



SOURASHTRA COLLEGE, MADURAI- 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

BOTANY - SYLLABUS (Under CBCS based on OBE)

(with effect from 2021-22)

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DEPARTMENT PROFILE

The Department of Botany has a long and distinguished history of excellence characterized by competent faculty, who have made major contributions to Plant Science over the past 50 years. Prof. V. R. SATYA MOORTHY was instrumental to introduce the Biology subject in the college as a supportive course for P.U.C. in 1967. Prof. Dr. N.M.R. CHANDRAKANTHAN took initiatives to establish the Botany Department in 1978 from the Biology Department and rendered academic services to undergraduate students of Chemistry as an ancillary subject. He taught classes in Plant Science and as an acclaimed well-known plant taxonomist he also first documented the campus flora of the Sourashtra College. He eventually rose to the top as the Principal of the college in 2006 and served in the position until 2009.

The scope of Botany has widened in recent times with the applications of the knowledge of plants to many other related areas of science. The opportunities for a postgraduate in various courses have expanded and there are greater prospects in academics, research, industry, consultancy and entrepreneurship, both in government and private sectors – in India and abroad. Job opportunities are also increasing as research organizations, herbal products companies, farm management organizations; biotech and drug development firms always do require the services of botany students.

VISION

Our dream is to provide quality education that will enable the well-being of graduates in the betterment of the Nation through good services to the society, and to motivate students to acquire knowledge and skills besides instilling confidence in critical thinking in a global perspective with honesty, perseverance and compassion.

MISSION

Our mission is to impart true botanical knowledge and bestow life skills to be a better citizen of tomorrow through an enlightened management and committed, competent faculty.

Signature of the Chairman/HOD



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DISTRIBUTION OF CREDITS (UG PROGRAMME)

CATEGORY: ANCILLARY

Part	S. Code	Course/Year	Sem	Title of the Paper	Duration	CA	SE	TOT	Cre
III	21UBYA11	B.Sc (Che) / I	I (T)	Plant Diversity and Plant Biotechnology	60 Hours (4 Hours/Week)	25	75	100	4
III	21UBYA21	B.Sc (Che) / I	II (T)	Taxonomy, Embryology of Angiosperms & Plant Physiology	60 Hours (4 Hours/Week)	25	75	100	4
III	21UBYAP1	B.Sc (Che) / I	I & II (P)	Plant Diversity, Applied Botany, Taxonomy, Embryology of Angiosperms & Plant Physiology	60 Hours (2 Hours/Week)	40	60	100	2
IV	21UBYN31	UG / II NME	III (T)	Medicinal Botany	30 Hours (2 Hours/Week)	25	75	100	2
IV	21UBYN41	UG / II NME	IV (T)	Horticulture and Economic botany	30 Hours (2 Hours/Week)	25	75	100	2

T- Theory; P- Practical

CATEGORY: PART IV

S.No.	S. Code	Course/Year	Sem	Title of the Paper	Duration	CA	SE	TOT	Credits
IV	21UACVE1	UG/ I	I (T)	Value Education	30 Hours (2 Hours/Week)	25	75	100	2
IV	21UACES1	UG/ I	II (T)	Environmental Studies	30 Hours (2 Hours/Week)	25	75	100	2

T- Theory



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Course code	Course Title	Category	L	T	P	Credits
21UBYA11	Plant Diversity and Plant Biotechnology	Allied-1	4	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	25	75	100

COURSE DESCRIPTION:

This course helps the students to understand the diversity and complexity of plant life forms and applications of various fields.

COURSE OBJECTIVES:

- To provide the basic knowledge about the structure and life cycle pattern of Algae, Fungi, Lichens, Bryophytes, Pteridophytes & Gymnosperms.
- This paper will enable the student to get a glimpse of the economic importance and applications of plants.

COURSE OUTCOMES (COs):

On the completion of the course, the student will be able to

CO	Course Outcome	Knowledge level (on the basis of Blooms Taxonomy)
CO1	recognize and expose the diversity and complexity of plant life forms	K1
CO2	understand clearly about the life forms based on their morphology and anatomy	K2
CO3	gain the glimpse of economic importance the lower plants	K3
CO4	explain the principles and applications of tissue culture	K3
CO5	get knowledge about the Mass multiply of mushrooms and biofertilizers and their benefits	K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION

Passed in the BOS Meeting held on 18-03-2020



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PLANT DIVERSITY AND PLANT BIOTECHNOLOGY

UNIT – I

Algae & Fungi: General characteristics of **Algae**. Structure and life cycle of the Sargassum*. Economic importance of Algae.

General characteristics of **Fungi**. Structure and life cycle of the Puccinia*. Economic importance of Fungi.

Note: *Development of gametophyte, sporophyte and sex organs need not be discussed

Unit – II

Lichens & Bryophytes: General Features of **Lichens**, Structure and reproduction of Usnea. Economic importance of Lichens.

General characteristics of **Bryophytes**, Structure and life cycle of Funaria*. Economic importance of Bryophytes.

Note: *Development of gametophyte, sporophyte and sex organs need not be discussed

Unit – III

Pteriophytes & Gymnosperms: General characteristics of **Pteriophytes**. Structure and Life history of Lycopodium*.

General characteristics of **Gymnosperms**. Structure and Life history of Pinus* .

Note: *Development of gametophyte, sporophyte and sex organs need not be discussed

Unit - IV

Plant Tissue culture: Definition, Basic Tissue culture techniques, Sterilization methods, Anther Culture, Applications of tissue culture.

Unit - V

Mushroom cultivation and Biofertilizers: Nutritive value of mushrooms, Cultivation of Oyster mushroom. Biofertilizers- Definition, Types. Mass cultivation of Blue Green Algae (BGA), Rhizobium and its significance.

TEXT BOOKS :

1. Pandey B.P. 2014. A Text book of Botany- Algae, Fungi & Bryophyta, Vol. I & II. S. Chand & Company Ltd. Ramnagar, New Delhi.
2. Pandey B.P. 2014. A text book of Botany-Bryophyta, Pteridophyta & Gymnosperms. S. Chand & Company Ltd. Ramnagar, New Delhi.
3. Ignacimuthu, S. 1996. Basic Biotechnology – Tata McGraw Publishing Co. Ltd.
4. Dubey, R .C. 2002. A textbook of Biotechnology. S.Chand and Co. Ltd., New Delhi.
5. Kapoor, J.N. 1989. Mushroom Cultivation, ICAR, New Delhi.

REFERENCE BOOKS:

1. Smith, G.M. 1971. Cryptogamic Botany - Algae & Fungi, Vol. I. Tata McGraw Hill Pub. Co. NewDelhi.
2. Smith, G.M. 1971. Cryptogamic Botany - Bryophytes & Pteridophytes, Vol. II. Tata McGraw Hill Pub. Co. New Delhi.
3. Vasishta, P.C. 2005. Botany for Degree students- Gymnosperms, Vol. V. S. Chand & Company Ltd. Ramnagar, New Delhi- 110055.
4. Satyanarayana, U. 2013. Biotechnology. Books and Allied (P) Limited, Kolkata, India.



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Course code	Course Title	Category	L	T	P	Credits
21UBYA21	Taxonomy, Embryology of Angiosperms & Plant Physiology	Allied-II	4	-	-	4

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	II	25	75	100

COURSE DESCRIPTION:

This course helps to provide the fundamental knowledge of a principles, uses and developmental process of angiosperm plants and also to provide understanding of basic metabolic activities in plants.

COURSE OBJECTIVES:

- To provide the basic knowledge of identification of plants by morphology and the uses.
- To provide fundamental knowledge of angiosperm embryology.
- To understand the fundamental metabolic functions in plants.

COURSE OUTCOMES (COs):

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge level (on the basis of Blooms Taxonomy)
CO1	identify angiosperm plants based on their morphology	K1
CO2	recognize the importance of Plant Resources	K2
CO3	explain the fundamentals of plant embryology	K3
CO4	study the structure and development of microsporangium and mega sporangium	K3
CO5	know the value of the basic physiological process and metabolic functions in plants.	K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION



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TAXONOMY, EMBRYOLOGY OF ANGIOSPERMS & PLANT PHYSIOLOGY

UNIT –I: Taxonomy of Angiosperms

Principles and types of classifications, Herbarium techniques, Outline of Bentham and Hooker's system of classification-Merits and Demerits.

UNIT - II

Study of salient features of following families and their economic importance
Caesalpiniaceae, Rubiaceae, Apocynaceae, Euphorbiaceae, Poaceae

UNIT - III: Embryology of Angiosperms

Structure and development of anther, Structure and development of male gametophyte, Types of ovule, Structure of embryo sac- eg. *Polygonum* type.

UNIT –IV: Plant Physiology

Absorption of water – Active and Passive absorption, Transpiration- Types, stomatal mechanism (Steward theory), Guttation.

UNIT - V

Photosynthesis – Light - cyclic and non-cyclic, Dark reactions-C₄ cycle, Respiration- Aerobic respiration- Glycolysis, Krebs's cycle, ETP pathway.

TEXT BOOKS:

1. Sharma, O.P. 2009. Plant Taxonomy, Tata McGraw-Hill publishers, New Delhi
2. Vashishta, P.C.1992. Taxonomy of Angiosperms, R.Chand and Co. Ltd., New Delhi.
3. Mukherji. S. and Ghosh, A. K. 2005. Plant Physiology, New Central Book Agency Ltd., New Delhi
4. Bhojwani, S.S. and Bhatnagar S.P. 1999. The Embryology of Angiosperms. Vikas Publishing House P.Ltd., New Delhi.

REFERENCE BOOKS:

1. Lawrence, G.H.M. 1951. Taxonomy of Vascular plants. The Mac-Millan Co., New York.
2. Maheshwari, P. 1980, An Introduction to the Embryology of Angiosperms. Tata McGraw Hill Publishing Company Ltd., Bombay – New Delhi
3. Salisbury, F. B. and Ros, C. W. 2010. Plant Physiology, Asia Ltd., Singapore.



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Course code	Course Title	Category	L	T	P	Credits
21UBYAP1	Plant Diversity, Applied Botany, Taxonomy, Embryology of Angiosperms & Plant Physiology	Allied Practical	-	-	2	2

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I & II	40	60	100

COURSE DESCRIPTION:

This course helps to make the students to identify group of plants based on morphology and anatomy.

COURSE OBJECTIVES:

- To impart the basic and applied knowledge about Plant Diversity, Applied Botany, Taxonomy, Embryology of Angiosperms & Plant Physiology.

COURSE OUTCOMES (COs):

On the completion of the course the student will be able to

CO	Course Outcome	Knowledge level (on the basis of Blooms Taxonomy)
CO1	identify the various groups of plants based on their morphology	K1
CO2	distinguish the life forms at generic level based on anatomical variations	K2
CO3	be equipped with micro preparation of various groups of plants	K3
CO4	explain the principles, importance and applications of plants	K3

K1- KNOWLEDGE (REMEMBERING), K2-UNDERSTANDING, K3-APPLICATION



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PLANT DIVERSITY, APPLIED BOTANY, TAXONOMY, EMBRYOLOGY OF ANGIOSPERMS & PLANT PHYSIOLOGY

1. Sectioning and Mounting of T.S. of Sargassum (stem, leaf), Lycopodium (stem), and Pinus (needle).
2. Spotters- Identification of specimens or slide from Algae, Fungi, Lichens, Bryophytes, Pteridophytes and Gymnosperms (mentioned in the syllabus).
3. Identification of pictures or Photographs related to Plant tissue culture, mushroom cultivation and biofertilizers.
4. To assign the given plant specimens to the respective families giving reasons.
5. To describe the given plant in technical terms
6. Identification of sections of Anther and Ovule (Permanent slides)
7. To describe any three physiological setups (Effect of light intensity on the rate of photosynthesis, Ganong's Potometer, Kuhn's fermentation tube)
8. To conduct field visit to the botanically important areas (minimum two days)
9. Submission of 5 herbarium sheets.



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Course code	Course Title	Category	L	T	P	Credits
21UACVE1	Value Education	Part IV	2	-	-	2

L – Lecture

T – Tutorial

P – Practical

Year	Semester	Internal	External	Total
I	I	25	75	100

COURSE DESCRIPTION

This course aims to impart knowledge about Social Ethics, Religious Values, Professional values and Gender Studies

COURSE OBJECTIVE

- Students realize that character building is equally important as career building, develops positive thinking to promote themselves and the society.

COURSE OUTCOMES (COs):

On the completion of the course, the student will be able to

CO	Course Outcome
CO1	develop his personality in its physical, mental, emotional and spiritual aspects
CO2	inculcate good manners and become responsible and cooperative citizens.
CO3	get an awareness on Women Empowerment
CO4	develop a democratic way of thinking and living.



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VALUE EDUCATION

UNIT – I

Values and the Individual: Values and meaning: The significance of values; classification of values; need for value education. Value and the individual: self discipline, self confidence, self initiative, empathy, compassion, forgiveness, honesty and courage.

UNIT – II

Values and religion: Introduction, Karmayoga in Hinduism, love and justice in Christianity, Brotherhood in Islam, compassion in Buddhism, Ahimsa in Jainism and courage in Sikhism, Need for religious harmony.

UNIT – III

Values and Society: Definition of Society, democracy, secularism, socialism, gender justice, Human rights, socio political awareness, social integration and social justice.

UNIT – IV

Professional values: Definition, Accountability, willingness to learn, team spirit, competence development, honesty, transparency, respecting others, democratic functioning, integrity and commitment.

Women Empowerment: Concept, Types, Essential Factors, Role of Government, Society and Family.

UNIT – V

Role of social institutions in value education: Role of family, social institutions and mass media in value formation. Role models: Mahatma Gandhi, Abraham Lincoln, Mother Theresa and APJ Abdul Kalam.

REFERENCE BOOK:

A text book of Value Education by Prof. Murugeasan.



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Course code	Course Title	Category	L	T	P	Credits
21UACES1	Environmental Studies	Part IV	2	-	-	2

L – Lecture T – Tutorial P – Practical

Year	Semester	Internal	External	Total
I	II	25	75	100

COURSE DESCRIPTION

Students acquire knowledge on the basic concepts, components and importance of environment.

COURSE OBJECTIVES

- To understand that living and non living things are interlinked from Micro to macro level as an unbroken chain from sun to soil.
- To provide the basic knowledge and importance of environment, ecosystem and biodiversity.
- To make clear the students with details of diversity of animals and plants and their conservation.

COURSE OUTCOMES (COs):

On the completion of the course the student will be able to

CO1	recognize and expose the importance natural resources
CO2	define the structure and functions of ecosystem
CO3	explain the benefits of biodiversity and its conservation
CO4	summarise the sources, effects and control measures of various types of Pollutants
CO5	understand the global environmental issues



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ENVIRONMENTAL STUDIES

UNIT - I

Multidisciplinary nature of environmental studies: Definition, scope and importance. Natural Resources, Renewable and non-renewable resources; Forest and water resources, Deforestation- definition, causes and their effects, Afforestation.

UNIT - II

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: a. Grassland ecosystem b. pond ecosystem.

UNIT - III

Biodiversity and its conservation: Introduction – Definition: genetic, species and ecosystem diversity, Value of biodiversity, consumptive use, productive use, social, ethical, aesthetic and option values, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and Ex-situ conservation.

UNIT - IV

Environmental Pollution: Definition, Cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Noise pollution, Solid waste Management, Role of an individual in prevention of pollution.

Unit - V

Social Issues and the Environment: From Unsustainable to Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Population explosion, Role of Information Technology in Environment and human health.

FIELD WORK:

1. Visit to a local area to document environmental assets
river/forest/grassland/hill/mountain
2. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
3. Study of common plants, insects, birds.
4. Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCE BOOKS:

1. Bharucha Erach. 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi.
2. K.M. Poornima, K.P. Gnanesh, G.R. Shyamala, M. Balaji, M. Rajasekaran and M. Venkatesan. 2015. Environmental Studies. Shanlax Press, Madurai – 625003. Pp.23-34. (ISBN No. – 978-81-929458-1-1).

E-BOOK:

<https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf>