UNIVERSITY OF MUMBAI

No. UG/110of 2017-18

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.

REGISTRAR

MUMBAI – 400 032
27th July, 2017

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 27th July, 2017

Copy forwarded with compliments for information to :-

1) The Co-ordinator, Faculty of Science,
2) The Offg. 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

....PTO

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Course Code	SEM III- Title	Credits
USBO302	**FORM AND FUNCTION II**	**2 Credits (45 lectures)**
Unit II : Cell Biology • Ultra Structure and functions of the following cell organelles: o Mitochondrion(membranes, cristae, F1 particles and matrix) o Peroxisomes and Glyoxysomes o Ribosomes (prokaryotic, eukaryotic and subunits) • Cell Division and its significance o Cell Cycle, structure of Interphase Nucleus(nuclear envelop, chromatin network, nucleolus and nucleoplasm) o Mitosis & Meiosis o Differences between Mitosis and Meiosis • Nucleic Acids: Types, structure and functions of DNA and RNA		**15 Lectures**
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 determination-** Chromosomal Methods: heterogametic males and heterogametic females. Sex determination in monoecious and dioecious plants. Genic Balance Theory of sex determination in Drosophila, Lyon's Hypothesis of X chromosome inactivation. **Sex linked-** eye colour in *Drosophila*, Haemophilia, colour blindness **Sex influenced**- baldness in man • **Extranuclear Genetics** Organelle heredity- o Chloroplast determines heredity - Plastid transmission in plants, Streptomycin resistance in *Chlamydomonas*. o Male sterility in maize		**15 Lectures**
Unit III : Molecular Biology • **DNA replication** : Modes of Replication, Messelson and Stahl Experment, **DNA replication in prokaryotes and eukaryotes**- enzymes involved and molecular mechanism of replication. • **Protein Synthesis**: o Central dogma of Protein synthesis o Transcription in prokaryotes and eukaryotes: promoter sites, initiation, elongation and termination. o RNA processing: Adenylation & Capping.		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Course Code	SEM IV-Title	Credits

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

USBO402	FORM AND FUNCTION II	2 Credits (45 lectures)
Unit I : Anatomy • Normal Secondary Growth in Dicotyledonous stem and root. • Growth rings, periderm, lenticels, tyloses, heart wood and sap wood. • Mechanical Tissue system o Tissues providing mechanical strength and support and their disposition o I-girders in aerial and underground organs • Types of Vascular Bundles.		**15 Lectures**
Unit II : Plant Physiology and Plant Biochemistry • **Respiration: Aerobic:** Glycolysis, TCA Cycle, ETS & Energetic of respiration; Anaerobic respiration. • **Photorespiration** • **Photoperiodism:** 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; • **Vernalization** mechanisms and applications.		**15 Lectures**
Unit III : Ecology and Environmental Botany • Biogeochemical Cycles- Carbon, Nitrogen and Water. • Ecological factors: Concept of environmental factors. Soil as an edaphic factor, Soil composition, types of soil, soil formation, soil profile. • Community ecology- Characters of community - Quantitative characters and qualitative characters		**15 Lectures**

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

Semester III USBOP3 PRACTICAL Paper II – FORM AND FUNCTION- II	Cr 1

Cell Biology

1 Study of the ultra-structure of cell organelles prescribed for theory from Photomicrographs

2 Estimation of DNA from plant material (one Std & one Unknown, No Std Graph)

3 Estimation of RNA from plant material (one Std & one Unknown, No Std Graph)

Cytogenetics

4 Study of inheritance pattern with reference to Plastid Inheritance

5 Study of cytological consequences of chromosomal aberrations (Laggards, Chromosomal Bridge, Ring chromosome, Chromosomal ring) from permanent slides or photomicrographs.

6 Study of mitosis and meiosis from suitable plant material

Molecular Biology

7 DNA sequencing- Sanger's method

8 Determining the sequence of amino acids in the protein molecule synthesised from the given m-RNA strand (prokaryotic and eukaryotic)

Syllabus for the S.Y.B.Sc. Program: B.Sc.Course : BOTANY

SEMESTER IV USBOT P4 PRACTICALS Paper II – FORM AND FUNCTION- II	Cr 1

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*

8 Estimation of proteins by Lowry's method (Prepare standard graph).

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.

11 Quantitative estimation of organic matter of the soil by Walkley and Blacks Rapid titration method.

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-RNAstrand **'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. – Q_{10} – 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