

**2015-2016**

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**  
**(Re-Accredited by NAAC with 'A' Grade)**

**Recognized by UGC as "College with Potential for Excellence"**

**I B.SC Botany Syllabus 2015-16**

**Paper-I Microbial Diversity, Algae &Fungi**

**UNIT- I: ORIGIN AND EVOLUTION OF LIFE, MICROBIAL DIVERSITY (12 hrs)**

1. Origin of life –theories
2. Geological time scale
3. Microbial diversity-Mycoplasma – Chlamydia -Archaeobacteria –Actinomycetes

**UNIT- II: VIRUSES AND BACTERIA (12 hrs)**

1. Viruses: General account of Viruses, structure, replication and transmission of plant diseases caused by Viruses.
2. Bacteria: Structure, nutrition, reproduction and economic importance. Outlines of plant diseases of important crop plants caused by Bacteria and their control.

**UNIT III: CYANOBACTERIA AND LICHENS (12 hrs)**

1. Cyanobacteria: General account of cell structure, thallus organization and their uses as Biofertilizers
2. Structure, reproduction and life history of Nostoc and Scytonema
3. Lichens – Morphology –Anatomy –Reproduction –Economic importance

**UNIT –IV Algae (12 hrs)**

1. General account, Fritsch classification of Algae and economic importance.
2. Structure, reproduction, life history of Oedogonium, Ectocarpus and Polysiphonia

**UNIT V: FUNGI (12 hrs)**

3. General characters, classification (Alexopolous) and economic importance
1. Structure, reproduction and life history of *Albugo*, *Penicillium*, *Puccinia*
2. General account of plant diseases caused by Fungi and their control
3. Mushroom cultivation.

### **Suggested Readings:**

- Alexopolous, J. and W.M Charles.1988 introduction to mycology. Wiley Eastern, New Delhi.
- Ananthanarayan&Panikers; Microbiology 9<sup>th</sup> edition.
- Pandey, B.P 2001. College Botany Vol. I: Algae, Fungai, Lichens, Bacteria, Viruses, Plant pathology, Industrial Microbiology and Bryophyta. S. Chand & company Ltd, New Delhi.
- Pandey, B.P 2007. Botany for Degree students: Diversity of microbes, Cryptograms, Cell biology and Genetics. S. Chand & company Ltd, New Delhi.
- Sambamurthy, A.V.S.S 2006. A textbook of Algae. I.K. International Pvt. Ltd., New Delhi.
- Sambamurthy, A.V.S.S 2006. A textbook of Plant Pathology. I.K. International Pvt. Ltd., New Delhi
- Sharma, O.P 2006. A text book of Thallophyta, McGraw Hill Publishing. Co. New Delhi.
- Thakur, A.K. and S.K. Bassi. 2008, A text book of Botany: Diversity of Microbes and Cryptogams. S. Chand & company Ltd, New Delhi.
- Vashishta, B.R., A.K. Sinha and V.P.Singh. 2008. Botany for Degree Students: Algae. S. Chand & company Ltd, New Delhi
- Vashishta, B.R.1990. Botany for Degree Students: Fungi. S. Chand & company Ltd, New Delhi.

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**I B.SC II SEMESTER BOTANY SYLLABUS 2015-16**

**Paper --II T: Bryophyta, Pteridophyta, Gymnosperms & Palaeobotany**

**UNIT – I: BRYOPHYTA (14 hrs)**

- 1. Bryophyta:** General characters, classification and alternation of generations.
- 2. Structure, reproduction** and Life history of Marchantia, Anthoceros and Polytrichum.
3. Evolution of Sporophyte in Bryophytes.

**UNIT - II: PTERIDOPHYTA –Part –A (14 hrs)**

- 1. Pteridophyta:** General characters, Classification, alternation of generations.
- 2. Structure,** reproduction and life history of Rhynia, Lycopodium, and Equisetum.

**UNIT-III: PTERIDOPHYTA –Part –B (10 hrs)**

- 1. Structure,** reproduction and life history of Marsilea
2. Heterospory and seed habit
3. Stelar Evolution in Pteridophytes

**UNIT – VI: GYMNOSPERMS (12 hrs)**

- 1. Gymnosperms:** General characters, structure, reproduction and classification.
- 2. Morphology, Anatomy,** reproduction and life history of Pinus and Gnetum.

**UNIT – V: PALAEOBOTANY (10 hrs)**

- 1. Palaeobotany:** Introduction, Fossils and fossilization; Importance of fossils.
- 2. Bennetitiales:** General account.
3. Wielandiella

**Suggested Readings:**

Pandey, B.P 2001. College Botany Vol. I: Algae, Fungai, Lichens, Bacteria, Viruses, Plant pathology, Industrial Microbiology and Bryophyta. S. Chand & company Ltd, New Delhi.

Pandey, B.P 2006. College Botany Vol. II: Pteridophyta, Gymnosperms and paleobotany. S. Chand & company Ltd, New Delhi.

Sporne, K.R, 1965, Morphology of Gymnosperms, Hutchinson Co., Ltd., London.

Vashishta, P.C., A.K. Sinha and Anilkumar. 2006. Botany – Pteridophyta (Vascular Cryptogams), S. Chand & company Ltd, New Delhi.

Vashishta, B.R., A.K. Sinha and Adarshakumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & company Ltd, New Delhi.

Vashishta, P.C., A.K. Sinha and Anilkumar. 2006. Botany for Degree students: Gymnosperms. S. Chand & company Ltd, New Delhi.

Watson.E.V. 1974.The structure and life of Bryophytes, B.I. Publications, New Delhi.

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**I B. SC BOTANY MODEL QUESTION PAPER 2015-2016**

**Time: 3 hours**

**Marks: 70**

**Section – A - Short Questions**

**1. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$**

**Section - B - Essay Questions**

**2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 10 Marks  $5 \times 10 = 50$**

**External 70 marks**

**INTERNAL ASSESMENT**

Two internals - 20marks

Assignments - 5

Seminars - 5

Total = 30 marks

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**I B. Sc – BOTANY PRACTICAL SYLLABUS: PAPER I SEMESTER -I**

**Paper-I-IP: Microbial Diversity, Algae and Fungi**

**Total hours of laboratory Exercises 48 hrs @ 3 per week**

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1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber, Incubator, etc.
2. Preparation of solid and liquid media for culturing of microbes (Demonstration)
3. Study of viruses and bacteria using electron micro photographs
4. Gram staining of Bacteria
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Vein clearing of Bhendi and Leaf curl of Papaya),Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast
6. Vegetative and reproductive structures of the following :
  - a. **Algae:** Oedogonium, Ectocarpus, Polysiphonia, Nostoc and Scytonema
  - b. **Fungi:** Albugo, Penicillium and Puccinia .
7. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus
8. Lichens: Different types of thalli and Anatomy
9. **Field Visit**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, GUDUR (AUTONOMOUS)**

**BOTANY PRACTICAL MODEL PAPER – I  
MICROBIAL DIVERSITY, ALGAE AND FUNGI**

TIME – 3 H

MARKS: 50

1. Identify giving reasons three of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1marks, Diagrams--1marks, Identification--1mark, classification –1 mark) 3x 4 = 12 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of Internal structure--identify giving reasons. Draw labeled diagrams and leave your preparations For evaluation.(Slide-3 marks, diagrams- 2marks, Identification-3 marks) 8 Marks

3. Conduct C. - Gram staining of Bacteria 5 Marks.

4. Write critical notes and Identify D, E, F, G and H 5x3= 15 Marks.

5. Record (submission is compulsory) 5 Marks.

6. Viva –Voce 5 Marks

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Total: 50 Marks  
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**Key:**

- A. Algal material
- B. Fungi material
- C. Bacterial material.
- D. Instruments of Micro biology.
- E. Whole specimen or permanent slide of Algae.
- F. Whole specimen or permanent slide of Fungi.
- G. Whole specimen or permanent slide of plant pathology.
- H Whole specimen or permanent slide of Lichens

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**I B.Sc II SEMESTER BOTANY PRACTICAL SYLLABUS**

**Paper—II P: Bryophyta, Pteridophyta, Gymnosperms & Palaeobotany**

**Total hours of laboratory Exercises 48 hrs @ 3 per week**

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1. Morphology (vegetative and reproductive structures) , anatomy of the following taxa

**1. Bryophyta:**

- a) Marchantia,
- b) Anthoceros,
- c) Polytrichum

2. **Pteridophyta:**

- a) Lycopodium,
- b) Equisetum,
- c) Marsilea,

3. **Gymnosperms:**

- a) Pinus
- b) Gnetum
- c) Fossil Gymnosperms/ Photographs



**DUVVURU RAMANAMMA WOMEN'S COLLEGE, GUDUR (AUTONOMOUS)**

**I BSc II SEMESTER BOTANY PRACTICAL MODEL PAPER – II**  
**Paper—II P: Bryophyta, Pteridophyta, Gymnosperms & Palaeobotany**

Q. 1. Section cutting (Bryophyta) A	--	10 Marks
(Slide-5, Diagram—3, Notes—2)		
Q.2. Section cutting (Pteridophyta) B	--	9 Marks
(Slide--4 Diagram—3, Notes—2)		
Q.3. Section cutting (Gymnosperms) C	--	9 Marks
(Slide--4 Diagram—3, Notes—2)		
Q.4. Spotless 4 slides D, E, and F	--	(3X4) =12 Marks
(Identification—1, Diagram—1, Notes—2)		
(D-Bryophyta, E- Pteridophyta, F- Gymnosperms, or Palaeobotany)		
Q.5. Record	--	5 Marks
Q.6. Viva – Voce	--	05 Marks
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		50 Marks
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**Botany II B. Sc III Semester Syllabus**

**PAPER – III; Taxonomy and Medicinal Botany**

**(Total Hours of Teaching: 66 @ 4h/week)**

**UNIT – I : 1. Classifications (20h)**

- 1.1. Types of classification: Artificial, Natural and phylogenetic
- 1.2. Systems of classification Salient features and comparative account of Bentham & Hooker and Engler & Prantel
- 1.3. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code-
- 1.4. A brief account- Herbarium, Concept, techniques and applications.
- 1.5. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy.

**UNIT-II: 2.0 Systematic study and Economic importance of plants (20h)**

- 2.1 Families: Capparedaceae, Rutaceae
- 2.2. Caesalpinaceae, Fabaceae, Mimosaceae
- 2.3 Cucurbitaceae,Apiaceae
- 2.4 Asteraceae,Asclepiadaceae,Lamiaceae
- 2.5 Euphorbiaceae
- 2.6 Orchidaceae ,Poaceae

**UNIT– III :3.0: Medicinal Botany (12h)**

- 3.1. Ethno medicine: Scope, interdisciplinary nature, distinction of Ethno medicine from Engler & Prantel
- 3.2. Outlines of Ayurveda systems of traditional medicine.
- 3.3. Siddha systems of traditional medicine.
- 3.4. Homeopathic systems of traditional medicine.
- 3.5. Role of AYUSH, NMPB, CIMAP& CDRI.

**UNIT-IV4.0. Plants in Health care (14h)**

- 4.1. Taxonomic pharmacological studies, active principlesand uses of following Medicinal Plants-Root- Rauwolfia Serpentina,Rhizome- Zingeber , Datura.
- 4.2. Leaf: - Vinca and Neem
- 4.3. Fruit: - Amla, Seed: - Coriandrum
- 4.4. Identification, Prevention of Adulteration plant crude drugs, Indian pharmacopoeia
- 4.5. Plant crude drugs types, methods of collection, processing and storage practices and Evaluation crude drugs

## Reference Books:

- Davis, P.H. AND v.h.Heywood.1963.Principles of Angiosperm Taxonomy.Oliver and Boyd, London.
- Heywood, V.H.1965.Plant Taxonomy.ELBS, London.
- Heywood, V.H. AND d.m.Moore (Eds). 1984. Current Concepts in plant Taxonomy.Academic press, London.
- Jain, S.K. and V.Mudgal. 1999. A Handbook of Ethnobotany.Bishen Singh Mahendra Pal Singh, Dehradun.
- Jeffrey, C.1982.An Introduction to plant Taxonomy, Cambridge University press, Cambridge. London.
- Johri, S.G. 2000.Medicinal plants.Oxford and IBH, New Delhi.
- Kokate, C.and Gokeale-Pharmacognacy-Nirali Prakashan, New Delhi.
- Lad, V.1984.Ayurveda-The Science of self-healing.Motilal Banarasidass, New Delhi.
- Lewis, W.H. and M.P.F.Elwin Lewis. 1976. Medical Botany.plants Affecting Man's Health.A Wiley Inter science publication. John Wiley and Sons, New York.
- Pandey, B.P. 2007. Botany for Degree Students: Diversity of Seed plants and their Systematics, Structure, Development and Reproduction in Flowering plants.S.Chand & Company Ltd, New Delhi.
- Rastogi, R.R.and B.N.Mehrotra. 1993. Compendium of Indian Medicinal plants.Vol.I & Vol.II. CSIR, Publication and Information Directorate, New Delhi.
- Sivarajan, V.V. and I.Balasubramaniyan. 1994. Ayurvedic Drugs and their plant sources.Oxford and IBH, New Delhi.
- Stace, C.A. 1989.Plant Taxonomy and Biostatistics (2<sup>nd</sup> Ed.).Edward Arnold, London.
- Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.

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**Botany II B. Sc IV Semester Syllabus**

**Paper – IV; Plant Anatomy, Embryology W. e. f 2014-2015**

**(Total Hours of Teaching: 54 @ 4h/Week)**

**UNIT-I: 1.0 Meristems, Tissues and Leaf (14h)**

- 1.1. Meristems: Types, histological organization of shoot apices and theories.
- 1.2. Histological organization of root apices and theories.
- 1.3. Tissues and Tissue Systems, Simple tissues -Parenchyma, Collenchyma, Sclerenchyma  
Complex tissues-Xylem, Phloem
- 1.4. Epidermal, ground, vascular tissue systems.
- 1.5. Leaf: Internal structure of mesophyte, xerophytes, hydrophytes

**UNIT-II: 2.0 Vascular cambium and wood structure (12h)**

- 2.1. Anomalous secondary growth of Stems and root, Growth of stems of Boerhavia, Bignonia, Dracaena
- 2.2. Anomalous secondary, growth in Beetroot
- 2.3. Wood structure: General account
- 2.4. Study of local timbers-Teak (*Tectona grandis*), Rosewood, (*Alberialatefolia*) Red sanders, (*Pterocarpus santalinus*)
- 2.5 Nallamaddi (*Terminalia tomentosa* (T.alata) Yegisa (*Pterocarpus marsupium*) and Neem (*Azadirachta indica*)

**Unit –III: 3.0 Sporogenesis (14h)**

- 3.1. Introduction: History and importance of Embryology.
- 3.2. Anther structure, Microsporogenesis
- 3.3. Development of male gametophyte.
- 3.4. Ovule structure, Types and parts of ovule
- 3.5. Megasporogenesis: types and development of female gametophyte.  
Monosporic, Bisporic, Tetrasporic types

**Unit-IV : 4.0 Fertilization (14h)**

- 4.1. Fertilization and post fertilization changes
- 4.2. Endosperm –Development of Nuclear Endosperm, Cellular Endosperm, Helobial Endosperm
- 4.3. Embryo-genesis and types (Dicot, Monocot, *Luzula*)
- 4.4. Polyembryony
- 4.5. Palynology: Principles and applications.

## **Reference Books:**

- Bhattacharya et.al.2007.A textbook of palynology, Central, New Delhi.
- Bhojwani, S.S.and S.P.Bhatnagar.2000.The Embryology of Angiosperms (4<sup>th</sup> Ed.), Vikas Publishing House, Delhi.
- Esau, K.1971.Anatomy of Seed plants.John Wiley and Son, USA.
- Johri, B.M. 1984.Embryology of Angiosperms.Springer-Verleg, Berlin.
- Kapil, R.P.1986.Pollination Biology.Inter India Publishers, New Delhi.
- Maheswari, P.1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.
- Esau's plant Anatomy Meristems, Cell and Tissues of the plant Body.
- A.D.A.M-Student Atlas of Anatomy.
- Histology & Anatomy.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**II B. Sc Botany Practical syllabus**

**Practical – II: Anatomy, Embryology, Taxonomy and Medicinal Botany**

**(Total Hours of Laboratory Exercises: 90 @ 3h/week in 30 Sessions)**

**Suggested Laboratory Exercises:**

1. Demonstration of double staining technique. (3h)
2. Tissue organization in root and shoot apices using permanent slides (3h)
3. Preparation of double staining slides  
Anomalous secondary structure: Examples as given in theory  
Syllabus. Achyrnthus, Boerhavia, Bignonia and Dracaena (6h)
4. Stomatal types using epidermal peels. (3h)
5. Microscopic study of wood in T.S., T.L.S. and R.L.S. Specimens /Slides (6h)
6. Structure of anther and microsporogenesis using permanent slides. (3h)
7. Structure of pollen grains using whole mounts (Catharanthus, Hibiscus, Acassia, Grass). (3h)
8. Study of ovule types and developmental stages of Embryosac Slides (3h)
9. Structure of Endosperm (NUCLEAR AND CELLULAR); Developmental stages of dicot and monocot Embryos using permanent slides. (3h)
10. Systematic study of locally available plants belonging to the families prescribed in theory syllabus (Minimum of one plant representative for each family) (18h)
11. Local field visits to study the vegetation and flora. (6h)
12. Identification and Detailed account of active principles of medicinally important parts of locally available plants parts vinca etc. Ascovered in theory (a minimum 10 plants) used in traditional medicine. (12h)
13. Field visitors to identify and collection Ethno medicinal plants used by local tribes / Folklore. (3h)
14. Preparation and submission of 25 Taxonomy 10 and medicinal plants herbarium

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, (Autonomous) GUDUR**  
**II BSC BOTANY MODEL PAPER – II**  
**Practical-II Anatomy, Embryology, Taxonomy and Medicinal Botany**  
**Time 3h** **Max Marks 50**

1. Make suitable stained preparation of the material “A” to bring out the details of internal structure – identify with reasons. Draw labeled diagrams and leave your preparations for the evaluation (Slide --- 5 marks, Diagram --- 3 marks, Identification –2 marks.) 10 marks
2. Give complete technical description of Specimen “B”. Draw labeled diagrams of vegetative and floral parts, floral diagram. Floral formula, L.S. of flower, T.S of ovary identify with reasons.) (Vegetative characters –2 marks; floral characters – 4 marks ,Twig Diagram.1M L.S of Flower-1M , T.S of ovary-1M , Floral diagram-2M , Floral formula-1M , Identification characters-2M.) 14 marks
3. Identify and write active principle chemicals and uses of the material C  
(Identification -2M, Chemicals and uses-2M , Diagrams-2M) 6marks
4. Identify and write notes on “D”  
Identification-1M, Notes-2M, Diagrams-2M) 5mar
5. Viva-voice 5marks.
6. Herbarium and field notes  
(Herbarium-3M, Field notes-2M) 5 marks.
7. Record submission is compulsory. 5marks.

**Key:**

- A. Anatomy : Anomalous secondary structure as covered in theory syllabus
- B. Taxonomy : specimen worked out in lab covered in theory syllabus
- C. Medicinal Botany : worked out in lab covered in theory syllabus
- D. Embryology slides
- E. Viva voce ( Questions as per the practical record done by student)

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**BOTANY - III B. SC: V- SEMESTER SYLLABUS w. e. f 2013-2014**  
**PAPER- V: CELL BIOLOGY AND GENETICS**  
**(Total hours of teaching: 46 @ 3 h/week)**

**UNIT - I 1.0 Ultra structure of cell envelopes and Nucleus (10h)**

- 1.1 Plant cell envelopes: Ultra structure of cell wall
- 1.2 Molecular organization of cell membrane
- 1.3. Ultra structure of Nucleus
- 1.4 Nucleic acids-Structure and replication of DNA: types and functions of RNA

**UNIT-II 2.0. Chromosomes and Cell Division (12h)**

- 2.1. Chromosomes: Morphology
- 2.2. Organization of DNA in a Chromosome
- 2.3. Euchromatin and Heterochromatin, Karyotype, Special types of chromosomes- Lamp brush, Polytene and B-Chromosomes.
- 2.4. Mitosis, Meiosis, Cell cycle and its regulation

**UNIT-III 3.0 Genetics (12h)**

- 3.1. Mendelism: Laws of inheritance
- 3.2 Genetic interactions-Epistasis, Complementary, Supplementary and inhibitory genes
- 3.3. Linkage and crossing over
- 3.4. Genetic maps

**UNIT-IV 4.0 Molecular biology of Cell (12h)**

- 4.1. Mutations: Chromosomal aberrations-Structural and numerical changes.
- 4.2. Gene mutations
- 4.3. Transcription, Genetic code, Translation.
- 4.4 Mechanism and regulation of gene expression in prokaryotes
- 4.5. Extra nuclear genome: Plasmids



## REFERENCE BOOKS :-

- Fukui,K.and S.Nakayama.1996.Plant Plant Chromosomes:Laboratory Methods.CRC Press,Boca Raton, Florida.
- Harris,N.and K.J.Oparka.1994.Plant cell Biology:A Practical Approach.IRL press at University press,Oxford.UK.
- Pandey,B.P.2007.Botany for Degree Students : Diversity of Microbes,Croptogams,Cell Biology and Genetics.S.Chand & Company Ltd.,New Delhi.
- Sharma,A.K. and A.Sharma 1999.Plant Chromosomes :Analosis,Maniculation and Engineering. Harwood Academic Publishers,Australia.
- Shukla,R.S.and P.S.Chandle.2007.Cytogenetics,Evolution,Biostatistics and plant Breeding.S.Chand and Company Ltd.,New Delhi.
- Snustad,D.P.and M.J.Simmons.2000.Principals of Genetics.John wiley and Sons,inc.,U.S.A
- Strickberger,M.W.1990.Genetics (3<sup>rd</sup> ED.).Macmillan publishing company.

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**BOTANY - III B. Sc: V - Semester Syllabus**

**PAPER - VI: PLANT PHYSIOLOGY w. e. f 2013-2014**

**(Total hours of teaching: 48 h @ 3 h/week)**

**UNIT-I1.0.Water Relations**

**(12h)**

- 1.1. Importance of Water to Plant Life
- 1.2. Diffusion, Imbibition, Osmosis: Water, Osmotic and Pressure Potentials,
- 1.3. Ascent of Sap
- 1.4. Transpiration: Stomata Structure and Movements.
- 1.5. Mineral Nutrition: Essential Macro Mineral Nutrients and Their Role: Symptoms of Mineral Deficiency
- 1.6. Absorption of Mineral Ions: Passive and Active Processes.
- 1.7. Enzymes: Nomenclature, Characteristics, Mechanism and Regulation of Enzyme Action, Enzyme Kinetics, Factors Regulating Enzyme Action.

**UNIT-II 2.0.Photosynthesis**

**(12h)**

- 2.1. Photosynthetic pigments
- 2.2. Absorption and action spectra; Red drop and Emerson enhancement effect
- 2.3. Concept of two photo systems; mechanism of Photosynthetic
- 2.4. Electron transport and Evolution of Oxygen photophosphorylation;
- 2.5. Carbon assimilation pathways: C3, C4 and CAM;
- 2.6 Photorespiration
- 2.7 Translocation of organic substances: Mechanism of Phloem Transport; source sink Relationships

**UNIT-III 3.0 Respiration and nitrogen metabolism**

**(14h)**

- 3.1. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle;
- 3.2. Electron transport system mechanism of oxidative phosphorylation,
- 3.3. Pentose phosphate pathway. Nitrogen Metabolism
- 3.4. Biological nitrogen fixation
- 3.5. Nitrate reduction
- 3.6. Ammonia assimilation.
- 3.7. Protein synthesis.

**UNIT-IV4.0. Growth and development**

**(10h)**

- 4.1. Structure and functions of lipids
- 4.2. Conversion of lipids to carbohydrates-Oxidation
- 4.3. Growth and Development: Definition, Phases and kinetics of growth
- 4.4. A. physiological effects of phytohormon-auxins  
B. Gibberellins cytokinins  
C. ABA and ethylene
- 4.5. Physiology of flowering photoperiodism and Vernalization.
- 4.6. Role of phytochrome in flowering.

**REFERENCE BOOKS:-**

- Hopkins, W.G. 1995. Introduction to plant physiology. Jhon wiley & Sons Inc., New York, USA
- Pandey, B.P. 2007. Botany for Degree Students: Plant physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S.Chandan and Company Ltd., New Delhi.
- Salisbury, F. B. and C.W. Ross. 1992. Plant Physiology (2<sup>nd</sup> Ed). Sinauer Associates, Inc., Publishers, Massachusetts, USA.

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**BOTANY - III B. Sc: VI - Semester Syllabus**

**PAPER - VII: ECOLOGY AND BIODIVERSITY w. e. f 2013-2014**

**(Total hours of teaching: 42H @ 3 h/week)**

**UNIT – I1 .0: Introduction of Ecology (12h)**

- 1.1. Concept and components of Ecosystem.
- 1.2. Energy flow, food chains, food webs
- 1.3. Ecological pyramids,
- 1.4. Plants and Environment: Ecology factors-Climatic (Light and temperature), edaphic.
- 1.5. Ecological adaptations of plants

**UNIT-II 2.0. Population and production Ecology (10h)**

- 2.1. Population Ecology: Natalty, Mortality, growth curves, ecotypes, ecads.
- 2.2. Community ecology: Ecological succession (Hydrosere, Xerosere)
- 2.3. Production ecology: Concepts of productivity, GPP, NPP, CR (Community Respiration)
- 2.4. Secondary production/R ratio and Ecosystems.

**UNIT – III 3.0. Biodiversity and Conservation (10h)**

- 3.1. Concepts, Convention on Biodiversity-Earth Summit.
- 3.2. Types of biodiversity.
- 3.3. Levels, threats and values of Biodiversity.

**UNIT-IV4.0 Agro-biodiversity (8h)**

- 4.1 Agro-biodiversity Vavilov centers of crop plants,
- 4.2. Principles of Conservation
- 4.3. IUCN threat-categories
- 4.4. RED data book-threatened & endangered plants of India.
- 4.5 Role of organizations in the conservation of Biodiversity –IUCN, UNEP, WWF, NBPGR, NBD

**REFERENCE BOOKS :**

- Kormondye,E.1989.Concepts of Ecology (3<sup>rd</sup> ED).Printice Hall of India,New Delhi
- Kothari,A.1997.Understanding Biodiversity :Life,Sustainability and Equity:Tracts for theTimes.11.Orient Longman Ltd.,New Delhi.
- Michael,S.1996.Ecology.Oxford University press,London.
- Mishra,D.D.2008.Fundamental Concepts in Environmental Studies.S.Chand & Company Ltd., New Delhi
- Odum,E.P.1983.Basics of Ecology Saunder's International Students Edition,Philadelphia
- Singh,H.R.2005.Environmental Biology.S.Chand and Company Ltd.,New Delhi.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

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**BOTANY - III B. Sc: VI - Semester Syllabus**

**PAPER: VIII Plant Tissue Culture, Biotechnology, Seed technology and Horticulture.**

**(Total hours of teaching: 42 @ 3 h/week)**

**UNIT-I1.0. Tissue Culture**

**(12h)**

- 1.1. Tissue culture: Introduction
- 1.2. Sterilization procedures
- 1.3. culture media-composition and preparation
- 1.4. Explants.
2. Callus culture; cell and protoplast culture, Somatic hybrids and cybrids.
3. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, Secondary metabolites and synthetic seeds.

**UNIT-II2.0. Biotechnology**

**(8h)**

- 2.1. Introduction, history and scope.
- 2.2. rDNA technology    2.3. Vectors and gene cloning    2.4. Transgenic plants

**UNIT-III 3.0. Seed technology**

**(10h)**

- 3.1. Seed: Seed dormancy; causes and methods of breaking dormancy.
- 3.2. Seed storage: Seed banks, factors affecting
- 3.3. Seed viability    3.4. Genetic erosion.
- 3.5. Seed production technology.    3.6. Seed testing    and certification.

**UNIT-IV4.0. Horticulture**

**(14h)**

- 4.1. Horticulture Introduction
- 4.2. Cultivation of ornamental plants and vegetable gardening    Cultivation of vegetable crops.
- 4.3. Bonsai    4.4. Landscaping
- 4.5. Floriculture: Introduction. Importance of green house, poly house, mist chamber, shade nets  
Micro irrigation systems.
- 4.6. Floriculture potential and its trade in India
- 4.7. Vegetative propagation of plants: Stem, root and leaf cuttings. Layering and bud grafting.  
Role of plant growth regulators in horticulture

**REFERENCES:**

- Adams,C.R.,K.M.Banford and M.P.Early.1993.Principles of Horticulture.Butterworth Heineman Ltd.,London.
- Agrawal,P.K.1993.Hand Book of Seed Technology.Dept.of Agriculture and Cooperation.National Seed Corporation Ltd.,New Delhi
- Balasubramanian,D.,C.F.A.Bryce,K.Dharmalingam,J.Green and K.Jayaraman.2004.Biotechnology.University press (India) Private Limited,Hyderabad.

- Bedell, Y.E. Seed science and Technology. India forest species. Allied Publishers Limited. New Delhi. Channarayappa. 2007. Molecular Biotechnology-Principles and Practices. Universities press (India) Private Limited, Hyderabad.
- Chawala, H.S. 2002. Introduction to plant Biotechnology. Oxford and IBH Publishing Company, New Delhi.
- Dubey, R.C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
- Edmond, J.B., T.L. Senn, F.S. Adreus and R.J. Halfacre. 1997. Fundamentals of Horticulture (4<sup>th</sup> Ed.). Tata McGraw-Hill, New Delhi.
- Gorer, R. 1978. The Growth of Gardens. Faber and Faber Ltd., London
- Hartman, H. T. and D.E. Kestler. 1976. Plant propagation: Principles and practices. Prentice and hall of India, New Delhi.
- Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand And Company Ltd., New Delhi.
- Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities press (India) Private Limited, Hyderabad.
- Janick Jules. 1979. Horticulture Science. (3<sup>rd</sup> Ed). W.FH. Freeman and Co., San Francisco, USA.
- Lewin, B. 1994. Genes V. Oxford University Press., Oxford.
- Lewin, B. 2002. Genes VII. Oxford University Press., Oxford.
- Ramawat, K.G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
- Rao, K.M. 1991. A Text Book of Horticulture. McMillan India Ltd, New Delhi.

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**III B. Sc BOTANY Model Question Paper**

**Time 3 hours**

**Marks 70**

**The Question Paper Pattern is as Follows**

**Section – A - Essay Questions**

**From each Unit 2 Essay Questions with Internal choice Each Essay  
Question Carries 10 Marks  $4 \times 10 = 40$**

**Section - B - Short Questions**

**Ten Questions are given, Students have Answer 6  
Questions Each Question Carries 5 Marks  $6 \times 5 = 30$**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, (Autonomous) GUDUR**  
**PRACTICAL-III: CELL BIOLOGY, GENETICS, ECOLOGY AND BIODIVERSITY**

**(Total Hours of Laboratory Exercises: 90 @ 3h/Week in 30 Sessions)**

**Suggested Laboratory Exercises:**

1. Study of various Stages of mitosis using cytological preparation of Onion root tips (6h)
2. Study of various Stages of meiosis using cytological preparation of Onion flower buds (12h)
3. Study of Polytene Chromosomes using cytological preparation of Salivary glands from Chironomus/prepared slides/photographs (3h)
4. Study on the Ultra structure of cell organelles using electron microphotographs (6h)
5. Solving genetic problems related to Monohybrid,(two)Dihybrid ratio(two) and interaction of genes(six)(minimum of eight problems). (18h)
6. Knowledge of ecological instruments: Working principles and applications of Hygrometer, rain gauge, anemometer, altimeter, light meter, wet and dry bulb thermometer (with the help of Equipment/diagrams/photographs). (6h)
7. Determination of soil texture (composition of clay, sand, silt etc.by sieve method.)& PH (6h)
8. Study of morphological and anatomical characteristics of plant communities using locally available plant species: Hydrophytes(Eichhornia Root,Hidrilla Stem,Nymphaea Petiole,)Xerophytes (Causuarina Anatomy,and Opuntia,Euphorbia antiquorum Morphology) and Halophytes (Rhizophora,and Avecenia-Root) (12h)
9. Detailed study on flora of a local fresh water or aquaculture pond. (6h)
10. Geographical spotting of certain endemic and endangered plant species of A.P (3h)
- 11 Minimum of two field visits to local areas of ecological/conservation of biodiversity importance (Sacred grove/Reserved forest/Botanical garden/Zoo park/Lake etc.) (6h)



**DUVURU RAMANAMMA WOMENS COLLEG (AUTONOMOUS), GUDUR**  
**MODEL QUESTION PAPER FOR PRACTICAL EXAMINATION**  
**BOTANY- PRACTICAL PAPER – III**  
**PRACTICAL-III: CELL BIOLOGY, GENETICS, ECOLOGY AND BIODIVERSITY**

**TIME: 3Hours**

**MAX. MARKS: 50**

1. Identify the material ‘A’ by application of the squash technique (8 M)  
(Scheme of valuation: Procedure-2M+Experimentation-4M+Observation or recording of results with diagrams-2M)
2. Solve the “B” problem with the given data and explain in detail (8M)  
(Scheme of valuation: Checker board preparation – 4M+Discussion-4M)
3. Make suitable stained preparation of the material “C” and identify the material with the help of the (8M)  
(Scheme of valuation: Section cutting – 4M+Identification with reasons – 2M+Diagram – 2M)
4. Conduct “D” Minor Ecology Experiment: (5M)  
(Scheme of valuation: Procedure – 2M+Conducting the Experiment-2M+results-1M)
5. Critical notes on “E,F,G spotters of scientific interest: (9M)  
(Scheme of valuation: Identification – 1M+Notes – 1+diagram – 1M for each spotter)
6. Viva-Voce (Interactive testing): (5M)  
To assess soft skills and involvement of student in doing laboratory exercises
7. Record submissions is Compulsory:-Including a brief on field visit (7M)

**Key:**

- A: Root tip of Onion
- B: Genetic problem
- C: Ecology Material Section Cutting
- D: Soil test
- E: Cytology slides – Mitosis stages, lamp brush chromosomes, Polytene Chromosomes, Karyotype.
- F: Ecology material – Morphology of any specimen studied in theory
- G: Biodiversity – Any endemic plant studied.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, (Autonomous) GUDUR**

**III BSC BOTANY PRACTICAL SYLLABUS PAPER IV**

**Paper – IV: Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture**

**(Total Hours of Laboratory Exercises: 90@ 3h/Week in Sessions)**

**Suggested Laboratory Exercises:**

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rhoeo/Tradescantia. (3h)
2. Determination of rate of transpiration using cobalt chloride method/Ganong's photometer. (6h)
3. Study of mineral deficiency symptoms using plant material/photographs. (6h)
4. Determination of catalase activity using potato tubers by titration method. (3h)
5. Separation of chloroplast pigments using paper chromatography technique. (3h)
6. Estimation of protein by biuret method. (3h)
7. Demonstration of seed dressing using fungicide to control diseases. (3h)
8. Demonstration of seed dressing using biofertilizer (Rhizobium) to enrich nutrient supply. (3h)
9. Study on tools/equipment used in horticulture: Rake, hoe, Spade, Trowel, digger, Pick-axe, shade net, Glass house and mist chamber (6h)
10. Demonstration of vegetative plant propagation: Rooting of cuttings – and stem; layering; stem, bud and wedge grafting (12h)
11. Knowledge of instruments and facilities used in plant tissue culture using equipment photographs (Autoclave, laminar Flow, Inoculation Chamber, Incubator, hot air Oven, Inoculation loop) (6h)
12. Study visits to places of horticultural and biotechnological interest-commercial nurseries/Botanical gardens; Biotechnology R & D laboratories/Industries. (12h)

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**  
**MODEL QUESTION PAPER FOR PRACTICAL EXAMINATION**  
**BOTANY - PRACTICAL PAPER – IV**

**Paper – IV: Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture**

**TIME: 3Hours**

**MAX.MARKS:50**

1. Conduct the Major Experiment “A” and discuss the results along with its application. (15M)  
(Scheme of valuation: Aim and apparatus to be submitted in advance – 3M+procedure – 3M+Experimentation – 6M+Observations or recording of results with discussion – 3M)
2. Explain the specimen/charts/setup of “B” in detail with a labeled diagram (8M)  
(Scheme of valuation: Explanation – 4M+Diagram – 4M)
3. Explain or comment on the specimen/chart/setup of “C” in detailed with a labeled diagram (7M)  
( Scheme of valuation: Explanation – 4M+Diagram – 3M)
4. Explain or comment on the specimen/chart/setup of “D” in detailed with a labeled diagram (7M)  
( Scheme of valuation: Explanation – 4M+Diagram – 3M)
5. Viva-Voce(Interactive testing): (6M)  
To assess soft skills and involvement of student in doing laboratory exercises
6. Record submissions is Compulsory:-Including a brief on field visit (7M)

**Key:****A: Physiology Experiments – any one**

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rhoeo/Tradescantia.
2. Determination of rate of transpiration using cobalt chloride method/Ganong's photometer.
3. Determination of catalase activity using potato tubers by titration method.
4. Separation of chloroplast pigments using paper chromatography technique.
5. Estimation of protein by biuret method.
6. Testing of seed Viability using 2,3,5-triphenyl tetrazolium chloride (TTC).

**B: Minor Experiment.**

1. Study of mineral deficiency symptoms using plant material/photographs.
2. Isolation and Estimation of DNA (Demonstration)
3. Demonstration of seed dressing using fungicide to control diseases.
4. Demonstration of seed dressing using biofertilizer (Rhizobium) to enrich nutrient supply.

**C: Plant tissue culture Techniques**

1. Knowledge of instruments and facilities used in plant tissue culture using equipment photographs
2. Study of protocols and photographs/charts related to plant Bio-technology: Isolation of nuclear and plasmid DNA, separation of DNA by gel electrophoresis
3. Study of Biotechnology products: Samples of antibiotics, vaccines, biofertilizers, single cell protein, cosmetics; photographs of transgenic plants, multiple shoots and Artificial/synthetic seeds

**D: Horticulture Techniques**

1. Study on tools/equipment used in horticulture: Rake, hoe, Spade, Trowel, digger, Pick-axe, shade net, Glass house and mist chamber
2. Demonstration of vegetative plant propagation: Rooting of cuttings – and stem; layering ; stem, bud and wedge grafting

**2016-2017**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**

**I B.Sc - SEMESTER- I: Botany Syllabus**

W.e.f. 2016-17 (Revised in April, 2016)

**Paper- I: Microbial Diversity, Algae and Fungi**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)**

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

**UNIT- II: VIRUSES (12hrs)**

1. Viruses- Discovery, general account, structure & replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
2. Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bendi Vein clearing and Papaya leaf curl diseases.

**UNIT III: BACTERIA (12hrs)**

1. Bacteria: Discovery, General characteristics, cell structure and nutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

**UNIT –IV Algae (12hrs)**

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium*, *Ectocarpus* and *Polysiphonia*.

**UNIT V: FUNGI (12hrs)**

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.
4. Mushroom cultivation

**Suggested activity:** Seminar, Quiz, debate, collection of diseased plant parts – studying symptoms and identification of pathogen, collection and study of Fresh and marine Algae available in local area.

**Books for Reference:**

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- **Blackwell**.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
7. Alexopoulos, C.J., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons. Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
8. Webster, J (1999): Introduction to Fungi (2nd edition) Cambridge University Press.

**\*\*Student Activities like Seminars, Assignments, Fieldwork, Study Projects, and Models etc. are Part of Curriculum for all units in all papers.**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B. Sc - SEMESTER- II: BOTANY THEORY SYLLABUS**

**Paper –II: DIVERSITY OF ARCHAEGONIATES & PLANT ANATOMY**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: BRYOPHYTES**

**(12hrs)**

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of *Marchantia*, and *Funaria*.
3. Evolution of Sporophyte in Bryophytes.

**UNIT-II:PTERIDOPHYTES**

**(12hrs)**

1. Pteridophytes: General characters, classification (up to Classes)
2. Structure, reproduction and life history of *Lycopodium*, and *Marsilea*.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

**UNIT – III: GYMNOSPERMS**

**(12hrs)**

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy, reproduction and life history of *Pinus* and *Gnetum*
3. Economic importance with reference to wood, essential oils and drugs

**UNIT –I V: TISSUES AND TISSUE SYSTEMS**

**(12hrs)**

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

**UNIT – V. SECONDARY GROWTH**

**(12hrs)**

1. Anomalous secondary growth in *Achyranthes*, *Boerhaavia* and *Dracaena*.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of *Marsilea* sporocarp, *Pinus* needles, male and female cones, study of *Pinus* pollen grains, collection of locally available economically useful timbers.

### Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes New Philologist, Indian Reprint
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta – Vol.II. Bryophyta Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.
6. Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot. Allahabad.
7. Smith, G.M. (1955): Cryptogamic Botany Vol.II (2nd Edn,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, the MacMillan Co., N.Y. & Collier- MacMillan Ltd., London.
10. Coulter, J.M. & C.J. Chamberlain (1964): Morphology of Gymnosperms Central Book Depot, Allahabad.
11. Sporne, K.R. (1971): The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.
12. Esau, K. (1965): Vascular Differentiation in Plants. Holt, Rinehart & Winston, N.Y., Chicago, San Fransisco, Toronto, London.
13. Eames, A.J., & Mc Daniels, L.H.(1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
14. Esau. K. (1980): Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.



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**BOTANY MODEL QUESTION PAPER I B. SC 2016-2017**

**Time: 3 hours**

**Marks: 70**

**Section – A - Short Questions**

- 1. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all). 5×4=20 marks**

**Section - B - Essay Questions**

- 2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 10 Marks 5×10=50 marks**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B. Sc - SEMESTER –III: BOTANY THEORY PAPER –III**  
**Paper-III: Plant Taxonomy and Embryology)**  
Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12hrs)**

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

**UNIT – II: CLASSIFICATION (12 hrs)**

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

### **UNIT –III: SYSTEMATIC TAXONOMY-I (12hrs)**

1. Systematic study and economic importance of the following families: Brassicaceae, Rutaceae, Leguminaceae (Fabaceae, caesalpinaceae, Mimosaceae), Curcubitaceae, and Apiaceae.

### **UNIT –IV: SYSTEMATIC TAXONOMY-II (12hrs)**

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae, and Poaceae.

### **UNIT – V: EMBRYOLOGY (12hrs)**

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia*, *Drusa*, *Adoxa*) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.
5. Palynology general account only

**Suggested activity:** Collection of locally available plants of medicinal importance, observing pollen grains in honey, aero palynology-collection of pollen from air using glycerin strips in different seasons.

#### **Books for Reference:**

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
3. Jefferey, C. (1968): An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores- Luck now, Ajmer, Allahabad, Delhi.
5. Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed., ) International Society of Plant Morphologists- University of Delhi.
6. Swamy. B.G.L. & Krishnamurthy. K.V. (1980): From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.
7. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
9. Taxonomy: Prof.T.Pullaiiah
10. Taxonomy: Gurucharan singh

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B.Sc. BOTANY, SEMESTER- IV**

**PAPER –IV: PLANT PHYSIOLOGY AND METABOLISM**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: PLANT – WATER RELATIONS (12 hrs)**

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

**UNIT –II: MINERAL NUTRITION & ENZYMES (12hrs)**

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium* outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

**UNIT –III: PHOTOSYNTHESIS (12 hrs)**

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, and carbon assimilation pathways: C3, C4 and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

**UNIT – IV: PLANT METABOLISM (12 hrs)**

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

**UNIT –V: GROWTH AND DEVELOPMENT (12hrs)**

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

**Suggested activity:** Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

**Books for Reference:**

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison- Wesley Publishing Co., Inc. Reading, Massachusetts, Palo Alto, London.
2. Devlin, R.M. (1969): Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
3. Noggle, R. & Fritz (1989): Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M. & Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

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**BOTANY Model Question Paper II B. Sc 2016-2017**

**Time: 3 hours**

**Marks: 70**

**Section – A - Short Questions**

- 1. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$  marks**

**Section - B - Essay Questions**

- 2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 10 Marks  $5 \times 10 = 50$  marks**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B.Sc – SEMESTER –I: BOTANY PRACTICAL SYLLABUS**

**Paper-I: Microbial Diversity, Algae and Fungi**

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following:
  - a) Cyanobacteria: *Nostoc and Scytonema*.
  - b) Algae: *Volvox, Oedogonium, Ectocarpus, Polysiphonia*,
  - c) Fungi: *Rhizopus, Penicillium and Puccinia*.
7. Study of plant material infected by Fungi (Rot of tomatoes, blue and green moulds of Citrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry -identification of different spores)).
8. Lichens: Morphology and anatomy of different thalli.
9. Field Visit.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR B.Sc -**  
**SEMESTER –I BOTANY PRACTICAL PAPER –I**  
***Papoaer-1 P: Microbial Diversity, Algae and Fungi***

Time: 3hrs.

Max. Marks: 50

1. Identify giving reasons two of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1 mark, Diagrams--1 mark, Identification--1 mark)  
2x 3= 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure-- identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)  
10 Marks

3. Perform Gram staining of the given Bacterial culture 9Marks

4. Write critical notes and Identify D, E, F, G and H (5X4) = 20Marks  
(Identification-1marks, classification-1mark, Diagrams-1 mark, notes -1 mark)

5. Record (submission is compulsory) 5Marks

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Total: 50 Marks  
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**Key:**

- A. Algal material
- B. Fungi material
- C. Bacterial culture
- D. One of the instruments of Micro biology laboratory.
- E. Whole specimen or a permanent slide of Algae.
- F. Whole specimen or a permanent slide of Fungi.
- G. Whole specimen or a permanent slide of Plant disease studied.
- H. Whole specimen or a permanent slide of Lichens.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS), GUDUR**  
**I B.Sc SEMESTER -II BOTANY PRACTICAL SYLLABUS**  
**Paper-II: Diversity of Archaeogniates & Plant Anatomy**  
**Total hours of laboratory Exercises 30 hrs @ 2 per week**

1. Morphology (vegetative and reproductive structures), anatomy of the following:

*Marchantia, Funaria, Lycopodium* and *Pinus*.

2. Anatomy:

a) Demonstration of double staining technique.

b) Tissue organization in root and shoot apices using permanent slides

c) Preparation of double staining slides

d) Anomalous secondary structure of *Achyranthes*, *Boerhavia* and *Dracaena*.

e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc., SEMESTER –II: BOTANY PRACTICAL MODEL PAPER II**  
**II P: Diversity of Archaeogniates & plant Anatomy**

1. Section cutting of material - <b>A</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
2. Section cutting of material - <b>B</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
3. Section cutting of material - <b>C</b> (Slide 4 marks, diagrams-3 marks, Identification-3 marks)	10 Marks
4. Identification of spotters - D, E, and F	3x4 =12 marks
5. Record (submission compulsory)	5marks
6. Viva	5marks
<hr/>	
Total : 50 Marks	
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**Key:**

- A. Bryophyta/ Pteridophyta material
- B. Gymnosperm material.
- C. Anatomy material.
- D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta
- E. Whole specimen or permanent slide of Gymnosperm.
- F. Whole specimen or permanent slide of wood.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR II B.Sc**  
**BOTANY - SEMESTER-III**

**Paper-III: PRACTICAL PLANT TAXONOMY AND EMBRYOLOGY**

Total hours of laboratory Exercises 30hrs @ 2 per week

**Suggested laboratory exercises:**

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus*, *Hibiscus*, *Acacia*, and Grass).
4. Demonstration of Pollen viability test using *in-vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis* / *Senna* / *Crotalaria*)
8. Field visits.
9. Study of local flora and submission of Field Note Book.

## Plant Taxonomy And Embryology

(Description- vegetative - 4 marks, floral characters – 5 marks; Twig with inflorescence -1 mark, L.S. of Flower & T.s. of Ovary--2 marks and floral Diagram--2 marks, floral formula --1 mark )  
1x 15= 15 Marks

3. Identification of spotters D&E (Embryology) 2x5=10 marks  
(Identification -1mark, notes-2marks, diagram-2marks)

5. Viva 5marks

Total : 50 Marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR II B. Sc**  
**BOTANY SEMESTRE- IV**

**Paper-IV: PRACTICAL SYLLABUS**

**PAPER-IV: Plant Physiology and Metabolism**

Total hours of laboratory Exercises 30 hrs @ 2 per week

**Suggested Laboratory Exercises:**

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer. Demonstrations of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of lg photosynthesis under varying Co Concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmot' bubbler.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B. Sc – SEMESTER- IV, BOTANY PRACTICAL MODEL PAPER**  
**PAPER- IV - Plant Physiology and Metabolism**

1. Perform the Experiments A. Give the aim, principle, procedure and observation. Tabulate the results. Draw labeled diagram. 1 x 15 = 15 marks

(Aim-1mark, procedure-3marks, experimentation-5marks, observations & recording of results with discussion-4marks, diagram -2mark)

2. Give the protocol of the experiments B & C 2 x 5 = 10 marks

(Explanation -3marks, diagrams-2marks)

3. Spotters' D, E, F 3x5= 15marks

(Identification -1 mark, notes-2marks, diagram-2marks)

4. Record 5 marks

5. Viva 5 marks

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Total: 50 marks  
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**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**(Re-Accredited by NAAC with 'A' Grade)**

**BOTANY - III B. SC: V- SEMESTER SYLLABUS W. e. f 2013-2014**

**PAPER- V: CELL BIOLOGY AND GENETICS**

**(Total hours of teaching: 46 @ 3 h/week)**

**UNIT - I 1.0 Ultra structure of cell envelops and Nucleus (10h)**

**1.1 Plant cell envelops: Ultra structure of cell wall**

**1.2 Molecular organization of cell membrane**

**1.3. Ultra structure of Nucleus**

**1.4 Nucleic acids-Structure and replication of DNA: types and functions of RNA**

**UNIT-II 2.0. Chromosomes and Cell Division (12h)**

**2.1. Chromosomes: Morphology**

**2.2. Organization of DNA in a Chromosome**

**2.3. Euchromatin and Heterochromatin, Karyotype, Special types of chromosomes- Lamp brush, Polytene and B-Chromosomes.**

**2.4. Mitosis, Meiosis, Cell cycle and its regulation**

**UNIT-III 3.0 Genetics (12h)**

**3.1. Mendelism: Laws of inheritance**

**3.2 Genetic interactions-Epistasis, Complementary, Supplementary and inhibitory genes**

**3.3. Linkage and crossing over**

**3.4. Genetic maps**

**UNIT-IV 4.0 Molecular biology of Cell (12h)**

**4.1. Mutations: Chromosomal aberrations-Structural and numerical changes.**

**4.2. Gene mutations**

**4.3. Transcription, Genetic code, Translation.**

**4.4 Mechanism and regulation of gene expression in prokaryotes**

**4.5. Extra nuclear genome: Plasmids**

## REFERENCE BOOKS :-

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- Harris,N.and K.J.Oparka.1994.Plant cell Biology:A Practical Approach.IRL press at University press,Oxford.UK.
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- Sharma,A.K. and A.Sharma 1999.Plant Chromosomes :Analosis,Maniculation and Engineering. Harwood Academic Publishers,Australia.
- Shukla,R.S.and P.S.Chandle.2007.Cytogenetics,Evolution,Biostatistics and plant Breeding.S.Chand and Company Ltd.,New Delhi.
- Snustad,D.P.and M.J.Simmons.2000.Principals of Genetics.John wiley and Sons,inc.,U.S.A
- Strickberger,M.W.1990.Genetics (3<sup>rd</sup> ED.).Macmillan publishing company.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**(Re - Accredited by NAAC with 'A' Grade)**

**Botany - III B. SC: V - Semester Syllabus w. e. f 2013-2014**

**Paper - VI: Plant Physiology**

**(Total hours of teaching: 48 h @ 3 h/week)**

**UNIT-I1.0. Water Relations**

**(12h)**

- 1.1. Importance of water to plant life
- 1.2. Diffusion, Imbibition, Osmosis: Water, Osmotic and pressure potentials,
- 1.3. Ascent of sap
- 1.4. Transpiration: Stomatal structure and movements.
- 1.5. Mineral nutrition: essential macro mineral nutrients and their role: symptoms of mineral Deficiency
- 1.6. Absorption of mineral ions: passive and active processes.
- 1.7. Enzymes: Nomenclature, Characteristics, mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action.

**UNIT-II 2.0. Photosynthesis**

**(12h)**

- 2.1. Photosynthetic pigments
- 2.2. Absorption and action spectra; Red drop and Emerson enhancement effect
- 2.3. Concept of two photosystems; mechanism of Photosynthetic
- 2.4. Electron transport and Evolution of Oxygen photophosphorylation;.
- 2.5. Carbon assimilation pathways: C<sub>3</sub>, C<sub>4</sub> and CAM;
- 2.6 Photorespiration
- 2.7 Translocation of organic substances: Mechanism of Phloem Transport; source sink Relationships

**UNIT-III 3.0 Respiration and nitrogen metabolism**

**(14h)**

- 3.1. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle;
- 3.2. Electron transport system mechanism of oxidative phosphorylation,
- 3.3. Pentose phosphate pathway. Nitrogen Metabolism
- 3.4. Biological nitrogen fixation
- 3.5. Nitrate reduction
- 3.6. Ammonia assimilation.
- 3.7. Protein synthesis.

**UNIT-IV 4.0. Growth and development**

**(10h)**

- 4.1. Structure and functions of lipids
- 4.2. Conversion of lipids to carbohydrates-Oxidation
- 4.3. Growth and Development: Definition, Phases and kinetics of growth
- 4.4. A. physiological effects of phytohormon-auxins  
B. Gibberellins cytokinins  
C. ABA and ethylene
- 4.5. Physiology of flowering photoperiodism and Vernalization.
- 4.6. Role of phytochrome in flowering.



**REFERENCE BOOKS:-**

- Hopkins, W.G. 1995. Introduction to plant physiology. John Wiley & Sons Inc., New York, USA
- Pandey, B.P. 2007. Botany for Degree Students: Plant physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chandan and Company Ltd., New Delhi.
- Salisbury, F. B. and C.W. Ross. 1992. Plant Physiology (2<sup>nd</sup> Ed). Sinauer Associates, Inc., Publishers, Massachusetts, USA.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

**(Re-Accredited by NAAC with 'A' Grade)**

**BOTANY - III B. Sc: VI - Semester Syllabus w. e. f 2013-2014**

**Paper - VII: Ecology and Biodiversity**

**(Total hours of teaching: 42H @ 3 h/week)**

**UNIT – II .0: Introduction of Ecology (12h)**

- 1.1. Concept and components of Ecosystem.
- 1.2. Energy flow, food chains, food webs
- 1.3. Ecological pyramids,
- 1.4. Plants and Environment: Ecology factors-Climatic (Light and temperature), edaphic.
- 1.5. Ecological adaptations of plants

**UNIT-II 2.0. Population and production Ecology (10h)**

- 2.1. Population Ecology: Natality, Mortality, growth curves, ecotypes, ecads.
- 2.2. Community ecology: Ecological succession (Hydrosere, Xerosere)
- 2.3. Production ecology: Concepts of productivity, GPP, NPP, CR (Community Respiration)
- 2.4. Secondary production/R ratio and Ecosystems.

**UNIT – III 3.0. Biodiversity and Conservation (10h)**

- 3.1. Concepts, Convention on Biodiversity-Earth Summit.
- 3.2. Types of biodiversity.
- 3.3. Levels, threats and values of Biodiversity.

**UNIT-IV 4.0 Agro-biodiversity (8h)**

- 4.1 Agro-biodiversity Vavilov centres of crop plants,
- 4.2. Principles of Conservation
- 4.3. IUCN threat-categories
- 4.4. RED data book-threatened & endangered plants of India.
- 4.5 Role of organizations in the conservation of Biodiversity –IUCN, UNEP, WWF, NBPGR, NBD

**REFERENCE BOOKS :**

- Kormondye, E. 1989. Concepts of Ecology (3<sup>rd</sup> ED). Printice Hall of India, New Delhi
- Kothari, A. 1997. Understanding Biodiversity : Life, Sustainability and Equity: Tracts for the Times. 11. Orient Longman Ltd., New Delhi.
- Michael, S. 1996. Ecology. Oxford University press, London.
- Mishra, D. D. 2008. Fundamental Concepts in Environmental Studies. S. Chand & Company Ltd., New Delhi
- Odum, E. P. 1983. Basics of Ecology Saunder's International Students Edition, Philadelphia
- Singh, H. R. 2005. Environmental Biology. S. Chand and Company Ltd., New Delhi.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**  
**(Re-Accredited by NAAC with 'A' Grade)**  
**BOTANY - III B. Sc: VI - Semester Syllabus**  
**PAPER: VIII Plant Tissue Culture, Biotechnology, Seed technology and Horticulture.**  
**(Total hours of teaching: 42 @ 3 h/week)**

**UNIT-II1.0. Tissue Culture**

**(12h)**

- 1.1. Tissue culture: Introduction
- 1.2. Sterilization procedures
- 1.3. culture media-composition and preparation
- 1.4. Explants.
2. Callus culture; cell and protoplast culture, Somatic hybrids and cybrids.
3. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, Secondary metabolites and synthetic seeds.

**UNIT-II2.0. Biotechnology**

**(8h)**

- 2.1. Introduction, history and scope.
- 2.2. rDNA technology
- 2.3. Vectors and gene cloning
- 2.4. Transgenic plants.

**UNIT-III3.0. Seed technology**

**(10h)**

- 3.1. Seed: Seed dormancy; causes and methods of breaking dormancy.
- 3.2. Seed storage: Seed banks, factors affecting
- 3.3. Seed viability
- 3.4. Genetic erosion.
- 3.5. Seed production technology.
- 3.6. Seed testing and certification.

**UNIT-IV4.0. Horticulture**

**(14h)**

- 4.1. Horticulture Introduction
- 4.2. Cultivation of ornamental plants and vegetable gardening Cultivation of vegetable crops.
- 4.3. Bonsai
- 4.4. Landscaping
- 4.5. Floriculture: Introduction. Importance of green house, poly house, mist chamber, shade nets Micro irrigation systems.
- 4.6. Floriculture potential and its trade in India
- 4.7. Vegetative propagation of plants: Stem, root and leaf cuttings. Layering and bud grafting. Role of plant growth regulators in horticulture

## REFERENCES:

- Adams,C.R.,K.M.Banford and M.P.Early.1993.Principles of Horticulture.Butterworth Heineman Ltd.,London.
- Agrawal,P.K.1993.Hand Book of Seed Technology.Dept.of Agriculture and Cooperation.National Seed Corporation Ltd.,New Delhi
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- Tunwar, N.S. and S.V.Singh.1988.India Minimum Seed Certification Standers. The Central Seed Certification Board, Govt. of India, New Delhi.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

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**Recognized by UGC as "College with Potential for Excellence"**

**III B. Sc BOTANY Model Question Paper**

**Time 3 hours**

**Marks 70**

**The Question Paper Pattern is as Follows**

**Section – A - Essay Questions**

- 1. From each Unit 2 Essay Questions with Internal choice Each Essay Question Carries 10 Marks  $4 \times 10 = 40$**

**Section - B - Short Questions**

- 2. Ten Questions are given, Students have Answer 6 Questions Each Question Carries 5 Marks  $6 \times 5 = 30$**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, (Autonomous) GUDUR**  
**III BSC Botany Practical Syllabus**  
**Paper-III: Cell Biology, Genetics, Ecology and Biodiversity**  
**(Total Hours of Laboratory Exercises: 90 @ 3h/Week in 30 Sessions)**  
**Suggested Laboratory Exercises:**

1. Study of various Stages of mitosis using cytological preparation of Onion root tips (6h)
2. Study of various Stages of meiosis using cytological preparation of Onion flower buds (12h)
3. Study of Polytene Chromosomes using cytological preparation of Salivary glands from Chironomus/prepared slides/photographs (3h)
4. Study on the Ultra structure of cell organelles using electron microphotographs (6h)
5. Solving genetic problems related to Monohybrid,(two)Di hybrid ratio(two) and interaction of genes(six)(minimum of eight problems). (18h)
6. Knowledge of ecological instruments: Working principles and applications of Hygrometer, rain gauge, anemometer, altimeter, light meter, wet and dry bulb thermometer (with the help of Equipment/diagrams/photographs). (6h)
7. Determination of soil texture (composition of clay, sand, silt etc.by sieve method.)& PH (6h)
8. Study of morphological and anatomical characteristics of plant communities using locally available plant species: Hydrophytes(Eichhornia Root,Hidrilla Stem,Nymphaea Petiole,)Xerophytes (Causuarina Anatomy,and Opuntia,Euphorbia antiquorum Morphology) and Halophytes (Rhizophora,and Aviceenia-Root) (12h)
9. Detailed study on flora of a local fresh water or aquaculture pond. (6h)
10. Geographical spotting of certain endemic and endangered plant species of A.P (3h)
- 11 Minimum of two field visits to local areas of ecological/conservation of biodiversity importance (Sacred grove/Reserved forest/Botanical garden/Zoo park/Lake etc.) (6h)

**DUVURU RAMANAMMA WOMENS COLLEG (AUTONOMOUS), GUDUR**

**Model Question Paper for Practical Examination**

**III BSC Botany- Practical Paper – III**

**Paper -III: Cell Biology, Genetics, Ecology and Biodiversity**

**TIME: 3Hours**

**MAX. MARKS: 50**

1. Identify the material 'A' by application of the squash technique (8 M)  
(Scheme of valuation: Procedure-2M+Experimentation-4M+Observation or recording of results with diagrams-2M)
2. Solve the "B" problem with the given data and explain in detail (8M)  
(Scheme of valuation: Checker board preparation – 4M+Discussion-4M)
3. Make suitable stained preparation of the material "C" and identify the material with the help of the (8M)  
(Scheme of valuation: Section cutting – 4M+Identification with reasons – 2M+Diagram – 2M)
4. Conduct "D" Minor Ecology Experiment: (5M)  
(Scheme of valuation: Procedure – 2M+Conducting the Experiment-2M+results-1M)
5. Critical notes on "E,F,G spotters of scientific interest: (9M)  
(Scheme of valuation: Identification – 1M+Notes – 1+diagram – 1M for each spotter)
6. Viva-Voce (Interactive testing): (5M)  
To assess soft skills and involvement of student in doing laboratory exercises
7. Record submissions is Compulsory:-Including a brief on field visit (7M)

**Key:**

A: Root tip of Onion

B: Genetic problem

C: Ecology Material Section Cutting

D: Soil test

E: Cytology slides – Mitosis stages, lamp brush chromosomes, Polytene Chromosomes, Karyotype.

F: Ecology material – Morphology of any specimen studied in theory

G: Biodiversity – Any endemic plant studied.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE, (Autonomous) GUDUR**  
**III BSC Botany Practical Syllabus Paper IV**  
**Paper – IV: Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture**  
**(Total Hours of Laboratory Exercises: 90@ 3h/Week in Sessions)**  
**Suggested Laboratory Exercises:**

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rhoec/Tradescantia. (3h)
2. Determination of rate of transpiration using cobalt chloride method/Ganong's photometer. (6h)
3. Study of mineral deficiency symptoms using plant material/photographs. (6h)
4. Determination of catalase activity using potato tubers by titration method. (3h)
5. Separation of chloroplast pigments using paper chromatography technique. (3h)
6. Estimation of protein by biuret method. (3h)
7. Demonstration of seed dressing using fungicide to control diseases. (3h)
8. Demonstration of seed dressing using biofertilizer (Rhizobium) to enrich nutrient supply. (3h)
9. Study on tools/equipment used in horticulture:Rake, hoe,Spad,Trowel,digger, Pick-axe,shade net, Glass house and mist chamber (6h)
10. Demonstration of vegetative plant propagation:Rooting of cuttings – and stem; layering;stem, bud and wedge grafting (12h)
11. Knowledge of instruments and facilities used in plant tissue culture using equipment photographs (Autoclave,laminar Flow,Inoculation Chamber,Incubator,hot air Oven,Inoculation loop) (6h)
12. Study visits to places of horticultural and biotechnological interest-commercial nurseries/Botanical gardens; Biotechnology R & D laboratories/Industries. (12h)



**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**  
**Botany Practical Model Paper**  
**III BSC Botany - Practical Paper – IV**  
**Paper – IV: Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture**  
**TIME: 3Hours** **MAX.MARKS:50**

1. Conduct the Major Experiment “A” and discuss the results along with its application. (15M)  
(Scheme of valuation: Aim and apparatus to be submitted in advance – 3M+procedure – 3M+Experimentation – 6M+Observations or recording of results with discussion – 3M)
2. Explain the specimen/charts/setup of “B” in detail with a labeled diagram (8M)  
(Scheme of valuation: Explanation – 4M+Diagram – 4M)
3. Explain or comment on the specimen/chart/setup of “C” in detailed with a labeled diagram  
( Scheme of valuation: Explanation – 4M+Diagram – 3M) (7M)
4. Explain or comment on the specimen/chart/setup of “D” in detailed with a labeled diagram  
( Scheme of valuation: Explanation – 4M+Diagram – 3M) (7M)
5. Viva-Voce(Interactive testing): (6M)  
To assess soft skills and involvement of student in doing laboratory exercises
6. Record submissions is Compulsory:-Including a brief on field visit (7M)

**Key:**

**A: Physiology Experiments – any one**

1. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rhoeo/Tradescantia.
2. Determination of rate of transpiration using cobalt chloride method/Ganong’s photometer.
3. Determination of catalase activity using potato tubers by titration method.
4. Separation of chloroplast pigments using paper chromatography technique.
5. Estimation of protein by biuret method.
6. Testing of seed Viability using 2,3,5-triphenyl tetrazolium chloride (TTC).

**B: Minor Experiment.**

1. Study of mineral deficiency symptoms using plant material/photographs.
2. Isolation and Estimation of DNA (Demonstration)
3. Demonstration of seed dressing using fungicide to control diseases.
4. Demonstration of seed dressing using biofertilizer (Rhizobium) to enrich nutrient supply.

### **C: Plant tissue culture Techniques**

1. Knowledge of instruments and facilities used in plant tissue culture using equipment photographs
2. Study of protocols and photographs/charts related to plant Bio-technology: Isolation of nuclear and plasmid DNA, separation of DNA by gel electrophoresis
3. Study of Biotechnology products: Samples of antibiotics, vaccines, biofertilizers, single cell protein, cosmetics; photographs of transgenic plants, multiple shoots and Artificial/synthetic seeds

### **D: Horticulture Techniques**

1. Study on tools/equipment used in horticulture: Rake, hoe, Spade, Trowel, digger, Pick-axe, shade net, Glass house and mist chamber
2. Demonstration of vegetative plant propagation: Rooting of cuttings – and stem; layering ; stem, bud and wedge grafting

**2017-2018**

**2017-18 BOTANY SYLLABUS**  
**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**  
**I B.Sc - SEMESTER- I: BOTANY SYLLABUS**  
W.e.f. 2016-17 (Revised in April, 2016)  
**Paper- I: Microbial Diversity, Algae and Fungi**  
Total hours of teaching 60hrs @ 4 hrs per week

**UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)**

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

**UNIT- II: VIRUSES (12hrs)**

1. Viruses- Discovery, general account, structure & replication of –T4 Phage (Lytic, Lysogenic) and TMV, Viroids, Prions.
2. Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bendi Vein clearing and Papaya leaf curl diseases.

**UNIT III: BACTERIA (12hrs)**

1. Bacteria: Discovery, General characteristics, cell structure and nutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

**UNIT –IV Algae (12hrs)**

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium*, *Ectocarpus* and *Polysiphonia*.

**UNIT V: FUNGI (12hrs)**

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.
4. Mushroom cultivation

**Suggested activity:** Seminar, Quiz, debate, collection of diseased plant parts –studying symptoms and identification of pathogen, collection and study of Fresh and marine Algae available in local area.

**Books for Reference:**

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- **Blackwell**.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
7. Alexopoulos, C.J., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons. Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
8. Webster, J (1999): Introduction to Fungi (2nd edition) Cambridge University Press.

**\*\*Student Activities like Seminars, Assignments, Fieldwork, Study Projects, and Models etc. are Part of Curriculum for all units in all papers.**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B. Sc - Semester- II: Botany Theory Syllabus**

**Paper –II: Diversity of Archegoniate & Plant Anatomy**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: BRYOPHYTES**

**(12hrs)**

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of Marchantia, and Funaria.
3. Evolution of Sporophyte in Bryophytes.

**UNIT-II:PTERIDOPHYTES**

**(12hrs)**

1. Pteridophytes: General characters, classification (up to Classes)
2. Structure, reproduction and life history of Lycopodium, and Marsilea.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

**UNIT – III: GYMNOSPERMS (12hrs)**

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy, reproduction and life history of Pinus and Gnetum
3. Economic importance with reference to wood, essential oils and drugs

**UNIT –I V: TISSUES AND TISSUE SYSTEMS**

**(12hrs)**

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

**UNIT – V. SECONDARY GROWTH**

**(12hrs)**

1. Anomalous secondary growth in Achyranthes, Boerhaavia and Dracaena.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of Marsilea sporocarp, Pinus needles, male and female cones, study of Pinus pollen grains, collection of locally available economically useful timbers.

### Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes New Philologist, Indian Reprint
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta – Vol.II. Bryophyta Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.
6. Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot. Allahabad.
7. Smith, G.M. (1955): Cryptogamic Botany Vol.II (2nd Edn,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, the MacMillan Co., N.Y. & Collier- MacMillan Ltd., London.
10. Coulter, J.M. & C.J. Chamberlain (1964): Morphology of Gymnosperms Central Book Depot, Allahabad.
11. Sporne, K.R. (1971): The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.
12. Esau, K. (1965): Vascular Differentiation in Plants. Holt, Rinehart & Winston, N.Y., Chicago, San Fransisco, Toronto, London.
13. Eames, A.J., & Mc Daniels, L.H.(1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
14. Esau. K. (1980): Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.

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**I BSC BOTANY MODEL QUESTION PAPER**

**Time: 3 hours**

**Marks: 60M**

**Section – A - Short Questions**

Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  
5×4=20M

**Section - B - Essay Questions**

2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice  
each Question Carries 10 Marks                      5×8=40M

**External 60 marks**

**INTERNAL ASSESMENT**

Two internals     - 20 marks  
Assignments     - 5 marks  
Seminars         - 5 marks  
Objective questions - 10 marks  
Total               = 40 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B. Sc - Semester –III: Botany Theory Paper –III**

**Paper-III: Plant Taxonomy and Embryology)**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: INTRODUCTION TO PLANT TAXONOMY    (12hrs)**

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

**UNIT – II: CLASSIFICATION                      (12 hrs)**

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.

3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

### **UNIT –III: SYSTEMATIC TAXONOMY-I (12hrs)**

1. Systematic study and economic importance of the following families: Brassicaceae, Rutaceae, Leguminaceae (Fabaceae, caesalpinaceae, Mimosaceae), Curcubitaceae, and Apiaceae.

### **UNIT –IV: SYSTEMATIC TAXONOMY-II (12hrs)**

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae, and Poaceae.

### **UNIT – V: EMBRYOLOGY (12hrs)**

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia*, *Drusa*, *Adoxa*) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.
5. Palynology general account only

**Suggested activity:** Collection of locally available plants of medicinal importance, observing pollen grains in honey, aero palynology-collection of pollen from air using glycerin strips in different seasons.

### **Books for Reference:**

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
3. Jefferey, C. (1968): An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores- Luck now, Ajmer, Allahabad, Delhi.
5. Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed., ) International Society of Plant Morphologists- University of Delhi.
6. Swamy. B.G.L. & Krishnamurthy. K.V. (1980): From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.
7. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
9. Taxonomy: Prof.T.Pullaiiah
10. Taxonomy: Gurucharan singh



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B.Sc. Botany, Semester- IV**

**PAPER –IV: Plant Physiology and Metabolism**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: PLANT – WATER RELATIONS (12 hrs)**

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

**UNIT –II: MINERAL NUTRITION & ENZYMES (12hrs)**

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium* outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

**UNIT –III: PHOTOSYNTHESIS (12 hrs)**

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, and carbon assimilation pathways: C3, C4 and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

**UNIT – IV: PLANT METABOLISM (12 hrs)**

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

**UNIT –V: GROWTH AND DEVELOPMENT (12hrs)**

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

**Suggested activity:** Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

### **Books for Reference:**

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison- Wesley Publishing Co., Inc. Reading, Massachusetts, Palo Alto, London.
2. Devlin, R.M. (1969): Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
3. Noggle, R. & Fritz (1989): Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M. & Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

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**BOTANY Model Question Paper II B. Sc 2016-2017**

**Time: 3 hours**

**Marks: 70**

**Section – A - Short Questions**

- 2. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$  marks**

**Section - B - Essay Questions**

- 2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 10 Marks  $5 \times 10 = 50$  marks**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**  
**III B. Sc - Semester- V: Botany Syllabus Theory Paper – V**  
**Paper-V: Cell Biology, Genetics and Plant Breeding**  
**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I Cell Biology: (12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.
4. Special types of chromosomes-Lamp brush, Polytene and B-chromosomes

**UNIT – II Genetic Material: (12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.
4. Mitosis, Meiosis and its Significance.

**UNIT – III Mendelian Inheritance: (12 hrs)**

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

**UNIT – IV Plant Breeding: (12 hrs)**

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

**UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)**

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

**Suggested activity:** Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

**Books for Reference:**

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, 19 London

2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.
2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.
3. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
4. De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company .
5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.
6. Winchester, A.M. (1958) : Genetics(3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.
7. Singleton, R.(1963) : Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.
8. Strickberger, M.W. (1976): Genetics(2nd Edition) MacMillan Publishing Co., Inc., N.Y., London
9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park-California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.
10. Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7thedition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.
11. Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hydrabad.
12. Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.
13. Poelman J.M: Breeding Field Crops, Springer.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**

**III B. Sc - Semester- V: Botany Theory Syllabus**

**Paper-VI: Plant Ecology & Phytogeography**

**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I. Elements of Ecology (12 hrs)**

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

**UNIT– II. Ecosystem Ecology (12 hrs)**

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

**UNIT – III Population &Community Ecology (12 hrs)**

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, and competition.
3. Interaction between plants growing in a community.
4. Ecological Succession (Hydrosere,Xerosere).

**UNIT – IV Phytogeography (12 hrs)**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

**UNIT- V: Plant Biodiversity and its importance (12 hrs)**

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance.

**Suggested activity :**Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

**Books for Reference:** 1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York 22

2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta.

3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.

4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta

5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.

6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.

7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.

8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.

9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.

10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing 10. Co Ltd. New Delhi.

11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K. 12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.

13. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y. 14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. SC - Botany Syllabus Semester- VI**  
**PAPER – VII – Elective**  
**PAPER VII-(B): Nursery, Gardening and Floriculture.**  
**Total hours of teaching 60hrs @ 3hrs per week**

**Unit I: Nursery: (12 hrs.)**

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

**Unit II: Gardening (12 hrs.)**

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)
6. Some Famous gardens of India.

**Unit III: Propagation methods (12 hrs.)**

- 1 Sowing/raising of seeds and seedlings, transplanting of seedlings.
2. Airlayering, cutting, selection of cutting ,propagule collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. Green house - mist chamber, shed root, shade house and glass house for propagation.

**Unit IV: Floriculture: ( 12 hrs.)**

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

**Unit V: Commercial Floriculture ( 12 hrs.)**

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriums, Gladiolous, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting. 4. Methods of harvesting.



**Books for Reference:**

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
  2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras. 3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil. institution)
  4. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.
- Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

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**III BSC BOTANY MODEL QUESTION PAPER**

**Time: 3 hours**

**Marks: 70M**

**Section – A - Short Questions**

2. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$

**Section - B - Essay Questions**

2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 10 Marks  $5 \times 10 = 50M$

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B.Sc – SEMESTER –I: BOTANY PRACTICAL SYLLABUS**

**Paper-I: Microbial Diversity, Algae and Fungi**

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following:
  - a) Cyanobacteria: *Nostoc* and *Scytonema*.
  - b) Algae: *Volvox*, *Oedogonium*, *Ectocarpus*, *Polysiphonia*,
  - c) Fungi: *Rhizopus*, *Penicillium* and *Puccinia*.
7. Study of plant material infected by Fungi (Rot of tomatoes, blue and green moulds of Citrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry -identification of different spores).
8. Lichens: Morphology and of anatomy of different thalli.
9. Field Visit.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**B.Sc - SEMESTER –I BOTANY PRACTICAL PAPER –I**  
***Papoaer-1 P: Microbial Diversity, Algae and Fungi***

Time: 3hrs.

Max. Marks: 50

1. Identify giving reasons two of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1 mark, Diagrams--1 mark, Identification--1 mark)  
2x 3= 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure-- identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)  
10 Marks

3. Perform Gram staining of the given Bacterial culture 9Marks

4. Write critical notes and Identify D, E, F, G and H (5X4) = 20Marks  
(Identification-1marks, classification-1mark, Diagrams-1 mark, notes -1 mark)

5. Record (submission is compulsory) 5Marks

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Total: 50 Marks  
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**Key:**

- A. Algal material
- B. Fungi material
- C. Bacterial culture
- D. One of the instruments of Micro biology laboratory.
- E. Whole specimen or a permanent slide of Algae.
- F. Whole specimen or a permanent slide of Fungi.
- G. Whole specimen or a permanent slide of Plant disease studied.
- H. Whole specimen or a permanent slide of Lichens.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS), GUDUR**

**I B.Sc SEMESTER -II Botany Practical Syllabus**

**Paper-II: Diversity of Archegoniate & Plant Anatomy**

**Total hours of laboratory Exercises 30 hrs @ 2 per week**

1. Morphology (vegetative and reproductive structures), anatomy of the following:

*Marchantia*, *Funaria*, *Lycopodium* and *Pinus*.

2. Anatomy:

a) Demonstration of double staining technique.

b) Tissue organization in root and shoot apices using permanent slides

c) Preparation of double staining slides

d) Anomalous secondary structure of *Achyranthes*, *Boerhavia* and *Dracaena*.

e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc., SEMESTER –II: BOTANY PRACTICAL MODEL PAPER II**  
**II P: Diversity of Archegoniate & plant Anatomy**

1. Section cutting of material - <b>A</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
2. Section cutting of material - <b>B</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
3. Section cutting of material - <b>C</b> (Slide 4 marks, diagrams-3 marks, Identification-3 marks)	10 Marks
4. Identification of spotters - D, E, and F	3x4 =12 marks
5. Record (submission compulsory)	5marks
6. Viva	5marks
<hr/>	
Total : 50 Marks	
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**Key:**

- A. Bryophyta/ Pteridophyta material
- B. Gymnosperm material.
- C. Anatomy material.
- D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta
- E. Whole specimen or permanent slide of Gymnosperm.
- F. Whole specimen or permanent slide of wood.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B.Sc BOTANY - SEMESTER-III**

**Paper-III: Practical Plant Taxonomy and Embryology**

Total hours of laboratory Exercises 30hrs @ 2 per week

**Suggested laboratory exercises:**

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus*, *Hibiscus*, *Acacia*, and Grass).
4. Demonstration of Pollen viability test using *in-vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis* / *Senna* / *Crotalaria*)
8. Field visits.
9. Study of local flora and submission of Field Note Book.

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**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR II B. Sc**

**Botany Semester- IV**

**Paper-IV: Practical Syllabus**

**PAPER-IV: Plant Physiology and Metabolism**

Total hours of laboratory Exercises 30 hrs @ 2 per week

**Suggested Laboratory Exercises:**

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer. Demonstrations of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of lg photosynthesis under varying Co Concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmot' bubbler.



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B. Sc – SEMESTER- IV,**  
**BOTANY PRACTICAL MODEL PAPER**  
**PAPER- IV - Plant Physiology and Metabolism**

1. Perform the Experiments A. Give the aim, principle, procedure and observation. Tabulate the results. Draw labeled diagram. 1 x 15 = 15 marks

(Aim-1mark, procedure-3marks, experimentation-5marks, observations & recording of results with discussion-4marks, diagram -2mark)

2. Give the protocol of the experiments B & C 2 x 5 = 10 marks  
(Explanation -3marks, diagrams-2marks)

3. Spotters' D, E, F 3x5= 15marks  
(Identification -1 mark, notes-2marks, diagram-2marks)

4. Record 5 marks

5. Viva 5 marks

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Total: 50 marks  
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**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Practical Syllabus**  
**SEMESTER- V**  
**Practical Paper-V: Cell Biology, Genetics and Plant Breeding**  
**Total hours of teaching 30hrs @ 2hrs per week**

**Suggested Laboratory Exercises:**

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of effect of temperature & organic solvent on permeability of cell membrane.
5. Study of DNA packing by micrographs
6. Numerical problems solving Mendel' Laws of inheritance
7. Hybridization techniques – emasculation, bagging (for demonstration only).
8. Field visit to a plant breeding research station.
9. Calorimetric estimation of DNA by diphenylamine method.
10. Polytene chromosome
11. Meiosis stages- slides

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc – SEMESTER- V, Botany Practical Model Paper**  
**Paper-V: Cell Biology, Genetics and Plant Breeding**

1. Perform the Experiment A. performs squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.

(Procedure-4M, Experimentation-3M, Diagrams-3M)

1x1=10Marks

2. Solving numerical problems on Mendelian inheritance B.

1x8 = 8Marks

(Checker board-4M, Discussion-4M)

3. Solve the genetic problem C.

1x4 = 4Marks

(Checker board-2M, Discussion-2M)

4. Give the experimental protocol of the experiment D.

1x6 =6Marks

5. Identify and write note on E, F, G

3x4 =12Marks

(Identification-1m, Notes-1m, Diagram-1M)

6. Record & Viva

10

Total----- 50 marks

**KEY:**

A-Onion root tip by Squash technique

B&C- Numerical problems on Mendelian Inheritance.

D-Estimation of DNA by diphenylamine method & Membrane permeability-Protocol only

E-Cytology

F-Genetic Material

G-Plant Breeding

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Practical Syllabus**  
**SEMESTER- V**  
**Practical Paper-VI: Plant Ecology & Phytogeography**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauge, and luxmeter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
7. Study of species diversity index of vegetation.
8. Estimation of Primary Productivity of an ecosystem
9. To study field vegetation with respect to stratification, canopy cover and composition.
10. Study of plants included in agro forestry and social forestry.
11. To locate the hotspots, phytogeographical regions and distribution of endemic plants in the map of India.
12. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.
13. Estimation of bicarbonates in the given sample.

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - SEMESTER- VI: Botany Practical Model Paper**  
**Paper–VI: Plant Ecology & Phytogeography**

1. Perform the major experiment A.

(Procedure-4M, Experimentation-4M, Observation, recording of result with diagrams-2M)

1x1=10Marks

2. Make suitable stained preparation of the material B & Identify the material with the help of slide.

(Identification with reasons-2M, Section cutting-4M, Diagrams-2M) 1x8=8Marks

3. Protocol of the Experiment C. 1x6=6Marks

4. Identify & write note on D, E, F, G 4x4=16Marks

(Identification-1m, Notes-1m, Diagram-1M)

5. Record & Viva-Voce 10Marks

Total -----50 Marks

KEY:

A. Estimation of and Bicarbonates.

B. Anatomy-Hydrophytes/Xerophytes.

C. Protocol of the pond Ecosystem/Quadrat method/Porosity/Hotspots in India.

D. Hydrophytes.

E. Xerophytes.

F. Ecological Equipments

G. Phytogeography

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - BOTANY SYLLABUS SEMESTER- VI (Elective) Practical Syllabus, Paper**  
**VII-(B): Nursery, Gardening and Floriculture**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Tools, implements and containers used for propagation and nursery techniques. 2. Propagation by cutting, layering, budding and grafting
3. Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.
4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..
5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.
7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/ landscape designing

Expected domain skills to be achieved: Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), land scape drawings using computers, raising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**PRACTICAL MODEL PAPER**  
**PAPER-VII-(B): NURSERY, GARDENING AND FLORICULTURE**

**Time: 3hours**

**Max.Marks =50marks**

Q1. Project report (A)	15 marks
Q2.Viva-voce on study project	05 marks
Q3. Identify and write notes on B, C, D, and E	(4x5) =20 marks
B- Tool/instrument/container used in nursery	
C-Seed propagation technique	
D- Plant used in lawn (plant specimen/photograph)	
E-ornamental flower (photograph/live specimen)	
Q4. Field report	05 marks
Q5. Record	05 marks
Total-----	50 marks

**2018-2019**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**

**I B.Sc - SEMESTER- I: BOTANY SYLLABUS 2018-19**

**Paper- I: Microbial Diversity, Algae and Fungi**

**Total hours of teaching 60hrs @ 4 hrs per week**

**UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)**

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

**UNIT- II: VIRUSES (12hrs)**

1. Viruses- Discovery, general account, structure& replication of –T4 Phage (Lytic , Lysogenic) and TMV, Viroids, Prions .
2. Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bhendi Vein clearing and Papaya leaf curl diseases.

**UNIT III: BACTERIA (12hrs)**

1. Bacteria: Discovery, General characteristics, cell structure and nutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

**UNIT –IV Algae (12hrs)**

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium*, *Ectocarpus* and *Polysiphonia*.

**UNIT V: FUNGI (12hrs)**

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.
4. Mushroom cultivation

**Suggested activity:** Seminar, Quiz, debate, collection of diseased plant parts –studying symptoms and identification of pathogen, collection and study of Fresh and marine Algae available in local area.



**Books for Reference:**

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- **Blackwell**.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
7. Alexopoulos, C.J., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons. Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
8. Webster, J (1999): Introduction to Fungi (2nd edition) Cambridge University Press.

**\*\*Student Activities like Seminars, Assignments, Fieldwork, Study Projects, and Models etc. are Part of Curriculum for all units in all papers.**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B. Sc - SEMESTER- II: BOTANY THEORY SYLLABUS 2018-19**

**Paper –II: Diversity of Archegoniate & Plant Anatomy**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: BRYOPHYTES**

**(12hrs)**

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of Marchantia, and Funaria.
3. Evolution of Sporophyte in Bryophytes.

**UNIT-II:PTERIDOPHYTES**

**(12hrs)**

1. Pteridophytes: General characters, classification (up to Classes)
2. Structure, reproduction and life history of Lycopodium, and Marsilea.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

**UNIT – III: GYMNOSPERMS (12hrs)**

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy, reproduction and life history of Pinus and Gnetum
3. Economic importance with reference to wood, essential oils and drugs

**UNIT –I V: TISSUES AND TISSUE SYSTEMS**

**(12hrs)**

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

**UNIT – V. SECONDARY GROWTH**

**(12hrs)**

1. Anomalous secondary growth in Achyranthes, Boerhaavia and Dracaena.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of Marsilea sporocarp, Pinus needles, male and female cones, study of Pinus pollen grains, collection of locally available economically useful timbers.

### Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes New Philologist, Indian Reprint
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta – Vol.II. Bryophyta Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.
6. Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot. Allahabad.
7. Smith, G.M. (1955): Cryptogamic Botany Vol.II (2nd Edn,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, the MacMillan Co., N.Y. & Collier- MacMillan Ltd., London.
10. Coulter, J.M. & C.J. Chamberlain (1964): Morphology of Gymnosperms Central Book Depot, Allahabad.
11. Sporne, K.R. (1971): The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.
12. Esau, K. (1965): Vascular Differentiation in Plants. Holt, Rinehart & Winston, N.Y., Chicago, San Fransisco, Toronto, London.
13. Eames, A.J., & Mc Daniels, L.H.(1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
14. Esau. K. (1980): Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.

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**I BSC BOTANY MODEL QUESTION PAPER**

**Time: 3 hours**

**Marks: 60M**

**Section – A - Short Questions**

Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks,  
(ONE question from each unit max eight from all).  $5 \times 4 = 20M$

**Section - B - Essay Questions**

2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice  
each Question Carries 8 Marks  $5 \times 8 = 40M$

**External 60 marks**

**INTERNAL ASSESMENT**

Two internals - 20 marks  
Assignments - 5 marks  
Seminars - 5 marks  
Objective questions - 10 marks  
Total = 40 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B. Sc - SEMESTER –III: BOTANY SYLLABUS 2018-19**

**Paper-III: Plant Taxonomy and Embryology)**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12hrs)**

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

**UNIT – II: CLASSIFICATION (12 hrs)**

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

### **UNIT –III: SYSTEMATIC TAXONOMY-I (12hrs)**

1. Systematic study and economic importance of the following families: Brassicaceae, Rutaceae, Leguminaceae (Fabaceae, caesalpinaceae, Mimosaceae), Curcubitaceae, and Apiaceae.

### **UNIT –IV: SYSTEMATIC TAXONOMY-II (12hrs)**

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae, and Poaceae.

### **UNIT – V: EMBRYOLOGY (12hrs)**

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia*, *Drusa*, *Adoxa*) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.
5. Palynology general account only

**Suggested activity:** Collection of locally available plants of medicinal importance, observing pollen grains in honey, aero palynology-collection of pollen from air using glycerin strips in different seasons.

### **Books for Reference:**

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.
3. Jefferey, C. (1968): An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores- Luck now, Ajmer, Allahabad, Delhi.
5. Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed., ) International Society of Plant Morphologists- University of Delhi.
6. Swamy. B.G.L. & Krishnamurthy. K.V. (1980): From flower to fruit Tata McGraw Hill Publishing Co., Ltd., New Delhi.
7. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
9. Taxonomy: Prof.T.Pullaiiah
10. Taxonomy: Gurucharan singh

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B.Sc. BOTANY, SEMESTER- IV SYLLABUS 2018-19**

**PAPER –IV: Plant Physiology and Metabolism**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: PLANT – WATER RELATIONS (12 hrs)**

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

**UNIT –II: MINERAL NUTRITION & ENZYMES (12hrs)**

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium* outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

**UNIT –III: PHOTOSYNTHESIS (12 hrs)**

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, and carbon assimilation pathways: C<sub>3</sub>, C<sub>4</sub> and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

**UNIT – IV: PLANT METABOLISM (12 hrs)**

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

**UNIT –V: GROWTH AND DEVELOPMENT (12hrs)**

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

**Suggested activity:** Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

### **Books for Reference:**

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison- Wesley Publishing Co., Inc. Reading, Massachusetts, Palo Alto, London.
2. Devlin, R.M. (1969): Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
3. Noggle, R. & Fritz (1989): Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M. & Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**

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**BOTANY Model Question Paper II B. Sc 2018-2019**

**Time: 3 hours**

**Marks: 60**

**Section – A - Short Questions**

- 3. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$  marks**

**Section - B - Essay Questions**

- 2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 8 Marks  $5 \times 8 = 40$  marks**



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**

**III B. Sc - SEMESTER- V: BOTANY SYLLABUS 2018-19**

**Paper-V: Cell Biology, Genetics and Plant Breeding**

**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I Cell Biology: (12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.
4. Special types of chromosomes-Lamp brush, Polytene and B-chromosomes

**UNIT – II Genetic Material: (12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.
4. Mitosis, Meiosis and its Significance.

**UNIT – III Mendelian Inheritance: (12 hrs)**

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

**UNIT – IV Plant Breeding: (12 hrs)**

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

**UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)**

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

**Suggested activity:** Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

**Books for Reference:**

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, 19 London

2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.
2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.
3. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
4. De. Robertis and De Robertis, 1998, Cell and Molecular Biology, K.M. Verghese and Company .
5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.
6. Winchester, A.M. (1958) : Genetics(3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.
7. Singleton, R.(1963) : Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.
8. Strickberger, M.W. (1976): Genetics(2nd Edition) MacMillan Publishing Co., Inc., N.Y., London
9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park-California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.
10. Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7th edition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.
11. Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hyderabad.
12. Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.
13. Poelman J.M: Breeding Field Crops, Springer.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**  
**III B. Sc - SEMESTER- V: BOTANY THEORY SYLLABUS 2018-19**  
**PAPER-VI: Plant Ecology & Phytogeography**  
**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I. Elements of Ecology (12 hrs)**

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

**UNIT– II. Ecosystem Ecology (12 hrs)**

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

**UNIT – III Population & Community Ecology (12 hrs)**

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, and competition.
3. Interaction between plants growing in a community.
4. Ecological Succession (Hydrosere, Xerosere).

**UNIT – IV Phytogeography (12 hrs)**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

**UNIT- V: Plant Biodiversity and its importance (12 hrs)**

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance.

**Suggested activity :** Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

**Books for Reference:** 1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York 22

2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta.

3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.

4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta

5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.

6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.

7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.

8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.

9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.

10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing 10. Co Ltd. New Delhi.

11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K. 12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.

13. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y. 14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. SC - BOTANY SYLLABUS SEMESTER- VI**  
**PAPER – VII – ELECTIVE**  
**PAPER VII-(B): Nursery, Gardening and Floriculture.**  
**Total hours of teaching 60hrs @ 3hrs per week**

**Unit I: Nursery: (12 hrs.)**

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

**Unit II: Gardening (12 hrs.)**

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)
6. Some Famous gardens of India.

**Unit III: Propagation methods (12 hrs.)**

- 1 Sowing/raising of seeds and seedlings, transplanting of seedlings.
2. Airlayering, cutting, selection of cutting ,propagule collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. Green house - mist chamber, shed root, shade house and glass house for propagation.

**Unit IV: Floriculture: ( 12 hrs.)**

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

**Unit V: Commercial Floriculture ( 12 hrs.)**

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriums, Gladiolous, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting. 4. Methods of harvesting.

**Books for Reference:**

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.

2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras. 3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil. institution)  
4. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.  
Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

**DUVURU RAMANAMMA WOMENS COLLEGE (AUTONOMOUS), GUDUR**  
**(Re-Accredited by NAAC with 'A' Grade)**

**Recognized by UGC as "College with Potential for Excellence"**

**III BSC BOTANY MODEL QUESTION PAPER**

**Time: 3 hours**

**Marks: 70M**

**Section – A - Short Questions**

3. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$

**Section - B - Essay Questions**

2. Answer all of the fallowing .from each Unit 2 Essay Questions with Internal choice  
each Question Carries 10 Marks  $5 \times 10 = 50M$

**INTERNAL ASSESMENT**

Two internals	- 20 marks
Assignments	- 5 marks
Seminars	- 5 marks
Total	= 30 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B.Sc – SEMESTER –I: Botany Practical Syllabus**

**PAPER-I: Microbial Diversity, Algae and Fungi**

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following:
  - a) Cyanobacteria: *Nostoc and Scytonema*.
  - b) Algae: *Volvox, Oedogonium, Ectocarpus, Polysiphonia*,
  - c) Fungi: *Rhizopus, Penicillium and Puccinia*.
7. Study of plant material infected by Fungi (Rot of tomatoes, blue and green moulds of Citrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry -identification of different spores)).
8. Lichens: Morphology and anatomy of different thalli.
9. Field Visit.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc - SEMESTER –I BOTANY PRACTICAL PAPER –I**  
**PAPOAER-1 P: Microbial Diversity, Algae and Fungi**

Time: 3hrs.

Max. Marks: 50

1. Identify giving reasons two of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1mark, Diagrams--1mark, Identification--1mark)  
2x 3= 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure-- identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)  
10 Marks

3. Perform Gram staining of the given Bacterial culture 9Marks

4. Write critical notes and Identify D, E, F, G and H (5X4) = 20Marks  
(Identification-1marks, classification-1mark, Diagrams-1 mark, notes -1 mark)

5. Record (submission is compulsory) 5Marks

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Total: 50 Marks  
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**Key:**

- A. Algal material
- B. Fungi material
- C. Bacterial culture
- D. One of the instruments of Micro biology laboratory.
- E. Whole specimen or a permanent slide of Algae.
- F. Whole specimen or a permanent slide of Fungi.
- G. Whole specimen or a permanent slide of Plant disease studied.
- H. Whole specimen or a permanent slide of Lichens.



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS), GUDUR**  
**I B.Sc SEMESTER -II BOTANY PRACTICAL SYLLABUS**  
**PAPER-II: Diversity of Archegoniate & Plant Anatomy**  
**Total hours of laboratory Exercises 30 hrs @ 2 per week**

1. Morphology (vegetative and reproductive structures), anatomy of the following:

*Marchantia, Funaria, Lycopodium* and *Pinus*.

2. Anatomy:

a) Demonstration of double staining technique.

b) Tissue organization in root and shoot apices using permanent slides

c) Preparation of double staining slides

d) Anomalous secondary structure of *Achyranthes*, *Boerhavia* and *Dracaena*.

e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc., SEMESTER –II: Botany Practical Model Paper II**  
**II P: Diversity of Archegoniate & Plant Anatomy**

1. Section cutting of material - <b>A</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
2. Section cutting of material - <b>B</b> (Slide 3 marks, diagrams-3 marks, Identification-3 marks)	9 Marks
3. Section cutting of material - <b>C</b> (Slide 4 marks, diagrams-3 marks, Identification-3 marks)	10 Marks
4. Identification of spotters - D, E, and F	3x4 =12 marks
5. Record (submission compulsory)	5marks
6. Viva	5marks
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Total : 50 Marks	
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**Key:**

- A. Bryophyta/ Pteridophyta material
- B. Gymnosperm material.
- C. Anatomy material.
- D. Whole specimen or permanent slide of Bryophyta/ Pteridophyta
- E. Whole specimen or permanent slide of Gymnosperm.
- F. Whole specimen or permanent slide of wood.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B.Sc BOTANY - SEMESTER-III**

**Paper-III: Practical Plant Taxonomy and Embryology**

Total hours of laboratory Exercises 30hrs @ 2 per week

**Suggested laboratory exercises:**

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus*, *Hibiscus*, *Acacia*, and Grass).
4. Demonstration of Pollen viability test using *in-vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis* / *Senna* / *Crotalaria*)
8. Field visits.
9. Study of local flora and submission of Field Note Book.

**NAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B.Sc., BOTANY- SEMESTER -III**  
**PRACTICAL MODEL PAPER III**  
**PLANT TAXONOMY AND EMBRYOLOGY**

1. Describe the given Plant specimens “A” in technical terms. Draw neat labeled diagrams of twig with inflorescence, L.S. of Flower, T.s. of Ovary and floral Diagram. Give floral formula. Identify the family.

(Description- vegetative - 4 marks, floral characters – 5 marks; Twig with inflorescence -1mark, L.S. of Flower& T.s. of Ovary--2marks and floral Diagram--2marks, floral formula --1mark )

1x 15= 15 Marks

2. Derive the plant specimens B&C to their respective families 2x5=10marks

3. Identification of spotters D&amp;E (Embryology) 2x5=10 marks

(Identification -1 mark, notes-2marks, diagram-2marks)

4. Record, Herbarium & field notes (submission compulsory) 10 marks

(Record-5marks, Herbarium-3marks, field notes-2marks)

## 5. Viva

5marks

Total : 50 Marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B. Sc BOTANY SEMESTRE- IV**

**Paper-IV: Practical Syllabus**

**PAPER-IV: Plant Physiology and Metabolism**

Total hours of laboratory Exercises 30 hrs @ 2 per week

**Suggested Laboratory Exercises:**

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer. Demonstrations of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of lg photosynthesis under varying Co Concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmot' bubbler.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B. Sc – SEMESTER- IV, Botany Practical Model Paper**  
**Paper- IV - Plant Physiology and Metabolism**

1. Perform the Experiments A. Give the aim, principle, procedure and observation. Tabulate the results. Draw labeled diagram. 1 x 15 = 15 marks

(Aim-1mark, procedure-3marks, experimentation-5marks, observations & recording of results with discussion-4marks, diagram -2mark)

2. Give the protocol of the experiments B & C 2 x 5 = 10 marks

(Explanation -3marks, diagrams-2marks)

3. Spotters' D, E, F 3x5= 15marks

(Identification -1 mark, notes-2marks, diagram-2marks)

4. Record 5 marks

5. Viva 5 marks

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Total: 50 marks  
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**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - BOTANY PRACTICAL SYLLABUS**  
**SEMESTER- V**

**Practical Paper-V: Cell Biology, Genetics and Plant Breeding**  
**Total hours of teaching 30hrs @ 2hrs per week**

**Suggested Laboratory Exercises:**

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of effect of temperature & organic solvent on permeability of cell membrane.
5. Study of DNA packing by micrographs
6. Numerical problems solving Mendel' Laws of inheritance
7. Hybridization techniques – emasculation, bagging (for demonstration only).
8. Field visit to a plant breeding research station.
9. Calorimetric estimation of DNA by diphenylamine method.
10. Polytene chromosome
11. Meiosis stages- slides

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc – SEMESTER- V, BOTANY PRACTICAL MODEL PAPER**  
**PAPER-V: Cell Biology, Genetics and Plant Breeding**

1. Perform the Experiment A. performs squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.

(Procedure-4M, Experimentation-3M, Diagrams-3M) 1x1=10Marks

2. Solving numerical problems on Mendelian inheritance B. 1x8 = 8Marks

(Checker board-4M, Discussion-4M)

3. Solve the genetic problem C. 1x4 = 4Marks

(Checker board-2M, Discussion-2M)

4. Give the experimental protocol of the experiment D. 1x6 =6Marks

5. Identify and write note on E, F, G 3x4 =12Marks

(Identification-1m, Notes-1m, Diagram-1M)

6. Record & Viva 10

Total----- 50 marks

**KEY:**

A-Onion root tip by Squash technique

B&C- Numerical problems on Mendelian Inheritance.

D-Estimation of DNA by diphenylamine method & Membrane permeability-Protocol only

E-Cytology

F-Genetic Material

G-Plant Breeding



**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - BOTANY PRACTICAL SYLLABUS**  
**SEMESTER- V**

**Practical Paper-VI: Plant Ecology & Phytogeography**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauge, and luxmeter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
7. Study of species diversity index of vegetation.
8. Estimation of Primary Productivity of an ecosystem
9. To study field vegetation with respect to stratification, canopy cover and composition.
10. Study of plants included in agro forestry and social forestry.
11. To locate the hotspots, phytogeographical regions and distribution of endemic plants in the map of India.
12. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.
13. Estimation of bicarbonates in the given sample.

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - SEMESTER- VI: Botany Practical Model Paper**  
**PAPER–VI: Plant Ecology & Phytogeography**

1. Perform the major experiment A.

(Procedure-4M, Experimentation-4M, Observation, recording of result with diagrams-2M)  
1x1=10Marks

2. Make suitable stained preparation of the material B & Identify the material with the help of slide.

(Identification with reasons-2M, Section cutting-4M, Diagrams-2M) 1x8=8Marks

3. Protocol of the Experiment C. 1x6=6Marks

4. Identify & write note on D, E, F, G 4x4=16Marks

(Identification-1m, Notes-1m, Diagram-1M)

5. Record & Viva-Voce 10Marks

Total -----50 Marks

KEY:

A. Estimation of and Bicarbonates.

B. Anatomy-Hydrophytes/Xerophytes.

C. Protocol of the pond Ecosystem/Quadrat method/Porosity/Hotspots in India.

D. Hydrophytes.

E. Xerophytes.

F. Ecological Equipments

G. Phytogeography

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Syllabus Semester- VI (Elective) Practical Syllabus,**  
**Paper VII-(B): Nursery, Gardening and Floriculture**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Tools, Implements And Containers Used For Propagation And Nursery Techniques.
  2. Propagation by Cutting, Layering, Budding and Grafting
  3. Seed Propagation- Preparation Of Portable Trays, Seed Treatments, Sowing And Seedling Production.
  4. Identification and Description of Annuals, Herbaceous Perennials, Climbers, Creepers, Foliage and Flowering Shrubs, Trees, Palms, Ferns, Ornamental Grasses; Cacti and Succulents.
  5. Planning and Designing Of Gardens, Functional Uses of Plants in the Landscape
  6. Preparation of Land for Lawn and Planting.
  7. Identification of Commercially Important Flower Crops and Their Varieties.
  8. Propagation Practices in Flower Crops, Sowing Of Seeds and Raising Of Seedlings Of Annuals.
  9. Use of Chemicals and Other Compounds for Prolonging the Vase Life Of Cut Flowers.
  10. Grading, Packing and Marketing of Cut Flowers.
  11. Visit to Commercial Nurseries and Commercial Tissue Culture Laboratory
  12. Study Project under Supervision of Lecturer – Nursery/Ornamental Flowers/ Plants/Lawn Designing/ Landscape Designing
- Expected Domain Skills To Be Achieved: Ability To Use A Variety Of Garden Tools And Implements, Proficiency In Layering And Grafting Techniques (Cleft Grafting And Bud Grafting), Land Scape Drawings Using Computers, Raising Of Healthy Nurseries Of Flowering Plants, Managing Vase Life Of Cut Flowers Etc.

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**PRACTICAL MODEL PAPER**  
**PAPER-VII-(B): Nursery, Gardening and Floriculture**

**Time: 3hours**

**max.marks =50marks**

- |   |                 |
|---|-----------------|
| Q1. Project report (A)                            | 15 marks        |
| Q2. Viva-voce on study project                    | 05 marks        |
|   |                 |
| Q3. Identify and write notes on B, C, D, and E    | (4x5) =20 marks |
| B- Tool/instrument/container used in nursery      |                 |
| C-Seed propagation technique                      |                 |
| D- Plant used in lawn (plant specimen/photograph) |                 |
| E-ornamental flower (photograph/live specimen)    |                 |
|   |                 |
| Q4. Field report                                  | 05 marks        |
|   |                 |
| Q5. Record  | 05 marks        |
| Total-----50 marks                                |                 |

**2019-2020**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**

**I B.Sc - SEMESTER- I: BOTANY SYLLABUS 2019-20**

**Paper- I: Microbial Diversity, Algae and Fungi**

**Total hours of teaching 60hrs @ 4 hrs per week**

**UNIT- I: MICROBIAL WORLD (Origin and Evolution of Life, Microbial diversity (12hrs)**

1. Discovery of microorganisms, origin of life, spontaneous, biogenesis, Pasteur experiments, germ theory of disease.
2. Classification of microorganisms – R.H. Whittaker's five kingdom concept, Carl Woese's- Domain system.
3. Brief account of special groups of bacteria- Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria.

**UNIT- II: VIRUSES (12hrs)**

1. Viruses- Discovery, general account, structure & replication of –T4 Phage (Lytic , Lysogenic) and TMV, Viroids, Prions .
2. Plant diseases caused by viruses– Symptoms, transmission and control measures (Brief account only).
3. Study of Tobacco Mosaic, Bendi Vein clearing and Papaya leaf curl diseases.

**UNIT III: BACTERIA (12hrs)**

1. Bacteria: Discovery, General characteristics, cell structure and nutrition.
2. Reproduction- Asexual and bacterial recombination (Conjugation, Transformation, Transduction).
3. Economic importance of Bacteria.

**UNIT –IV Algae (12hrs)**

1. General account - thallus organization and reproduction in Algae.
2. Fritsch classification of Algae (up to classes only) and economic importance.
3. Structure, reproduction and life history of *Oedogonium*, *Ectocarpus* and *Polysiphonia*.

**UNIT V: FUNGI (12hrs)**

1. General characteristics and outline classification (Ainsworth).
2. Structure, reproduction and life history of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), and *Puccinia* (Basidiomycota).
3. Lichens-Structure and reproduction; ecological and economic importance.
4. Mushroom cultivation

**Suggested activity:** Seminar, Quiz, debate, collection of diseased plant parts –studying symptoms and identification of pathogen, collection and study of Fresh and marine Algae available in local area.

**Books for Reference:**

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- **Blackwell**.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw- Hill Co. New Delhi.
4. Fritsch F.E. (1935 The Structure & Reproduction of Algae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.
5. Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
6. Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.
7. Alexopoulos, C.J., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons. Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.
8. Webster, J (1999): Introduction to Fungi (2nd edition) Cambridge University Press.

**\*\*Student Activities like Seminars, Assignments, Fieldwork, Study Projects, and Models etc. are Part of Curriculum for all units in all papers.**

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B. Sc - SEMESTER- II: Botany Theory Syllabus 2019-20**

**Paper –II: Diversity of Archegoniate & Plant Anatomy**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: BRYOPHYTES**

**(12hrs)**

1. Bryophytes: General characters, Classification (up to classes)
2. Structure, reproduction and Life history of Marchantia, and Funaria.
3. Evolution of Sporophyte in Bryophytes.

**UNIT-II:PTERIDOPHYTES**

**(12hrs)**

1. Pteridophytes: General characters, classification (up to Classes)
2. Structure, reproduction and life history of Lycopodium, and Marsilea.
3. Heterospory and seed habit.
4. Evolution of stele in Pteridophytes.

**UNIT – III: GYMNOSPERMS (12hrs)**

1. Gymnosperms: General characters, classification (up to classes)
2. Morphology, anatomy, reproduction and life history of Pinus and Gnetum
3. Economic importance with reference to wood, essential oils and drugs

**UNIT –I V: TISSUES AND TISSUE SYSTEMS**

**(12hrs)**

1. Meristems - Root and Shoot apical meristems and their histological organization.
2. Tissues – Meristematic and permanent tissues (simple, complex, secretory)
3. Tissue systems–Epidermal, ground and vascular.

**UNIT – V. SECONDARY GROWTH**

**(12hrs)**

1. Anomalous secondary growth in Achyranthes, Boerhaavia and Dracaena.
2. Study of local timbers of economic importance-Teak, Rosewood, Red sanders and Arjun (Tella maddi).

**Suggested activity:** Collection of Marsilea sporocarp, Pinus needles, male and female cones, study of Pinus pollen grains, collection of locally available economically useful timbers.

### Books for Reference:

1. Cavers, Frank ( ): The inter-relationships of the Bryophytes New Philologist, Indian Reprint
2. Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
3. Parihar, N.S. ( ): An Introduction to embryophyta – Vol.II. Bryophyta Central Book Depot, Allahabad.
4. Watson, E.V. (1968): British Mosses & Liverworts Cambridge University Press, U.K
5. Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.
6. Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot. Allahabad.
7. Smith, G.M. (1955): Cryptogamic Botany Vol.II (2nd Edn,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.
8. Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London
9. Bierhorst, D.W. (1971) : Morphology of Vascular Plants, the MacMillan Co., N.Y. & Collier- MacMillan Ltd., London.
10. Coulter, J.M. & C.J. Chamberlain (1964): Morphology of Gymnosperms Central Book Depot, Allahabad.
11. Sporne, K.R. (1971): The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.
12. Esau, K. (1965): Vascular Differentiation in Plants. Holt, Rinehart & Winston, N.Y., Chicago, San Fransisco, Toronto, London.
13. Eames, A.J., & Mc Daniels, L.H.(1979) : An Introduction to Plant anatomy Tata-McGraw-Hill Publishing Co., (P) Ltd. Bombay, New Delhi.
14. Esau. K. (1980): Plant Anatomy, (2nd Edition) Wiley Eastern Ltd., New Delhi.



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**I BSC BOTANY MODEL QUESTION PAPER**

**Time: 3 hours**

**Marks: 60M**

**Section – A - Short Questions**

Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks,  
(ONE question from each unit max eight from all).  $5 \times 4 = 20M$

**Section - B - Essay Questions**

2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice  
each Question Carries 8 Marks  $5 \times 8 = 40M$

**External 60 marks**

**INTERNAL ASSESMENT**

Two internals - 20 marks

Assignments - 5 marks

Seminars - 5 marks

Objective questions - 10 marks

Total = 40 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B. Sc - SEMESTER –III: Botany Syllabus 2019-20**

**Paper-III: Plant Taxonomy and Embryology)**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: INTRODUCTION TO PLANT TAXONOMY (12hrs)**

1. Fundamental components of taxonomy (identification, nomenclature, classification)
2. Taxonomic resources: Herbarium- functions& important herbaria, Botanical gardens, Flora, Keys- single access and multi-access.
3. Botanical Nomenclature- Principles and rules of ICBN (ranks and names; principle of priority, binomial system; type method, author citation, valid-publication).

**UNIT – II: CLASSIFICATION (12 hrs)**

1. Types of classification- Artificial, Natural and Phylogenetic.
2. Bentham & Hooker's system of classification- merits and demerits.
3. Engler & Prantle's system of classification- merits and demerits
4. Phylogeny – origin and evolution of Angiosperms

**UNIT –III: SYSTEMATIC TAXONOMY-I (12hrs)**

1. Systematic study and economic importance of the following families: Brassicaceae, Rutaceae, Leguminaceae (Fabaceae, caesalpinaceae, Mimosaceae), Curcubitaceae, and Apiaceae.

**UNIT –IV: SYSTEMATIC TAXONOMY-II (12hrs)**

1. Systematic study and economic importance of plants belonging to the following families: Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Arecaceae, and Poaceae.

**UNIT – V: EMBRYOLOGY (12hrs)**

1. Anther structure, microsporogenesis and development of male gametophyte.
2. Ovule structure and types; Megasporogenesis, development of Monosporic, Bisporic and Tetrasporic types (*Peperomia*, *Drusa*, *Adoxa*) of embryo sacs.
3. Pollination and Fertilization (out lines) Endosperm development and types.
4. Development of Dicot and Monocot embryos, Polyembryony.
5. Palynology general account only

**Suggested activity:** Collection of locally available plants of medicinal importance, observing pollen grains in honey, aero palynology-collection of pollen from air using glycerin strips in different seasons.

**Books for Reference:**

1. Porter, C.L. ( ): Taxonomy of flowering Plants, Eurasia Publishing House, New Delhi.
2. Lawrence, G.H.M. (1953): Taxonomy of Vascular Plants, Oxford & IBH Publishers, New Delhi, Calcutta.

3. Jefferey, C. (1968): An Introduction to Plant Taxonomy J.A. Churchill, London.
4. Mathur, R.C.(1970) : Systematic Botany (Angiosperms) Agra Book Stores- Luck now, Ajmer, Allahabad, Delhi.
5. Maheswari, P (1963): Recent Advances in the Embryology of Angiosperms (Ed., ) International Society of Plant Morphologists- University of Delhi.
6. Swamy. B.G.L. & Krishnamurthy. K.V. (1980): From flower to fruit  
Tata McGraw Hill Publishing Co., Ltd., New Delhi.
7. Maheswari, P.(1985):An Introduction to the Embryology of Angiosperms  
Tata McGraw Hill Publishing Co.,Ltd., New Delhi.
8. Bhojwani, S.S. & Bhatnagar, S.P. (2000) : The Embryology of Angiosperms (4th Edition) Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
9. Taxonomy: Prof.T.Pullaiiah
10. Taxonomy: Gurucharan singh

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B.Sc. BOTANY, SEMESTER- IV Syllabus 2019-20**

**PAPER –IV: Plant Physiology and Metabolism**

Total hours of teaching 60hrs @ 4 hrs per week

**UNIT – I: PLANT – WATER RELATIONS (12 hrs)**

1. Physical properties of water, Importance of water to plant life.
2. Diffusion, imbibition and osmosis; concept & components of Water potential.
3. Absorption and transport of water and ascent of sap.
4. Transpiration –Definition, types of transpiration, structure and opening and closing mechanism of stomata.

**UNIT –II: MINERAL NUTRITION & ENZYMES (12hrs)**

1. Mineral Nutrition: Essential elements (macro and micronutrients) and their role in plant metabolism, deficiency symptoms.
2. Mineral ion uptake (active and passive transport).
3. Nitrogen metabolism- biological nitrogen fixation in *Rhizobium* outlines of protein synthesis (transcription and translation).
4. Enzymes: General characteristics, mechanism of enzyme action and factors regulating enzyme action.

**UNIT –III: PHOTOSYNTHESIS (12 hrs)**

1. Photosynthesis: Photosynthetic pigments, photosynthetic light reactions, photo-phosphorylation, and carbon assimilation pathways: C<sub>3</sub>, C<sub>4</sub> and CAM (brief account)
2. Photorespiration and its significance.
3. Translocation of organic solutes: mechanism of phloem transport, source-sink relationships.

**UNIT – IV: PLANT METABOLISM (12 hrs)**

1. Respiration: Glycolysis, anaerobic respiration, TCA cycle, electron transport system. Mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

**UNIT –V: GROWTH AND DEVELOPMENT (12hrs)**

1. Growth and development: definition, phases and kinetics of growth.
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering -photoperiodism, role of phytochrome in flowering; Vernalization.
4. Physiology of Senescence and Ageing.

**Suggested activity:** Seminars, Quiz, Debate, Question and Answer sessions, observing animations of protein biosynthesis in you tube.

### **Books for Reference:**

1. Steward. F.C (1964): Plants at Work (A summary of Plant Physiology) Addison- Wesley Publishing Co., Inc. Reading, Massachusetts, Palo Alto, London.
2. Devlin, R.M. (1969): Plant Physiology, Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
3. Noggle, R. & Fritz (1989): Introductory Plant Physiology Prentice Hall of India.
4. Lawlor.D.W. (1989): Photosynthesis, metabolism, Control & Physiology ELBS/Longmans-London.
5. Mayer, Anderson & Bonning(1965): Introduction to Plant Physiology D.Van Nostrand . Publishing Co., N.Y
6. Mukherjee, S. A.K. Ghosh(1998) Plant Physiology ,Tata McGraw Hill Publishers(P) Ltd., New Delhi.
7. Salisbury, F.B & C.W. Ross (1999): Plant Physiology CBS Publishers and Printers, New Delhi.
8. Plummer, D.(1989) Biochemistry–the Chemistry of life ,McGraw Hill Book Co., London, N.Y. New Delhi, Paris, Singapore, Tokyo.
9. Day, P.M. & Harborne, J.B. (Eds.,) (2000): Plant Biochemistry. . Harcourt Asia (P) Ltd., India & Academic Press, Singapore.

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**BOTANY Model Question Paper II B. Sc 2019-2020**

**Time: 3 hours**

**Marks: 60**

**Section – A - Short Questions**

- 4. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$  marks**

**Section - B - Essay Questions**

- 2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice each Question Carries 8 Marks  $5 \times 8 = 40$  marks**

**INTERNAL ASSESMENT**

Two internals	- 20 marks
Assignments	- 5 marks
Seminars	- 5 marks
Objective questions	- 10 marks
Total	= 40 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**  
**III B. Sc - SEMESTER- V: Botany Syllabus 2019-20**  
**Paper-V: Cell Biology, Genetics and Plant Breeding**  
**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I Cell Biology: (12hrs)**

1. Cell, the unit of life- Cell theory, Prokaryotic and eukaryotic cells; Eukaryotic cell components.
2. Ultra structure and functions of cell wall and cell membranes.
3. Chromosomes: morphology, organization of DNA in a chromosome (nucleosome model), Euchromatin and heterochromatin.
4. Special types of chromosomes-Lamp brush, Polytene and B-chromosomes

**UNIT – II Genetic Material: (12hrs)**

1. DNA as the genetic material: Griffith's and Avery's transformation experiment, Hershey – Chase bacteriophage experiment.
2. DNA structure (Watson & Crick model) and replication of DNA (semi-conservative)
3. Types of RNA (mRNA, tRNA, rRNA), their structure and function.
4. Mitosis, Meiosis and its Significance.

**UNIT – III Mendelian Inheritance: (12 hrs)**

1. Mendel's laws of Inheritance (Mono- and Di- hybrid crosses); backcross and test cross.
2. Chromosome theory of Inheritance.
3. Linkage: concept, complete and incomplete linkage, coupling and repulsion; linkage maps based on two and three factor crosses.
4. Crossing Over: concept & significance.

**UNIT – IV Plant Breeding: (12 hrs)**

1. Introduction and Objectives of plant breeding.
2. Methods of crop improvement: Procedure, advantages and limitations of Introduction, Selection, and Hybridization (outlines only).

**UNIT – V Breeding, Crop Improvement and Biotechnology: (12 hrs)**

1. Role of mutations in crop improvement.
2. Role of somaclonal variations in crop improvement.
3. Molecular breeding – use of DNA markers in plant breeding and crop improvement (RAPD, RFLP).

**Suggested activity:** Seminar, Debate, Quiz, observation of live cells and nucleus in Onion peels, observation of Meiotic nuclei in Maize pollen. Solving Genetics problems.

**Books for Reference:**

1. Old, R.W. and Primrose S.B. 1994, Principles of Gene Manipulation Blackwell Science, 19 London

2. Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York.
2. Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John Wiley and Sons, London.
3. Power C.B., 1984, Cell Biology, Himalaya Publishing Co. Mumbai
4. De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company .
5. Sinnott, E.W., L.C. Dunn & J. Dobshansky (1958) : Principles of Genetics (5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London.
6. Winchester, A.M. (1958) : Genetics(3rd Edition) Oxford & IBH Publishing House, Calcutta, Bombay, New Delhi.
7. Singleton, R.(1963) : Elementary Genetics, D. Van Nostrand Co., Ltd., Inc., N.Y. & Affiliated East West Press (P) Ltd., New Delhi.
8. Strickberger, M.W. (1976): Genetics(2nd Edition) MacMillan Publishing Co., Inc., N.Y., London
9. Watson, J.D. (1977): Molecular Biology of the Gene, W.A. Benjamin, Inc., Menlo Park-California, Reading-Massachusetts, London, Amsterdam, Don Mills, Ontario, Sydney.
10. Gardner,E.J & Snusted, D.P.(1984): Principles of Genetics (7thedition) John Wiley & Sons, N.Y. Chichester, Brisbane, Toronto, Singapore.
11. Lewin, B. (1985) Genes VII Wiley Eastern Ltd., New Delhi, Bombay, Calcutta, Madras, Hydrabad.
12. Allard R.W(1999): The Principles of Plant Breeding, John & Wiley and Sons.
13. Poelman J.M: Breeding Field Crops, Springer.



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR,**  
**III B. Sc - SEMESTER- V: Botany Theory Syllabus 2019-20**  
**PAPER-VI: Plant Ecology & Phytogeography**  
**Total hours of teaching 60 hrs @ 4 hrs per week**

**UNIT – I. Elements of Ecology (12 hrs)**

1. Ecology: definition, branches and significance of ecology.
2. Climatic Factors: Light, Temperature, precipitation.
3. Edaphic Factor: Origin, formation, composition and soil profile.
4. Biotic Factor: Interactions between plants and animals.

**UNIT– II. Ecosystem Ecology (12 hrs)**

1. Ecosystem: Concept and components, energy flow, Food chain, Food web, Ecological pyramids.
2. Productivity of ecosystem-Primary, Secondary and Net productivity.
3. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.

**UNIT – III Population & Community Ecology (12 hrs)**

1. Population -definition, characteristics and importance, outlines –ecotypes.
2. Plant communities- characters of a community, outlines – Frequency, density, cover, life forms, and competition.
3. Interaction between plants growing in a community.
4. Ecological Succession (Hydrosere, Xerosere).

**UNIT – IV Phytogeography (12 hrs)**

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Phytogeographic regions of India.
3. Phytogeographic regions of World.
4. Endemism – types and causes

**UNIT- V: Plant Biodiversity and its importance (12 hrs)**

1. Definition, levels of biodiversity-genetic, species and ecosystem.
2. Biodiversity hotspots- Criteria, Biodiversity hotspots of India.
3. Loss of biodiversity – causes and conservation (In-situ and ex-situ methods).
4. Seed banks - conservation of genetic resources and their importance.

**Suggested activity :** Collection of different soils, studying their texture, observing polluted water bodies, student study projects, debates on man's activity on ecosystem and biodiversity conservation methods, visiting a nearest natural vegetation area. Visit to NGO, working in the field of biodiversity and report writing; to study Honey Bees and plants yielding honey.

**Books for Reference:** 1. Daubenmire, R.F. ( ): Plants & Environment (2nd Edn.,) John Wiley & Sons., New York 22

2. Puri, .G.S. (1960): Indian Forest Ecology (Vol.I & II) Oxford Book Co., New Delhi & Calcutta.

3. Billings, W.B. (1965): Plants and the Ecosystem Wadsworth Publishing Co., Inc., Belmont.

4. Misra, R. (1968): The Ecology work Book Oxford & INH Publishing Co., Calcutta

5. Odum E.P. (1971): Fundamentals of Ecology (2nd Edn.,) Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.

6. Odum E.P. (1975): Ecology By Holt, Rinert & Winston.

7. Oosting, H.G. (1978): Plants and Ecosystem Wadworth Belmont.

8. Kochhar, P.L. (1975): Plant Ecology. (9th Edn.,) New Delhi, Bombay, Calcutta-226pp.

9. Kumar, H.D. (1992): Modern Concepts of Ecology (7th Edn.,) Vikas Publishing Co., New Delhi.

10. Kumar H.D. (2000): Biodiversity & Sustainable Conservation Oxford & IBH Publishing 10. Co Ltd. New Delhi.

11. Newman, E.I. (2000): Applied Ecology Blackwell Scientific Publisher, U.K. 12. Chapman, J.L&M.J. Reiss (1992): ecology (Principles & Applications). Cambridge University Press, U.K.

13. Cain, S.A . (1944): Foundations of Plant Geography Harper & Brothers, N.Y. 14. Mani, M.S (1974): Ecology & Biogeography of India Dr. W. Junk Publishers, The Haque

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. SC - BOTANY SYLLABUS SEMESTER- VI**  
**PAPER – VII – ELECTIVE 2019-20**  
**PAPER VII-(B): Nursery, Gardening and Floriculture.**  
**Total hours of teaching 60hrs @ 3hrs per week**

**Unit I: Nursery: (12 hrs.)**

1. Definition, objectives, scope and building up of infrastructure for nursery.
2. Planning and seasonal activities - Planting - direct seeding and transplants.
3. Nursery Management and Routine Garden Operations.

**Unit II: Gardening (12 hrs.)**

1. Definition, objectives and scope - different types of gardening.
2. Landscape and home gardening - parks and its components, plant materials and design .
3. Computer applications in landscaping.
4. Gardening operations: soil laying, manuring, watering.
5. Landscaping Places of Public Importance: Landscaping highways and Educational Institutions)
6. Some Famous gardens of India.

**Unit III: Propagation methods (12 hrs.)**

- 1 Sowing/raising of seeds and seedlings, transplanting of seedlings.
2. Airlayering, cutting, selection of cutting ,propagule collecting season, treatment of cutting rooting medium and planting of cuttings - Hardening of plants.
3. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
4. Green house - mist chamber, shed root, shade house and glass house for propagation.

**Unit IV: Floriculture: ( 12 hrs.)**

1. Ornamental Plants: Flowering annuals; herbaceous, perennials; Divine vines; Shade and ornamental trees.
2. Ornamental bulbous and foliage plants; Cacti and succulents.
3. Ornamentals-palms.
4. Cultivation of plants in pots; Indoor gardening; Bonsai.

**Unit V: Commercial Floriculture ( 12 hrs.)**

1. Factors affecting flower production; Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life of flowers
2. Cultivation of Important cut flowers (Carnation, Aster, Dahlia, Gerbera, Anthuriums, Gladiolous, Marigold, Rose, Lilium)
3. Management of pests, diseases and harvesting. 4. Methods of harvesting.

**Books for Reference:**

1. Bose T.K. & Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.

2. Sandhu, M.K., 1989, Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
3. Kumar, N., 1997, Introduction to Horticulture, Rajalakshmi Publications, Nagercoil. institution)
4. Randhawa, G.S. and Mukhopadhyay, A. 1986. Floriculture in India. Allied Publishers.

Suggested Activities: Raising a nursery, managing it, studying and drawing various land scaping designs, practicing layering methods, using shade nets to protect horticultural crops, practicing indoor gardening techniques, visiting florists and recording their methods of prolonging vase life of commercial cut flowers.

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**III BSC BOTANY MODEL QUESTION PAPER 2019-20**

**Time: 3 hours**

**Marks: 60M**

**Section – A - Short Questions**

4. Eight Questions are given, Students have Answer 5 Questions. Each Question Carries 4 Marks, (ONE question from each unit max eight from all).  $5 \times 4 = 20$

**Section - B - Essay Questions**

2. Answer all of the following .from each Unit 2 Essay Questions with Internal choice  
each Question Carries 8 Marks  $5 \times 8 = 40M$

**INTERNAL ASSESMENT**

Two internals	- 20 marks
Assignments	- 5 marks
Seminars	- 5 marks
Objective type questions	=10 marks
Total	= 40 marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**I B.Sc – SEMESTER –I: Botany Practical Syllabus**

**Paper-I: Microbial Diversity, Algae and Fungi**

Total hours of laboratory Exercises 30 hrs @ 2 per week

1. Knowledge of Equipment used in Microbiology: Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, laminar air flow chamber and Incubator.
2. Preparation of liquid and solid media for culturing of microbes (Demonstration).
3. Study of viruses and bacteria using electron photo micrographs (TMV, Bacteriophage, HIV, Cocci, Bacillus, Spirillum bacteria).
4. Gram staining technique.
5. Study of Plant disease symptoms caused by Bacteria (Citrus canker, leaf blight of rice, Angular leaf spot of Cotton) and viruses (TMV, Bhendi vein clearing and Leaf curl of Papaya), Fungi (Late blight of potato, Red rot of Sugarcane and Paddy blast).
6. Study of vegetative and reproductive structures of the following:
  - a) Cyanobacteria: *Nostoc and Scytonema*.
  - b) Algae: *Volvox, Oedogonium, Ectocarpus, Polysiphonia*,
  - c) Fungi: *Rhizopus, Penicillium and Puccinia*.
7. Study of plant material infected by Fungi (Rot of tomatoes, blue and green moulds of Citrus fruits and wheat rust (Section cutting of diseased parts of Wheat and Barberry -identification of different spores)).
8. Lichens: Morphology and anatomy of different thalli.
9. Field Visit.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc - SEMESTER –I Botany Practical Paper –I**  
**PAPOAER-1 P: Microbial Diversity, Algae and Fungi**

Time: 3hrs.

Max. Marks: 50

1. Identify giving reasons two of the given **Algal mixture** "A". Leave your preparation for evaluation. Draw labeled diagrams. (Slide--1 mark, Diagrams--1 mark, Identification--1 mark)  
2x 3= 6 Marks

2. Make suitable stained preparation of the **material "B"** to bring out the details of internal structure-- identify giving reasons. Draw labeled diagrams and leave your preparations for evaluation. (Slide-4 marks, diagrams-3 marks, Identification-3marks)  
10 Marks

3. Perform Gram staining of the given Bacterial culture 9Marks

4. Write critical notes and Identify D, E, F, G and H (5X4) = 20Marks  
(Identification-1marks, classification-1mark, Diagrams-1 mark, notes -1 mark)

5. Record (submission is compulsory) 5Marks

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Total: 50 Marks  
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**Key:**

- A. Algal material
- B. Fungi material
- C. Bacterial culture
- D. One of the instruments of Micro biology laboratory.
- E. Whole specimen or a permanent slide of Algae.
- F. Whole specimen or a permanent slide of Fungi.
- G. Whole specimen or a permanent slide of Plant disease studied.
- H. Whole specimen or a permanent slide of Lichens.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS), GUDUR**  
**I B.Sc SEMESTER -II BOTANY PRACTICAL SYLLABUS**  
**PAPER-II: Diversity of Archegoniate & Plant Anatomy**  
**Total hours of laboratory Exercises 30 hrs @ 2 per week**

1. Morphology (vegetative and reproductive structures), anatomy of the following:

*Marchantia, Funaria, Lycopodium* and *Pinus*.

2. Anatomy:

a) Demonstration of double staining technique.

b) Tissue organization in root and shoot apices using permanent slides

c) Preparation of double staining slides

d) Anomalous secondary structure of *Achyranthes*, *Boerhavia* and *Dracaena*.

e) Anatomical study of wood in T.S., T.L.S. and R.L.S.

3. Field visits to local timber depots.



**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**I B.Sc., SEMESTER –II: Botany Practical Model Paper II**  
**II P: Diversity of Archegoniate & Plant Anatomy**

- |   |               |
|---|---------------|
| 1. Section Cutting Of Material - <b>9</b> Marks               |               |
| (Slide 3 Marks, Diagrams-3 Marks, and Identification-3 Marks) |               |
| 2. Section Cutting Of Material - <b>B</b>                     | 9 Marks       |
| (Slide 3 Marks, Diagrams-3 Marks, and Identification-3 Marks) |               |
| 3. Section Cutting Of Material - <b>C</b>                     | 10 Marks      |
| (Slide 4 Marks, Diagrams-3 Marks, and Identification-3 Marks) |               |
| 4. Identification of Spotters - D, E, And F                   | 3x4 =12 Marks |
| 5. Record (Submission Compulsory)                             | 5marks        |
| 6. Viva   | 5marks        |

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Total : 50 Marks  
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**Key:**

- A. Bryophyta/ Pteridophyta Material
- B. Gymnosperm Material.
- C. Anatomy Material.
- D. Whole Specimen Or Permanent Slide Of Bryophyta/ Pteridophyta E. Whole Specimen Or Permanent Slide Of Gymnosperm.
- F. Whole Specimen Or Permanent Slide Of Wood.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR II B.Sc**  
**BOTANY - SEMESTER-III**

**Paper-III: Practical Plant Taxonomy and Embryology**

Total hours of laboratory Exercises 30hrs @ 2 per week

**Suggested laboratory exercises:**

1. Systematic study of locally available plants belonging to the families prescribed in theory syllabus.
2. Demonstration of herbarium techniques.
3. Structure of pollen grains using whole mounts (*Catharanthus*, *Hibiscus*, *Acacia*, and Grass).
4. Demonstration of Pollen viability test using *in-vitro* germination (*Catharanthus*).
5. Study of ovule types and developmental stages of embryo sac using permanent slides /Photographs.
6. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot Embryos using permanent slides / Photographs
7. Isolation and mounting of embryo (using *Symopsis* / *Senna* / *Crotalaria*)
8. Field visits.
9. Study of local flora and submission of Field Note Book.

**Practical Model Paper III**  
**Plant Taxonomy and Embryology**

(Description- vegetative - 4 marks, floral characters – 5 marks; Twig with inflorescence -1mark, L.S. of Flower& T.s. of Ovary--2marks and floral Diagram--2marks, floral formula --1mark )  
1x 15= 15 Marks

3. Identification of spotters D&E (Embryology) 2x5=10 marks  
(Identification -1mark, notes-2marks, diagram-2marks)

## 5. Viva 5marks

Total : 50 Marks

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**

**II B. Sc BOTANY SEMESTRE- IV**

**Paper-IV: PRACTICAL SYLLABUS**

**PAPER-IV: Plant Physiology and Metabolism**

Total hours of laboratory Exercises 30 hrs @ 2 per week

**Suggested Laboratory Exercises:**

1. Osmosis – by potato osmoscope experiment
2. Determination of osmotic potential of plant cell sap by plasmolytic method using leaves of *Rhoeo* / *Tradescantia*.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer. Demonstrations of ascent of sap/Transpiration pull.
6. Effect of Temperature on membrane permeability by colorimetric method.
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of lg photosynthesis under varying Co Concentrations.
10. Effect of light intensity on oxygen evolution in photosynthesis using Wilmot' bubbler.

**DUVVURU RAMANAMMA WOMEN'S COLLEGE (AUTONOMOUS) GUDUR**  
**II B. Sc – Semester- IV, Botany Practical Model Paper**  
**Paper- IV - Plant Physiology and Metabolism**

1. Perform the Experiments A. Give the aim, principle, procedure and observation. Tabulate the results. Draw labeled diagram. 1 x 15 = 15 marks

(Aim-1mark, procedure-3marks, experimentation-5marks, observations & recording of results with discussion-4marks, diagram -2mark)

2. Give the protocol of the experiments B & C 2 x 5 = 10 marks

(Explanation -3marks, diagrams-2marks)

3. Spotters' D, E, F 3x5= 15marks

(Identification -1 mark, notes-2marks, diagram-2marks)

4. Record 5 marks

5. Viva 5 marks

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Total: 50 marks  
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**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Practical Syllabus**  
**SEMESTER- V**  
**Practical Paper-V: Cell Biology, Genetics and Plant Breeding**  
**Total hours of teaching 30hrs @ 2hrs per week**

**Suggested Laboratory Exercises:**

1. Study of the structure of cell organelles through photomicrographs.
2. Study of structure of plant cell through temporary mounts.
3. Study of various stages of mitosis using cytological preparation of Onion root tips.
4. Study of effect of temperature & organic solvent on permeability of cell membrane.
5. Study of DNA packing by micrographs
6. Numerical problems solving Mendel' Laws of inheritance
7. Hybridization techniques – emasculation, bagging (for demonstration only).
8. Field visit to a plant breeding research station.
9. Calorimetric estimation of DNA by diphenylamine method.
10. Polytene chromosome
11. Meiosis stages- slides

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc – SEMESTER- V, Botany Practical Model Paper**  
**PAPER-V: Cell Biology, Genetics and Plant Breeding**

1. Perform the Experiment A. performs squash on onion root tip, prepare the slide, identify at least one division stage. Write the procedure and draw the diagram of reported stage.

(Procedure-4M, Experimentation-3M, Diagrams-3M) 1x1=10Marks

2. Solving numerical problems on Mendelian inheritance B. 1x8 = 8Marks

(Checker board-4M, Discussion-4M)

3. Solve the genetic problem C. 1x4 = 4Marks

(Checker board-2M, Discussion-2M)

4. Give the experimental protocol of the experiment D. 1x6 =6Marks

5. Identify and write note on E, F, G 3x4 =12Marks

(Identification-1m, Notes-1m, Diagram-1M)

6. Record & Viva 10

Total----- 50 marks

**KEY:**

A-Onion root tip by Squash technique

B&C- Numerical problems on Mendelian Inheritance.

D-Estimation of DNA by diphenylamine method & Membrane permeability-Protocol only

E-Cytology

F-Genetic Material

G-Plant Breeding

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Practical Syllabus**  
**SEMESTER- V**  
**Practical Paper-VI: Plant Ecology & Phytogeography**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, psychrometer, rain gauge, and luxmeter.
2. Permeability (percolation; total capacity as well as rate of movement) of different soil samples.
3. Determination of soil pH
4. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (4 each)
5. Determination of minimal quadrat size for the study of herbaceous vegetation in the college campus by species area curve method
6. Study of Phytoplankton and macrophytes from water bodies.
7. Study of species diversity index of vegetation.
8. Estimation of Primary Productivity of an ecosystem
9. To study field vegetation with respect to stratification, canopy cover and composition.
10. Study of plants included in agro forestry and social forestry.
11. To locate the hotspots, phytogeographical regions and distribution of endemic plants in the map of India.
12. The following practical should be conducted in the Field/lab with the help of photographs, herbarium, Floras, Red data book- Study of endangered plants species, critically endangered plants species, vulnerable plant species and monotypic endemic genera of India.
13. Estimation of bicarbonates in the given sample.



**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - SEMESTER- VI: Botany Practical Model Paper**  
**PAPER–VI: Plant Ecology & Phytogeography**

1. Perform the major experiment A.

(Procedure-4M, Experimentation-4M, Observation, recording of result with diagrams-2M)  
1x1=10Marks

2. Make suitable stained preparation of the material B & Identify the material with the help of slide.

(Identification with reasons-2M, Section cutting-4M, Diagrams-2M) 1x8=8Marks

3. Protocol of the Experiment C. 1x6=6Marks

4. Identify & write note on D, E, F, G 4x4=16Marks

(Identification-1m, Notes-1m, Diagram-1M)

5. Record & Viva-Voce 10Marks

Total -----50 Marks

KEY:

A. Estimation of and Bicarbonates.

B. Anatomy-Hydrophytes/Xerophytes.

C. Protocol of the pond Ecosystem/Quadrat method/Porosity/Hotspots in India.

D. Hydrophytes.

E. Xerophytes.

F. Ecological Equipments

G. Phytogeography

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**III B. Sc - Botany Syllabus Semester- VI (Elective) Practical Syllabus,**  
**Paper VII-(B): Nursery, Gardening and Floriculture**  
**Total hours of teaching 30hrs @ 2hrs per week**

1. Tools, implements and containers used for propagation and nursery techniques. 2. Propagation by cutting, layering, budding and grafting
3. Seed propagation- preparation of portable trays, seed treatments, sowing and seedling production.
4. Identification and description of annuals, herbaceous perennials, climbers, creepers, foliage and flowering shrubs, trees, palms, ferns, ornamental grasses; cacti and succulents..
5. Planning and designing of gardens, functional uses of plants in the landscape
6. Preparation of land for lawn and planting.
7. Identification of commercially important flower crops and their varieties.
8. Propagation practices in flower crops, sowing of seeds and raising of seedlings of annuals.
9. Use of chemicals and other compounds for prolonging the vase life of cut flowers.
10. Grading, packing and marketing of cut flowers.
11. Visit to commercial nurseries and commercial tissue culture laboratory
12. Study project under supervision of lecturer – nursery/ornamental flowers/ plants/lawn designing/ landscape designing

Expected domain skills to be achieved: Ability to use a variety of garden tools and implements, proficiency in layering and grafting techniques (cleft grafting and bud grafting), land scape drawings using computers, rising of healthy nurseries of flowering plants, managing vase life of cut flowers etc.

**D.R.W COLLEGE (AUTONOMOUS) GUDUR**  
**Practical Model Paper**  
**PAPER-VII-(B): Nursery, Gardening and Floriculture**

**Time: 3hours**

**Max.Marks =50marks**

- |   |                 |
|---|-----------------|
| Q1. Project report (A)                            | 15 marks        |
| Q2.Viva-voce on study project                     | 05 marks        |
| Q3. Identify and write notes on B, C, D, and E    | (4x5) =20 marks |
| B- Tool/instrument/container used in nursery      |                 |
| C-Seed propagation technique                      |                 |
| D- Plant used in lawn (plant specimen/photograph) |                 |
| E-ornamental flower (photograph/live specimen)    |                 |
| Q4. Field report                                  | 05 marks        |
| Q5. Record  | 05 marks        |
| Total-----50 marks                                |                 |