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 2020-2021 onwards)

Semester-V				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
III	Core	Cell Biology and Embryology of Angiosperms	AMBO51	4
III	Core	Morphology and Taxonomy of Angiosperms	AMBO52	4
III	Core	Biochemistry and Bioinformatics	AMBO53	4
III	Elective - I	Plant Ecology and Phytogeography - I(A)	AEBO5C	3
III	Major Practical - V	Cell Biology, Embryology, Morphology and Taxonomy of Angiosperms - Practical	AMBOP5	3
III	Major Practical VI	Biochemistry, Bioinformatics and Elective - I Practical	AMBOP6	3
IV	Skill Based Common	Personality Development	ACSB51	2

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

A. **Scheme for internal Assessment**:
Maximum marks for written test: **20 marks**
3 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	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

- **Cumulative Grade Point Average (CGPA)**

$$\mathbf{CGPA} = \frac{\mathbf{\Sigma\,(GP \times C)}}{\mathbf{\Sigma C}}$$

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

- **Classification**
  a) First Class with Distinction : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 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, Pollengrain 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
6. Endosperm specimens

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.

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); APG - IV system of classification (outline only); 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 studyplants 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.
   Maintain a record book for external valuation

REFERENCES:

1. 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, NewDelhi.
4. Mathews, K.M, (1987 – 90) –Flora of Tamil Nadu and Carnatic (1 –4 Vols.) Rapinat
5. Meerut. Naik, V. N. 2000. Taxonomy of Angiosperms. Tata McGraw – Hill Publishing Company Limited. New Delhi.
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.
8. Singh, V & Singh, D.K (1983) – Taxonomy of Angiosperms, Rastogi Publications,
9. 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. 28

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.

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

UNIT – IV

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

UNIT – V

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

PRACTICAL:

1. Analysis of herbaceous vegetationby using quadrate 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
3. Continental drift,Remote sensing, Vegetation in Tamil Nadu.
4. Maintain a Record note book.

REFERENCE:

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 PlantAutoecology,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.

PERSONALITY DEVELOPMENT

UNIT: I - PERSONALITY

Definition –Determinants –Personality Traits –Theories of Personality –Importance of Personality Development. SELF AWARENESS–Meaning –Benefits of Self –Awareness –Developing Self –Awareness. SWOT–Meaning –Importance-Application –Components. GOAL SETTING-Meaning-Importance –Effective goal setting –Principles of goal setting –Goal setting at the Right level.

UNIT :II- SELF MONITORING

Meaning –High self –monitor versus low self monitor –Advantages and Disadvantages self monitor-Self –monitoring and job performance. PERCEPTION-Definition-Factor influencing perception-Perception process –Errors in perception –Avoiding perceptual errors. ATTITUDE–Meaning-Formation of attitude –Types of attitude -Measurementof Attitudes –Barriers to attitude change –Methods to attitude change.

ASSERTIVENESS-Meaning –Assertiveness in Communication –Assertiveness Techniques –Benefits of being Assertive –Improving Assertiveness.

UNIT : III - TEAM BUILDING

Meaning –Types of teams –Importance of Team building-Creating Effective Team.

LEADERSHIP–Definition –Leadership style-Theories of leadership –Qualities of an Effect leader. NEGOTIATION SKILLS–Meaning –Principles of Negotiation –Types of Negotiation –The NegotiationProcess –Common mistakes in Negotiation process. CONFLICT MANAGEMENT–Definition-Types of Conflict-Levels of Conflict – Conflict Resolution –Conflict management .

UNIT :IV - COMMUNICATION

Definition –Importance of communication –Process of communication - Communication Symbols –Communication network –Barriers in communication – Overcoming Communication Barriers. TRANSACTIONAL ANALYSIS–Meaning – EGO States –Types of Transactions –Johari Window-Life Positions. EMOTIONAL INTELLIGENCE-Meaning –Components of Emotional Intelligence-Significance of managing Emotional intelligence –How to develop Emotional Quotient. STRESS MANAGEMENT–Meaning –Sources of Stress –Symptoms of Stress –Consequences of Stress –Managing Stress.

UNIT :V - SOCIAL GRACES

Meaning–Social Grace at Work –Acquiring Social Graces. TABLE MANNERS– Meaning –Table Etiquettes in Multicultural Environment-Do's and Don'ts of Table Etiquettes. DRESS CODE–Meaning-Dress Code for selected Occasions –Dress Code for an Interview. GROUP DISCUSSION–Meaning –Personality traits required for Group Discussion-Process of Group Discussion-Group Discusson Topics. INTERVIEW–Definition-Types of skills –Employer Expectations –Planning for the Interview –Interview Questions-Critical Interview Questions.

REFERENCES:

1. Dr.S. Narayana Rajan, Dr. B. Rajasekaran, G. Venkadasalapthi, V. Vijuresh Nayaham and Herald M.Dhas, Personality Development, Publication Division, Manonmaniam Sundaranar University, Tirunelveli
2. Stephan P.Robbins, Organisational Behaviour, Tenth Edition, Prentice Hall of India Private Limited, New Delhi,2008.
3. Jit S. Chandan, Oragnisational Behaviour, Third Edition, Vikas Publishing House Private Limited, 2008.
4. Dr.K.K. Ramachandran and Dr.K.K. Karthick, From Campus to Corporate, Macmillan Publishers India Limited, New Delhi,2015.