UNIVERSITY OF MUMBAI
No. UG/110-A of 2017
MUMBAI-400 032
24th July, 2017

CIRCULAR:-

The Principals of the affiliated Colleges in Science and the Directors of
recognized Science Institutions concerned are hereby informed that in continuation
syllabi relating to Bachelor of Science degree Course (S.Y.B.Sc) passed by the
Academic Council at its meeting held on 26/2/2015, vide item No. 4.33 and
proposal received from Chairperson, Board of Studies in Botany has been accepted
by the Academic Council at its meeting held on 11th May, 2017 vide item no. 4.214
and that in accordance therewith, the revised syllabus as per the (CBCS) for
S.Y.B.Sc - Paper – II (Sem - III) Programme in the Course of Botany, which is
available on the University's website (www.mu.ac.in) and that the same has been
brought into force with effect from the academic year 2017-18.

MUMBAI – 400 032
24th July, 2017

REGISTRAR

To,

The Principals of the affiliated Colleges in Science and the Directors of
Recognized Institutions concerned.

A.C/4.214/11.05.2017

No. UG/110-A of 2017
MUMBAI-400 032
24th July, 2017

Copy forwarded with compliments for information to :-

1) The Co-ordinator, Faculty of Science,
2) The Ofgg. Director, Board of Examinations and Evaluation,
3) The Chairperson, Board of Studies in Botany,
4) The Director of Board of Studies Development,
5) The Professor-cum-Director, Institute of Distance and Open Learning,
6) The Co-Ordinator, University Computerization Centre.

REGISTRAR

Circular 2014-15/Science/3
# Syllabus for the S.Y.B.Sc. Program: B.Sc. Course: BOTANY

<table>
<thead>
<tr>
<th>Course Code</th>
<th>SEM III- Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>USBO302</td>
<td>FORM AND FUNCTION II</td>
<td>2 Credits (45 lectures)</td>
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</table>

**Unit II: Cell Biology**
- Ultra Structure and functions of the following cell organelles:
  - Mitochondrion (membranes, cristae, F1 particles and matrix)
  - Peroxisomes and Glyoxysomes
  - Ribosomes (prokaryotic, eukaryotic and subunits)
- Cell Division and its significance
  - Cell Cycle, structure of Interphase Nucleus (nuclear envelop, chromatin network, nucleolus and nucleoplasm)
  - Mitosis & Meiosis
  - Differences between Mitosis and Meiosis
- Nucleic Acids: Types, structure and functions of DNA and RNA

**Unit III: Cytogenetics**
- **Variation in Chromosome structure (Chromosomal Aberrations)**
  - Definition, Origin, Cytological and Genetic Effects of the following: Deletions, Duplications, Inversions and Translocations.
- **Sex determination, Sex linked, sex influenced and sex limited traits:**
  - **Sex linked-** eye colour in *Drosophila*, Haemophilia, colour blindness
  - **Sex influenced-** baldness in man
- **Extranuclear Genetics**
  - Organelle heredity-
    - Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in *Chlamydomonas*.
    - Male sterility in maize

**Unit III: Molecular Biology**
- **DNA replication**: Modes of Replication, Messelson and Stahl Experiment,
  - **DNA replication in prokaryotes and eukaryotes**- enzymes involved and molecular mechanism of replication.
- **Protein Synthesis**:
  - Central dogma of Protein synthesis
  - Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination.
  - RNA processing: Adenylation & Capping.
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<tr>
<th>Course Code</th>
<th>SEM IV-Title</th>
<th>Credits</th>
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</table>
## Syllabus for the S.Y.B.Sc. Program: B.Sc.Course: BOTANY

<table>
<thead>
<tr>
<th>USBO402</th>
<th>FORM AND FUNCTION II</th>
<th>2 Credits (45 lectures)</th>
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<tbody>
<tr>
<td><strong>Unit I: Anatomy</strong></td>
<td></td>
<td>15 Lectures</td>
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<tr>
<td>• Normal Secondary Growth in Dicotyledonous stem and root.</td>
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<td>• Growth rings, periderm, lenticels, tyloses, heart wood and sap wood.</td>
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<tr>
<td>• Mechanical Tissue system</td>
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<td>15 Lectures</td>
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<tr>
<td><strong>Unit II: Plant Physiology and Plant Biochemistry</strong></td>
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<td>15 Lectures</td>
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<tr>
<td>• <strong>Respiration: Aerobic:</strong> Glycolysis, TCA Cycle, ETS &amp; Energetic of respiration; Anaerobic respiration.</td>
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<td>• <strong>Photorespiration</strong></td>
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<tr>
<td>• <strong>Photoperiodism:</strong> Phytochrome Response and Vernalization with reference to flowering in higher plants, Physico-chemical properties of phytochrome, Pr-Pfr interconversion, role of phytochrome in flowering of SDPs and LDPs;</td>
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<td>• <strong>Vernalization</strong> mechanisms and applications.</td>
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<tr>
<td><strong>Unit III: Ecology and Environmental Botany</strong></td>
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<td>15 Lectures</td>
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<tr>
<td>• Biogeochemical Cycles- Carbon, Nitrogen and Water.</td>
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<td>• Ecological factors: Concept of environmental factors. Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile.</td>
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<td>• Community ecology- Characters of community - Quantitative characters and qualitative characters</td>
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<tr>
<td>Subject</td>
<td>Description</td>
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<tr>
<td>Cell Biology</td>
<td>1. Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs</td>
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<td>2. Estimation of DNA from plant material (one Std &amp; one Unknown, No Std Graph)</td>
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<td>3. Estimation of RNA from plant material (one Std &amp; one Unknown, No Std Graph)</td>
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<td>Cytogenetics</td>
<td>4. Study of inheritance pattern with reference to Plastid Inheritance</td>
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<td>5. Study of cytological consequences of chromosomal aberrations (Laggards, Chromosomal Bridge, Ring chromosome, Chromosomal ring) from permanent slides or photomicrographs.</td>
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<td>6. Study of mitosis and meiosis from suitable plant material</td>
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<td>Molecular Biology</td>
<td>7. DNA sequencing- Sanger’s method</td>
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<td>8. Determining the sequence of amino acids in the protein molecule synthesised from the given m-RNA strand (prokaryotic and eukaryotic)</td>
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<td>SEMESTER IV USBOT P4</td>
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<tr>
<td>PRACTICALS Paper II – FORM AND FUNCTION- II</td>
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**Anatomy**

1. Study of normal secondary growth in the stem and root of a Dicotyledonous plant
2. Types of mechanical tissues, mechanical tissue system in aerial, underground organs.
3. Study of conducting tissues - Xylem and phloem elements in Gymnosperms and Angiosperms as seen in LS and through maceration technique.
4. Study of different types of vascular bundles.
5. Growth rings, periderm, lenticels, tyloses, heart wood and sap wood

**Plant Physiology and Plant Biochemistry**

6. $Q_{10}$ - germinating seeds using Phenol red indicator
7. NR activity – *in-vivo*

**Ecology and Environmental Botany**

9. Study of the working of the following Ecological Instruments- Soil thermometer, Soil testing kit, Soil pH, Wind anemometer.
10. Mechanical analysis of soil by the sieve method & pH of soil.
12. Study of vegetation by the list quadrat method
Syllabus for the S.Y.B.Sc. Program: B.Sc. Course: BOTANY

S.Y.B.Sc.   BOTANY PRACTICAL SKELETON PAPER   SEMESTER - III
TIME - 3 hours   PAPER – II   Total Marks – 50

Q.1. Make a squash/smear preparation of specimen ‘A’. Draw and comment on your observations and show the slides to examiners. (10)

Q.2. To estimate DNA/RNA from the given sample ‘B’. (10)

Q.3. Determine the sequence of bases in a DNA strand by Sanger’s method from the given data ‘C’.

OR

Determine the sequence of amino acids in the polypeptide synthesized from the given m-RNA strand ‘C’. (10)

Q.4. Identify and describe the specimen/photograph - D, E and F (15)

Q.5. Journal/Field Report. (05)

KEY:
A. – Mitosis/Meiosis
B. Germinating seeds/Onion
C. DNA seq/AA seq.
D. Cell organelles
E. Plastid inheritance
F. Chromosomal aberrations
Syllabus for the S.Y.B.Sc. Program: B.Sc. Course: BOTANY

UNIVERSITY OF MUMBAI

S.Y.B.Sc. BOTANY PRACTICAL SKELETON PAPER SEMESTER - IV
TIME - 2 hours 15 min PAPER – II Total Marks – 50

Q.1. a). Make a temporary stained preparation of T.S. of specimen ‘A’ and comment on the secondary growth/mechanical tissue system/ Macerate the given material ‘A’ and describe the conducting tissue seen. (10)

Q.2. Perform the Physiological experiment ‘B’ allotted to you. (13)

Q.3. Perform the Ecological experiment ‘C’ allotted to you. (13)

Q.4. Identify and describe the specimen / slide/ photograph - ‘D’ ‘E’ and ‘F’. (06)

Q.5. Viva - Voce. (05)

KEY:
A. – Dicot stem/ dicot root / Mechanical Tissue (Coleus stem, Typha leaf, Maize stem and Maize root /Annona / Magnolia for maceration).

B. – Q10 - germinating seeds using Phenol red indicator
   NR activity – in-vivo
   Estimation of proteins by Lowry’s method

C. – Mechanical analysis of soil by the sieve method & pH of soil
   Estimation of organic matter of the soil
   Study of vegetation by the list quadrat method

D - Vascular bundles
E. – Growth rings, periderm, lenticels, tyloses, heart wood and sap wood
F. – Ecological Instrument