S. G. V. C. Vidya Prasarak Trust's,
Matoshri Gangamma Veerappa Chiniwar Arts, Commerce & Science College,
MUDDEBIHAL-586212. Dist. Vijayapur (Karnataka)
(Accredited with CGPA of 2.58 on seven point scale at 'B+' Grade)

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Ref. No. : 644/21

Date : 2021-22

Certificate

This is to certify that following are the programme/ curriculum/ Syllabus based project work during the year 2021-22

PRINCIPAL,
M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL-586212. Dist: Vijayapur.

M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL -586212 Dt: Vijayapur.

M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL
-586212
Dt: Vijayapur.

ರಾಣಿ ಚನ್ನಮ್ಮ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ
RANI CHANNAMMA UNIVERSITY, BELAGAVI
विद्वान् सर्वत्र पूज्यते
ದಶಮಾನೋತ್ಸವ ವರ್ಷ - 2020

RANI CHANNAMMA UNIVERSITY BELAGAVI

THE COURSE STRUCTURE & SYLLABUS OF UNDER GRADUATE

BACHELOR OF SCIENCE

BOTANY

1ST TO 6TH Semesters

w.e.f.

Academic Year 2020-21 and Onwards
Under

CHOICE BASED CREDIT SYSTEM (CBCS)

CHOICE BASED CREDIT SYSTEM [CBCS]
B.Sc. Program with Optional Subject: BOTANY

PRINCIPAL,
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M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL
-586212
Dt: Vijayapur.

First Semester B.Sc. (Botany)

Paper Code: BOTDSCT1.1 **Paper Title:** Biodiversity (Microbes, Algae, Fungi and Archegoniate)
Teaching Hours: 4 Hrs / Week **Marks:** Th-80+IA-20
Total hours: 60 **Credits: 3**

Unit1:

- **Viruses** : Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance;
- **Bacteria:** Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.
- **Viral Plant Diseases**: TMV. Vein clearing, Dwarfing, Yellowing and BBTV disease.
- **Bacterial Plant Disease**: Citrus canker, Bacterial blight and Crown gall disease.

15 hours

Unit2:

- **Algae**: General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae by smith; Morphology and life-cycles of the following: *Nostoc*, *Oedogonium*, *Vaucheria, Volvox, Ectocarpus & Batrachospermum*. Economic importance of algae.
- **Fungi**: Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition , nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of *Rhizopus* (Zygomycota), *Penicillium* (Ascomycota), *cercospora (Deutoromycota), Puccinia, Agaricus* (Basidiomycota);
- **Fungal Diseases:** Late blight of potato, White rust of *Albugo candida*., Black rust of *Puccinia*, Powdery mildew and Early Blight of Tomato.
- **Symbiotic Associations-Lichens**: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance **15 hours**.

Unit 3:

- **Introduction to Archegoniate:** Unifying features of archegoniates, Transition to land habit, Alternation of generations.
- **Bryophytes:** General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of *Riccia, Marchantia, Anthoceros* and *Funaria* (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of *Sphagnum*.

15 hours

Unit 4:

- **Pteridophytes:** General characteristics, classification, Early land plants (*lepidodendron, Lepidocarpon, Calamites*). Classification (up family), morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes.
- **Gymnosperms:** General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of *Cycas, Gnetum* and *Pinus*. (Developmental details not to be included). Ecological and economical importance. **15 hours**

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Second Semester B.Sc. (Botany)

Paper Code: BOTDSCT2.1 **Paper Title:** Plant Ecology and Diversity of angiosperms
Teaching Hours: 4 Hrs / Week **Marks:** Th-80+IA-20
Teaching hours: 60 **Credits:** 3

Unit1:

- **Atmosphere:** Atmosphere gaseous composition and Atmospheric layers.
- **Ecological factors:** Soil, weathering, composition, pedogenesis and soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.

15 hours

Unit 2:

- **Plant Succession:** Characters; Ecotone and edge effect; Succession; Hydrosere and Xerosere.
- **Ecosystem:** Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycles; carbon, nitrogen and Phosphorous cycles.
- **Phytogeography:** Principle, biogeographical zones; Endemism.

15 hours

Unit3

- **Morphology of Angiosperms:** Root, Stem, leaf and its modifications: inflorescence, flower and fruit.

15 hours

Unit4:

- **Plant Taxonomy:** Introduction, Identication Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access
- **Classification**

  Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series).
- **Taxonomic hierarchy**

  Ranks, categories and taxonomic groups, Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.
- **Botanical nomenclature**

  Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.

15 hours

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Third Semester B.Sc. (Botany)

Paper Code: BOTDSCT3.1 **Paper Title:** Plant Anatomy and Embryology
Teaching Hours: 4 Hrs / Week **Marks: Th-80+IA-20**
Teaching hours: 60 **Credits: 3**

Unit1:

- **Tissues**: Tunica carpous theory and apical theory, meristems and its types; Simple and complex tissues.
- **The tissue system:** Epidermal tissue system, Ground and fundamental tissue system and Vascular or conducting tissue system.
- **Organ:** Structure of dicot and monocot root stem and leaf.

15 hours

Unit 2:

- **Secondary Growth**: Stelar and Extrastelar Secondary growth in root and stem, Wood (heartwood and sapwood). Abnormal secondary growth in Bignonia, Dracaena and Beet root.
- **Leaf fall and healing of wounds**.
- **Special tissues**: Secretary.
- **Mechanical tissues in plants**

15 hours

Unit3:

- **Structural organization of flower:** Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultra structure of mature embryo sac.
- **Pollination and fertilization:** Pollination mechanisms and adaptations; Types of pollination: Anemophily, Entemophily, hydrophily. Double fertilization; Endosperm types, structure and functions.

15 hours

Unit 4:

- **Embryo and endosperm:** Dicot and Monocot seed-structure, appendages and dispersal mechanisms. Structure and development of Dicot and Monocot embryo; Embryo- endosperm relationship.
- **Apomixis and polyembryony:** Definition, Classification and practical applications.

15 hours

M.G.V.C. Arts, Commerce & Science College
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Third Semester B.Sc. (Botany)

Paper Code: BOTDSCT3.1 **Paper Title:** Plant Anatomy and Embryology
Teaching Hours: 4 Hrs / Week **Marks: Th-80+IA-20**
Teaching hours: 60 **Credits: 3**

Unit1:

- **Tissues**: Tunica carpous theory and apical theory, meristems and its types; Simple and complex tissues.
- **The tissue system:** Epidermal tissue system, Ground and fundamental tissue system and Vascular or conducting tissue system.
- **Organ:** Structure of dicot and monocot root stem and leaf.

15 hours

Unit 2:

- **Secondary Growth**: Stelar and Extrastelar Secondary growth in root and stem, Wood (heartwood and sapwood). Abnormal secondary growth in Bignonia, Dracaena and Beet root.
- **Leaf fall and healing of wounds**.
- **Special tissues**: Secretary.
- **Mechanical tissues in plants**

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Unit3:

- **Structural organization of flower:** Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultra structure of mature embryo sac.
- **Pollination and fertilization:** Pollination mechanisms and adaptations; Types of pollination: Anemophily, Entemophily, hydrophily. Double fertilization; Endosperm types, structure and functions.

15 hours

Unit 4:

- **Embryo and endosperm:** Dicot and Monocot seed-structure, appendages and dispersal mechanisms. Structure and development of Dicot and Monocot embryo; Embryo- endosperm relationship.
- **Apomixis and polyembryony:** Definition, Classification and practical applications.

15 hours

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Fourth Semester B.Sc. (Botany)

Paper Code: BOTDSCT4.1
Teaching Hours: 4 Hrs / Week
Teaching Hours: 60

Paper Title: Plant Physiology and Biochemistry
Marks: Th-80+IA-20
Credits: 3

Unit 1:

- **Plant-water relations:** Solutions, Suspensions, colloids, True solutions, Molarity, Molar, Buffer, Molal, pH, Emulsion and Gel. Permeability, Diffusion, Osmosis, Imbibition, membranes, Endoosmosis, Exoosmosis, osmotic pressure, Turger pressure, Wall pressure, Relation between O.P, D.P.D and T.P. Importance of water, water potential and its components;
- **Transpiration**: Transpiration types, Structure of stomata, Types of stomata, stomatal Movment, Starch sugure Interconversion theory and K^+ ion pump theory. significance of transpiration; Factors affecting transpiration; guttation,
- **Pathways of water movment:** Apoplast and symplast.
- **Mineral nutrition:** Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.

15 hours

Unit 2:

- **Ascent of sap, translocation of solutes:** Theories on Ascent of sap: Root pressure theory and transpiration pull theory. Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading.
- **Photosynthesis:** Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C_3, C_4 and CAM pathways of carbon fixation; Photorespiration, Blackmen's law of Limiting factor and factors affecting photosynthesis.

15 hours

Unit3:

- **Respiration:** Aerobic cellular respiration: Glycolysis, TCA cycle, Oxidative phosphorylation & Pentose Phosphate Pathway. Anaerobic respiration: Alcoholic lactic acid and acetic acid fermentation amphibolic pathway. Respiratory quotient of carbohydrate, protein and organic acid.
- **Enzymes:** Structure and properties, Classification, Mechanism of enzyme catalysis Lock and key model and induced fit model, enzyme inhibition and factors affecting enzyme activity.
- **Nitrogen metabolism:** Nitrogen cycle, Biological nitrogen fixation; Nitrate and ammonia assimilation.

15 hours

Unit 4:

- **Plant growth regulators:** Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylene. Application of Phytoharmones.
- **Plant Movements:** Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far red light responses on photomorphogenesis; Vernalization.
- Structure and classification of Proteins, carbohydrates and Lipids. **15 hours**

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Fifth Semester B.Sc. (Botany)

Paper Code: BOTDSET5.1
Teaching Hours: 4Hrs / Week
Teaching Hours:60

Paper Title : Economic Botany and Biotechnology
Marks: Th-80+IA-20
Credits :3

Unit1:

- **Origin of Cultivated Plants:** Concept of centers of origin, their importance with reference to Vavilov's work.
- **Cereals:** Origin, morphology and uses of Wheat, Jowar and Rice
- **Legumes:** General account with special reference to Gram and Soybean
- **Pulses**: Origin, morphology and uses of Chick pea, Cow pea and Lentil.

15 hours

Unit2:

- **Spices:** General account with special reference to clove and black pepper (Botanical name, family, part used, morphology and uses)
- **Beverages:** Tea (morphology, processing, uses)
- **Oils and Fats:** General description with special reference to groundnut.
- **Rubber:** General description with special reference to Hevea sp.
- **Fiber Yielding Plants:** General description with special reference to Cotton (Botanical name, family, part used morphology and uses).

15 hours

Unit 3:

- **Microbial genetic manipulation**: Bacterial transformation, selection of recombinant and trasformants, genetic improvement of industrial microbes, nitrogen fixers and fermentation technology.
- **Immunology:** Hybridoma and monoclonal antibodies, ELISA and Immunodetection. Molecular diagnosis of human disease, Human gene Therapy.
- **Plant tissue culture:** Micropropagation; haploid production through androgenesis and gynogenesis; brief account of embryo & endosperm culture with their applications

15 hours

Unit4:

- **Recombinant DNA Techniques**: Biotechnology scope, tools of genetic engineering, gene cloning techniques, gel electrophoreses, Bioreactor, transgenic plants. Agro bacterium and retroviruses as natural genetic engineer. Intellectual property rights and possible ethical risks.
- **Blotting techniques:** Northern, Southern and Western Blotting, DNA Fingerprinting; Molecular DNA markers i.e. RAPD, RFLP, SNPs; DNA sequencing, PCR and Reverse Transcriptase-PCR.

15 hours

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Fifth Semester B.Sc. (Botany) Elective I

Paper Code: BOTDSET5.2A
Teaching Hours: 4Hrs / Week
Teaching Hours:60

Paper Title : Cell and Molecular Biology
Marks: Th-80+IA-20
Credits :3

Unit 1:

- **Techniques in Biology**
  Principles of microscopy; Light Microscopy; Phase contrast microscopy; Fluorescence microscopy; Confocal microscopy; Sample Preparation for light microscopy; Electron microscopy (EM)- Scanning EM and Scanning Transmission EM (STEM); Sample Preparation for electron microscopy; X-ray diffraction analysis.
- **Cell as a unit of Life**
  The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape; Eukaryotic Cell components.
- **Cell Membrane and Cell Wall**
  The functions of membranes; Models of membrane structure; The fluidity of membranes; Membrane proteins and their functions; Carbohydrates in the membrane; Faces of the membranes; Selective permeability of the membranes; Cell wall.

15 Hours

Unit 2:

- **Mitochondria:** Structure, marker enzymes, composition; Semiautonomous nature; Symbiont hypothesis; Proteins synthesized within mitochondria; mitochondrial DNA.
- **Chloroplast:** Structure, marker enzymes, composition; semi autonomous nature, chloroplast DNA.
- **ER, Golgi body & Lysosomes:** Structures and roles.
- **Peroxisomes and Glyoxisomes:** Structures, composition, functions in animals and plants and biogenesis.
- **Nucleus:** Nuclear Envelope- structure of nuclear pore complex; chromatin; molecular organization, DNA packaging in eukaryotes, euchromatin and heterochromatin, nucleolus and ribosome structure (brief).

15 Hours

Unit 3:

- **Cell Cycle**
  Overview of Cell cycle, Mitosis and Meiosis; Molecular controls.
- **Genetic material**
  Gene concept: DNA: Miescher to Watson and Crick- historic perspective, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment, DNA structure, types of DNA, types of genetic material.
- **DNA replication (Prokaryotes and eukaryotes):** bidirectional replication, semi–conservative, semi discontinuous RNA priming, Ó (theta) mode of replication, replication of linear, ds- DNA, replicating the 5́ end of linear chromosome including replication enzymes.

15 Hours

Unit4:

- **Transcription (Prokaryotes and Eukaryotes)**
  Types of structures of RNA (mRNA, tRNA, rRNA), RNA polymerase- various types; Protein synthesis in Prokaryotes and eukaryotes, genetic code.
- **Regulation of gene expression**
  Gene concept and protein synthesis, Prokaryotes: Lac operon and Tryptophan operon; and in Eukaryotes.

15 Hours

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Sixth Semester B.Sc. (Botany)

Paper Code: BOTDSE6.1 **Paper Title :** Analytical Techniques in Plants
Teaching Hours: 4Hrs / Week **Marks:** Th-80+IA-20
Credits :3

Unit1:

- **Imaging and related techniques**
  Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy; Use of fluorochromes: (a) Flow cytometry (FACS); (b) Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freez eetching.

15 Hours

Unit 2:

- **Cell fractionation**
  Centrifugation: Differential and density gradient centrifugation, sucrose density gradient, $CsCl_2$ gradient, analytical centrifugation, ultracentrifugation, marker enzymes.
- **Radioisotopes**
  Use in biological research, auto-radiography, pulse chase experiment.
- **Spectrophotometry**
  Principle and its application in biological research.

15 Hours

Unit3:

- **Chromatography**
  Principle; Paper chromatography; Column chromatography, TLC, GLC, HPLC, Ion- exchange chromatography; Molecular sieve chromatography; Affinity chromatography.
- **Characterization of proteins and nucleic acids**
  Mass spectrometry; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids; Electrophoresis: AGE, PAGE, SDS-PAGE

15 Hours

Unit4:

- **Biostatistics**
  Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical; Measures of central tendency: Arithmetic mean, mode, median; Measures of dispersion: Range, mean deviation, variation, standard deviation; Chi-square test for goodness of fit.

15 Hours

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Sixth Semester B.Sc. (Botany)

Paper Code: BOTDSE6.1 **Paper Title :** Analytical Techniques in Plants
Teaching Hours: 4Hrs / Week **Marks:** Th-80+IA-20
Credits :3

Unit1:

- **Imaging and related techniques**
  Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy; Use of fluorochromes: (a) Flow cytometry (FACS); (b) Applications of fluorescence microscopy: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freez eetching.

15 Hours

Unit 2:

- **Cell fractionation**
  Centrifugation: Differential and density gradient centrifugation, sucrose density gradient, $CsCl_2$ gradient, analytical centrifugation, ultracentrifugation, marker enzymes.
- **Radioisotopes**
  Use in biological research, auto-radiography, pulse chase experiment.
- **Spectrophotometry**
  Principle and its application in biological research.

15 Hours

Unit3:

- **Chromatography**
  Principle; Paper chromatography; Column chromatography, TLC, GLC, HPLC, Ion- exchange chromatography; Molecular sieve chromatography; Affinity chromatography.
- **Characterization of proteins and nucleic acids**
  Mass spectrometry; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids; Electrophoresis: AGE, PAGE, SDS-PAGE

15 Hours

Unit4:

- **Biostatistics**
  Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical; Measures of central tendency: Arithmetic mean, mode, median; Measures of dispersion: Range, mean deviation, variation, standard deviation; Chi-square test for goodness of fit.

15 Hours

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Sixth Semester B.Sc. (Botany) Elective III

Paper Code: BOTDSET6.2A
Paper Title : Research Methodology
Teaching Hours: 4Hrs / Week
Marks: Th-80+IA-20
Credits :3

Unit1:

- **Basic concepts of research**
  Research-definition and types of research (Descriptive vs analytical; applied vs fundamental; quantitative vs qualitative; conceptual vs empirical). Research methods vs methodology. Literature-review and its consolidation; Library research; field research; laboratory research.

15 hours

Unit2:

- **General laboratory practices**
  Common calculations in botany laboratories. Understanding the details on the label of reagent bottles. Molarity and normality of common acids and bases. Preparation of solutions. Dilutions. Percentage solutions. Molar, molal and normal solutions. Technique of handling micropipettes; Knowledge about common toxic chemicals and safety measures in their handling.
- **Data collection and documentation of observations**
  Maintaining a laboratory record; Tabulation and generation of graphs. Imaging of tissue specimens and application of scale bars. The art of field photography.

15 hours

Unit3:

- **Overview of Biological Problems**
  History; Key biology research areas, Model organisms in biology (A Brief overview): Genetics, Physiology, Biochemistry, Molecular Biology, Cell Biology, Genomics, Proteomics-Transcriptional regulatory network.
- **Methods to study plant cell/tissue structure**
  Whole mounts, peel mounts, squash preparations, clearing, maceration and sectioning; Tissue preparation: living vs fixed, physical vs chemical fixation, coagulating fixatives, non- coagulant fixatives; tissue dehydration using graded solvent series; Paraffin and plastic infiltration; Preparation of thin and ultrathin sections.

15 hours

Unit 4:

- **Plant microtechniques**
  Staining procedures, classification and chemistry of stains.Staining equipment. Reactive dyes and fluorochromes (including genetically engineered protein labeling with GFP and other tags). Cytogenetic techniques with squashed plant materials.
- **The art of scientific writing and its presentation**
  Numbers, units, abbreviations and nomenclature used in scientific writing. Writingre ferences. Powerpoint presentation. Poster presentation. Scientific writing and ethics, Introduction to copyright-academic misconduct/plagiarism.

15 hours

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Ref. No. : 643/21 Date : 2021-22

DEPARTMENT OF BOTANY
PROJECT WORK - 2021-22
B.Sc IInd SEMESTER

Sl.No	Seat No	Name of the Students	Project
1	U15NU21S002	Khwajabandenawaz Mulawad	Bryophytes
2	U15NU21S004	Tasneem.Soudagar	Bryophytes
3	U15NU21S023	Tanveer Attar	Bryophytes
4	U15NU21S024	Manjula.Lakkanavar	Bryophytes
5	U15NU21S027	Pratiba.Dodamani	Bryophytes
6	U15NU21S032	Muskan.Mujawar	Bryophytes
7	U15NU21S034	Vidyashree.Sasnur	Bryophytes
8	U15NU21S035	Sangeeta	Bryophytes
9	U15NU21S040	Sohail.Desai	Bryophytes
10	U15NU21S042	Sachin	Bryophytes
11	U15NU21S065	Vinuta	Bryophytes
12	U15NU21S093	Bhagyashree.K	Bryophytes
13	U15NU21S072	Muskan	Bryophytes
14	U15NU21S086	Rajiyabegum.Rudrawadi	Bryophytes
15	U15NU21S090	Malappa.Kashinakunti	Bryophytes

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B.Sc IInd SEMESTER

Sl.No	Seat No	Name of the Students	Project
1	U15NU21S002	Khwajabandenawaz Mulawad	Paleobotany
2	U15NU21S004	Tasneem.Soudagar	Paleobotany
3	U15NU21S023	Tanveer Attar	Paleobotany
4	U15NU21S024	Manjula.Lakkanavar	Paleobotany
5	U15NU21S027	Pratiba.Dodamani	Paleobotany
6	U15NU21S032	Muskan.Mujawar	Paleobotany
7	U15NU21S034	Vidyashree.Sasnur	Paleobotany
8	U15NU21S035	Sangeeta	Paleobotany
9	U15NU21S040	Sohail.Desai	Paleobotany
10	U15NU21S042	Sachin	Paleobotany
11	U15NU21S065	Vinuta	Paleobotany
12	U15NU21S093	Bhagyashree.K	Paleobotany
13	U15NU21S072	Muskan	Paleobotany
14	U15NU21S086	Rajiyabegum.Rudrawadi	Paleobotany
15	U15NU21S090	Malappa.Kashinakunti	Paleobotany

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