

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR – 639 005
B.Sc., BOTANY COURSE STRUCTURE UNDER CBCS SYSTEM
(For the candidates admitted from the year 2016-17 onwards)

Programme Outcome (POs)

- To understand knowledge about, the plants and their economic value
- To make awareness about, the natural resources and environment
- To impart knowledge about the chemical and phytochemical aspects
- To understand the physiology, anatomy and diseases of plants and animals
- To build knowledge about the importance of higher education

Programme Specific Outcomes (PSOs)

- To impart knowledge on self-employment opportunity skills in edible mushroom cultivation, biofertilizers production, seedling and horticulture techniques.
- To understand the employment opportunities in teaching, clinical and environment protection agencies
- To understand, the chemical oriented analytical techniques
- To understand about communicable diseases and their diagnosis both in plants and animals

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SEMESTER	COURSE	SUBJECT TITLE	SUBJECT CODE	INSTR. HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
							INT	ESE	
I	Tamil - I	Tamil – I	U16L1T1	6	3	3	25	75	100
	English - I	English – I	U16L1E1	6	3	3	25	75	100
	Core Course – I	Phycology and Bryology	U16BO1C1	6	5	3	25	75	100
	Core Course – II	Practical - I (Covering Cc-I & Cc-III)	-	3	-	-	-	-	-
	First Allied Course-I	Allied Chemistry - I	U16CH1A1	5	3	3	25	75	100
	First Allied Course – II	Allied Chemistry – II (Practical)	-	2	-	-	-	-	100
	Value Education	Value Education	U16VE1	2	2	3	25	75	
				30	16				500
II	Tamil – II	Tamil – II	U16L2T2	6	3	3	25	75	100
	English – II	English – II	U16L2E2	6	3	3	25	75	100
	Core Course – II	Practical – I (For CCI & III)	U16BO2C2P	3	4	3	25	75	100
	Core Course – III	Mycology, Lichenology And Plant Pathology	U16BO2C3	6	5	3	25	75	100
	First Allied Course - II	Allied Chemistry – II (Practical)	U16CH2A2P	2	4	3	25	75	100
	First Allied Course – III	Allied Chemistry - III	U16CH2A3	5	3	3	25	75	100
	Environmental Studies	Environmental Studies	U16ES2	2	2	3	25	75	100
				30	24				700
III	Tamil - III	Tamil- III	U16L3T3	6	3	3	25	75	100
	English – III	English -III	U16L3E3	6	3	3	25	75	100
	Core Course – IV	Cytology, Anatomy and Embryology.	U16BO3C4	6	5	3	25	75	100
	Core Course V	Practical - II (Covering CC-IV & CC-VI)	-	3	-	-	-	-	-
	Second Allied Course - I	Allied Zoology - I	U16ZO3A1	5	3	3	25	75	100
	Second Allied Course - II	Allied Zoology - II (Practical)	-	2	-	-	-	-	-
	Non Core Elective I	Nutrition and Dietetics	U16ZO3N1	2	2	3	25	75	100
				30	16				500
IV	Tamil – IV	Tamil- IV	U16L4T4	6	3	3	25	75	100
	English – IV	English -IV	U16L4E4	6	3	3	25	75	100
	Core Course – VI	Pteridophytes, Gymnosperms And Palaeobotany	U16BO4C6	5	5	3	25	75	100
	Core Course V	Practical – II (For CC IV & VI)	U16BO4C5P	2	4	3	25	75	100
	Second Allied Course II	Allied Zoology – II (Practical)	U16ZO4A2P	2	4	3	25	75	100
	Second Allied Course III	Allied Zoology - III	U16ZO4A3	5	3	3	25	75	100
	Skill Based Elective I	Mushroom Cultivation	U16BO4S1	2	4	3	25	75	100
	Non Core Elective II	Communicable Diseases and Management	U16ZO4N2	2	2	3	25	75	100
				30	28				800
V	Core Course – VII	Genetics And Evolution	U16BO5C7	5	5	3	25	75	100
	Core Course – VIII	Angiosperm Taxonomy	U16BO5C8	5	4	3	25	75	100
	Core Course – IX	Plant Ecology And Phytogeography	U16BO5C9	4	3	3	25	75	100
	Core Course - X	Practical - III (Covering CC-VII & CC-VIII)		3	-	-	-	-	-
	Core Course - XI	Practical - IV (Covering CC-XII & CC-XIII)		3	-	-	-	-	-
	Elective Course - I	Biostatistics, Computer Application And Bioinformatics	U16BO5E1	4	4	3	25	75	100
	Skill Based Elective II	Herbal Technology	U16BO5S2	2	4	3	25	75	100
	Skill Based Elective III	Plant Tissue Culture	U16BO5S3	2	4	3	25	75	100
	Soft Skills Development	Soft Skills Development	U16SSD3	2	2	3	25	75	100
				30	26				700
VI	Core Course – X	Practical – III (Covering CC VII, VIII and CC IX)	U16BO6C10P	3	4	3	25	75	100
	Core Course – XI	Practical – IV (Covering CC XII & XIII)	U16BO6C11P	3	5	3	25	75	100
	Core Course – XII	General Microbiology	U16BO6C12	6	5	3	25	75	100
	Core Course - XIII	Biophysics, Biochemistry And Plant Physiology	U16BO6C13	6	5	3	25	75	100
	Elective Course - II	Biofertilizers And Biopesticides	U16BO6E2	5	5	3	25	75	100
	Elective Course - III	Plant Biotechnology	U16BO6E3	6	4	3	25	75	100
	Extension Activities	Extension Activities		-	1				
	Gender Education	U16EA4	1	1	3	25	75	100	
				30	30				700
TOTAL				180	140				3900

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BOARD OF STUDIES IN BOTANY

CONTROLLER OF EXAMINATIONS

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – I SEMESTER – CORE COURSE - I
(For the candidates admitted from the year 2016-17 onwards)

PHYCOLOGY AND BRYOLOGY

Course outcomes

On the completion of this course, the students will be able to

Easily understand the structural features and systematic position of Thallophyta and Bryophyta.

Learn about the structure, pigmentation, food reserves and methods of reproduction of Algae

Learn about the structure, food reserves and methods of reproduction of Bryophyta

Know about the Economic importance of algae and Fungi

PHYCOLOGY:

Unit - I : Fritsch Classification (1935 - 1945). General characteristics and Thallus organization of Algae, Economic importance of Algae.

Unit - II : Structure, Reproduction, and life history of the following types : *Nostoc*, *Chlamydomonas*, *Volvox*, *Oedogonium*, *Caulerpa*.

Unit - III : Structure, Reproduction, and life history of the following types : *Vaucheria*, *Dictyota*, *Sargassum* and *Polysiphonia* .

BRYOLOGY:

Unit- IV : E.V. Watson (1981) Classification. General characteristics, Evolution of Gametophytes and Sporophytes, Economic importance of Bryophytes.

Unit - V : Structure, Reproduction and life history of the following types - *Riccia*, *Marchantia*, *Anthoceros*.

Reference Books :

Phycology:

1. Vashista R.C.(2001) - Botany for degree students - S.Chand and co (P) Ltd., New Delhi.
2. Sharma, O.P. (2011). Diversity of microbes & Cryptogams – Algae, Tata McGraw Hill Education Private Limited, New Delhi.
3. Lee, R. E. (2008). Phycology - IV Edition, Cambridge University Press ,New Delhi.
4. Rashid.A. 2007. An Introduction to Bryophyta – Vikas publications, New Delhi.
5. Sambamurthy A.V. S.S. 2005. A Textbook of Algae. I.K. International Pvt.Ltd, New Delhi.
6. Fritsch F.F. (1935)The structure and reproduction of the Algae volume I&II.Tata McGraw Hill Edu.Private Limited, New Delhi.

Bryology :

1. Smith , G.M. 1955 - Cryptogamic Botany Vol. II (Bryophytes & Pteridophytes) Tata Mcgraw Hill Publishing Co. New Delhi.
2. Chandrakant Pathak, 2003. The latest portfolio of theory & practice in Bryophyta, Dominant publications. New Delhi.
3. Chopra, R.N. and P.K. Kumar, 2003. Biology of Bryophytes, New age International Pvt. ltd., New Delhi.
4. Vashishta, Sinha A.K, Adarsh Kumar. (2011). Bryophytes, S.Chand &Company ltd., New Delhi.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.SC., - I & III - SEMESTER – FIRST / SECOND ALLIED COURSE - I
(For the candidates admitted from the year 2016-17 onwards)
(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)

ALLIED CHEMISTRY – I

Course outcomes

On the completion of this course, the students will be able to

1. To estimate the chemical elements by using volumetric analysis.
2. To practice laboratory hygiene, first aid procedures and to identify water hardness.
3. To learn the various kinds of atomic models.
4. To follow the IUPAC nomenclature of Organic Compound, Polymer and Nuclear Chemistry.

UNIT- I (15 hours)

- 1.1 Volumetric Analysis : Standard Solution – Primary and Secondary Standards – Types of titrimetric reactions – reactions – redox- precipitation – EDTA titrations.
- 1.2 Laboratory Hygiene and Safety: Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous Chemicals.
- 1.3 Simple first aid procedure for Accidents: Acid in eye, alkali in eye, acid burns, alkali burns, poisoning, inhalation of gases, cut by glasses and heat burns.

UNIT –II(15 hours)

- 2.1- Water: Soft water – Temporary and permanent hardness of water
- 2.2 - Treatment of water for municipal purpose – Softening of water- Definition – Softening by Zeolite Process.
- 2.3- Atomic Structure: Rutherford's Nuclear Atom –Bohr's Model of the atom- Bohr Sommerfeld theory - Distribution of electrons –Paulis Exclusion Principle-Hund's Rule of maximum Multiplicity – Aufbau Principle.

UNIT-III (15 hours)

- 3.1 Radioactivity – Definition – types of radioactive rays – Nuclear energy – mass defect – binding energy – magic Numbers – Nuclear fission – Nuclear fusion – difference between Nuclear fission and fusion – Nuclear power plant
- 3.2 Isotopes, Isobars and Isotones.

UNIT – IV (15 hours)

- 4.1 Classification and Nomenclature of organic of Compounds classification of organic compounds – functional groups – homologous series.
- 4.2 IUPAC System of nomenclature of simple and complex aliphatic compounds.

UNIT- V (15 hours)

- 5.1 Polymerisation – Introduction –Preparation of Polymers – addition polymers (Polyethylene, PVC and Teflon) – Condensation polymers (nylon – 6,6 and terylene)
- 5.2 Synthetic rubbers(BUNA, Butyl rubber and SBR) Thermoplastic and thermosetting plastics.

Books Recommended:

1. R.Gopalan, P.S.Subramanian, K.Rengarajan – Elements of Analytical Chemistry Sultan chand & Sons New Delhi -2
2. B.K.Sharma “Industrial Chemistry” GOEL Publishing House Meerut.
3. P.L.Soni and Mohan Katyal “Text Book of inorganic Chemistry 20th Received Edition, Sultan Chand 1992.
4. U.N.Dash-Nuclear Chemistry Sultan Chand & Sons New Delhi-2.
5. I.L.Finar-Organic Chemistry. The fundamental Principles ELBS English Lan.
6. P.L.Soni H.M.Chawla “Text Book of organic chemistry sultan chand andsons New Delhi-2.
7. B.S.Bahl and Arun Bahl ‘Advanced Organice chemistry S.Chand and Co New Delhi.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – II SEMESTER – CORE COURSE - III
(For the candidates admitted from the year 2016-17 onwards)
MYCOLOGY, LICHENOLOGY AND PLANT PATHOLOGY

Course outcomes

On the completion of this course, the students will be able to

Incised characteristics, structural features, systematic position and economic importance of fungi and lichens.

Study some plant diseases with special reference to the causative agents, symptoms, etiology and control measures.

MYCOLOGY

Unit-I : General features, occurrence and distribution. Mode of nutrition in fungi - Classification of fungi (Alexopoulos and Mims, 1979). General characters of major classes: Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina (Any one example in each class). Thallus organization, cell structure and fruit bodies. Economic importance of fungi (medicine and industries).

Unit-II : Homothallism and Heterothallism in fungi. Homokaryon and Heterokaryon, Hormonal control in sex organ development in fungi. Reproduction, life cycle types, reduction in sexuality in fungi. Spore dispersal mechanisms and fungal genetics - Fossil fungi.

LICHENOLOGY

Unit-III : General features of lichen. Classification (Miller,1984). Distribution, thallus organisation, vegetative and sexual reproduction, lichens as indicators of pollution and economic importance.

PLANT PATHOLOGY

Unit-IV : Plant pathology - Methods of studying plant diseases - common terminologies used in plant pathology - symptomology, Etiology, Epidemic disease, Control measures - Host parasite interactions - Mycotoxins - Aflatoxins, Defense mechanisms in plant - integrated disease management.

Unit-V : Causative organism, mode of action and control measures of common plant diseases : Tobacco Mosaic, Citrus canker, Rice blight, Tikka disease of groundnut, Downy mildew of grapes, Damping off disease of seedlings, Rust of wheat.

Reference Books:

Mycology and lichenology:

1. Alexopoulos, C. J. and Mims, C. W. (2000). Introductory Mycology. Wiley Eastern Ltd., New York.
2. Sharma, O.P. (2011). Fungi and allied microbes The McGraw –Hill companies , New Delhi
3. Mehrotra, R. S and Aneja, K. R. (1990). An Introduction of Mycology. Wiley Eastern Ltd., New Delhi.
4. Sharma, P.D (2003). The Fungi. Rastogi Publications, Meerut.
5. Vashishta, B. R. and Sinha, A. K. (2007). Botany for Degree Students - Fungi. S. Chand and Co. Ltd., New Delhi.
6. Muthukumar, S. and Tarar, J.L. (2006).Lichen Flora of Central India, Eastern book Corporation , New delhi
7. Dharani Dhar Awasthi .(2000). A Handbook of Lichens Vedams eBooks (P) Ltd. New Delhi .

Plant Pathology:

1. Bilgrami, K.S. & H.C.Dube (1990) A text book of Modern Plant Pathology – Vikas Publishing House (P) Ltd., New Delhi.
2. Butler, E. J. and Jones, S. G. (1949). Plant Pathology. Macmillan & Co., London.
3. Cooper, J. I. (1995). Viruses and the Environment. 2nd ed. Chapman & Hall, London.
4. Sambamurthy A.V. S.S. 2006. A Textbook of Plant Pathology. I.K. International Pvt.Ltd., New Delhi.
5. Singh. R.S. 2005. Principles of Plant Pathology – 4th edition. Oxford & IBH, New Delhi.

Sl. No.:

Subject Code:

U16CH2A2P
/U16CH4A2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05

B.SC., - II & IV - SEMESTER – FIRST ALLIED COURSE - I

(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)

(For the candidates admitted from the year 2016-17 onwards)

ALLIED CHEMISTRY – II PRACTICAL

Course outcomes

On the completion of this course, the students will be able to

1. To estimate the chemical elements by using volumetric analysis.
2. To practice laboratory hygiene, first aid procedures and to identify water hardness.
3. To analyse the importance of reactions of organic compounds.

1. Acidimetry and alkalimetry

- a) Strong acid Versus Strong Base
- b) Weak acid Versus Strong base.
- c) Determination of hardness of water

2. Permanganometry

- a) Estimation of ferrous sulphate using KMnO_4
- b) Estimation of oxalic acid using KMnO_4

3. Iodometry

- a) Estimation of copper using thiosulphate
- b) Estimation of $\text{K}_2\text{Cr}_2\text{O}_7$
- c) Estimation of KMnO_4 using thiosulphate

II ORGANIC ANALYSIS

A study of reactions of the following organic compounds:

1. Carbohydrate
2. Amide
3. Aldehyde
4. Acid
5. Amine
6. Phenol

The students may be trained to perform the specific reactions like

Test for element

(nitrogen only) Aliphatic

or aromatic,

Saturated or unsaturated and functional group present and record their observation.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05

B.SC., - II & IV - SEMESTER – FIRST / SECOND ALLIED COURSE – III

(FOR BOTANY, MATHEMATICS, PHYSICS & ZOOLOGY MAJOR)

(For the candidates admitted from the year 2016-17 onwards)

ALLIED CHEMISTRY – III

Course outcomes

On the completion of this course, the students will be able to

1. Analyse the theory of molecular orbital and sulphur compounds and the theory of coordination compounds can be understood.
2. Review the optical properties of organic compounds and to analyse the aromaticity of hydrocarbons. Understand the chemistry of pesticides and chromatography principles.
3. Understand the various forms of catalysis and to predict knowledge of surface chemistry.

UNIT- I (15 hours) Molecular Orbital theory: Basic concepts of M.O. theory – Bonding and antibonding orbitals – Bond order – Application of M.O. theory to H_2, He_2, N_2, O_2 and F_2 molecules. Compounds of Sulphur: Preparation, Properties, uses and structures of per acids of sulphur and sodium thio sulphate.

UNIT –II (15 hours) Co-Ordination Chemistry: Nomenclature of Mononuclear complexes – Werner, Sidgwick theories Chelation – Application and structure of EDTA – Biological role of haemoglobin and chlorophyll (Elementary idea)

UNIT-III (15 hours) Electron displacement Effect: Inductive Effect – Definition – Relative strengths of aliphatic mono carboxylic acids and aliphatic amines
Stereoisomerism: Optical isomerism – Optical activity – Chirality – Lactic and tartaric acids-racemic mixture- resolution. Geometrical isomerism – Maleic and fumaric acids.

UNIT – IV (15 hours) Aromatic Hydrocarbons: Structure, Stability, Resonance and aromaticity of benzene. Electrophilic substitution reactions in benzene with mechanism – nitration, sulphonation, halogenation. Naphthalene – isolation, synthesis and properties
Organic halogen Compounds: Chemistry of Chloroform, Carbon tetra chloride, DDT, BHC and Freon

UNIT- V (15 hours) Surface Chemistry: Emulsions, Gels – Definition, Preparation, Properties and applications. Chromatography – Column, paper and thin layer chromatography. Catalysis-types, Mechanisms and industrial applications.

Books Recommended:

P.L. Soni and Mohan katyal “Text Book of Inorganic Chemistry”
20th Revised Edition, Sultan Chand 1992.

R.B. Puri and L.R. Sharma “Principles of Inorganic Chemistry” Sultan Chand 1989.

R.D. Madan “Modern inorganic Chemistry” S. Chand and Co.Pvt. Ltd., 1987 New Delhi.

P.L. Soni “Text Book of Inorganic Chemistry” ,Sultan Chand and Co., New Delhi.

B.S. Bahl and Arun Bahl ‘Advanced Organic Chemistry’ S.Chand and New Delhi.

B.R. Puri, L.R.Sharma amd madan S.Pathania ‘Principles of Physical Chemistry’ Shoban Lal

Nagin Chand and Co., Delhi.

P.L Soni “Text Book of Physical Chemistry” Sultan Chand and Co., new Delhi.

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U16BO2C2P

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – II SEMESTER – CORE COURSE - II
(For the candidates admitted from the year 2016-17 onwards)

PRACTICAL - I (Covering CC-I & CC-III)

(PHYCOLOGY, BRYOLOGY, MYCOLOGY AND PLANT PATHOLOGY)

Course Outcomes

On the completion of this course, the students will be able to

Microscopic observation and identification of algae, fungi and bryophytes,
Observation of crop plants infected by the pathogens included in the syllabus and study of symptoms,
Causative agents and etiology.

PHYCOLOGY AND BRYOLOGY :

To make suitable micropreparation of the type study.

To identify macro specimen relevant to the syllabus.

To identify micro slides relevant to the syllabus.

To maintain the record note.

MYCOLOGY AND PLANT PATHOLOGY :

1. A study of vegetative, Reproductive and micro preparation of genera included in the fungi and lichen.
2. Study the name of the disease, name of the pathogen, symptom and control measures.

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Sl. No.:

Subject Code:

U16BO3C4

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – III SEMESTER – CORE COURSE - IV
(For the candidates admitted from the year 2016-17 onwards)

CYTOLOGY, ANATOMY AND EMBRYOLOGY

Course outcomes:

On the completion of this course, the students will be able to

Learn the structure, chemistry and functions of cellular organelles- Meristems

Gain knowledge on embryo development and seed formation

CYTOLOGY:

Unit - I : Ultrastructure and Function of Plant Cell: Cell Wall, Cytoplasm, Plasma membrane, Endoplasmic reticulum, Golgi Complex, Lysosomes, Mitochondria, Plastids, Ribosomes and Nucleus.

Unit - II: Structure, Types and Functions of Chromosomes, DNA and RNA. Cell division ; Amitosis, Mitosis and Meiosis. Programmed Cell Death (PCD) - Apoptosis.

ANATOMY:

Unit - III : Plant Tissues ; Classification. Meristematic Tissue - Cytological characteristics and Types. Simple Tissues - Parenchyma, Collenchyma and Sclerenchyma. Complex Tissues; Xylem and Phloem, Stomatal Types.

Unit - IV : Primary Structure of Root, Stem and Leaf in Dicots and Monocots. Normal Secondary Growth in Stem and Root. Annual Rings - Heartwood and Sapwood. Anomalous Secondary Growth in Dicots, Ex: Dracaena, Nodal Anatomy - Uni and Trilocular.

EMBRYOLOGY :

Unit - V: Structure and development of Anther and Male gametophyte. Structure, development and types of Ovule and Embryo sac (Polygonum type). Double Fertilization. Endosperm: Structure and Types. Development of Embryo in Dicot and Monocot.

Text Books:

1. Annie Ragland, 2014 - Cytology, Anatomy, Pteridophytes & Gymnosperms - Saras Publication.
2. Verma P.S. and Agarwal,V.K. Cytology, Revised Edition 2010. S. Chand & Co Publication.
3. S.S. Bhojwani and S.P. Bhatnagar - 2009 (Revised Edition) The Embryology of Angiosperms.– Vikas Publishing House, Pvt. Ltd., New Delhi.

Reference Books:

1. Singh, S.P. and Tomar B.s. 2014 - Cell Biology - Rostogi Publications. 10th Revised Edition.
2. Gupta P.K. 2014 - Cell and Molecular Biology. Rostogi Publications. 4th Revised Edition.
3. Rastogi, S.C, 1992. Cell Biology. Tata MCGRAW. Hill publication Co. Ltd, New Delhi.
4. De Robertis, E.D.P and De Robertis E.M.P, 1980. Cell and Molicular Biology (7th edtn.).Holt Saunders International Ed., Publication, Tokyo.
5. Pijushroy,(2010).plant Anatomy, New central Book Agency ,Pvt Lit, New delhi
6. Easu,K. - Plant Anatomy - John Wiley & Sons. Inc. N.Y.
7. Singh.V., P.C. Pandey and D.K.Jain. 2003. Embryology of Angiosperms. Rastogi Publications. Meerut.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-5
B.Sc., BOTANY & CHEMISTRY – III SEMESTER – ALLIED COURSE - I
(For the candidates admitted from the year 2016-17 onwards)

ALLIED ZOOLOGY - I
(INVERTEBRATA AND CHORDATA)

Course outcomes :

On the completion of this course, the students will be able to

1. Become familiar with the world of fauna that surrounds us and their importance.
2. Identify the invertebrates and classify them up to the class level with the basis of systematics
3. Understand the basis of life processes and recognize the economically important invertebrate and chordate fauna.

UNIT- I General Characters of the Phyla based on the following types
Phylum Protozoa – *Paramecium*
Phylum Porifera – Acon Sponges
Phylum Coelenterata – *Obelia Sp.*

UNIT- II General Characters of the Phyla based on the following types.
Phylum Platyhelminthes – *Fasciola hepatica*
Phylum Nematelminthes – *Ascaris lumbricoides*
Phylum Annelida – *Megascolex Sp.*

UNIT-III General Characters of the Phyla based on the following types
Phylum Arthropoda – *Panurginus Sp.*
Phylum Mollusca – *Lamellidens Sp.*
Phylum Echinodermata – *Asterias Sp.*

UNIT-IV General characters of the classes based on the following types
Class Pisces – *Scoliodon*; Class Amphibia – *Rana*; Class Reptilia – *Calotes* –
Morphology, digestive, respiratory, circulatory, nervous system, sense organs,
excretory and reproductive system.

UNIT-V General Characters of the classes based on the following types.
Class Aves – *Columba*; Class Mammalia – *Oryctolagus* – Morphology,
digestive, respiratory, circulatory, nervous system, sense organ, excretory and
reproductive system.

Text Books:

1. Text Book of Invertebrates, Arumugam, N. Saras Publications, Nagercoil
2. Text book of Chordates, Arumugam, N. Saras Publications, Nagercoil.

Reference Books:

1. Outlines of Zoology – M. Ekambaranatha Ayyar – Viswanathan Publications.
2. A Manual of Zoology, Vol -I & II M. Ekambaranatha Ayyar – Viswanathan Publications.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-5

B.Sc. BOTANY – III SEMESTER – NON-CORE ELECTIVE –I

(For the candidates admitted from the year 2016-17 onwards)

NUTRITION AND DIETETICS

Course outcomes :

On the completion of this course, the students will be able to

1. Understand the importance of various nutrients.
2. Have an in-depth knowledge on the physiological processes and metabolism of nutrients
3. Know the calorific values of different nutrients
4. Preserve the food materials from contamination.

UNIT-I Introduction and Scope. Components of Food- Carbohydrate, protein, and lipids, vitamins and minerals sources and functions- Deficiency diseases, Importance of water in diet.

UNIT-II Digestion, absorption and assimilation of carbohydrate, protein, lipid, Calcium, Phosphorous, Potassium, Sodium, Iron, Iodine and Vitamins.

UNIT-III Calorific values of Food- Energy Units- Balanced diet- BMR- Energy requirements of man, woman, infants and children

UNIT-IV Nutritional value of food: cereals, fruits, milk, egg, meat, fish and their properties, Food spoilage- Food adulteration- Food poisoning Food preservatives, Sterilization, Refrigeration, Dehydration and chemical preservation

UNIT-V Nutritional requirements: Infants, School children, Pregnant and lactating mother, Adolescence old age, Faulty food habits- obesity, Diabetes and cardiac problems.

References:

1. Swaminathan , M., 1989. Hand book of food and nutrition, Bapco, Bangalore
2. Gopalan, C., B.S. Raasatri and S. Balasubramanian, 1971, Nutritive value of Indian Foods, NIN, Hyderabad.
3. Ghosh, S.1981. The feeding care of infants and your children, UNICEF, New Delhi
4. Goyal, S. and Gupta, P., 2012, Food nutrition and Health, S. Chand & Company Ltd.
5. Mudambi, S.R., 1995, Fundamentals of food nutrition. New age International, New Delhi.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – IV SEMESTER – CORE COURSE - VI
(For the candidates admitted from the year 2016-17 onwards)

PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY

Course outcomes :

It brings basic knowledge to the students about their cryptogams, Tracheophyte and also ecology, evolutionary characters of plants.

To study the anatomical, reproductive features of Cryptogams and Palaeobotany.

It brings out the phenological and structural features Gymnosperms and Palaeobotany.

PTERIDOPHYTES

Unit - I : General characteristics and Classification (Sporne, 1970). Stellar evolution, Heterospory and origin of seed habit in Pteridophytes.

Unit - II : Morphology, Structure, Reproduction, and Life history of the following genera *Psilotum*, *Lycopodium*, *Selaginella* and *Equisetum*.

Unit - III : Morphology, Structure, Reproduction, and Life history of the following genera *Ophioglossum*, *Adiantum* and *Salvinia*.

GYMNOSPERMS

Unit - IV : General characteristics and Classification (Sporne, 1965). Morphology, Structure and reproduction of following genera - *Cycas*, *Pinus* and *Gnetum*.

PALAEOBOTANY

Unit - V : Fossils, Types and methods of fossilization - Geological time scale. A brief study of the following fossil forms - *Rhynia*, *Lepidodendron*, *Lepidocarpon*, *Calamites* and *Williamsonia*.

Reference Books :

Pteridophytes:

1. Sporne, K.R. (1970) - The morphology of pteridophytes (The structure of ferns and allied plants).
2. Singh, V., Pande, P.C. and Jain, D.K. - 4th Edition (2014-15) - A Text Of Botany, Diversity of Microbes and Cryptogams - Rastogi Publications, Meerut.
3. Vashishta, P.C., Sinha and Anilkumar (2010). Pteridophytes, S. Chand & company Ltd, New Delhi.

Gymnosperms :

1. Johri, R.M., Lata S, Tyagi K (2005), A text book of Gymnosperms, Dominant pub. & Distributer, New Delhi.
2. Biswas, C. and Johri, B.M. (2004). The Gymnosperms. Narosa Publishing House, New Delhi.

Palaeobotany :

1. A.C. Arnold 2000. An introduction to palaeobotany, Tata McGraw Hill Education Private Limited, New Delhi.
2. Kimura, M. (1983). The natural theory of molecular evolution, Cambridge University Press, Cambridge.
3. Arora M.P. (1990). Evolutionary biology, Himalaya Publication House, Delhi.

CHAIRMAN – BOS

COE

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – IV SEMESTER – CORE COURSE - V
(For the candidates admitted from the year 2016-17 onwards)

PRACTICAL - II (Covering CC-IV & CC-VI)

**(CYTOLOGY, ANATOMY, EMBRYOLOGY, PTERIDOPHYTES, GYMNOSPERMS
AND PALAEOBOTANY)**

Course Outcomes

It clearly brings out the molecular and anatomical structural features and reproductive nature of plants.

Training the students to prepare micropreparation and showing the stages of mitosis (Onion root tips)

and showing permanent slides/photographs of mitosis and meiosis . Micropreparation of stems, roots and leaf of dicot and monocot.

Cytology

1. Cellular organelles- Nucleus, Mitochondria, Chloroplast, Golgi complex, Endoplasmic reticulum (Identification only from electron microphotographs of standard publications).
2. Study of mitosis (squash) using Onion root tip.

Anatomy

Preparation of microslides - Dicot and monocot stem, leaf and root (Primary structure). Secondary structure of Dicot stem and root - Anomalous growth in *Aristolochia*, *Boerhaavia* and *Dracaena*.

Embryology

Slides showing T.S. of Anther, Types of ovules. Embryo dissection in *Tridax*.

Pteridophytes:

Preparation of Microslides in the following plants. Transverse sections of *Psilotum* stem, *Adiantum* leaf and *Marsilea* sporocarp.

Gymnosperms:

Study of Anatomy and reproductive features of the following plants. Transverse section of *Cycas* leaf, *Pinus* needle leaf, *Gnetum* stem and *Cupressus* stem

Palaeobotany

Study and observation of Morphology, Anatomy and Reproductive features in the following fossil forms *Rhynia*, *Lepidodendron*, *Lagenostoma*, *Calamites* and *Williamsonia*

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Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-5
B.Sc. BOTANY & CHEMISTRY – IV SEMESTER – ALLIED COURSE II
(For the candidates admitted from the year 2016-17 onwards)

ALLIED ZOOLOGY – II PRACTICAL

Course Outcomes

On the completion of this course, the students will be able to

1. Identify the animals at class level
2. Dissect and display parts of some invertebrate fauna
3. Understand the commercial values of animal products

1. DISSECTIONS:

Earth worm – Nervous System.

Cockroach – Digestive System, Nervous System.

2. MOUNTINGS:

Earthworm – Body setae

Cockroach – Mouth Parts.

Honey Bee – Mouth Parts.

Shark – Placoid Scales

Any Carp – Cycloid & Ctenoid Scales.

3. SPOTTERS:

Amoeba, Paramecium, Ascon sponge, Obelia colony, Metridium, Fasciola hepatica, Taenia solium, Taenia scolex, Planaria, Ascaris, Earthworm, Earthworm T. S., Nereis, Leech, Leech T.S, Prawn, Scorpion, Grasshopper, Centipede, Peripatus, Freshwater mussel, Pila, Sepia, Sea-star, Sea-urchin, Sea-cucumber, Amphioxus, Ascidian, Balanoglossus, Shark, Anabas, Exocoetus, Echineis, Frog, Salamander, Calotes, Draco, Turtle, Naja Naja, Vipera russellii, Pigeon, Parrot, Rat, Rabbit, Bat.

4. Species of animals used in Vermiculture, Apiculture, Sericulture, Aquaculture and Poultry farming.

5. Products: Vermicompost, Honey, Bee's wax, Silk, Cod liver oil, Abnormal Eggs of poultry birds.

A record of laboratory work should be submitted at the time of Practical examination.

Mark distribution for the Practical Examination:

1. Dissection	25
2. Mounting	15
3. Spotters (5x5)	25
4. Record	10
Total	75

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Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-5

B.Sc. BOTANY & CHEMISTRY – IV SEMESTER - ALLIED COURSE - III

(For the candidates admitted from the year 2016-17 onwards)

ALLIED ZOOLOGY – III

(COMMERCIAL ZOOLOGY)

Course Outcomes

On the completion of this course, the students will be able to

1. Rear earthworm and make vermicompost
2. Know the nutritional value and medicinal value of honey
3. Understand the lifecycle and economic importance of silkworm
4. Establish and Manage a fish farm
5. Set-up a poultry farm.

UNIT- I Vermiculture and composting – Types of earthworm – Significance – Rearing – Rearing technology – Management – Economic importance – Composting.

UNIT- II Apiculture – Species of Honey bees – Newton’s Bee hive – Care and management – Honey extraction – Economic importance – Nutritive and medicinal values of honey.

UNIT-III Sericulture – Feeding habits of larvae – Life cycle of silk worm (*Bombyx mori*) – Economic importance of silk worm and silk.

UNIT-IV Aquaculture – Construction of pond – Management of pond – Freshwater cultivable fishes – Fish feed – Induced breeding – fish diseases (Furunculosis, Epizootic Ulcerative syndrome (EUS) and Vibriosis).

UNIT-V Poultry farming – types of poultry – Management – Poultry nutrition – diseases and their prevention – Economics of poultry production.

Text Book:

1. G.S. Shukla and V.B. Upadhyay – Economic Zoology, Rastogi Publications.
2. Thiyagarajan, S. 2000 – Commercial Zoology, Tee Jay Publication, Thanjavur (Tamil version)

Reference Books:

1. Ashan, J. and S.P. Sinha – A hand book of Economic zoology – S. Chand & Co
2. Sardar Singh – Bees Keeping in India, ICAR, New Delhi, 1982.
3. Santhanam, et al., 1999, Aquaculture, Oxford & IBH Pub. Co., Pvt. Ltd, New Delhi.
4. Ullal, S.R. and M. N. Narasimhan – Central Silk Board, Government of India, Mumbai
5. Singh – Livestock and Poultry Production
6. Manju Yadav, 2003. Economic zoology, Discovery Publishing House, New Delhi
7. Rose, S.P., Principles of Poultry science, C & B International
8. Ismail. S., 2001, Vermiculture, Orient Longman Ltd., Chennai

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – IV SEMESTER – SKILL BASED ELECTIVE - I
(For the candidates admitted from the year 2016-17 onwards)

MUSHROOM CULTIVATION

Course Outcomes

On the completion of this course, the students will be able

To teach to the students knowledge and skills, which allow them to establish a mushroom cultivation

To cultivate mushrooms in a form of extra-earnings.

Appropriate knowledge belongs principally to a new applied science and practice

UNIT - I: INTRODUCTION

History, Outlines of Classification, Characteristics and Types of mushrooms. Economic importance, Nutritional value, Edible, Poisonous and Hallucinogenic mushrooms.

UNIT - II: LIFE CYCLE

Systematic position, morphology, distribution, structure and life cycle of *Volvariella*, *Agaricus*, *Pleurotus*, *Lentinus* and *Calocybe*.

UNIT - III: CULTIVATION TECHNOLOGY

Laboratory - Mushroom farm layout and mushroom shed - Preparation of slants - collection of tissue - Raising of pure culture - Spawn production - management of fruiting bodies / mushroom development - harvest. Cultivation of Button, Oyster and Paddy straw mushroom.

UNIT - IV: DISEASE MANAGEMENT

Diseases caused by viruses, bacteria, fungi, termites and insects - control measures. Post harvesting technology - Blanching, steeping, sun drying, pickling, freeze drying and canning - Short term and long term storages.

UNIT - V: BIOLOGICAL IMPORTANCE

Medicinal and nutritive value of mushrooms - Important recipes from mushrooms - Bioremediation - Recycling, composting of organic waste and restoration of damaged environment - Marketing - Economic return, Foreign exchange from Mushroom cultivating countries and International trade.

Reference Books:

1. Dubey, RC. (2001) A text book of Biotechnology, S.Chand & Co. Ltd.
2. Chang, T.W.A. Haynes 1978. "Biology and cultivation of Mushrooms" Academic Press. N.Y.
3. Zadrazil, F & K. Grabbe 1983 "Edible Mushroom, Biotechnology" Vol. 3, Weinheim: Verlag Chemie, Berlin.
4. Kannaiyan. 2001. Handbook of Edible Mushrooms" TNAU Publication.
5. Verma, B.N. & Prasad, Prem Kumar & Sahu, K.K. (2013) - Mushrooms : Edible and Medicinal Cultivation Conservation Strain Improvement With Their Marketing.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR-5

B.Sc., BOTANY – IV SEMESTER - NON-CORE ELECTIVE - II

(For the candidates admitted from the year 2016-17 onwards)

COMMUNICABLE DISEASES AND MANAGEMENT

Course Outcomes

On the completion of this course, the students will be able to

- Analyse the modes of transmission of communicable diseases
- Understand the causes, symptoms of various protozoan, bacterial, viral and fungal diseases.
- Adhere to the vaccination schedule and spread awareness on the importance of prevention of communicable diseases

UNIT- I Classification of communicable diseases, Mode of transmission. **Viral diseases** – Polio, Rabies, Yellow fever, Mumps, Influenza, Measles, Encephalitis, Hepatitis and AIDS – Causes, symptoms, prevention and cure.

UNIT- II Bacterial diseases: Dysentery, Cholera, Tuberculosis, Tetanus, Diphtheria, Typhoid, STD and Leprosy – causes, symptoms, prevention and cure.

UNIT-III Protozoan Diseases: Amoebiasis, Leishmaniasis, Trichomoniasis and Malaria – Causes, symptoms, prevention and cure. **Fungal Diseases:** Superficial and Systemic Mycoses.

UNIT-IV Helminth Parasites: Taeniasis, Ascariasis, Ancylostomiasis, Elephantiasis, and Filariasis – Causes, symptoms, prevention and cure.

UNIT-V Vaccines and Antibiotics: Types of Vaccines, Vaccination schedule for pregnant mothers and children. Types, sources and importance of antibiotics

Text Books:

1. Park, K. 2005 Park's Text book of Preventive and Social Medicine, M/s Banarsidas Bhanot, Publishers, Jabalpur, India, 18 Ed.,
2. Kotpal, R.L., A Text Book of Invertebrates, Rastogi Publishers, Meerut.

Reference Books:

1. Deepak Kumar, 2001, Diseases and Medicines in India; A Historical Overview, Tulika, New Delhi
2. Turk and Turk, Text Book of Social and Preventive Medicine

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Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – V SEMESTER – CORE COURSE - VII
(For the candidates admitted from the year 2016-17 onwards)

GENETICS AND EVOLUTION

Course outcomes

On the completion of this course, the students will be able to

Bring out knowledge about heredity analysis and evolutionary relationships of plants.

Learn about Mendelian principles

Know about gene mapping methods & Extra chromosomal inheritance

Familiarize about Evolution & Emergence of evolutionary thoughts

Unit - I : Transmission Genetics: Heritage from Mendel

History of Mendel's studies - Mendel's law of inheritance - Laws of dominance, segregation and independent assortment - Monohybrid and Dihybrid Crosses - Back Crosses (Dominant Recessive Back Crosses) - Genetic Terminology.

Unit - II : Transmission Genetics: Mendel's experiments in modern context

Allelic and Non-allelic interactions between genes - Allelic interaction (Incomplete Dominance); Non-allelic Interactions - Inheritance of comb shape in Fowls, Lethal Factor, Complementary Factor, Supplementary Factor, Epistasis, Inhibitory Factor, Duplicate Factors, Multiple Factor Hypothesis, Multiple Alleles and Blood groups.

Unit - III : Chromosomal Basis of Heredity

Structural and numerical variations of chromosomes. Mutation - Biochemical, Lethal, Somatic and Germinal mutations; Spontaneous and Induced Mutations - Mutagenic Agents; Point mutation, Chromosome mutation and Genomic mutation. Role of mutation in evolution. Polyploidy and its Types - Euploidy, Aneuploidy and Polyploidy - Autopolyploidy and Allopolyploidy.

Unit - IV : Gene Linkage

Linkage and Crossing Over - Coupling and Repulsion - Complete and Incomplete Linkage - Mechanism of Crossing Over - Cytological Proof of Crossing Over, Sex determination, differentiation and sex-linkage, Sex Linked Inheritance - *Drosophila* (Eye Colour) and Humans (Colour Blindness); Cytoplasmic Inheritance. Sex Determination in *Drosophila*, Humans and Plants.

Unit - V: Evolution

Origin of life - Evolution Concepts in Diversity of Life. Lamarckism, Darwinism, Neo- Darwinism and Modern Synthetic Theories.

Reference Books :

GENETICS:

1. Sambamurthy A.V. S.S. 2005. Genetics. Narosa Publishing House, New Delhi.
2. Sarin.C.2002. Genetics.Tata McGraw-Hill Publishing Co.Ltd, New Delhi.
3. Strickberger, M.W. (1976) : Genetics (2nd Edition) MacMillan Publishing Co., Inc., N.Y., London-914pp.,
4. Herskowitz, L.H. (1977) : Principles of Genetics (2nd Edition) MacMillan Publishing Co., Inc., N.Y. & Collier-Macmillan,
5. Gupta, P.K. (2000) : Genetics Rastogi Publishers, Meerut, India-611pp.,
6. Singh.B.D.2005.Genetics.Kalyani Publishers. New Delhi.

EVOLUTION:

1. Savage, J.M. (1969) : Evolution (2nd Edition) Amarind Publishing Cossec P (P) Ltd., New Delhi, Bombay, Calcutta
2. Gottlieb, L.D. & Jain, S.K. (1988) : Plant Evolutionary Biology Chapman & Hill, London, N.Y.-414pp.
3. Shukla, R.S. & P.S. Chandel (1996) : Cytogenetics, Evolution & Plant Breeding S.Chand & Co., New Delhi
4. Verma, P.S. & V.K. Agarwal (1999) : Concepts of Evolution S. Chand & Co., New Delhi-148pp.,
5. Anna Sproule (1998) : Charles Darwin Scientists who have changed the world Orient Longmans, Hyderabad-64pp.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – V SEMESTER – CORE COURSE - VIII
(For the candidates admitted from the year 2016-17 onwards)

ANGIOSPERM TAXONOMY]

Course outcomes

On the completion of this course, the students will be able to

Learn the types of classifications- artificial, Natural and phylogenetic.

Gain knowledge about Botanical Survey of India (BSI).

Briefly study on herbarium techniques.

Learn the taxonomic evidences from molecular, numerical and chemicals.

MORPHOLOGY

UNIT - I: Leaf : Types, shape and size, venation, phyllotaxy. **Stem :** Shape, types and modifications (underground, aerial and sub aerial) **Root :** Types and modifications. **Inflorescence:** Types. Flower - Descriptive terminology of floral parts. **Fruit :** Types.

TAXONOMY

UNIT - II: ICBN - Binomial system of nomenclature - systems of angiosperms classification: Bentham and Hooker, Armen Takhtajan - Merits and Demerits. Taxonomic tools - Herbarium, Flora, Botanical Garden.

UNIT - III: A detailed study of the following families and their economic importance : Annonaceae, Capparidaceae, Malvaceae, Sterculiaceae, Tiliaceae, Anacardiaceae, Rutaceae, Leguminosae (Fabaceae, Caesalpinaceae and Mimosaceae) and Cucurbitaceae.

UNIT - IV: A detailed study of the following families and their economic importance : Rubiaceae, Asteraceae, Apocyanaceae, Asclepidaceae, Solanaceae, Convolvulaceae, Acanthaceae, Verbenaceae and Lamiaceae.

UNIT - V: A detailed study of the following families and their economic importance : Amaranthaceae, Euphorbiaceae, Loranthaceae, Lilliacae, Commelinaceae, Typhaceae and Poaceae.

Reference books:

1. Davis, P. H. and V. H. Heywood 1991. Principles of Angiosperm Taxonomy. Today and Tomorrow Publications, New Delhi
2. Cronquist, A. 1981. An Integrated system of Classifications of flowering plants. Columbia University Press, New York.
3. Gurcharan Singh. 2004. Plant Systematics : Theory and practice Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Stoeckle , M.(2003).Taxonomy ,DNA and the bard code of life .bioscience 53: 796- 797.
5. Simpson M.G.(2006). Plant systematics , Elsevier Academic Press,USA.
6. Lawrence George H. M. 1951. Taxonomy of vascular plants Oxford and IBH Publ. Co. Pvt. Ltd., New Delhi.
7. Manilal, K. S. and M. S. Muktesh Kumar (ed.) 1998. A Hand book of Taxonomy Training, DST, New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – V SEMESTER – CORE COURSE - IX
(For the candidates admitted from the year 2016-17onwards)

PLANT ECOLOGY AND PHYTOGEOGRAPHY

Course outcomes

On the completion of this course, the students will be able to

- Learn the Approaches to the study of Ecology (Autecology, Synecology and Genecology)
- Understand the population & Community Ecology - concept of metapopulation
- Know about the Principles of Toxicology and types of Toxins, sources, metabolism and monitoring.
- Know about the distribution of plants in various ecosystem

Unit - I: Ecology - Definition and its Divisions - Autecology and Synecology - Plant ecology and its applications. Environmental or ecological factors - Climatic, Soil, Physiographic and Biotic factors.

Unit - II: Ecosystem,- structure and function - Producers, Consumers and Decomposers. Major Ecosystem - Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem and Artificial Ecosystem. Energy and its flow in Ecosystem - Tropic level - Food chains - Food web - Ecological Pyramids - Pyramid of numbers, Pyramid of biomass and Pyramid of energy.

Unit - III: Plant succession, Plant Adaptations - Hydrophytes, Xerophytes, Mesophytes, Epiphytes, Halophytes and Mangrove vegetation - Methods of study of vegetation (Quadrant & Transect).

Unit - IV: Environmental Pollution - Soil Pollution, Water Pollution, Air Pollution, Agriculture Pollution, Radiation Pollution, Thermal Pollution, Noise Pollution, Control on environmental Pollution, Acid rain, Green House effect and Global Warming- Impact of Pollution on vegetation - Control of Pollution through vegetation.

Unit - V: Principles of Phytogeography, Climate and Climatic regions of India, Vegetation of South India, Phytogeographical regions of India and Ecological indicators. Biodiversity - Hot Spots of Biodiversity in India - threats to Indian Biodiversity, conservation of Biodiversity - *In situ* and *Ex situ* conservation, Endemic and Endangered flora.

Reference Books:

1. Puri G.S 1960- Indian Forest ecology (Vol I&II) Oxford Book Co., New Delhi & Calcutta.
2. Agarwal, K.C, 2001. Fundamentals of Environmental Biology, S.Chand, New Delhi..
3. Prof. Y.anjaneyalu - Introduction of Environmental Science - BSP - BS Publication Hydrabad.
4. Odum E.P(1971) - Fundamental of Ecology - Sounders & Co.
5. Mishra, S.P. (2006), Environmental Pollution - Pointer Publishers, Jaipur.
6. Aulay Mackenzie. Andy, S. Ball and Sonia R.Virdee, 2002. Instant notes Ecology 2nd edition, Viva books, Chennai.
7. Claude Fauric, Christiane Ferra, Paul Medori and Jean Devaux, 2001. Ecology science and practice special Indian edition, Oxford & IBH.
8. Dash, M.C, 2004. Fundamentals of Ecology, Tata McGraw, Hill,New Delhi.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – V SEMESTER – ELECTIVE COURSE - I
(For the candidates admitted from the year 2016-17 onwards)

BIostatISTICS, COMPUTER APPLICATION AND BIOINFORMATICS

Course outcomes

On the completion of this course, the students will be able

To learn about the Application of statistical methods and computer in Botany.

To get introduced to the basic concepts of Bioinformatics and its significance in

Biological data analysis.

To gain knowledge about various Biological databases that provide information about nucleic acids and protein.

Biostatistics

UNIT - I: Definition of Biostatistics, Collection of data - Primary and secondary. Classification and tabulation of data - Parts of Table - diagrammatic representation of data.

UNIT - II: Skewness and Kurtosis, Correlation of analysis - types, methods of studying correlation. Measures of central tendency - Mean, Median and Mode - Standard Deviation, Standard Error, Analysis of variance - One way and Two way ANOVA.

Computer applications

UNIT - III: History of Computers, Types of Computers, Basic Computer Concepts, parts of a Computer - Input and Output Devices, Computer Memory, Storage Devices, Central Processing Unit, Software, Hardware, Computer Peripherals - Mouse, Modem.

UNIT - IV: Web Browsing: Computer Network (LAN, WAN, Wi-Fi and Li-Fi), Word Processing Software MS-office - MS Word, Excel, Power point, and Desk Top Publishing. Internet and Intranet.

Bioinformatics

UNIT - V: Introduction to bioinformatics, Application of bioinformatics in various fields. Biological databases - Nucleic acid databases - Gen Bank, DDBJ and EMBL.

Protein data bases : SWISS PROT and PDB - Biological data formats (FASTA and BLAST).

Reference Books:

1. P.K. Gupta ,Statistical methods -Chand & Co, New Delhi.
2. Satguru Prasad (2013), Elements of Biosatistics - Rastogi Publications, Meerut.
3. Sharma, K.L.A.P., Pullaiah, T. & Reddy, B. Ravindra - Biosatistics - ASTRAL International (P) Ltd, New Delhi.
4. Computer fundamentals windows and Internet- Ramaiha publication
5. Bioinformatics - S.C. Rastogi, Namita Mendiratta and Parag Rastogi.
6. Harisha S (2007). Fundamentals of Bioinformatics. IK International Publishing house Pvt. Ltd. New Delhi
7. Bryan Bergeron, M.D. (2006). Bioinformatics Computing, Prentice – Hall of India. New Delhi.
8. Attwood T K and Parry Smith D J, (1999).Introduction to Bioinformatics Addison Wesley Longman Limited, England.
9. Windows and MS-OFFICE 2000 with database Concepts, by Krishnan, Scitech Publication (India) Pvt. Ltd, Chennai.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – VSEMESTER – SKILL BASED ELECTIVE - II
(For the candidates admitted from the year 2016-17 onwards)

HERBAL TECHNOLOGY

Course outcomes

On the completion of this course, the students will be able to

To impart the knowledge on Ancient Indian medicinal system cultivation and conservation strategy
To know the pharmaceutically important plants.

Unit - I: Introduction, history, scope, classification of drugs in Medicinal Plants.
Individual drug adulterants and adulterations.

Unit - II: Ethnobotany: Definition, Areas and recent studies, Methodologies of ethnobotanical research- field work, literature, herbaria and museum. Importance of ethnobotany, Indian systems of medicine - Siddha, Ayurveda, Unani and Aromatherapy.

Unit - III: Conservation and cultivation of herbal plants. Medicinal gardening - gardens in the hills and plains, house garden. Tribal (South India) medicines and its role in Health Care. Intellectual Property Rights (IPR), Patent Rights.

Unit - IV: Detailed organoleptic study of *Adathoda vasica*, *Andrographis paniculata*, *Gymnema sylvestris*, *Azadiracta indica*, *Datura metel*, *Eclipta alba*, *Emblica officinalis*, *Ocimum sanctum*, *Phyllanthus niruri*, *Catheranthus roseus* and *Zingiber officinalis*.

Unit - V: Herbal preparations- Collection of wild herbs, capsules and compresses. Glycerites, Hydrotherapy or Herbal oils- Liquid extracts of Tincture and Herbal teas. Extraction of phytopharmaceuticals: Alkaloids, Volatile oils, Resins and Tannins.

Reference Books:

1. Jain S. K. 1989 Methods and approaches in Ethnobotany, Society of Ethnobotanists in Lucknow.
2. Bhattacharjee, S.K. 2004. Hand Book of Medicinal plants. Pointer Publishers, Jaipur.
3. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. (2003). Pharmacognosy. NiraliPrakashan.
4. Pune. Pal D. C and Jain S. K 1998 Tribal medicine, Naya prakash publishers, Calcutta.
5. Jain, (2001). Medicinal plants. National Book Trust, New Delhi.
6. John Jothi Prakash, E. (2003). Medicinal Botany and Pharmacognosy. JPR Publication, Vallioor, Tirunelveli.
7. Joshi, S.G. (2001). Medicinal plants. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Medicinal Plants Source Book India, (1996). International Library Association, Switzerland.
9. Prajapathi, Purohit, Sharma and Kumar. (2003). A Hand book of Medicinal plants. Agrobios Publications, Jodhpur.
10. Purohit and Vyas, (2004). Medicinal Plants Cultivation. Agrobios Publications, Jodhpur.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – V SEMESTER – SKILL BASED ELECTIVE - III
(For the candidates admitted from the year 2016-17 onwards)

PLANT TISSUE CULTURE

Course outcomes

On the completion of this course, the students will be able to

Understand the basic knowledge about tissue culture tools, medium, sterilization and techniques of tissue culture.

Learn about the production of Synthetic seeds & significance

Study about the role of tissue culture in crop improvement.

Unit - I: Plant Tissue Culture: Introduction - Laboratory organization - Tools and Techniques - pH meter, Autoclave, Laminar Air Flow Chamber - Glassware Cleaning and Sterilization methods - Lab Safety.

Unit - II: Culture media: Composition - Preparation of MS Medium, B5 medium and White's Medium. Moist heat sterilization - Explant sterilization. Carbon Source and Solidifying agent.

Unit - III: Concept of Totipotency - Explants Sources - Callus Culture - Suspension Culture - Meristem Culture - Direct and Indirect Plant Regeneration.

Unit - IV: Haploid Production - Anther Culture - Pollen Culture - Androgenic Haploids - Ovary Culture - Gynogenic Haploids - Diploidization of Haploids.

Unit - V : Somatic Embryogenesis - Artificial Seeds - Encapsulating Agents - Application of Somatic Embryogenesis and Synthetic Seeds; Somaclonal Variations; Application of Plant Tissue Culture in Agriculture and Forestry.

Reference Books :

1. Razdan, M.K, 1993. An Introduction to Plant Tissue Culture - Oxford and IBH publishing co, New Delhi.
2. Kalyankumar 1992, Cell culture and Somatic Cell genetics of plant. 3 volumes. Academic press inc.
3. London Timir Baran Jha and Biswajit Ghost, Plant tissue culture (Basic and Applied). University Press, Hyderabad. 2005
4. Pullaiah, T. (2013), Plant Tissue Culture: Emerging Trends - ASTRAL International (P) Ltd, New Delhi.
5. Dodds T.H and Roberts I.W, 1985. Experiments in Plant Tissue Culture. Cambridge University Press.
6. Bhojwani, S.S. & Razdan, M.K. (2004). Plant Tissue Culture, Read Elsevier India Pvt.Ltd.
7. Kalyankumar De,(2008). Plant tissue culture. New Central Book Agency, Calcutta.
8. Purohit, S.S. 2010. Plant Tissue Culture. Agrobios (India) Revised Edition.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05

B.Sc., BOTANY – VISEMESTER – CORE COURSE - X

(For the candidates admitted from the year 2016-17 onwards)

PRACTICAL - III (Covering CC-VII & CC-VIII)

(GENETICS, EVOLUTION AND ANGIOSPERM TAXONOMY)

Course outcomes

It gives knowledge on Genetic problem solving method and Taxonomical study on various families.

To dissect out the floral parts of plants coming under the families prescribed in the theory syllabus.

To identify the economic products related to theory syllabus and write Botanical name, family and uses.

To observe the genetic variations among inter and intra specific plants.

Genetics

1. Problems on simple, monohybrid and dihybrid ratio
2. Simple problem of interaction on various factors are included in the theory

Morphology

Study of special types of inflorescences - Cyathium, Hypanthodium, Verticillaster and Thirsus - Study of fruits - Hesperidium, pome, pepo, Aggregate (custard apple) and multiple fruits (Pine apple and Jack fruits)

Taxonomy

1. Detailed study of any 15 families

Annonaceae, Capparidaceae, Malvaceae, Sterculiaceae, Tiliaceae, Anacardiaceae, Rutaceae, Leguminosae (Fabaceae, Ceasalpinaceae and Mimosaceae), Cucurbitaceae, Rubiaceae, Asteraceae, Apocyanaceae, Asclepidaceae, Acanthaceae, Solanaceae, Convolvulaceae, Lamiaceae, Verbenaceae, Amaranthaceae, Euphorbiaceae, Lilliaceae, Poaceae and Typhaceae. Submission of atleast 25 numbers of herbarium of plant materials as per theory syllabus.

2. Field trips

Botanical Tour (2 - 3 days) to any botanically rich location in and around Tamilnadu / other states.

Plant Ecology and Phytogeography:

1. Study of Morphological and anatomical features of hydrophytes, xerophytes and mesophytes.
2. Study of morphological features of epiphytes, parasites and halophytes.
3. Study of vegetation by quadrat, line transect and estimation of frequency, density and dominance cover.
4. Determination of soil and water pH.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – VI SEMESTER – CORE COURSE - XI
(For the candidates admitted from the year 2016-17onwards)

PRACTICAL - IV (Covering CC-XII & CC-XIII)

(MICROBIOLOGY, PLANT PHYSIOLOGY, BIO-CHEMISTRY AND BIO-PHYSICS)

Course outcomes

It develops the practical skill of students on micro preparation study and physiological as well as ecological nature of plants.

It impacts the basic knowledge of Plant physiology of plants

Microbiology:

1. Media Preparation - Sterilization Procedure
2. Isolation of Microbes from Water and Soil samples.
3. Gram Staining of Bacteria.
4. Histochemical localization of VAM fungi.

Physiology and Biochemistry Experiments:

1. Determination of Osmotic Pressure in potato cells.
2. Effect of Light Intensity on Transpiration Using Ganong's Potometer.
3. Comparison of Stomatal and Cuticular Transpiration by Cobalt Chloride Test.
4. Measurement of Oxygen Evolution Under Different Colored Light Using Wilmott's Bubbler.
5. Determination of Photosynthetic Rate Under Different CO₂ Concentration.
6. Measurement of Respiration Rate using Germinating Seeds and Flower Buds with Simple Respiroscope.
7. Separation of Plant Pigments by Paper chromatography.
8. Estimation of total chlorophyll contents in leaves.
9. Extraction and Estimation of total Sugar.
10. Estimation of lipids.

Demonstration :

1. Osmosis.
2. Ganong's Light Screen.
3. Anaerobic Respiration.
4. Fermentation.
5. Lever Auxanometer.
6. Clinostat.

Bio Physics : Demonstration

1. pH Meter.
2. Centrifuge.
3. Spectrophotometer.
4. Electrophoretic Apparatus.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – VI SEMESTER – CORE COURSE - XII
(For the candidates admitted from the year 2016-17 onwards)

GENERAL MICROBIOLOGY

Course outcomes

On the completion of this course, the students will be able to

Learn about classification, characteristics, ultra structure of Prokaryotic and Eukaryotic microbes

Know about organisms and causal factor responsible for plant diseases & methods of studying plant diseases

Familiarize with some common plant diseases of India

Gain knowledge on Host parasite interaction process

Unit - I: Introduction, History, development and scope of microbiology. Distinguishing features of Archaea, Eubacteria, Actinobacteria and Mycoplasma. Microbial taxonomy and its modern trends (Wittaker's and Bergey's). Staining methods
- Simple, negative, differential, acid fast and Gram's staining.

Unit - II: Bacteria- Morphology - size, shape, structure, ultra structure: cell wall, capsule, flagella, pili, endospore, plasmid, locomotion. Reproduction - binary fission, genetic recombination - conjugation, transformation and transduction. Economic importance of bacteria.

Unit - III: Viruses – Introduction, Classification, characteristic feature, structure, types, isolation and cultivation of viruses. Plant viruses. Replication of viruses
- lytic and lysogenic cycles. Economic importance of viruses.

Unit - IV: Culture of Microorganisms - Types of culture media, methods of sterilization - disinfectant, antiseptic, sanitizer, germicide, moist heat and dry heat (incineration, hot air oven), fractional sterilization, Pasteurization, Tyndallization, filtration. Methods of growing and maintenance of culture. Isolation and pure culture techniques of bacteria and fungi.

Unit - V: Agricultural and Environmental microbiology – soil microbes. Nitrogen fixers, phosphate solubilizers, mycorrhizae (Ecto, Endo and Ectendo) . Conversion of waste into organic compost, vermicompost – process of vermicomposting, Sewage treatment – sewage microbes, BOD, COD, small and large scale sewage treatment - Primary and Secondary and Tertiary treatments.

Reference Books:

1. Pelczar, M.J., Chan, E.C.S., (1986): Microbiology, Tata McGraw Hill Publishing Co., Ltd., New Delhi - 918p
2. Sharma, P.D. (1993), Microbiology, Rastogi Publications, Merut, India-359p.
3. Agrawal , A.K, parihar ,P. (2006). Industrial microbiology , Student Edition , Jodhpur
4. Dubey. R.C. & Maheswari, D.K. (1999) : A Text Bok of Microbiology, S. Chand & Co., New Delhi-682.
5. Prescott, Harley and Klein' S.(2008). Microbiology 7th edition, McGraw hill International Edition, NewYork.
6. Ananthanarayanan, R. and CKJ. Paniker, 2004. Textbook of Microbiology. Orient Longman Pvt. Ltd.,
7. Arora, D.R., 2004. Text book of Microbiology, CBS.
8. Dubey, R.C. and D.K. Maheswari, 2007. A Textbook of Microbiology, S. Chand & Company, New Delhi.
9. Michael, J. Pelczar, JR. E.C. Channoel, R.Krieg, 2005. Microbiology, Mc. Graw-Hill.
10. Powar, C.B and Daginawala 1991. General Microbiology Vol-I and Vol-II Himalaya publishing house, Bombay.
11. Sullia, S.B and S. Shantharam, 2005. General Microbiology, Oxford & IBH

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – VI SEMESTER – CORE COURSE - XIII
(For the candidates admitted from the year 2016-17 onwards)

BIOPHYSICS, BIOCHEMISTRY AND PLANT PHYSIOLOGY

Course outcomes

On the completion of this course, the students will be able to

Know about the requirement of mineral nutrition for plant growth

Understand the process of Photosynthesis, Respiration and Nitrogen metabolism

Learn about Sensory photobiology

Know about the Plant Growth hormones (Auxins, Gibberellins, Cytokinins, Ethylene)

Understand the biosynthesis of terpenes, phenols and nitrogenous compounds

Understand the concepts in biophysics

Biophysics :

UNIT - I : Laws of thermodynamics, Redox potential, Entropy, Enthalpy. ATP in bioenergetics chemical bonds - Biological effect of ionizing radiation.

Biochemistry :

UNIT -II: Classification, Structure and Function of Carbohydrates - Mono, Di, Oligo and Polysaccharide. Lipids - Saturated , Unsaturated and Saponification. Protein- Primary, Secondary and Tertiary Structures. Enzymes and Vitamins.

Physiology :

UNIT- III : Water Relations : Physical and Chemical Properties of water, Absorption of water. SPAC - Transpiration - types, mechanism of transpiration - Guttation - Factors affecting transpiration. Translocation of Solutes. Mineral nutrition and mineral uptake - Role of Macro and Micro elements.

UNIT - IV: Role of light and Pigments in Photosynthesis - Enhancement Effect ; Photosystem I & II, Photophosphorylation, Light Reaction. Carbon Assimilation - Calvin Cycle, Hatch & Slack Pathway, CAM Pathway - Photorespiration. Factors affecting photosynthesis.

Respiration: Respiratory Substrates. Aerobic and Anaerobic. Glycolysis, Krebs's Cycle and Oxidative Phosphorylation, Energetics of Respiration, Pentose Phosphate Pathway. Factors affecting Respiration.

UNIT-V: Plant Growth - Growth curve - Factors affecting growth. Plant Growth Regulators - Auxins, Gibberellins, Cytokinins, Ethylene and their Functions. Flowering - Role of hormones in Flowering, Photoperiodism, Vernalization. Senescence and Abscission, Phytochrome. Dormancy and Seed germination - Causes and breaking of seed and bud dormancy - Advantages of dormancy.

Reference Books:

1. Lincoln Taiz and Eduardo Zeiger, 2005. Plant Physiology Sinauer Associates Inc. Sublishers, Sunderland, Massachusetts.
2. Panda, S.K, 2005. Advances in Strees Physiology of plants, Scientific publishers India, Jodhpur.
3. Salisbury, F.B and Cleon Ross, 2007. Plant physiology, Wadsworth publishing company, Belimont.
4. William G. Hopkins, 1999. Introduction to Plany Physiology, John Wiley and sons, INC, New York.
5. Jain, J.L., Sunjay Jain and Nitin Jain, 2007. Fundamentals of Biochemistry, S.Chand & co New Delhi.
6. Hans-Walter. Headt, 1997. Plant Biochemistry and Molecular Biology. Oxford University press, New York.
7. Rajeshwari, M.R. (2012)- Biophysics, Rastogi Publications, Meerut.

Sl. No.:

Subject Code:

**GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-
05 B.Sc., BOTANY – VI SEMESTER – ELECTIVE COURSE - II**
(For the candidates admitted from the year 2016-17 onwards)

BIOFERTILIZERS AND BIOPESTICIDES

Course outcomes

It clearly brings the ideas about types of Biofertilizers, pesticides mass production and its application in Agriculture.

It gives wide knowledge on molecular techniques, genetic engineering aspects of plants.

It gives broad knowledge on various ecosystems, environmental pollutions and social issues of environment as well as impact of human population on environment.

Unit - I:

Biofertilizers - Definition, kinds, microbes as biofertilizers, Symbiotic association - *Rhizobium* inoculants - Classification, Physiology, Host - *Rhizobium* interactions and mass cultivation.

Unit - II:

Organic farming Carrier materials, general outline of microbes as fertilizers, Rhizosphere effect - microbial products influencing plant growth.

Unit - III:

Mycorrhizae - VAM association, occurrence, types, Collection, isolation, inoculum production and mass cultivation.

Unit - IV:

Frankia, Actinorhizae and Host plants, characteristics, identification, cultural method and maintenance of *Anabaena*, *Azospirillum*, *Azotobacter* and *Azolla*.

Unit - V:

Biopesticides - Definition, Bacterial, Viral and Fungal Pesticides. Biological control of weeds - Mycoherbicides - insect as bio control agents - Biological control of plant pathogens.

Reference Books:

1. Dubey, R.C., 2005 A Text book of Biotechnology S.Chand & Co, New Delhi.
2. Kumaresan, V. 2005, Biotechnology, Saras Publications, New Delhi.
3. John Jothi Prakash, E. 2004. Outlines of Plant Biotechnology.
Emkay Publication, New Delhi.
4. Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
5. Subha Rao, N.S. 2000, Soil Microbiology, Oxford & IBH
Publishers, New Delhi.
6. Vayas, S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic
Farming Akta Prakashan, Nadiad.

Sl. No.:

Subject Code:

GOVERNMENT ARTS COLLEGE (AUTONOMOUS): KARUR-05
B.Sc., BOTANY – VI SEMESTER – ELECTIVE COURSE - III
(For the candidates admitted from the year 2016-17 onwards)

PLANT BIOTECHNOLOGY

Course outcomes

On the completion of this course, the students will be able to

Establish different types of plant cultures.

Apply the technical skills learnt to establish nurseries for horticultural and agricultural crops.

Compare the pros and cons of transgenic plants on environment

Explain the concepts of intellectual property management and handling of GMOs.

Unit-I:

Biotechnology- Definition, Scope, Importance and interdisciplinary areas of Biotechnology - Global impact of biotechnology - Biotechnology in India - Commercial potential of biotechnology - Need for future development.

Unit - II:

Plasmids- General account, Plasmid as a vector – pBR 322, Ti and Ri plasmids. Cosmids and phagemids. Gene Cloning - PCR technique - Blotting techniques - Southern, Northern and Western blotting.

Unit - III:

Improvement of hybrids - Production of encapsulated seeds - molecular farming from transgenic plants, nutritional quality (cyclodextrins, Vit A, and quality of seed protein) Immunotherapeutic drugs - edible vaccines, antibodies and interferons.

Unit - IV:

Gene Transfer in Plants : *Agrobacterium* mediated transformation, Direct DNA Transformation - Biolistics, Lipofection, Electroporation, Microinjection and Protoplast Transformation.

Unit - V:

Agriculture biotechnology - Transgenic crops. Crop improvement - Production of resistance - viral, insect and microbial. Cryopreservation. Production of *flavr - savr* tomato.

Reference Books :

1. Ignacimuthu, S.J.(2003). Plant Biotechnology. Oxford & IBH Publishing, New Delhi.
2. John Jothi Prakash, E. (2005). Outlines of Plant Biotechnology. Emkay Publishers, New Delhi.
3. Dubey, R.C., (2001). A text book of biotechnology. S. Chand & Co., New Delhi.
4. Kumaresan.V. 2001 – Biotechnology, Saras Publications, Nagercoil.
5. Trivedi, P.C. 2000 – Plant Biotechnology, Panima Publishing Corporation, New Delhi.
6. Lewin, B. 2003 – Genes VI, Allied Publishers, Chennai.
7. Gupta P. K. 2005 Elements of Biotechnology. Rastogi Publications Meerut.
8. Singh B. D. 2003 Biotechnology Expanding Horizons. Kalyani publishers Ludhiana.