DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi as mentioned against their names in the Faculty of Science as under** :-

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

All concerned are requested to note the contents of the circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/SU/SCI./
2015/3761-4160
Date:- 16-06-2015.

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Director,
Board of College and
University Development.

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Copy forwarded with compliments to:-

1] The Principals, affiliated concerned colleges,
Dr. Babasaheb Ambedkar Marathwada University

Copy to :-

1] The Controller of Examinations,
2] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
3] The Superintendent, [B.Sc. Unit],
4] The Superintendent, [M.Sc. Unit],
5] The Programmer [Computer Unit-1] Examinations,
6] The Programmer [Computer Unit-2] Examinations,
7] The Record Keeper.

-:**:-

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

REVISED SYLLABUS

OF

B.Sc. Botany

THIRD YEAR

Fifth & Sixth Semester

[Effective from - June, 2015-16 & onwards]

DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

B.Sc. III YEAR SYLLABUS

Subject- BOTANY

Semester- V AND VI

	Paper No.	Title of Paper	Lectures	Marks
		SEMESTER – V		
	XV	Cell Biology and Molecular Biology	45	50
B.Sc. III	XVI(A) OR XVI (B) OR XVI (C)	Diversity of Angiosperms - I OR Plant Breeding and Seed Technology OR Plant Pathology OR Biotechnology	45	50

	XVI(D)			
	XVII	Practical based on Paper - XV	45	50
	XVIII	Practical based on Paper - XVI	45	50
		SEMESTER – VI		
	XIX	Genetics and Biotechnology	45	50
	XX (A) XX (B) XX (C) XX (D)	Diversity of Angiosperms - II OR Economic Botany OR Microbiology and Disease Management OR Bioinformatics	45	50
	XXI	Practical based on Paper - XIX	45	50
	XXII	Practical based on Paper - XX	45	50

B.Sc. III Botany (Theory)

Semester -V

Paper XV

(Cell Biology & Molecular Biology)

(45L)

Unit-1

1. Cell:
   Structure of Prokaryotic cell (Bacterial cell) and Eukaryotic cell (plant cell)
   (02)
2. Cell wall and cell organelles:
   Structure and functions of cell wall and Cell organelles – Golgi complex, Endoplasmic reticulum, Lysosomes
   (08)
3. Nucleus:
   Ultra structure, (nuclear membrane, nucleolus, chromatin material, nucleoplasm), Functions of nucleus.

(05)

Unit-2

1. **Cell division:**
   (06)
   a) Cell cycle -G1 phase, S phase, G2 phase and M phase
   b) Mitosis – definition, process and significance.
   c) Meiosis-definition, process and significance.

2. **Nucleic acids:** (09)
   a. DNA: Definition, structure, chemical composition (nitrogenous bases, purines,

pyrimidines, nucleosides, nucleotides, phosphate and sugars) Watson and Crick's model, Z - DNA, B - DNA, functions of DNA

b. Replications of DNA – conservative, semi conservative and dispersive.

c. RNA: Structure, types and functions

Unit-3

1) Chromosome:

(07)

Definition, morphology-size, shape, number, Ultra structure – chromatid, chromonema, chromomere, centromere, kinetochore, secondary constriction, satellite, telomere, heterochromatin, euchromatin, Nucleosome model (Woodlock 1973), chemical composition, Functions of chromosome, Giant chromosomes-polytene and lampbrush chromosome.

2) Chromosomal aberrations :

(08)

a) Structural-deletion, duplication, inversion and translocation

b) Numerical: – euploidy and aneuploidy

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B.Sc. III Year (Theory)

Semester – V

Paper XVI (A)

(Diversity of Angiosperms-I) (45 L)

Unit: 1

1. Biodiversity (03)

Definition, concept, origin and evolution

2. Types of biodiversity: (05)

Species, genetic, ecological, cropland and agricultural diversity; biodiversity in India; endemism and hot spots; threatened species, threats to biodiversity

3. Conservation of biodiversity: (07)

Major causes for loss of biodiversity, listing of threatened biodiversity; threatened categories – extinct, endangered, vulnerable, rare and indeterminate. Conservation measures: – ex-situ, and in-situ; biodiversity conservation in India.

Unit -2

Phytotaxonomy: (08)

Classification of Angiosperms with special reference to Linnaeus, A. P. de Candole, Bentham and Hooker.

Study of diversity following families with reference to the system of classification of Bentham and Hooker

(22)

1. Magnoliaceae
2. Nymphaeaceae
3. Papveraceae .
4. Brassicaceae
5. Capparidaceae .
6. Rutaceae
7. Rhamnaceae
8. Combretaceae
9. Lythraceae
10. Cucurbitaceae
11. Apiaceae

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B. Sc. III Year (Theory)

Semester -V

Paper: XVI (B))

(Plant Breeding and Seed Technology) (45L)

Unit -1

Plant Breeding :

1. Introduction, history, aims and objectives (02)
2. Domestication, plant introduction and acclimatization (02)
3. Hybridization – history, hybridization procedure. (03)
4. Selection methods -mass selection, pureline selection and clonal selection (04)
5. Hybridization in self pollinating plants (03)
6. Hybridization in cross pollinating plants (03)
7. Heterosis and hybrid vigour (02)
8. Mutation in crop improvement (02)
9. Hybridization programme in Jowar and Cotton (06)
10. Experimental designs and biometrical techniques in plant breeding - Randomized block design, Latin square design, Analysis of variance, Assessment of variability, Simple measures of variability (03)

Unit -2

Seed Technology :

1. Seed technology -history, aims and objectives (01)
2. Morphology and anatomy of seed (monocot and dicot seed , endospermic and non endospermic seed) (02)
3. Stages of seed multiplication -
   a. nucleus seed (04)
   b. breeders seed
   c. foundation seed
   d. certified seed

e. registered seed

f. truthful seed

4. Seed certification process (02)
5. Stagewise multiplication of foundation and certified seed in Jowar and Cotton (02)
6. Seed processing – drying, cleaning, dressing, bagging, tagging, storage and marketing (02)
7. New techniques in seed technology (02)

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B.Sc. III Year (Theory)

Semester –V

Paper XVI (C)

(Plant Pathology)

(45L)

Unit-1

Fundamentals of plant pathology:

1. Plant pathology – history, scope, losses due to pathogens, importance and need to study plant pathology (02)
2. Classification of plant diseases on the basis of symptoms and causal organisms – animate and inanimate (03)
3. Plant pathological institutes – IARI (Indian Agricultural Research Institute), ICRISAT(International Crop Research Institute for Semi Arid Tropics) (02)
4. Seed pathology – concept and importance of seed pathology, seed borne pathogens, methods to study seed borne pathogens (03)
5. Study of air borne pathogens: methods and applications (03)
6. Field and laboratory diagnosis of plant disease - Koch's postulates (02)

Unit-2

Plant diseases:

Study of the following diseases with respect to symptoms, causal organism, disease cycle and disease management:

1) Cereals:	a. Black stem rust of wheat	(05)
	b. Grain smut of jowar	
	c. Ergot of bajra	
2) Pulses:	a. Wilt of pigeon pea	(04)
	b. Yellow vein mosaic of bean	
3) Vegetables:	a. Late blight of potato	(05)
	b. Little leaf of brinjal	
	c. Black rot of onion (*Aspergillus*)	(04)
4) Oil seeds:	a. Tikka disease of groundnut	
	b. Damping off of mustard	
5) Cash crops:	a. Grassy shoot of sugarcane	(06)
	b. Downy mildew of grapes	
	c. Angular leaf spot of cotton d. Citrus canker	
6) Ornamentals:	a. Powdery mildew of rose	(02)
7) Weeds:	a. Rust of Euphorbia	(02)

8) Trees: a. *Cercospora* on *Albizzia* fruits (02)

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B. Sc. III Year (Theory)

Semester- V

Paper XVI (D)

(Biotechnology) (45L)

Unit- 1

Biotechnology:

1. **Introduction:** a. Definition, scope and multidisciplinary nature (05)
   b. Biotechnology in India
2. **DNA structure, replication and recombination:** (05)
   a. Structure of DNA
   b. Replication of DNA, Role of DNA polymerase
   c. Denaturation and renaturation of DNA
   d. Recombination
3. **Recombinant DNA technology**: (15)
   a. Introduction, principles and procedure
   b. Enzymes involved in recombinant DNA technology
   c. Vectors
   d. Southern and Northern blotting technique
   e. Techniques in gene mapping
   f. DNA fingerprinting g. PCR
   h. DNA sequencing i. Genomics and DNA libraries
4. **Genetic engineering:** (05)
   a. Introduction to transgenic plants
   b. Vectors for gene deliveries
   c. Marker and reporter genes
   d. Role of agriculture in crop biotechnology
   e. Achievements in plant biotechnology

Unit- 2

1. **Plant tissue culture:** (10)
   a. Principles of tissue culture
   b. Terminology in tissue culture
   c. Cellular differentiation and totipotency
   d. Organogenesis and embryogenesis
   e. Protoplast isolation and culture
   f. Meristem culture
   g. Anther culture
   h. Applications of tissue culture
2. **Research projects:** (05)

a. Human genome project b. Plant genome project
c. DBT, Ministry of Science and Technology.

B.Sc. III Botany (Practical)

Semester -V

Paper XVII

(Cell Biology & Molecular Biology)

(45 L)

Unit-1

1. Study of the cell structure from onion leaf or *Tradescantia* leaf
2. Preparation of cytological (AA, FAA etc.) fixatives and stains
   (acetocarmine, aceto-orcein).
3. Study of electron micrographs of viruses, bacteria and cyanobacteria
4. Study of electron micrographs of eukaryotic cell and different cell
   organelles
5. Preparation of slides for the study of mitosis (root tips of onion)
6. Preparation of slides for the study of meiosis (*Rhoeo*, *Aloe* or onion flower buds)
7. Preparation of idiogram from the given micrograph of karyotype
8. Observation of giant chromosomes in *Chironomous* larvae
9. Preparation of wool models of mitosis, meiosis, cell structure,
   Chromosome, DNA and RNA.

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B.Sc. III Year (Practical)

Semester – V

Paper XVIII (A)

(Diversity of Angiosperms-I)

(45 L)

Unit: 1

1. Study of herbarium
2. Study of analytical characters
3. Preparation of indented and bracketed keys
4. Study of following families:
    1. Magnoliaceae
    2. Nymphaeceae
    3. Papaveraceae
    4. Brassicaceae
    5. Capparidaceae
    6. Rutaceae,
    7. Rhamnaceae
    8. Combretaceae
    9. Lythraceae
    10. Cucurbitaceae
    11. Apiaceae,
5. Mounting of pollen grains (acetolysis method)

Note: Students should undertake excursion to ecologically different areas for plant study and submission of list and photographs of wild plants at the time

of practical examination.

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B. Sc. III Year (Practical)

Semester -V

Paper: XVIII (B)

(Plant Breeding and Seed Technology)

(45 L)

Unit -1

Plant breeding:

1. Study of floral biology of jowar and cotton
2. Demonstration of male sterility in jowar
3. Artificial emasculation and pollination in jowar and cotton
4. Demonstration of hybridization techniques in jowar and cotton
5. Designing of field experiments
6. Visit to plant breeding centre

Seed technology:

1. Study of morphology and anatomy of monocot, dicot, endosprmic and non endospermic seeds
2. Study of seed germination – observation of normal and abnormal seedlings, germination percentage
3. Blotter test
4. Method of breaking seed dormancy
5. Study of various seed processes – drying, cleaning, dressing, bagging, tapping and marketing
6. Preparation of seed certification tag
7. Viability test (Tetrazolium test)
8. Visit to various seed farms and research centres

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B.Sc. III Year (Practical)

Semester –V

Paper XVIII (C)

(Plant Pathology)

(45L)

Unit-1

1. Study of Koch's postulates – isolation, inoculation and disease development
2. Study of the following diseases with respect to symptoms, causal organism, disease cycle and disease management
   1) **Cereals:**
      a. Black stem rust of wheat
      b. Grain smut of jowar
      c. Ergot of bajra
   2) **Pulses:**
      a. Wilt of pigeon pea
      b. Yellow vein mosaic of bean
   3) **Vegetables:**
      a. Late blight of potato
      b. Little leaf of brinjal
      c. Black rot of onion (*Aspergillus*)
   4) **Oil seeds:**
      a. Tikka disease of groundnut
      b. Damping off of mustard
   5) **Cash crops:**

a. Grassy shoot of sugarcane
b. Downy mildew of grapes
c. Angular leaf spot of cotton
d. Citrus canker

6) **Ornamentals:**
Powdery mildew of rose

7) **Weeds:**
Rust of Euphorbia

8) **Trees:**
Cercospora on *Albizzia* fruits

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B. Sc. III Year (Practical)

Semester- V

Paper XVIII (D)

(Biotechnology)

(45L)

Unit- 1

1. Principle and working of instruments in biotechnology laboratory - Autoclave / Pressure Cooker, Centrifuge, Hot plate, Water bath, Laminar Air flow, Oven, Microscope, pH Meter, Refrigerator, Magnetic Stirrer, Shaker, Agarose Gel Electrophoresis, Green House etc.
2. Sterilization of glasswares
3. Preparation of sterile media, nutrient broth, PDA, M.S. medium, B5 medium, White medium
4. Isolation of bacteria and fungi from air
5. Demonstration of meristem culture
6. Demonstration of anther culture
7. Separation of amino acids by gel electrophoresis

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B. Sc. III (Theory)

Semester -VI

Paper XIX

(Genetics and Biotechnology)

(45 L)

Unit : 1

1. **Mendelism:** (04)

i. Introduction -G.J. Mendel

ii. Mendelian principles –Law of Dominance , law of segregation, law of independent assortment, back cross and test cross

2. Interaction of genes: (07)

i. Allelic interaction: incomplete dominance, co dominance, lethal genes and blood group inheritance

ii. Non allelic and non epistatic -comb shapes in fowls

iii. Non allelic and epistatic:

a) Complementary genes or duplicate recessive epistasis (9:7)

b) Supplementary genes or recessive epistasis (9:3:4)

c) Dominant epistatic genes or dominant epistasis (12:3:1)

d) Duplicate genes or duplicate dominant epistasis (15:1)

3. Sex determination: (04)

i. Chromosomal theory of sex determination

ii. Mechanism of sex determination in man (xx -xy), Drosophila (xx and xy), birds (zz-zw), grasshopper (xx-xo) and genic balance theory in Drosophila

iii. Sex determination in plants – *Melandrium*

Unit : 2

1. Sex linked inheritance: (07)

X, XY and Y linked inheritance:

i) Colourblindness and hemophilia in man ii) Holandric genes

iii) White eye colour in Drosophila iv) Gynandromorphs

2. Structure and function of gene: (08)

i. Fine structure of gene (Seymour Benzer)

ii. One gene one enzyme hypothesis

iii. Genes and related diseases – phenylketonuria, and alkaptonuria

iv. Detection of genetic diseases –amniocentesis Genetic counseling

Unit: 3

Biotechnology:

(15)

1. Concept of genetic engineering and recombinant DNA technology
2. Restriction endonucleases, their properties and uses
3. Cloning vectors -plasmids and phage vectors
4. Techniques of genetic engineering -isolation of desired gene, gene cloning, transfer of gene into plants
5. Applications of genetic engineering

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B.Sc. III Year (Theory)

Semester – VI

Paper XX (A)

(Diversity of Angiosperms-II)

(45 L)

Unit: 1

Plant identification: keys, herbaria and botanical gardens (04)

Origin of angiosperms: origin and evolution, Bennettitalean, Ranalian and Caytonial theory (05)

Binomial nomenclature: Principles and rules (03)

Modern trends in taxonomy: (03)

Cytotaxonomy, chemotaxonomy, and numerical taxonomy

Unit: 2

1.Phytotaxonomy: (10)

Study of Engler & Plantle, Hutchinson, Takthajan system of classification

2.Study of diversity of families:

(20)

a. Asclepiadaceae

b. Scrophulariaceae

c. Oleaceae

d. Convolvulaceae

e. Verbenaceae

f. Amaranthaceae

g. Euphorbiaceae

h. Orchidaceae

i. Liliaceae

j Commelinaceae

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B. Sc. III Year (Theory)

Semester- VI

Paper: XX (B)

(Economic Botany)

(45L)

Unit -1

Origin, morphology, production, cultivation practices, harvesting and uses of crop plants.

a) **Cereals:** Maize, Pearl millet and Rice

b) **Pulses:** Bengal gram, Black gram and Pigeon pea

c) **Oil seed crops:** Soybean, Mustard and Castor

Unit -2.

a) **Fibre crops:** Jute, Sunhemp and Cotton

b) **Horticultural crops:** Banana, Orange and Mango

c) **Ornamentals:** Rose, Orchids and *Chrysanthemum*

Unit -3.

a) **Beverages:** Tea and Coffee

b) **Forage crops:** Cowpea, Jowar and Lucerne

c) **Vegetable crops:** Brinjal, Potato, Tomato and Onion

d) **Condiments and Spices:** Cardamom, Black pepper and Chillies

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B.Sc. III Year (Theory)

Semester –VI

Paper XX (C)

(Microbiology and Disease Management)

(45L)

Unit-1

1. **Microbiology**

Microorganisms in biological world, their classification and features of different groups (03)

2. **Microbial techniques**:

a. Microscopy – simple, compound and electron microscope
b. Micrometry – Principle, working and uses
c. Staining – common stains used in pathology, their preparation and significance, (cotton blue and Gram's Stain)
d. Sterilization of glass wares and media (06)

3. Culture media for isolating plant pathogen

Industrial application of microorganisms - organic acids, alcohol, milk products, antibiotics and bio pesticides (06)

Unit-2

Disease management:

1. Preventive methods: field sanitation, use of clean planting material, crop rotation, trap crops, time of sowing, planting distance and tillage (02)

2. **Control methods –**

a. Seed treatment: concept, objective, traditional and modern methods of seed treatment (02)
b. Soil sterilization: concept, objectives and methods (02)
c. Fungicides: Definition, classification and ideal characteristics of fungicides, study of fungicides with respect to active ingredients, formulations, methods of application, mode of action and uses (08)

i. Sulphur fungicides – Inorganic – Wettable sulphur, Organic – Thirum
ii. Copper fungicides
iii. Mercuric chloride – Agrosan – GN
iv. Heterocyclic nitrogenous compounds – Captan
v. Benzene compounds – Dexon

vi. Antibiotics – Streptomycin and Aureofungin
vii. Systemic – Bavistin and Vitavax
d. Pesticides: Nicotin,Neem and pyrethrum (01)
e. Rhodenticides – Zinc phosphoid (01)
f. Nematicides- Nemagon, Propoxar (01)
g Weedicides- 2,4-D (01)
h. Biological control- definition, need, examples and role (02)
Plant quarantine (01)

3. Control measures and environment: pollution due to chemicals, residual effects, toxicity, safe measures, colour code, antidote, symptoms of poisoning, precautions in using pesticides (03)
4. Pesticide application equipments: principle and working –pneumatic air pump knapsack sprayer, mist blower and duster, types of nozzles (03)
5. Plant clinic: Concept, objective and need (01)
6. Recent techniques in plant pathology: Genetically modified organisms (GMO's), B. T. Cotton, Pheromones (02)

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B. Sc. III Year (Theory)

Semester- VI

Paper XX (D)

(Bioinformatics)

(45L)

Unit- 1

1. Introduction to bioinformatics and its applications (03)
2. Sampling, sample size, sampling techniques (03)
3. Data collection and presentation: (05)
   a. Types of data
   b. Methods of data collection
   c. Data presentation - line chart, bar chart, histogram, polygon, ogive curve, pie diagram
4. **Measures of central tendency:** (04)
   a. Mean
   b. Median
   c. Mode ,

Unit – 2

1. **Measures of variability**: (05)
   a. Mean deviation,
   b. Standard deviation
   c. Coefficient of variation
   d. Standard error
2. Probability, chi-square test, t – test (05)
3. Introduction to computer basics- general characters, types of computer (03)
4. Hardware-input and output devices, CPU, storage devices (02)

Unit – 3

1. Software – MSDOS, Windows, Linux, concept of files and folders and directories,

(08)

   Application software - Word processor, Spread sheet, Presentation, MS-access, html document
2. Networking technology - LAN, WAN, Arpanet, Internet, Web browsing and servers – Netscape navigator, Internet explorer, search engines like yahoo,

google etc. Introduction to MEDLINE, CCOD and PUBMED for biological information, Introduction to bioinformatics software - bioperl biojava bioxml (07)

B.Sc. III (Practical)

Semester -VI

Paper XXI

(Genetics and Biotechnology)

(45 L)

1. Quiz
2. Working out laws of inheritance by using seed mixtures
3. Problems based on gene interaction
4. Problems based on sex linked inheritance

B.Sc. III Year (Practical)

Semester – VI

Paper XXII (A)

(Diversity of Angiosperms-II)

(45 L)

1 . Study of following families:

1. Oleaceae
2. Asclepiadaceae
3. Convolvulaceae
4. Scrophulariaceae
5. Verbenaceae
6. Amaranthaceae
7. Euphorbiaceae
8. Orchidaceae
9. Liliaceae
10. Commelinaceae

2. Mounting of pollen grains (acetolysis method) and measurement of pollen size.
3. Study of different types of stomata and epidermal structures (Trichome)
4. Identification of plants up to species by using flora (Flora of Bombay Presidency/ Flora of Marathwada)
5. Students should undertake excursion to ecologically different areas for plant

study and submission of list and photographs of wild plants at the time of examination.

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B. Sc. III Year (Practical)
Semester- VI
Paper: XXII (B)
(Economic Botany) (45L)

Economic Botany:

1. Study of morphology, structure and simple histochemical tests of food storing tissues in Maize, Rice, Jowar, Gram, Pigeon pea, Potato
2. Study of histochemical tests of lignin and cellulose (Jute, Cotton, Sunhemp)
3. Hand section of Groundnut, Sunflower and staining of oil droplets
4. Study of plantation crops (Tea and Coffee)
5. Study of condiments and spices (Cardamom, Black Pepper and Chillies)
6. Study of horticultural crops (Banana, Orange and Mango)
7. Study of Vegetable crops (Brinjal, Potato, Onion, Tomato)
8. Study of ornamental plants (Rose and *Chrysanthemum*)

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B.Sc. III Year (Practical)

Semester –VI

Paper XXII (C)

(Microbiology and Disease Management)

(45L)

1. Study of fungicides as per theory syllabus
2. Preparation of Bordeaux mixture, burgundy mixture and Bordeaux paste
3. Study of insecticides with respect to active ingredient, colour code, formulation, mode of action, antidote and uses
4. Study of *Trichoderma* culture
5. Study of plant protection equipments –pneumatic air pump, knapsack sprayer, mist blower cum duster
6. Principle and working of autoclave, laminar air flow, Tilak air sampler
7. Use of aerobiological techniques to study fungal spora (gravity slide method, Tilak air sampler)
8. Calibration of microscope and measurement of fungal spores
9. Sketching of fungal spore by camera lucida technique
10. Detection of organic acids from healthy and infected leaves by circular paper chromatography
11. Detection of Amino acids from healthy and infected leaves by circular paper chromatography
12. Study of pathogens in fruits from local market
13. Study of fungi from locally available seed samples
14. Preparation of sterile media - nutrient agar, potato dextrose agar
15. Preparation of stains and mounting media - cotton blue, lacto phenol and gram stain

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B. Sc. III Year (Practical)

Semester- VI

Paper XXII (D)

(Bioinformatics) (45L)

1. Use of operating system and creation of a job from word processor, spread sheet, presentation and data base
2. Creating files, folders and directories
3. Internet browsing and downloading information with special reference to biological literature
4. Creating an e - mail account, sending and receiving e - mail
5. Graphical presentation of data
6. Computer based statistical techniques
7. Frequency table of single discrete variable
8. Computation of mean, median, and mode
9. Computation of mean deviation, standard deviation, coefficient of variation, variance, and standard error
10. Computation of chi- square test, and t - test
11. Students should undertake a visit biotechnology industry, biotechnology research laboratory

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XV

(Cell Biology and Molecular Biology)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)

10

Or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

Or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 3)

Or

Long answer type question ……..……(Unit 3)

10

Q.4. Write short notes on: (Any two) **(Based on all Units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question: 10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit 2)

5) …….(Unit 2)

6) …….(Unit 2)

7) …….(Unit 3)

8) …….(Unit 3)

9) …….(Unit 3)

10) ……...(Unit 3)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVI (A)

(Diversity of Angiosperms - I)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)

10

Or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

Or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1)

Or

Long answer type question ……..……(Unit 2)

10

Q.4. Write short notes on: (Any two) **(Based on all Units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

.

Q.5. Multiple choice question: 10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit 1)

5) …….(Unit 1)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit 2)

9) …….(Unit 2)

10) ……...(Unit 2)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVI (B)

(Plant Breeding and Seed Technology)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)

10

Or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

Or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1)

Or

Long answer type question ……..……(Unit 2)

10

Q.4. Write short notes on: (Any two) **(Based on all Units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question. 10

1) …….(Unit 1)
2) …….(Unit 1)
3) …….(Unit 1)
4) …….(Unit1)
5) …….(Unit 1)
6) …….(Unit 2)
7) …….(Unit 2)
8) …….(Unit 2)
9) …….(Unit 2)
10) ……...(Unit 2)

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVI (C)

(Plant Pathology)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1) 10

Or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

Or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1)

Or

Long answer type question ……..……(Unit 2)

10

Q.4. Write short notes on: (Any two) **(Based on all Units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question. 10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit1)

5) …….(Unit 1)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit 2)

9) …….(Unit 2)

10) ……...(Unit 2)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester V

Paper XVI (D)

(Biotechnology)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)

10

Or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

Or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1)

Or

Long answer type question ……..……(Unit 2)

10

Q.4. Write short notes on: (Any two) **(Based on all Units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question. 10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit1)

5) …….(Unit 1)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit 2)

9) …….(Unit 2)

10) ……...(Unit 2)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XIX

(Genetics and Biotechnology)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)

10

or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)

10

or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 3)

10

or

Long answer type question ……..……(Unit 3)

Q.4. Write short notes on: (Any two) **(Based on all units)**

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question 10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit1)

5) …….(Unit 2)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit3)

9) …….(Unit 3)

10) ……...(Unit 3)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XX (A)

(Diversity of Angiosperms - II)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1)
10

or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2)
10

or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1)
10

or

Long answer type question ……..……(Unit 2)

Q.4. Write short notes on: (Any two) **(Based on all units)**
10

a) Short answer question
b) Short answer question
c) Short answer question
d) Short answer question

Q.5. Multiple choice question
10

1) …….(Unit 1)
2) …….(Unit 1)
3) …….(Unit 1)

4) …….(Unit1)

5) …….(Unit 1)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit 2)

9) …….(Unit 2)

10) ……...(Unit 2)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XX (B)

(Economic Botany)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1) 10

or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2) 10

or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 3)

10

or

Long answer type question ……..……(Unit 3)

Q.4. Write short notes on: (Any two) **(Based on all units)** 10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question

10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit 2)

5) …….(Unit 2)

6) …….(Unit 2)

7) …….(Unit 3)

8) …….(Unit 3)

9) …….(Unit 3)

10) ……...(Unit 3)

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XX (C)

(Microbiology and Disease Management)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1) 10

or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2) 10

or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 1) 10

or

Long answer type question ……..……(Unit 2)

Q.4. Write short notes on: (Any two) (On both unit)

10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question

10

1) …….(Unit 1)

2) …….(Unit 1)

3) …….(Unit 1)

4) …….(Unit1)

5) …….(Unit 1)

6) …….(Unit 2)

7) …….(Unit 2)

8) …….(Unit 2)

9) …….(Unit 2)

10) ……...(Unit 2)

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Faculty of Science

Pattern of Theory Question Paper

B.Sc. III YEAR (BOTANY)

Semester VI

Paper XX (D)

(Bioinformatics)

Time: 2 Hours Max. Marks: 50

N.B.: i) Attempt all questions

ii) All questions carry equal marks

iii) Draw neat and well-labelled diagrams wherever necessary

Q.1. Long answer type question ……..……(Unit 1) 10

or

Long answer type question ……..……(Unit 1)

Q.2. Long answer type question ……..……(Unit 2) 10

or

Long answer type question ……..……(Unit 2)

Q.3. Long answer type question ……..……(Unit 3) 10

or

Long answer type question ……..……(Unit 3)

Q.4. Write short notes on: (Any two) **(Based on all units)** 10

a) Short answer question

b) Short answer question

c) Short answer question

d) Short answer question

Q.5. Multiple choice question 10

1) …….(Unit 1)
2) …….(Unit 1)
3) …….(Unit 1)
4) …….(Unit 2)
5) …….(Unit 2)
6) …….(Unit 2)
7) …….(Unit 3)
8) …….(Unit 3)
9) …….(Unit 3)
10) ……...(Unit 3)

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Practical Examination

B.Sc. III YEAR (Semester – V &VI)

BOTANY

Paper XVII and XXI

Practical based on paper-XV & XIX

(Cell Biology and Molecular Biology, Genetics and Biotechnology)

Time: 09.00 a.m. to 01.00 p.m. Max. Marks: 100

Date: _____ Batch No. _____

Center: _____

_____

Q.1. Prepare a temporary squash of the given material. Identify and describe any two stages. (Mitosis)

15

Q.2. Prepare a smear from the given material. Identify and describe any one stage (Meiosis) 10

Q.3 Prepare a temporary squash of the given material. Identify and describe Giant Chromosome. (chironomous larvae)

or 10

Prepare of idiogram of the given karyotype and comment.

Q.4. Prepare a temporary preparation of given material (Cell structure / Cyclosis)

or 10

Quiz based on Cell Biology, Molecular Biology, Genetic and Biotechnology (Any ten)

Q.5. Problem based on interaction of gene.

15

Q.6. Problem based on sex linked inheritance.

15

Q.7. Submission

a) Record book, 10

b) Woolen models 10

c) Viva - voce 05

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Practical Examination

B.Sc. III YEAR (Semester – V&VI)

BOTANY

Paper XVIII and XXII (A)

Practical based on paper-XVI & XX

(Diversity of Angiosperms – I and II)

Time: 02.00 a.m. to 06.00 p.m. Max. Marks: 100

Date: _____ Batch No. _____

Center: _____

_____

Q.1. Identify, classify giving reasons and describe the specimen 'A' and `B` up to family level. Give floral formula and floral diagram 30

Q.2. Identify the specimen `C` up to the species level with the help of flora. 10

Q.3. Prepare a temporary slide of specimen `D` 05

Q.4. Prepare a temporary slide of specimen `E`(Pollen grains)
05

Q.5. To determine analytical and synthetic characters between specimen provided
05

Q.6.Identify and describe the specimens as per the instructions (Four spots)
20

(2 Spots- Morphology,2 Spots-Eco. imp.)

Q.4. Submission:

a) Record book, 10

b) Project report /Tour report and Herbarium
10

c) Viva - voce 05

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Practical Examination

B.Sc. III YEAR (Semester – V&VI)

BOTANY

Paper XVIII and XXII (B)

Practical based on paper-XVI & XX

(Plant Breeding, Seed Technology and Economic Botany)

Time: 02.00 a.m. to 06.00 p.m. Max. Marks: 100

Date: _____ Batch No. _____

Center: _____

Q.1. Explain hybridization technique in given plant
20

Q.2. Preparation of seed certification tag
10

Q.3. Viability test of given seeds 10

Q.4. Histochemical test in given material `A`
(Starch/Protein/Lipid/Cellulose/Lignin)
10

Q.5. Identify and describe the specimens B, C, D,E and F as per instructions
25

(B-Plant breeding, C-Seed technology, D, E and F-Economic Botany).

Q.6. Submission:

a) Record book	10
b) Tour report and collection	10
c) Viva - voce	05

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Practical Examination

B.Sc. III YEAR (Semester – V & VI)

BOTANY

Paper XVIII and XXII (C)

Practical based on paper-XVI & XX

(Plant Pathology, Microbiology and Disease Management)

Time: 02.00 a.m. to 06.00 p.m. Max. Marks: 100

Date: _____ Batch No. _____

Center: _____

_____

Q.1. Identify and describe the symptoms and causal organisms of the specimen ‘A’ and 20

`B` Explain on the basis of external and internal characters

Q.2.Calibrate the microscope, measure the given spore and sketch with Camera Lucida 15

technique.

Q.3. Identify and describe fungal specimens from culture media/seed fungi/fruit fungi 10

Q.4.Prepare fungicides as per instructions 10

Or

Detection of organic acids/amino acids from infected and healthy leaves by circular paper chromatography

Q.5.Identify and describe as per instructions (C, D, E, and F) 20

(C- apparatus, D- pesticide/fungicide, E- diseased plant, F- fungal spore).

Q.6. Submission:

a) Record book 10

b) Project report / Tour report and collection 10

c) Viva - voce 05

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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

Faculty of Science

Practical Examination

B.Sc. III YEAR (Semester – V&VI)

BOTANY

Paper XVIII and XXII (D)

Practical based on paper-XVI & XX

(Biotechnology and Bioinformatics)

Time: 02.00 a.m. to 06.00 p.m. Max. Marks: 100

Date: _____ Batch No. _____

Center: _____

_____

Q.1. Identify the experiment and describe principle and procedure
(Meristem Culture / Anther Culture / Protoplast Culture)
10

Q.2. Separation of amino acids by gel electrophoresis

Or

Identify contaminating bacteria and fungi from the given culture

10

Q.3. Calculate mean, standard deviation, coefficient of variation and standard error

15

of the Provide data

.

Q.4. Prepare a job using- 15

Word processor/spread sheet/presentation/database

Or

Represent given data by graphical method

Q.5. Identify and describe the given specimens A, B, C, D, E as per instructions

25

Q.6. Submission:

a) Record book 10

b) Project report and Tour report

10

c) Viva - voce 05

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