

MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12 SYLLABUS

UG - COURSES – AFFILIATED COLLEGES



Course Structure for B. Sc. Botany (Choice Based Credit System)

(with effect from the academic year 2021-2022 onwards)

Semester-V								
Part	Subject Status	Subject Title	Subject Code	Credit				
III	Core	CELL BIOLOGY AND EMBRYOLOGY OF ANGIOSPERMS	CMBO51	4				
III	Core	MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS	CMBO52	4				
III	Core	BIOCHEMISTRY AND BIOINFORMATICS	CMBO53	4				
III	Elective - I	PLANT ECOLOGY AND PHYTOGEOGRAPHY - I(A)	CEBO53	4				
III	Major Practical - V	CELL BIOLOGY, EMBRYOLOGY, MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS - PRACTICAL	CMBOP5	2				
III	Major Practical VI	BIOCHEMISTRY, BIOINFORMATICS AND ELECTIVE - I PRACTICAL	CMBOP6	2				
IV	Skill Based Common	PERSONALITY DEVELOPMENT/EFFECTIVE COMMUNICATION	CCSB51/ CCSB52	2				





Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

A. Scheme for internal Assessment:

Maximum marks for written test: 20 marks3 internal tests, each of I hour duration shall be conducted every semester.To the average of the best two written examinations must be added the marks scored in. The assignment for 5 marks.

The break up for internal assessment shall be: Written test- 20 marks; Assignment -5 marks Total - 25 marks

B. Scheme of External Examination

3 hrs. examination at the end of the semester

- A Part : 1 mark question two from each unit
- B Part: 5 marks question one from each unit
- C Part: 8 marks question one from each unit

> Conversion of Marks into Grade Points and Letter Grades

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	0	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	А	8	Very Good
4	60-69	B+	7	Good
5	50-59	В	6	Above Average
6	40-49	С	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

<u>Cumulative Grade Point Average (CGPA)</u>

$$\mathsf{CGPA} = \frac{\Sigma \left(\mathsf{GP} \times \mathsf{C}\right)}{\Sigma \mathsf{C}}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

> Classification

a) F	irst Class with Distinction	:	$CGPA \ge 7.5*$
b) F	first Class	:	$CGPA \ge 6.0$
c) S	econd Class	:	$CGPA \ge 5.0 \text{ and } \le 6.0$

d) Third Class : CGPA< 5.0



CELL BIOLOGY AND EMBRYOLOGY OF ANGIOSPERMS

Objectives:

- The structure of prokaryotic and eukaryotic cells including cell organelles and their function, and cell division.
- The complete details about the flower, sporogenesis, pollination, development of gametophytes, fertilization, embryogeny and other post-fertilization events, and apomixis.

UNIT – I

Structure of Prokaryotic and Eukaryotic cells, Cell cycle, Amitosis, Mitosis, and Meiosis

UNIT – II

Ultrastructure of cell organelles and function: Nucleus, Chloroplast, Mitochondria, Endoplasmic reticulum, Golgi complex, and Ribosomes

UNIT – III

Morphological nature of Flower, Anther types and Structure, Microsporogenesis, Pollen grain structure, Ovule types, Megasporogenesis and Male Gametophyte Development, Female Gametophyte Development and its types

UNIT – IV

Pollination, Pollen-pistil Interaction, Self-incompatibility, Double Fertilization, Post fertilization changes, Endosperm Development and types, Embryogeny in Dicots and Monocots and Structure of Dicot and Monocot embryos

UNIT – V

Seed and Fruit Development, Parthenocarpy, Polyembryony, Apomixis, Basic concepts of Apogamy and Apospory, Agamospermy and Parthenogenesis

PRACTICAL:

Cell Biology

- 1. Study of Mitosis in the Onion root tip
- 2. Electro-micrographs of Cell organelles and Non-living Inclusions

Embryology of Angiosperms

- 1. Dissect and display the parts of a flower
- 2. Identification of anther types with the slides and photographs
- 3. Identification of ovules types with the slides and photographs



- 4. Dissect out anyone stage of embryo
- 5. Developmental stages of embryo photographs

To maintain a record notebook for external evaluation.

REFERENCES:

- 1. Batgina T.B., 2002. Embryology of Flowering Plants.Terminology and Concepts. Vol. 1.Generative Organs of Flower. Oxford & IBH.
- 2. Batgina T.B., 2005. Embryology of Flowering Plants.Terminology and Concepts. Vol. 2.Seed.CRC Press.
- 3. Batgina T.B.2009. Embryology of Flowering Plants.Terminology and Concepts.Vol 3. Reproductive Systems.CRC Press.
- 4. Bhojwani S.S., Bhatnagar S.P., Dantu P.K., 2018. The Embryology of Angiosperms.6th Ed. Vikas Publishing House Pvt. Ltd.
- 5. Gerald Karp. 2013. Cell Biology. 7th ed. Wiley.
- 6. Janet Iwasa and Wallace Marshall. 2018. Karp's Cell Biology. 8th Global Ed. John Wiley& Sons.
- 7. Johri B.M., 2011. Embryology of Angiosperms. Springer Softcover Reprint of the Original 1984.1sted.
- 8. Maheswari, P. (Panchanan). 2015. An Introduction to the Embryology of Angiosperms. Scholar Select.
- 9. VirendraBatra. 2009. Plant Cell Biology. Oxford Book Company.
- 10. William V. Dashek., Marcia Harrison. 2006. Plant Cell Biology. 1st ed. CRC Press.

https://www.youtube.com/watch?v=RQ-SMCmWB1s https://www.youtube.com/watch?v=IA0DhWDTUpU https://www.youtube.com/watch?v=ExuNJ_dKQaM https://www.youtube.com/watch?v=gwykLmOsw6k https://www.youtube.com/watch?v=i3BgMvJRo7E

MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Objectives:

- Understand the principles of systematics.
- Describe the distinctive features of selected families.
- Identify and preserve the plant species.
- Know the economic value of the plants in the cited families

UNIT – I

Modifications: Root, stem and leaf; Phyllotaxy - types; Inflorescence: Racemose,



Cymose, Mixed and Special types. Description of floral parts; Fruit - types.

UNIT – II

Systems of classification of plants: Natural - Benthem and Hooker system Phylogenetic – Engler and Prantl's system - (with merits and demerits); Plant Nomenclature – Binomial Nomenclature and author citation, ICBN; Herbarium techniques and importance.

UNIT – III

Detailed study of the following families and their economic importance: Nymphaeaceae, Anonaceae, Rutaceae, Caesalpiniaceae, Cucurbitaceae and Apiaceae.

UNIT - IV

Rubiaceae, Sapotaceae, Convolvulaceae, Asclepiadaceae and Lamiaceae.

UNIT – V

Amaranthaceae, Euphorbiaceae, Liliaceae, Arecaceae and Poaceae.

PRACTICAL:

- 1. Morphological identification of plant parts and their modifications.
- 2. Technical description of plant parts and dissection of floral parts of plants with reference to the families prescribed in the syllabus.
- 3. Field trips (minimum 2days) to places under the guidance of teachers to study plants in their natural habitat and submit a report.
- 4. Identify and comment on the useful plant parts or plants prescribed in the syllabus.
- 5. Preparation and submission of 10 herbarium sheets.
- 6. To maintain a record notebook for external evaluation.

REFERENCES:

- Ashok Bendre and Ashok Kumar (1984) A Text Book of Practical Botany Vol. II. Rastogi Publications, Shivaji Road, Meerut.
- 2. Davis P. H. and Heywood V.H. (1993) Principles of Angiosperms Taxonomy.
- 3. Lawrence, G.H.M (1953) Taxonomy of Vascular Plants, Oxford & IBH Publishes, New Delhi.
- 4. The flora of the Tamilnadu Carnatic / K.M. Matthew. Tiruchirapalli, India: Rapinat Herbarium, St. Josephs College, 1983. 3 v. (lxxxiv, 2154 p.).
- 5. Taxonomy of angiosperms. V N Naik. Publisher: New Delhi: Tata McGraw-Hill, ©1984.



- 6. Narayanaswamy, R.V &Rao, K. N (1976) Outlines of Botany, S. Viswanathan Printers & Publishers, Madras.
- 7. Singh, G. 2005. Plant Systematics Theory and Practice. Oxford & IBH, New Delhi.
- Singh, V & Singh, D.K (1983) Taxonomy of Angiosperms, Rastogi Publications,
- Vashista, P.C (1997) Taxonomy of Angiosperms, S. Chand & Co., (P) Ltd., New Delhi.
- 10. Verma, V (1974) A Text Book of Economic Botany, Emkay Publications, New Delhi.

https://www.youtube.com/watch?v=1K_G4UXc3s0 https://www.youtube.com/watch?v=OU4_7DKmVCk https://www.youtube.com/watch?v=0sRy8VbDXyY

BIOCHEMISTRY AND BIOINFORMATICS

Objectives:

- To enable the students to understand
- The fundamentals of Biochemistry and Bioinformatics.
- The structure of various biomolecules.
- To develop skill in detection and estimation of biomolecules in plant tissue.
- To develop skill in e-mail and internet, Library Information system and Virtual Reality.
- To become aware of the importance of computer applications in life sciences.

UNIT – I

Brief account of atom. Bonds - Ionic, Covalent and Hydrogen bonds. Principles and uses of pH meter, Colorimeter, Centrifuge and Chromatography.

UNIT – II

Carbohydrates: Basic structure and properties of Monosaccharides - Glucose and Fructose Disaccharides - Sucrose and Maltose. Polysaccharides - Cellulose and Starch.

UNIT – III

Proteins: Primary, Secondary and Tertiary structure and properties of proteins. Lipids: Classification, Basic structure and properties of lipids.



UNIT – IV

Enzymes: Classification, Nomenclature, Mechanism of enzyme action - Lock and Key hypothesis, Role of enzymes in food industry.

UNIT – V

Introduction to Bioinformatics, Basic components of computer, Internet and Browsing Websites. Virtual library, Online literature, Nucleic acid sequence data bases, Protein sequence data bases and Enzyme data bases.

PRACTICAL:

- 1. Measurement of pH of a solution using pH meter.
- 2. Determination of complementary colour.
- 3. Verification of Beer's Law.
- 4. Estimation of starch in plant tissues by colorimetry.
- 5. Estimation of proteins in plant tissues by colorimetry.
- 6. Separation of dyes from a mixture by Circular paper chromatography.

Spotters:

Instruments: pH meter, Colorimeter, Centrifuge, Keyboard, CPU and Pen drive. **Chemicals:** Glucose, Sucrose, Starch. Charts: Mechanism of Enzyme action - Lock and key model & Induced fit model.

To maintain a record notebook for external evaluation.

REFERENCES:

- 1. Conn. E.J. and Stumpf. P.K., 1987, outlines of Biochemistry, Wiley Eastern Ltd., Bombay.
- 2. Jain. J.L., 2001, Fundamentals of Biochemistry, S.Chand and Co., New Delhi.
- 3. Lehninger. A.L., 1987, Biochemistry, CBS Publishers, New Delhi.
- 4. Stryer, L., 1986, Biochemistry, CBS Publishers, New Delhi.
- 5. Attwood. T.K. and Parry. S., 1999, Introduction to Bioinformatics, Addison Wesley Longman Ltd.

https://www.youtube.com/watch?v=AE5QcL4VfH4 https://www.youtube.com/watch?v=vqGqxSP_U7M https://www.youtube.com/watch?v=PPJ7C3hcnPw https://www.youtube.com/watch?v=ozdO1mLXBQE https://www.youtube.com/watch?v=5BBYBRWzsLA https://www.youtube.com/watch?v=w-uk-_TOgR0



PLANT ECOLOGY AND PHYTOGEOGRAPHY

Preamble:

• To enable the students to understand biotic and abiotic factors in our ecosystem, to study the need of various ecosystems and vegetation. This course will enable the students to understand how environment influence the life of different organisms and vice versa.

UNIT – I

Vegetation: Biotic and abiotic factors and their influence on vegetation, a brief account of microbes, plants, animals, soil, wind, light, temperature, rainfall and fire. Biogeochemical cycles – Nitrogen and Carbon.

UNIT – II

Ecosystem: Concept, processes and component: Types of ecosystems – Aquatic and Forest: Ecological Classification of Plants: Morphological, anatomical and physiological adaptations of plants with special reference to Hydrophytes and Xerophytes

UNIT – III

Autecology and Synecology: Definition (Species, Population, Community); Vegetation – Units of vegetation – Formation, Association, Consociation; Society – development of vegetation; Migration – ecesis, colonization; Methods of study of vegetation – Quadrat

$\mathbf{UNIT} - \mathbf{IV}$

Biomonitoring and Biodegradation: Xenobioticis using microbe, Types of Bioremediation – in situ and ex situ, phytoremediation, Biosensors and Bioindicators.

$\mathbf{UNIT} - \mathbf{V}$

Phytogeography: Principles, continental drift and endemism. Vegetation in Tamil Nadu, Remote Sensing, Climate and climatic regions of India

PRACTICAL:

- 1. Analysis of herbaceous vegetation by using quadrat and line transect method to find out frequency, density, abundance and interpret the vegetation in terms of Raunkaier's frequency formula.
- 2. Morophological and anatomical adaptations of hydrophytes and xerophytes(each2)

Hydrophytes: Hydrilla, Nymphea Xerophytes: Nerium, Casuarina

Nesamony Memorial Christian College, Marthandam



- 3. Continental drift, Remote sensing, Vegetation in Tamil Nadu.
- 4. To maintain a record notebook for external evaluation.

REFERENCES:

- 1. A Text book of plant Ecology. 15thEdition R.S. Ambasht& N.K. Ambasht. C.B.S Publishers & distributors Pvt. Ltd.
- 2. Daubenmier, R.F. (1970), Plants and Environmental. A text book of Plant Autoecology, Wiley Eastern Private Limited
- 3. Daubenmier, R.F. (1970), Plant Communities, Wiley Easterh Private Limited.
- 4. Odum, E. (2008). Ecology, Oxford and IBH Publisher.
- 5. Plant Ecology, E.D Schulze E. Beck, K. Muller Hohenstein, Springer.
- 6. Sharma P.D (2010) Ecology and Environment, (8th Ed.) Rastogi Publications, Meerut.
- 7. Kormondy, E.J. (1996). Concepts of Ecology, Prentice Hall, U.S.A 4th edition.
- 8. Singh, J.S, Singh, S.P. and Gupta, S. (2006). Ecology Environment and Resource Conservation. Anaamaya Publications, New Delhi.
- 9. Wilkinson D.M (2007), Fundamental Processes in Ecology. An Earth System Approach Oxford.

https://www.youtube.com/watch?v=rNfmew9C508 https://www.youtube.com/watch?v=C6YrPt1ygX8 https://www.youtube.com/watch?v=1LuvE8dYUjg https://www.youtube.com/watch?v=6jgCsYEiVNA https://www.youtube.com/watch?v=ZY8jz1dkFg8 https://www.youtube.com/watch?v=mc1V733uOho

PERSONALITY DEVELOPMENT

UNIT I: INTRODUCTION

Concept of personality - Dimensions of personality - Significance & Stages of personality development - Elements of Success

UNIT II POSITIVE ATTITUDE & SELF-MOTIVATION

Attitude - Concept - Significance - Factors affecting attitudes - Positive attitude – Advantages –Negative attitude- Disadvantages - Ways to develop positive attitude -Differences between personalities having positive and negative attitude. Concept of motivation - Significance – Internal and external motives - Importance of selfmotivation-Factors leading to de-motivation

UNIT III SELF DEVELOPMENT SKILLS



Emotional Adjustment - Self-Awareness – Self-esteem - Self-Confidence - Stress CopingAbility – Time Management

UNIT IV SOCIAL SKILLS DEVELOPMENT

Assertiveness - Interpersonal Relationship – Problem Solving - Decision Making - ConflictResolution

UNIT V SERVICE ORIENTATION & EMPLOYABILITY QUOTIENT

Social Concern - Value System and Culture; Resume building- Developing Group DiscussionSkills – Facing the Mock Interview Sessions

Text Books:

1. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata McGraw Hill.

2. Bhatia, R. C. (2010). Personality Development, Ane Books Pvt. Ltd., Chennai.

3. Aurther, J. (2006). Personality Development. Lotus Press, New Delhi.

Reference Books:

1. Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi.Tata McGraw-Hill 1988.

2. Stephen P. Robbins and Timothy A. Judge (2014), Organizational Behavior 16th Edition: Prentice Hall.

3. Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing, 2003

4. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).

5. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House.2005.

6. Seven Habits Of Highly Effective People – Stephen Covey

7. You Can Win – Shiv Khera



EFFECTIVE COMMUNICATION

Objectives:

- To impart effective communication skills to enrich students' personality development and self confidence
- To enhance the students' employability skills
- The courses will help to bridge the gap between the skill requirements of the employer or industry and the competency of the students

Teaching Methodology:

Lectures, Practical classes, Video, Public speaking, Group Discussion and Case Studies

Unit – I Introduction

Introduction to Communication, Flow of Communication, Elements of Communication and their characteristics - Models of Communication - Barriers to Communication, How to overcome barriers of communication.

Unit – II Understanding Human Communication

Types of Communication transactions, Culture and communication- Signs, symbols and codes in communication, Tools of communication (Oral, written, one way, two way, verbal and nonverbal, vertical and horizontal and lateral) Business communication-Body language.

Unit – III Effective Communication

Concept, nature and relevance to communication process: - Empathy - Persuasion - Perception - Listening - Learning and Audio-Visual Aids- concept and classification

Unit – IV Language and Communication

Listening skills– Etiquette (Personal, social, telephone, email and global), Types of Listening, Barriers to Effective Listening & Traits of a Good Listener, Language for Communication: Language and Communication; General Principles of Writing; Improving Writing Skills, Essentials of good style, Expressions and words to be avoided

Unit – V Employment Communication

Soft Skills: Empathy - Intrapersonal skills - Interpersonal skills - Problem solving – Reflective thinking - Critical thinking - Negotiation skills, Employment Communication – Resume:Contents of Good Resume; Job Interview- Job Interview Techniques- Manners and etiquettes tobe maintained during an interview; and Presentation skills.

References:

- SOFT SKILLS, 2015, Career Development Centre, Green Pearl Publications.
- Barker, L. (1990). "Communication", New Jersey: Prentice Hall, Inc; 171.
- Devito, J. (1998) Human Communication. New York: Harper & Row.
- Patri and Patri (2002); Essentials of Communication. Greenspan Publications

