27. Diversity of Students:

<table>
<thead>
<tr>
<th>Name of the Course</th>
<th>% of students from the same state</th>
<th>% of students from other states</th>
<th>% of students from abroad</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Sc.</td>
<td>95</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>M.Sc.</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ph.D.</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

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 Moses (NET, 2010)

29. Student progression:

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

30. Details of Infrastructural facilities:

a. Library: 5860 Books (+ books in central library)
b. Internet facilities for Staff & Students: Available
c. Class rooms with ICT facility: Available
d. 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.
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.

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

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 organised 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:**

- **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.