SAURASHTRA UNIVERSITY
Accredited Grade ‘A’ by NAAC (CGPA 3.05)

Syllabus on the bases of Choice Based Credit System (CBCS)

For

Semester III & IV (S.Y.B.Sc.)

BOTANY

SEMESTER – III


SEMESTER – IV

Paper No. B – 401: Fundamental and Advance Botany

INFORCE FROM JUNE – 2020
FOREWORD

Renewing and updating of the curriculum is an essential part of any vibrant university academic system. Revising the curriculum should be a continuous process to provide an updated education to the students at large. To meet the need and requirement of the society and in order to enhance the quality and standards of education, updating and restructuring of the curriculum must continue as a perpetual process. As a part of duty of study board, we the members of botany study board designed the new curriculum for Second year (i.e. semester III & IV) Botany students. For designing of the curriculum we followed the UGC guideline for model curriculum. The exercise would not have been possible without the support of our respected faculties of botany. We hope that the results will fulfill expectations of the society. This syllabus/curriculum designed by following members of Saurashtra University; held at 14-09-2019, Syndicate hall, Saurashtra University.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Designation</th>
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<tbody>
<tr>
<td>1</td>
<td>Dr Mehul Rupani</td>
<td>Dean of Science faculty, Saurashtra University</td>
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<tr>
<td>2</td>
<td>Dr Vrunda Thaker</td>
<td>Member, Study Board of Botany, Saurashtra University</td>
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<tr>
<td>3</td>
<td>Dr R D Raviya</td>
<td>Member, Study Board of Botany, Saurashtra University</td>
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<tr>
<td>4</td>
<td>Dr Anila Patel</td>
<td>Member, Co-committee of Botany</td>
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<tr>
<td>5</td>
<td>Dr Ilza Mor</td>
<td>Member, Co-committee of Botany</td>
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<tr>
<td>6</td>
<td>Dr Jignasha Joshi</td>
<td>Member, Co-committee of Botany</td>
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<tr>
<td>7</td>
<td>Dr Rutva Dave</td>
<td>Member, Co-committee of Botany</td>
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<tr>
<td>8</td>
<td>Dr Manisha Sharma</td>
<td>Member, Co-committee of Botany</td>
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<tr>
<td>9</td>
<td>Dr Parth Bhatt</td>
<td>Member, Co-committee of Botany</td>
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</table>
This curriculum consists of two theory papers and two practical. Syllabus has been divided into two semesters (i.e. semester – III and IV). Students have to study one paper in each semester and two practical based on theory papers. The course is to be completed by assigning six periods for each theory and six periods for each practical per week. Practical periods are inclusive of field study.

**GENERAL DETAILS OF TEACHING HOURS AND COURSE CREDIT**

<table>
<thead>
<tr>
<th>Paper no.</th>
<th>Title of the papers</th>
<th>Lectures</th>
<th>Theory Credit</th>
<th>Practical Credit</th>
<th>Total Credit</th>
</tr>
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<tbody>
<tr>
<td>I</td>
<td>Plant Diversity – 2</td>
<td>60</td>
<td>04</td>
<td>02</td>
<td>06</td>
</tr>
<tr>
<td>II</td>
<td>Fundamental &amp; Advance Botany</td>
<td>60</td>
<td>04</td>
<td>02</td>
<td>06</td>
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</tbody>
</table>

**Pattern of Examination:**

Students will have to attend theory and practical both during the semester and at the end of semester, University exams will be conducted. Examination contains 70% external and 30% internal marks. A student’s performance during every practical session is assessed and marks for a maximum of 15 is recorded. External practical evaluation will carry 35 marks, so total 50 marks for each practical per paper examination will be counted. Internal assessment for theory can be following latest formula provided by Higher Education Department, Government of Gujarat.
Semester III & IV (Second Year B.Sc.)

SKELETON OF QUESTION PAPER FOR THEORY PAPERS

(EXTERNAL EXAMS)

<table>
<thead>
<tr>
<th>Question</th>
<th>Based on UNIT 1</th>
<th>Question 2</th>
<th>Based on UNIT 2</th>
<th>Question 3</th>
<th>Based on UNIT 3</th>
<th>Question 4</th>
<th>Based on UNIT 4</th>
<th>Question 5</th>
<th>Based on UNIT 5</th>
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<tbody>
<tr>
<td>Q – 1 (A)</td>
<td>Objective type questions</td>
<td>Q – 2 (A)</td>
<td>Objective type questions</td>
<td>Q – 3 (A)</td>
<td>Objective type questions</td>
<td>Q – 4 (A)</td>
<td>Objective type questions</td>
<td>Q – 5 (A)</td>
<td>Objective type questions</td>
</tr>
<tr>
<td>Q – 1 (B)</td>
<td>Answer in brief (Any 1 out of 2)</td>
<td>Q – 2 (B)</td>
<td>Answer in brief (Any 1 out of 2)</td>
<td>Q – 3 (B)</td>
<td>Answer in brief (Any 1 out of 2)</td>
<td>Q – 4 (B)</td>
<td>Answer in brief (Any 1 out of 2)</td>
<td>Q – 5 (B)</td>
<td>Answer in brief (Any 1 out of 2)</td>
</tr>
<tr>
<td>Q – 1 (C)</td>
<td>Answer in detail (Any 1 out of 2)</td>
<td>Q – 2 (C)</td>
<td>Answer in detail (Any 1 out of 2)</td>
<td>Q – 3 (C)</td>
<td>Answer in detail (Any 1 out of 2)</td>
<td>Q – 4 (C)</td>
<td>Answer in detail (Any 1 out of 2)</td>
<td>Q – 5 (C)</td>
<td>Answer in detail (Any 1 out of 2)</td>
</tr>
<tr>
<td>Q – 1 (D)</td>
<td>Write a note on (Any 1 out of 2)</td>
<td>Q – 2 (D)</td>
<td>Write a note on (Any 1 out of 2)</td>
<td>Q – 3 (D)</td>
<td>Write a note on (Any 1 out of 2)</td>
<td>Q – 4 (D)</td>
<td>Write a note on (Any 1 out of 2)</td>
<td>Q – 5 (D)</td>
<td>Write a note on (Any 1 out of 2)</td>
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</table>

TOTAL MARKS : 70; TOTAL TIME : 2½ HOURS
Total Scheme of evaluation

<table>
<thead>
<tr>
<th>Semester</th>
<th>Theory</th>
<th></th>
<th></th>
<th></th>
<th>Practical</th>
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<tr>
<td></td>
<td>Internal</td>
<td>External</td>
<td>Total</td>
<td>Internal</td>
<td>External</td>
<td>Total</td>
<td>Internal</td>
<td>External</td>
</tr>
<tr>
<td>III</td>
<td>30</td>
<td>70</td>
<td>100</td>
<td>15</td>
<td>35</td>
<td>50</td>
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<tr>
<td>IV</td>
<td>30</td>
<td>70</td>
<td>100</td>
<td>15</td>
<td>35</td>
<td>50</td>
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Minimum requirements of plant material and Instruments for Botany
Practical based on Paper B-301 and Paper B-401

- Use of one microscope for two students in practical batch
- Fresh plant material as well preserve material as per syllabus
- Different types of stain for slide preparation
- Charts for life cycles
- Original plant / Photographs / charts for Medicinal plants.
- Different types of stain for slide preparation
- Twig of plant and charts for Families

SAURASHTRA UNIVERSITY, RAJKOT
Faculty of Science
Course structure and Unique Code
Syllabus of Semester – III & IV (S.Y. B.Sc.) Botany
Effective from June 2020

<table>
<thead>
<tr>
<th>No</th>
<th>Course</th>
<th>Sem .</th>
<th>Paper name</th>
<th>Paper No.</th>
<th>Credit</th>
<th>Year</th>
<th>Faculty</th>
<th>Subject</th>
<th>Level</th>
<th>Sem</th>
<th>Paper NO.</th>
<th>Option</th>
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<tbody>
<tr>
<td>01</td>
<td>UG</td>
<td>III</td>
<td>Plant Diversity - 2</td>
<td>B - 301</td>
<td>06</td>
<td>20</td>
<td>03</td>
<td>03</td>
<td>01</td>
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<tr>
<td>02</td>
<td>UG</td>
<td>IV</td>
<td>Fundamental &amp; Advance Botany</td>
<td>B - 401</td>
<td>06</td>
<td>20</td>
<td>03</td>
<td>03</td>
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</tbody>
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New Theory Syllabus (CBCS) for Semester - III
In forced from June – 2020
BOTANY PAPER – 301
(PLANT DIVERSITY – 2)

UNIT – I: ALGAE
I.1  Cell structure of Eukaryotic algae.
I.2  Ranges of Thallus Structure
I.3  Life history of the following genus (Excluding development)
   (a) *Nostoc*        (b) *Batrachospermum*
I.4  Algae causing biological disturbances

UNIT – II: FUNGI
II.1  Cell structure of fungi.
II.2  Life history of the following genus (Excluding development)
      (Classification according to Ainsworth)
      (a) *Aspergillus* (b) *Saccharomyces* with haploid-diplontic life cycle
II.3  Industrial applications of above mention species.

UNIT – III: BRYOPHYTA
III.1  Vegetative reproduction in Bryophytes
III.2  Life history of the following genus (Excluding organ development)
       (a) *Anthoceros*        (b) *Funaria*
III.3  Economic importance of Bryophytes

UNIT – IV: PTERIDOPHYTA
IV.1  Life history of the following genus (Excluding organ development)
      (a) *Adiantum*
IV.2  Types of stele and stellar evolution.
IV.3  Economic importance of Pteridophyta
UNIT – V: GYMNOSPERM AND ANGIOSPERMS

V.1 Life cycle of Pinus (Excluding organ development)

V.2 Classification of the following plants families as per Bentham & Hooker’s system including examples of economic importance

(A) Dicotyledons
   (1) Combretaceae  (2) Verbenaceae  (3) Euphorbiaceae

(B) Monocotyledons
   (1) Commelinaceae

Semester – 3 (S.Y.B.Sc.) – BOTANY

PRACTICAL: P - 301

(Based on paper – 301)

1. Study of morphology, anatomy and reproductive structures in Nostoc

2. Study of morphology, anatomy and reproductive structures in Batrachospermum

3. Study of morphology, anatomy and reproductive structures in Aspergillus

4. Study of morphology, anatomy and reproductive structures in Saccharomyces

5. Study of morphology, anatomy and reproductive structures in Anthoceros

6. Study of morphology, anatomy and reproductive structures in Funaria

7. Study of morphology, anatomy and reproductive structures in Adiantum

8. Study of morphology, anatomy and reproductive structures in Pinus

9. Taxonomic study of Combretaceae family

10. Taxonomic study of Verbenaceae family

11. Taxonomic study of Euphorbiaceae family

12. Taxonomic study of Commelinaceae family

13. To study of steles by permanent

14. Field study / tour
New Theory Syllabus (CBCS) for Semester - IV

In forced from June – 2020

BOTANY PAPER – 401

(Fundamental & Advance Botany)

UNIT – I PLANT ANATOMY

I.1 Types of Simple tissue: Parenchyma, Collenchyma & Sclerenchyma
I.2 Types of Complex tissue: Xylem & Phloem
I.3 Anatomical studies of Monocot plant: Root, stem and leaf
I.4 Anatomical studies of Dicot plant: Root, stem and leaf

UNIT – II PLANT EMBRYOLOGY

II.1 Structure and germination of pollen grain
II.2 Types of Pollination
II.3 Structure and types of Ovule
II.4 Double Fertilization

UNIT – III PLANT PHYSIOLOGY AND ECOLOGY

III.1 Diffusion, Osmosis and Imbibition
III.2 Physiology of seed dormancy and dormancy breaking treatments
III.3. Soil composition and soil profile
III.4 Soil erosion and conservation

UNIT – IV BASIC TECHNIQUES IN BOTANY

IV.1 Herbarium: Tools and Technique
IV.2 Nursery technique: Grafting (Whip & Cleft) and Layering (Simple & Air)
IV.3 Kitchen gardening: Sowing/rising of seeds and seedlings,
    Study of cultivation of different vegetables (Chilly, Tomato & fenugreek)

UNIT – V ADVANCE TECHNIQUES IN BOTANY

V.1 Hydroponics: Introduction, techniques and media
V.2 Intellectual Property Rights (IPR): Patent, Geographical Indication, Trademarks and
    Copyrights
V.3 Remote sensing as a tool for vegetational analysis
1. Study of different simple tissue system of plants through permanent slides

2. Study xylem components by maceration

3. Anatomical study of monocot plant: Root, stem and leaf

4. Anatomical study of dicot plant: Root, stem and leaf

5. Germination of pollen grain

6. Study of different types of ovule through permanent slides

7. Demonstration/Perform experiments: Diffusion, Osmosis and Imbibition

8. To study selected soil properties by spot test:
   (a) pH       (b) Carbonate      (c) Nitrate

9. Preparation of classical and e-Herbarium

10. To demonstrate different nursery technique through chart

11. Cultivation of vegetables (Chilly, Tomato & fenugreek) through kitchen garden techniques with using house hold things

12. To demonstrate/perform Hydroponics techniques

13. Field study / tour
S.Y.B.Sc. – BOTANY  
SEMESTER – III PRACTICAL SKELETON  
(BASED ON PAPER – 301)

TIME: - 3 HOURS                                            TOTAL MARKS:-35

Q – 1  Identify & describe with labelled diagram specimen A & B [06]
Q – 2  Identify & describe specimen C & D [06]
Q – 3  Identified & draw labelled diagrams of specimen E [03]
Q – 4  Identify & describe the family & Show it to examiner specimen F [05]
Q – 5  Expose & show the preparation of specimen G to the examiner [04]
Q – 6  Rotation: Identify & Describe specimen H, I, J [06]
Q – 7  Certified Journal [05]

S.Y.B.Sc. BOTANY  
SEMESTER – IV PRACTICAL SKELETON  
(BASED ON PAPER – 401)

TIME: - 3 HOURS                                            TOTAL MARKS:-35

Q – 1  Perform the experiment & show the results / show preparation to the examiner of specimen A [06]
Q – 2  Perform the experiment & show the results / show preparation of the specimen B to the examiner [06]
Q – 3  Perform the experiment & show the results / preparation of specimen C to the examiner [06]
Q – 4  Rotation: Identify & Describe specimen D, E, F [09]
Q – 5  (a)  Viva-Voce [03]
   (b)  Certified journal [05]
List of Reference Books: