B.Sc BOTANY COURSE STRUCTURE UNDER CBCS PATTERN
(For the Candidates admitted from 2015 – 2016 Academic year onwards)

Semester	Subject Code	Part	Course Title	Hrs/ week	Credits	Marks		Total
						Int.	Ext.	
I	15T101a	I	LC-I- செய்யுள் (இக்கால இலக்கியம்), சிறுகதை, பயன்முறைத் தமிழ், தமிழ் இலக்கிய வரலாறு.	6	3	25	75	100
	15H101	II	ELC – I- English for communicative competence	6	3	25	75	100
	15BY101	III	CC-I -Plant Diversity I (Algae, Fungi, Lichens and Bryophytes)	6	5	25	75	100
	15BY102L		CC-II - Practical - I (Plant Diversity I & II)*	3	-	-	-	-
	15BY103A		AC –I -Zoology- Animal Structure and function	4	4	25	75	100
	15BY104L		AC –II -Zoology Practical*	3	-	-	-	-
	15VEDa	IV	VE-Value Education	2	1	-	100	100
			Total	30	16	-	-	500
II	15T202a	I	LC-II- செய்யுள் (பக்தி,இடைக்கால இலக்கியம்)தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு	6	3	25	75	100
	15H202	II	ELC –II- English for Proficiency	6	3	25	75	100
	15BY102L	III	CC-II - Practical-I (Plant Diversity -I & II)*	3	4	25	75	100
	15BY205		CC-III -Plant Diversity- II (Pteridophytes, Gymnosperms and Paleobotany)	4	4	25	75	100
	15BY104L		AC –II - Zoology Practical*	3	4	25	75	100
	15BY206A	IV	AC –III -Zoology- Economic Entomology and Vermitechnology	4	4	25	75	100
	15XBY21		SKBC-I- Biofertilizers	2	2	-	100	100
	15EVS		EVS-Environmental Science	2	1	-	100	100
			Total	30	25	-	-	800
III	15T303	I	LC-III- செய்யுள் (காப்பியங்கள்),புதினம்,தமிழ் இலக்கிய வரலாறு	6	3	25	75	100
	15H303	II	ELC –III – English for Employability	6	3	25	75	100
	15BY307	III	CC – IV -Microbiology and Plant Pathology	5	5	25	75	100
	15BY308L		CC – V - Practical –II (Microbiology and Plant Pathology , Cell Biology and Plant Anatomy)*	3	-	-	-	-
	15BY309A		AC – IV - Allied Chemistry- I	5	4	25	75	100
	15BY310L		AC – V - Allied Chemistry Practical-*	3	-	-	-	-
	15XBY32	IV	SKBC-II- Mushroom culture Techniques	2	2	-	100	100
	15GS		GS-Gender Studies (Self study)	0	1	-	100	100
			Total	30	18	-	-	600

Semester	Subject CODE	Part	Course Title	Hrs/ week	Credits	Marks		Total
						Int.	Ext.	
	15T404		LC-IV- செய்யுள் (பழந்தமிழ் இலக்கியம்), நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்	6	3	25	75	100
IV	15H404	II	ELC – IV- English through literary texts	6	3	25	75	100
	15BY308L	III	CC –V - Practical –II (Microbiology and Plant Pathology, Cell Biology and Plant Anatomy)*	6	5	25	75	100
	15BY411		CC- VI - Cell Biology and Plant Anatomy	3	4	25	75	100
	15BY310L		AC – V -Allied Chemistry Practical*	3	4	25	75	100
	15BY412A		AC –VI -Allied Chemistry – II	6	4	25	75	100
	15SSC	IV	SSC-Soft Skills Course	0	2	-	100	100
			Total	30	25	-	-	700
V	15BY513	III	CC – VII -Plant Embryology and Tissue culture	5	5	25	75	100
	15BY514		CC – VIII -Morphology and Taxonomy of Angiosperms	5	5	25	75	100
	15BY515		CC – IX - Biochemistry and Plant Physiology	5	4	25	75	100
	15BY516L		CC – X - Practical –III (Plant Embryology and tissue culture , Morphology and Taxonomy of Angiosperms, Biochemistry and Plant Physiology)	6	5	25	75	100
	15BY517a		EC-I – Bioinstrumentation	5	5	25	75	100
	15BY517b		EC –I – Plant Tissue Culture					
	15BY5Na	IV	NMEC - Gardening	4	4	-	100	100
	15BY5Nb		NMEC – Horticulture					
			Total	30	28	-	-	600
VI	15BY618L		CC – XI - Practical –IV (Ecology and conservation Biology, Genetic and Evolution, Biotechnology)	6	5	25	75	100
	15BY619	III	CC – XII -Ecology and Conservation Biology	6	5	25	75	100
	15BY620		CC – XIII -Genetics and Evolution	6	4	25	75	100
	15BY621		CC – XIV – Biotechnology	6	4	25	75	100
	15BY622a		EC –II -Biostatistics and Bioinformatics	6	5	25	75	100
	15 BY622b		EC – II - Economic Botany					
	15BYC		Comprehensive Course	0	4	-	100	100
	15EA		EA-Extension Activities	-	1	-	-	-
			Total	30	28		-	600
			Over all Total	180	140	-	-	3800

*** Examination will be conducted at the end of even Semester**

Elective Course-I
a.Bioinstrumentation
b. Plant Tissue culture

Non-Major Based Electives-I:
a. Gardening
b. Horticulture

Elective Course -II
a. Economic Botany
b. Biostatistics and Bioinformatics

Skill Based Course I – Biofertilizers
Skill Based Course II – Mushroom culture techniques

CODE:15T101a	LC-I-செய்யுள் (இக்கால இலக்கியம்), சிறுகதை,பயன்முறைத் தமிழ், தமிழ் இலக்கிய வரலாறு	SEM:I

அலகு – 1

மரபுக்கவிதைகள் பாரதியார் பாடல்கள் - பக்திப் பாடல்கள், தமிழ்த்தாய், கண்ணம்மா என் காதலி, **பாரதிதாசன் பாடல்கள் -** தமிழின் இனிமை, நீங்களே சொல்லுங்கள்?, சிறுத்தையே வெளியே வா, **பொன்னடியான் -** அறத்தால்..., மாணவனே!, **சாமி.பழனியப்பன் -** சமுதாயமும் நூலகங்களும் **தமிழேந்தி -** சுற்றுச் சூழல் கெடுவதுவோ?, சாதனை வேண்டும்.

அலகு – 2

புதுக்கவிதைகள் அப்துல் ரகுமான் - மறுபக்கம், **இன்குலாப்** - கொள்ளைக்காரர்கள் எப்படி இருக்கிறார்கள்?, **தணிகைச்செல்வன் -** தாய், **மு.மேத்தா** - தேசப்பிதாவிற்கு ஒரு தெருப்பாடகனின் அஞ்சலி, **தமிழன்பன்** - நல்லாள் நகும், **வாலி** - பாரதிதாசன், - **வைரமுத்து** - திருத்தி எழுதிய தீர்ப்புகள், **தாமரை -** தொலைந்து போனேன், **யுகபாரதி -** சொல்வதெனில், **நா.முத்துக்குமார்** - அக்காவின் கடிதம், **நாட்டுப் புறப் பாடல்கள்** - பக்திப் பாடல்கள், தாலாட்டுப் பாடல்கள், காதல் பாடல்கள், தொழிற் பாடல்கள் - ஒப்பாரிப் பாடல்கள், தெம்மாங்குப் பாடல்கள்.

அலகு – 3 சிறுகதை

பாடநூல் - வார்ப்பு - தொகுப்பாசிரியர்கள் - முனைவர் கா.வாசுதேவன், முனைவர் மு.அருணாசலம், என்.சி.பி.எச். வெளியீடு, சென்னை - 098. (2015-2016, 2016-2017 கல்வியாண்டுக்கு), **சிறுகதை மலர்** - பிரமி பதிப்பகம், திருச்சி-21. (2017-2018 கல்வியாண்டுக்கு).

அலகு – 4 பயன்முறைத் தமிழ்

எழுத்தியல் - எழுத்துப் பிழைகளும், திருத்தங்களும் - இன எழுத்துக்கள் வேறுபாடுகள் - தமிழில் பிறமொழிச் சொற்கள் - வலிமிகுதல், வலி மிகாமை.

பாடநூல் - பயன்பாட்டுத் தமிழ் (இலக்கணக் கையேடு), தமிழ் நாதன் பதிப்பகம், சென்னை – 110.

அலகு – 5 தமிழ் இலக்கிய வரலாறு

தற்காலம் - மரபுக் கவிதை-புதுக்கவிதை – தோற்றமும் வளர்ச்சியும், ஹைகூ கவிதை, நாட்டுப்புறப் பாடல்கள், மறுமலர்ச்சி காலக் கவிஞர்கள் - சிறுகதை – தோற்றமும் வளர்ச்சியும், தமிழ்உரைநடை வளர்ச்சி.

CODE:15H101	ELC-I -English for Communicative Competence	SEM: I

Objectives:

To expose students to effective communication in the form of prose, biographies and short stories

To familiarize students with various forms and functions of the English language

Unit - I

The Gift of Language – *J.G.Bruton*
My Visions for India – *A.P.J.Abdul Kalam*
Unlock Your Own Creativity – *Roger Von Oech*

Unit - II

Mahathma Gandhi – *Francis G.Hutchins*
Mother Teresa – *John Frazer*
Indira Nooyi – *An Article*

Unit - III

Science and Religion – *S.Radhakrishnan*
Technology with a Human Face – *E.F.Schumacher*
And Now E-teachers – *Robin Abreu*

Unit - IV

Vanishing Animals – *Gerald Durrell*
Climate Change and Human Strategy – *E.K.Federov*
The Old Folks at Home – *Alphonse Daude*

Unit - V

The Tempest (Retold by Charles Lamb) – *William Shakespeare*
The Cop and the Anthem – *O.Henry*
Marriage is a Private Affair – *Chinua Achebe*

CODE: 15BY101	CC - I - Plant Diversity - I (Algae, Fungi, Lichens and Bryophytes)	SEM: I

Objectives:

- *To learn about the Cryptogamic plants.*
- *To understand the diversity, complexity and the economic value of lower plants.*

Unit I:

Distribution of Algae with reference to their habitat- General classification of Algae based on Fritsch (1935) system – General characters of Blue-green Algae- *Nostoc* – Thallus organization- Occurrence – Structure – Heterocyst function – Reproduction – Vegetative reproduction – Asexual reproduction – Hormogones, Endospores and Akinetes - General characters of Green algae – *Caulerpa* – Thallus structure – Internal structure – Reproduction – Vegetative reproduction – Sexual reproduction.

Unit II:

General characters of Brown algae – *Ectocarpous* – Occurrence – Thallus structure – Internal structure- Reproduction – Vegetative, asexual and sexual reproduction – Life cycle. General characters of Red algae - *Gracillaria* – Occurrence – Thallus structure – Cell structure- Reproduction – Vegetative, asexual and sexual reproduction –Life cycle. Economic importance of Algae.

Unit III:

General characters of Fungi based on Alexopoulos (1979) system – General characters of Zygomycetes – *Rhizopus* – occurrence - somatic structure – Asexual reproduction – sexual reproduction – Life cycle. General characters of Ascomycetes – *Aspergillus* – Occurrence – somatic structure – Asexual reproduction – sexual reproduction – Life cycle. General characters of Basidiomycetes – *Agaricus* – Occurrence – mycelium - Asexual reproduction – sexual reproduction- fruit body (sporophore) – Life cycle.

Unit IV:

General characters of Deuteromycetes – *Fusarium* – Occurrence – vegetative structure – Asexual reproduction. Economic importance of Fungi. Lichens: Morphology of the thallus – crustose, foliose, and

fruticose – Fungal components – Algal components – symbiosis – vegetative reproduction: Fragmentation, Isidia and Soredia – sexual reproduction – Apothecium – Lichen as pollution indicators. Economic importance of Lichens.

Unit V:

General classification of Bryophytes based on Rothmaler (1951), *Marchantia, Polytrichum* – Occurrence – external features of adult gametophyte – Internal structure – Reproduction – Asexual reproduction – Sexual reproduction – Sporophyte structure – Life cycle. (Development of sex organs excluded).

Text Books:

- *Stephenson, S.L. 2010. The Kingdom fungi: The Biology of Mushroom, Molds and Lichens, Timber Press Inc., UK.*
- *Lynda Ed. West. 2010. Algae, Cambridge University Press, UK.*
- *Vashishta, B.R. 1988. Bryophyta, 6th Edition, S. Chand and company, (Pvt.) Ltd., New Delhi.*
- *Kumar, H.D. 1990. Introductory Phycology, Affiliated East West Press (P) Ltd., New Delhi.*
- *Rashid, A. 1998. An introduction to Bryophyta, Vikas Publishing House (P) Ltd., New Delhi.*

Reference Books:

- ✓ *West, G.S. 2010. Algae vol. I. Myxophyceae, Peridinieae, Bacillariaceae, Chlorophyceae, Cambridge Botanical hand book series, UK.*
- ✓ *Tuba, Z., N.G., Sleck and L.R. Stark. 2011. Bryophyte, Cambridge University Press, UK.*
- ✓ *Dube, H.C. 2009. Introduction to Fungi, Vikas publishing pvt. Ltd., New Delhi.*
- ✓ *Paracer, S and V.Ahmadjian. 2002. Symbiosis, Oxford University Press, Chennai.*

CODE: 15BY102L	CC-II - Practical - I (Plant Diversity I & II)	SEM:I & II

Plant Diversity-I

A study of both vegetative and reproductive structures (wherever available) of Genera included in the theory

1. To make suitable micro preparation of the following algae – *Caulerpa, Gracillaria, Sargassum, Nostoc, Oscillatoria*
2. To identify micro slides and specimens relevant to the syllabus
3. A study of vegetative and reproductive structures of genera of fungi and lichens.
4. Botanical tour for algal collection and submission of field report.

Plant Diversity II

1. Study of morphology and reproductive structures of the following types:

Pteridophytes: *Lycopodium, Selaginella, Equisetum, Marsilea*

Gymnosperm: *Cycas, Pinus, Gnetum, Cuppressus*

Fossils: Rhynia, Lepidodendran

2. Field studies, submission of field reports and herbarium

CODE: 15BY103A	AC-I - ZOOLOGY – ANIMAL STRUCTURE AND FUNCTION	SEM: I

Objectives:

- *To make the students understand the basic characteristics and diverse forms of invertebrate and vertebrate animals.*
- *To give a comprehensive idea of Developmental Biology, Animal Physiology and Evolution.*

UNIT I: Invertebrata: Classification of invertebrates upto major phyla with salient features and examples. Detailed study: Earthworm and Cockroach – morphology - digestive system, circulatory system, nervous system and reproductive system.

UNIT II: Chordata: General characters and classification upto classes. Detailed study: Fish and Rat – morphology - digestive system, circulatory system, nervous system and reproductive system.

UNIT III: Developmental Biology: Structure of Human sperm and ova. Fertilization – Physiochemical aspects. Clevage, Blastulation and Gastrulation in frog. Development of Eye and Heart in Frog.

UNIT IV: Physiology: Food and feeding – digestion and absorption. Respiration in man – structure of respiratory organ – gaseous exchange. Excretion in man – structure of kidney – physiology of urine formation.

UNIT V: Evolution: Origin of life - Lamarckism, New-Lamarckism – Darwinism, New Darwinism. Speciation - Mimicry and colouration. Animal Distribution - Zoogeography.

Text Books:

1. *Arumugam, N. 2012. Text book of Invertebrates and Chordates. Saras Publication. Nagercoil.*
2. *Ekambaranatha Iyer. 1993. Outlines of Zoology, S. Viswanathan (Primers & Publishers) Pvt. Ltd. Chennai.*

References:

1. *Verma, Tyagi and Agarwal. 1997. Animal Physiology, Chand and Co. Delhi.*
2. *Rastogi, S.C. 2001. Essentials of Animal Physiology (III Ed.), New Age International Publication, New Delhi.*
3. *Arumugam, N. 2012. Organic Evolution. Saras Publication. Nagercoil.*

CODE: 15BY104L	AC-II - ZOOLOGY – PRACTICAL	SEM: I & II

Objectives:

To impart training on the technique of dissecting the invertebrate/vertebrate animals and to understand the various systems present in the body. To train the students to discriminate the various external body parts of invertebrates. To observe the preserved invertebrate animals (wet and dry) and to study their characteristic features of insects.

I. Dissections and Experiments:

1. Earthworm: Digestive system and Nervous system.
2. Cockroach: Digestive system and Nervous system.
3. Rat/Frog: Pro-dissector software: Demonstration.
4. Qualitative test for carbohydrate, protein and fat.
5. Qualitative test for sugar, albumins and urea in Urine.
6. Estimation of salinity and oxygen of the given samples.
7. Field study: collection, identification and preservation of insect pests and natural enemies in agriculture field/garden.
8.

II. Minor Practical

1. Earthworm: Body setae.
2. Honey bee/Cockroach: Mouth Parts.
3. Honey bee sting.
4. Shark: Placoid scale.
5. Determination of pH of water samples (pH paper method)
6. Estimation of Haemoglobin by Haemoglobinometer.
7. Honey adulteration test.

III. Spotters: SEMester I

1.	Paramecium	13.	Catfish
2.	Sycon	14.	Cobra
3.	Obelia colony	15.	Kingfisher
4.	Planaria	16.	Bat
5.	Tape worm	17.	Cleavage (8-cell)
6.	Ascaris	18.	Frog-Blastula
7.	Nereis	19.	Frog-Gastrula
8.	Leech	20.	Clinical thermometer
9.	Limulus	21.	Sphygmomanometer
10.	Sepia	22.	Mimicry – Stick insect
11.	Starfish	23.	Mimicry - Chameleon
12.	Amphioxus		
Spotters: SEMester II			
1	Bee hive	6	Groundnut: Red hairy caterpillar
2	Honey	7	Sugarcane: Shoot borer
3	Cocoons	8	Cotton: Aphids
4	Silk thread	9	Biopesticide: Jatropha seed oil
5	Rice: Stemborer	10	Biopesticide: Neem oil

IV. Record Submission:

Code:15VEDa	**VE -Value Education (வாழ்வியல் கல்வியும் மனித உரிமைகளும்)**	**Sem:I**

அலகு 1

வாழ்வியல் கல்வி – திறன் மேம்பாடும் உயர் பண்புகளும்

கல்வி, வாழ்வியல் கல்வியின் நோக்கம் - வாழ்வியல் கல்வியின் பரிணாம வளர்ச்சி - வாழ்வியல் கல்வியின் கூறுகள் - **சுய முன்னேற்றம்** - திறன் மேம்பாடு - **உயர்பண்புகள்** - தன்மதிப்பீடும் சுயபரிசோதனையும் - பாலினச் சமத்துவத்தை உளமாரப் பின்பற்றுதல் - மாற்றுத் திறனாளிகள், மனவளம் குன்றியோர், வயதில் பெரியவர்கள், அனுபவசாலிகள், சான்றோர்கள், குடும்ப உறுப்பினர்கள், அருகில் வசிப்பவர்கள், சுற்றத்தார், உடன் பணியாற்றுவோர் இவர்களுக்கு மதிப்பளித்தல் - **நற்பண்புகளும் நடத்தை உருவாக்கமும்** - உண்மை - ஆக்கத்திறன் - தியாகம் - நேர்மை - கட்டுப்பாடு - உதவி செய்யும் மனப்பான்மை- - சகிப்புத்தன்மை - **அறிவியல் கண்ணோட்டம்**

அலகு 2

தேசிய, உலக முன்னேற்றத்திற்கான வாழ்வியல் கல்வி

தேசம், சர்வ தேசங்கள் குறித்த எண்ணங்கள் - நமது நாடு - அரசமைப்பு - மக்காளாட்சித் தத்துவம் - சமதர்மம் - மதச்சார்பின்மை - சமத்துவம் - சமூக நீதி, தனியுரிமை - சுதந்திரமும் சகோதரத்துவமும் **சமூகப் பண்புகள்** - இரக்கம் மற்றும் நேர்மை, சுயகட்டுப்பாடு, உலகளாவிய சகோதரத்துவம் - **தொழில் சார் பண்புகள்** - அறிவு வேட்கை - தொழிலில் நேர்மை - முறைமை - காலந்தவறாமையும் நம்பிக்கையும் - **மதம் சார்ந்த பண்புகள்** - சகிப்புத்தன்மை, மெய்யறிவு, நன்னடத்தை - **அழகியல் பண்புகள்** - இலக்கியம், நுண்கலைகள் ஆகியவற்றைப் பயில்தல், சுவைத்தல், மனதாரப் பாராட்டுதல் மதித்தல், பாதுகாத்தல், தேசிய ஒருமைப்பாடும் சர்வதேசப் புரிதலும்.

அலகு 3

அறப்பண்புகள் மற்றும் வாழ்வியலில் உலகளாவிய பெருவளர்ச்சிகள் ஏற்படுத்தும் தாக்கங்கள்

பன்பண்பாட்டு முரண்பாடுகளின் தாக்கங்கள் - எல்லை தாண்டிய கல்வி - தொழில் சார்ந்த அறை கூவல்களும் சமரச இணக்கமும் - பொருளியல் சிந்தனைகள் - மக்கள் தொடர்புச் சாதனங்கள் - இளமை உணர்ச்சி வேக நடத்தையின் நவீன அறைகூவல்கள் - இல்லறமும் நல்லுணர்வும் - ஒப்பீடும் போட்டி இடுதலும் - நேர்மறை, எதிர்மறை எண்ணங்கள் - அகந்தை - சினம் - சுயநலம் - அறைகூவல்கள்

அலகு 4

உடல், உள்ள நலமும் நோய் தீர்க்கும் செயல்பாடுகளும்

உணவுப் பழக்கமும் உணவு முறைகளும் - பொருந்தும் உணவுகள் - பொருந்தா உணவுகள் - மனக் கட்டுப்பாடு - மனத்திண்மை - எளிய உடற்பயிற்சி - தியானம் - மனம், ஆன்மா சார்ந்த விளைவுகள் - யோகா - நோக்கங்கள் - வகைகள் - முறைகள் - ஆசனங்கள் - ஆசைகளை ஒழுங்குபடுத்துதல் - கவலை நீக்குதல் - சினம் தணிதல் - நெடுநீர், மறதி, சோம்பல் தவிர்த்தல் - தூக்கம் முறைப்படுத்துதல் - துக்கம், இழப்புகளை எதிர்கொள்ளல் - புகை, மது முதலானவைகளின் தீங்கு உணர்தல்- வாழ்த்துகளின் பயன்கள்

குறிப்பு : இந்த அலகு உடற்பயிற்சி – தியானம் - யோகா செய்முறைப் பயற்சிகளுடன் கூடியது.

அலகு 5 மனித உரிமை, மனித உரிமை கருத்துக்கள்

தேசிய மற்றும் பன்னாட்டுக் கண்ணோட்டங்கள் - மனித உரிமையின் பரிணாமம் - மனித உரிமையின் பரந்த வகைப்பாடுகள் வாழ்தற்கான உரிமை, சுதந்திரம், கண்ணியத்துடன் வாழ்வதற்கான உரிமைகள் - கலாச்சாரம் மற்றும் கல்விக்கான உரிமைகள் - பொருளாதார உரிமைகள் - அரசியல் உரிமைகள் - சமூக உரிமைகள் - பெண்கள் மற்றும் குழந்தைகளின் மனித உரிமை - சமூகப் பழக்கங்களும் அரசியலமைப்புப் பாதுகாப்புகளும்.

CODE:15T202	LC-II- செய்யுள் (பக்தி,இடைக்கால இலக்கியம்)தமிழ்ச் செம்மொழி வரலாறு, மொழிபெயர்ப்பியல், தமிழ் இலக்கிய வரலாறு	SEM:II

அலகு - 1

தேவாரம் - திருஞானசம்பந்தர் திருவையாறு திருமுறைப் பதிகம் -3 "புலனைந்தும் பொறிகலங்கி" எனத் தொடங்கும் பதிகம், **திருமந்திரம்** - 10 பாடல்கள் ஒன்றவன்... (பாடல் எண் - 1), தீயினும்... (பாடல் எண் - 2), பிறப்பிலி... (பாடல் எண் - 25), வானின்று... (பாடல் எண் - 30), அப்பனை... (பாடல் எண் - 36), கல்லா அரசனும்... (பாடல் எண் - 238), வேட நெறி... (பாடல் எண் - 240), வேந்தன் உலகை... (பாடல் எண் - 245), அமுதூறும்....(பாடல் எண் - 248), தன்னையறியாது....(பாடல் எண் - 255). **நாலாயிரத் திவ்வியப் பிரபந்தம் -** குலசேகர ஆழ்வார் பெருமாள் திருமொழி – "ஊனேறு செல்வத் துடற்பிறவி" எனத்தொடங்கும் பாடல் முதல் 11 பாடல்கள் (677-687), **திருவிளையாடல் புராணம் -** திருநாட்டுச் சிறப்பு 20 பாடல்கள், **திருஅருட்பா** - பிள்ளைச் சிறு விண்ணப்பம் 3394 முதல் 3409 வரை 16 பாடல்கள்.

அலகு – 2

கலிங்கத்துப் பரணி - காடு பாடியது, **தமிழ் விடு தூது** - 179 ஆவது கண்ணி முதல் 198 ஆவது கண்ணி முடிய 20 கண்ணிகள், **குற்றாலக் குறவஞ்சி** – எங்கள் மலையே 5 பாடல்கள், **முக்கூடற்பள்ளு 07 பாடல்கள் - நாட்டுவளம்** -கோட்டு வளங்...(பாடல் எண் - 16), மேடை யேறித்தன்... (பாடல் எண் - 17), கறைபட் டுள்ளது... (பாடல் எண் - 21), மீதுயர்ந் திடுங்.... (பாடல் எண் - 25), **நகர்வளம் -** கொண்டல் கோபுரம்... (பாடல் எண் - 19) கோதி மாமணி...(பாடல் எண் - 23) கார் பூத்த வண்ணனார்... (பாடல் எண் - 28)

அலகு - 3 தமிழ்ச் செம்மொழி வரலாறு

செம்மொழி விளக்கம் - செம்மொழி வரலாறு - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழிக்கான தகுதிகள் அல்லது செம்மொழிப் பண்புகள் - தமிழ்ச் செம்மொழி நூல்கள்.

பாடநூல் - தமிழ்ச் சொம்மொழி வரலாறு – முனைவர் மு.சாதிக்பாட்சா, இராஜா பப்ளிகேசன், திருச்சி-23.

அலகு - 4 மொழிபெயர்ப்பியல்

ஒரு மடல்(கடிதம்) அல்லது ஒரு பத்தி ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல்.

பாடநூல் - மொழிபெயர்ப்பியலும் மொழிபெயர்ப்புகளும் - மகிழினி பதிப்பகம், சென்னை- 106.

அலகு - 5 தமிழ் இலக்கிய வரலாறு

சமயமும் தமிழும், சிற்றிலக்கியங்கள், பக்தி இலக்கியங்கள், முத்தொள்ளாயிரம், சித்தர்கள், உரையாசிரியர்கள், இலக்கண நூல்கள், நிகண்டுகள்.

CODE:15H202	ELC-II– English for Proficiency	SEM:II

Objectives

To expose students to the wisdom and experience written in the form of prose, biographies and short stories

To familiarize students with various forms and functions of the English language

UNIT I

1.**The Beauty Industry** – *Aldous Huxley*

2.**A Talk on Advertising** – *Herman Wouk*

3.**On Seeing Films** – *Anonymous*

UNIT II

1.**Charlie Chaplin**– *From his Biography*

2.**Subash Chandra Bose** – *M.L Ahuja*

3.**Isaac Newton** – *Colin Swatridge*

UNIT III

1.**The Need for Excellence** – *N.R.Narayana Murthy*

2.**Travel by Train** – *J.B.Priestly*

3.**Tight Corners** – *E.V.Lucas*

UNIT IV

1.**Letter to Bapu from Generation Next** – *Chetan Bhagat*

2.**Human Rights and Legal Responsibilities** – *Nani A.Palkhivala*

3.**Cellphone Epidemic** – *Claudia I.Haas*

UNIT V

1.**Three Days to see** – *Helen Keller*

2.**The Four Brothers** – *Walter De La Mare*

3.**A Different Kind of Learning** – *Jade Snow Wong*

CODE: 15BY205	CC-III - Plant Diversity- II (Pteridophytes, Gymnosperms and Paleobotany)	SEM:II

Objectives:

- *To understand the classification of Pteridophytes and Gymnosperms*
- *To identify the various forms of Pteridophytes*
- *To differentiate various members of Gymnosperms*
- *To understand the usage of fossils to study past plant.*

Unit I:

General characters of Pteridophytes – classification (Smith, 1955) - Stelar evolution- External and internal features, reproduction of *Psilotum*, *Selaginella*, and *Equisetum* - Economic importance of Pteridophytes.

Unit II:

A detailed study of the morphology, anatomy and reproduction of the following genera – *Lycopodium, Marsilea*, and *Adiantum* .

Unit III:

Gymnosperms - General characteristics and classification of Gymnosperms by (Chamberlain, 1935) – External and internal structure, mode of reproduction of *Cycas*, and *Pinus.*

Unit IV:

External and internal structure, mode of reproduction of the following genera: *Cupressus*, and *Gnetum*- Economic importance of gymnosperms

Unit V:

Paleobotany – Fossils & fossilization types of fossils (compression, impression, petrifaction, coal balls). Geological time scale. A detailed study of external and internal morphology and reproductive parts in *Rhynia, Lepidodendron.*

Text Books:

- *Parihar, N.S. 1965. An Introduction to Embryophyta, Vol. I., Central Book Depot, Allahabad.*
- *Sporne, K.R. 1974. Morphology of Gymnosperms, B.I. Publications, Chennai.*
- *Sporne, K.R. 1976. Morphology of Pteridophytes, B.I. Publications, Chennai.*

- *Vashishta, P.C.1976. Gymnosperms, S.Chand and Co., New Delhi.*
- *Vashishta, P.C.1976. Pteridophytes, S.Chand and Co., New Delhi.*
- *Pandey, B.P. 2001. College Botany, Vol.II, S.Chand and Co., New Delhi.*

Reference Books:

- ✓ *Alan Reid Smith. 1981. Pteridophytes, California Academy of Sciences. California.*
- ✓ *Reddy, S.M. and S.J. Chary. 2003. Gymnosperms, New age international (p) Ltd. Publisher. New Delhi.*
- ✓ *R. A. Spiler and B.A. Thomas, 1986. Systematics & Taxonomic approaches in Paleobotany, Clarendon Press,UK.*

CODE: 15BY206A	AC –III – Zoology - Economic Entomology and Vermitechnology	SEM:II

Objectives:

To know our students about insects and their attack on plants with control measures. To give a comprehensive idea of Vermiculture, Apiculture and Sericulture.

UNIT I:

Economic Entomology: Harmful and beneficial insects. Pest: Definition and types. Biology and life cycle of pests that affect agricultural crop plants and their management measures: paddy (Stemborer), groundnut (Red hairy caterpillar), sugarcane (Shoot borer), cotton (Aphids).

UNIT II:

Methods of insect control: Prophylactic measures – Cultural, Mechanical, Physical, Biological and Chemical methods. Pesticides – Classification. Introduction to biopesticides.

UNIT III:

Apiculture: Species of honey bees – Life cycle of honey bee (*Apis dorsata*) - types of bee hives – placing of bee hives - extraction of honey – Nutritive and medicinal values of honey.

UNIT IV:

Sericulture: Species of silk worms - Life cycle of silk worm (*Bombyx mori*) –cultivation of mulberry plants - rearing of silk worm – quality of cocoons.

UNIT V:

Vermiculture: species of earthworms used for vermiculture– Life cycle of vermicomposting species of *Lampita marutii* – Materials used for the production of vermicompost – plants and animal wastes. Methods of preparation of vermicompost. Advantages of vermicompost.

Text Books:

- *Tembhare, D.B. 1997. Modern Entomology. Himalaya Publishing House. Mumbai. (Unit I, II, III, IV).*
- *Seethalakshmy, M and R. Santhi. 2012. Saras Publication. Nagercoil. (Unit V).*

References:

- ✓ *Ravindranathan, K.R. 2005. A text book of Economic Zoology. Dominant publisher and distributors (P) Ltd. New Delhi.*
- ✓ *David, B.V and R. Kumaraswami. 2000. Elements of Economic Entomology, Popular Book Depot, Chennai.*
- ✓ *Shukla, G.S and Upadhya, V.B. 2005. Economic zoology. Rastogi publications.*
- ✓ *Ahsan, J and Sinha, S.P. A hand book on economic zoology. S. Chand and co.*
- ✓ *Ullal, S.R and Narasimhanna, M.N. Central silk board, Govt of India, Bombai.*

CODE: 15XBY21	SKBC-I - Biofertilizers	SEM:II

Objectives:

To develop the skill on the biofertilizer production by using various microorganisms

Unit I:

General account about the microbes used as biofertilizer – *Rhizobium* – isolation, identification, mass multiplication, and carrier based inoculants.

Unit II:

Azospirillum, isolation and mass multiplication – carrier based inoculants, associative effect of different microorganism. *Azotobacter* – classification, characteristics – crop response to *Azotobacter* inoculum, maintenance and mass multiplication.

Unit III:

Cyanobacteria (blue green algae), Azolla and Anabaena association, nitrogen fixation, factors affecting growth, blue green algae and Azolla in rice cultivation.

Unit IV:

VAM - fungi, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculums production of VAM, and its influence on growth and yield of crop plants.

Unit V:

Organic farming – Green manuring and organic fertilizers, recycling of biodegradable municipal agents, agricultural and Industrial wastes – biocompost making methods, types and method of vermicomposting – field Application

Reference Books

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

CODE:15EVS	EVS -Environmental Science	SEM:II

Objectives:

To create awareness among the students about our environment, its values, and the need for protecting it for the well being of mankind in the months and years to come.

To create awareness among the students about our environment, its values, and the need for protecting it for the well being of mankind in the months and years to come.

UNIT - I

Multidisciplinary nature of Environmental Science – Definition – Scope and importance. Natural resources: Land resources: Lands as resources and their uses – land degradation, soil erosion. Forest resources: Importance of forest resources - Major and minor forest produces – Need for afforestation – Water resources: Availability of surface and ground water – Importance of water conservation – Food resources: World food problems and possible solutions. Effect of modern agriculture.

UNIT - II

Mineral resources: Their availability and uses – environmental effects of extracting. Energy resources: Growing energy needs – renewable and non-renewable energy sources – Use of alternate energy sources – Case studies – Equitable use of resources for sustainable life styles.

UNIT-III:

Ecosystem: Concept – Structure and function of Grass land, Pond and Forest ecosystem – Food chains, food webs and Ecological pyramids. Biodiversity: Definition – Genetic, Species and Ecosystem diversity – Biogeographical classification of India – Values of Biodiversity – Biodiversity at global, national and local levels – India as a mega-diversity

nation – Hotspots of Diversity – Threats to Biodiversity – Endangered and Endemic species of India – *In situ* and *Ex situ* conservation of biodiversity.

UNIT-IV:

Environmental pollution: Definition, Causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear pollution – Solid Waste Management: Causes, effects and management of urban and industrial wastes

UNIT-V:

Social issues and environment: Effects of deforestation, Construction of Dams, Mineral mining on environment – Natural disasters and their management: Floods, Earthquake, Cyclone and Landslides – Conflicts over water – Advantages of rainwater harvesting and watershed management – Climate change, global warming, acid rain, ozone depletion. Environmental ethics – Case studies – Population explosion – Effects of population explosion on environment –Various acts and legislations, environment and human health, human rights, HIV/AIDS, women and child welfare. Role of individual in preservation of environment.

List of Reference Books

- ✓ *Anon. 2000. Environmental Studies (U.G.C Syllabus), Periyar E.V.R College, Tiruchirapalli.*
- ✓ *Asthana, D.K., Meera, A. 2006. A Text Book of Environmental Studies for under graduate students. S.Chand & Company Ltd., New Delhi.*
- ✓ *Benny Joseph. 2005. Environmental Studies. Tata McGraw-Hill Publishing Company Ltd., New Delhi.*
- ✓ *Kumaraswamy, K., Alagappa Moses, A. and Vasanthy, M. 2004. Environmental Studies (A Text Book for all under graduate students). Bharathidasan University, Tiruchirapalli.*

CODE:15T303	LC-III - செய்யுள் (காப்பியங்கள்), புதினம், தமிழ் இலக்கிய வரலாறு	SEM:III

அலகு - 1

1. சிலப்பதிகாரம் - கனாத்திறன் உரைத்த காதை (80 வரிகள்)
2. மணிமேகலை – ஆபுத்திரன் திறன் அறிவித்த காதை (115 வரிகள்)

அலகு - 2

1. கம்பராமாயணம் - இரணியன் வதைப் படலம் (56 பாடல்கள்)
2. பெரியபுராணம் - இளையான் குடி மாறனார் புராணம் (27 பாடல்கள்)
3. சீறாப் புராணம் - பாந்தள் வசனித்தப் படலம் - (18 பாடல்கள்)

அலகு - 3

1. இராவண காவியம் - தமிழகக் காண்டம் - (தலைமக்கள் படலம்-28 பாடல்கள்)
2. இயேசு காவியம் - (உவமை வழிச் செய்தி முழுவதும்)

அலகு – 4 புதினம்

பாடநூல் சக்கை, கலைச் செல்வி, என்.சி.பி.எச். வெளியீடு, சென்னை – 600 098.

அலகு – 5 தமிழ் இலக்கிய வரலாறு

காப்பியங்கள் - ஐம்பெருங்காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், பிறகாப்பியங்கள் நாவல் - தோற்றம், வளர்ச்சி,-அயல் நாடுகளில் தமிழ்.

CODE:15H303	ELC-III - ENGLISH FOR EMPLOYABILITY	SEM:III

Objectives

To expose students to the language items tested in the competitive examinations

To familiarize students with different forms of multiple choice and descriptive type questions

UNIT I

Spellings

Vocabulary – Synonyms and Antonyms

UNIT II

Spotting Errors

Errors and How to Avoid Them

UNIT III

Reading Comprehension

Jumbled Sentences

UNIT IV

Words often confused

Idioms and Phrases & Phrasal Verbs

Dialogue Writing

UNIT V

Public Speaking

Interview skills and Group Discussion

Letter Writing & CV Writing

Report Writing

General Paragraph and Essay Writing

The text book is compiled by the Members of the Dept of English.

CODE: 15BY307	CC – IV - Microbiology and Plant Pathology	SEM:III

Objectives:

To understand the classification, nutrition and growth of microbes.

To know the basic practices in microbial culture production.

To acquire information about plant diseases.

Unit I:

History of microbiology –scope of microbiology- discovery of microbes, - types of microorganisms: General characteristics of Bacteria, shape and size of bacteria – Ultra structure of bacterial cell- capsule, flagella, pili, mesosome, cell wall and endospore.

Unit II:

Outline of Bergey's classification of Bacteria, Multiplication of Bacteria, Growth curve, methods of measurement of bacterial growth, Factors affecting growth -Nutritional types of bacteria, Bacteriophage (Lambda) – structure and reproduction.

Unit III:

Methods in Microbiology- Theory and practice of Sterilization. Types of Culture media, Pure culture techniques – spread plate, pour plate and streak plate; staining techniques – simple staining, Simple-Gram's staining- Flagella, Capsular staining -Preservation of microbial cultures.

Unit IV:

Classification of plant diseases: Based on host, pathogen and symptoms. Entry of pathogen into a host.

Unit V:

Study of the following diseases; Causal organism- Symptoms- Disease cycle-Disease management.

a) Fungal disease: leaf spot disease of Ground nut.

b) Bacterial disease: leaf blight of paddy and citrus canker.

c) Viral disease: TMV

d) Phytoplasma disease: Brinjal little leaf disease

Text Books:

- *Ananthanarayanan, R. and C.K. Jayaram Paniker. 1996. Text book of Microbiology. Orient Longman, Hyderabad.*

- *Aneja, K.R. 1996. Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Cultivation. Vishwa Prakashan (New Age International (p) Ltd.) New Delhi.*
- *Pandey, B.P 1997. Plant pathology. S.Chand and Co. Ltd., New Delhi.*
- *Mehrothra, R.S. 1980. Plant pathology, Tata McGraw Hill Publishing Company Ltd., New Delhi.*

Reference Books:

- ✓ *Pelczar, M.J., E.C.S. Chan and N.R Krieg. 2010. Microbiology-Concepts and applications, Tata McGraw-Hill Publishing Company, New Delhi.*
- ✓ *Prescott, L.M., J.P. Harley, and D.A .Klein. 2002. Microbiology, McGraw -Hill Publishing Company, New Delhi.*
- ✓ *Bhatia, A.L. 2005. Handbook of Microbiology, Pointer Publishers, Jaipur.*
- ✓ *Ingram, J.L. and C.A. Ingram. 2004. Introduction to Microbiology, Thomson Books, UK*
- ✓ *Agrios, G.N.2006. Plant pathology, Fifth edition, Academic Press, New York.*
- ✓ *Singh, R.S. 2009. Plant Diseases, Oxford & IBH Publishing Co.Pvt. Ltd., New Delhi.*

CODE: 15BY308L	CC – V - Practical –II (Microbiology Plant Pathology and Cell Biology and Plant Anatomy)*	SEM:III & IV

Microbiology and Plant Pathology:

1. Preparation of culture media-sterilization technique. Inoculation and purification of microorganism-Streak plate pour plate and spread plate method.
2. Quantification of soil microbes by plating technique.
3. Motility of bacteria by hanging drop method.
4. Staining: Gram's staining, Fungal staining: lacto phenol cotton blue.
5. Study of the following diseased plant materials: a) Mildew and brown rust b) Red rot and leaf spot of Ground nut c) Citrus Canker.
6. Demonstration of the isolation of pathogen from diseased material.

Cell Biology and Plant Anatomy:

1. Cell division: Mitosis – Onion root tip squash
2. Study of cell inclusions – Starch grain from banana, rice and potato
3. Study of cell inclusions - Cystolith (Ficus leaf).
4. Study of the internal structure of Dicot root – *Vigna*
5. Monocot root- *Maize*
6. Dicot stem – *Tridax*
7. Monocot stem – *Maize*
8. Dicot leaf – *Tridax*
9. Monocot leaf- *Grass*
10. Anomalous secondary growth : *Boerhaavia* stem, *Dracaena* stem

CODE: 15BY309A	AC-IV- ALLIED CHEMISTRY-I	SEM:III

Objectives:

To learn about volumetric analysis and some bio organic compounds
To learn some separation techniques in organic chemistry.

Unit-I: Principles of volumetric analysis and quantum numbers.

1.1 Volumetric Principles –basic requirements of titration-concentration units –normality.Quantum numbers-principal, azimuthal, magnetic and spin quantum numbers and their significance.

1.2 principles governing the occupancy of electrons in various quantum levels-Pauli'sexclusion principle. Aufbau principle, Hund's rule-stability of half –filled and fully–filled orbitals.

Unit-II: Isomerism and heterocyclic compounds.

2.1 Classification of organic compounds-classification of functional groups-IUPAC-names of simple organic compounds. Isomerism-structural, chain, and position isomerism of alcohols only.

2.2 Metamerism. Steroisomerism- cis-trans isomerism- optical isomerism. Heterocyclic compounds-furan and pyridine-preparation and properties.

Unit-III: Carbohydrates and vitamins.

3.1 Carbohydrates- Glucose-preparation and properties. Sucrose-manufacture and properties.

3.2 Vitamins-Thiamine and riboflavin-occurrence and biological importance (no structural elucidation)

Unit-IV: Amino acids and proteins.

4.1 Amino acids-classification, preparation and properties. Peptides (elementary treatment). Protiens.

4.2 Biological functions of proteins-primary and structure of proteins. Purines-synthesis-classification-structure (no structural elucidation) and uses.

Unit-V: Separation technique

5.1 Solvent extraction-soxhlet steam distillation apparatus.

5.2 Chromatogrtaphy-column, paper, and thin layer chromatography.

References:

- *B.R.Puri, L.R.Sharma, principles of inorganic chemistry, S.Ninchand& Co., Jalandhar, 1982.*
- *B,S.Bahl, Arunbhal, A text book Organic Chemistry, S.Chand&Company Ltd. New Delhi, 16th edition,2001.*
- *I.L.Finar, Organic Chemistry, ELBS and Longman Group Ltd, London, 6th edition, 1973.*

Text Books:

- ✓ *B.R.Puri& L.R. Sharma, Principles of physical chemistry (16th edition), shobanLalNaginchand&Co., New Delhi (2000).*
- ✓ *B.R.Puri, L.R.Sharma, principles of inorganic chemistry, S.Naginchand& Co., Jalandhar, 1982.*
- ✓ *B,S.Bahl, Arunbhal, A text book Organic Chemistry, S.Chand&Company Ltd. New Delhi, 16th edition,2001.*
- ✓ *I.L.Finar, Organic Chemistry, ELBS and Longman Group Ltd, London, 6th edition, 1973.*

CODE: 15BY310L	AC-V-Allied Chemistry Practical	SEM:III & IV

Objectives:

To learn different titrimetric methods

To study the basics of organic analysis

I.VOLUMETRIC ANALYSIS

1. Acidimetry - Alkalimetry

a) Strong acid Vs strong base

b) Weak acid Vs strong base

c) Determination of Hardness of water

2. **Permanganimetry**

A) Estimation of Ferrous sulphate using $KMnO_4$

B) Estimation of Oxalic acid using $KMnO_4$

3. **Iodometary**

a) Estimation of Copper using thiosulphate

b) Estimation of $K_2Cr_2O_7$ using thiosulphate

c) Estimation of $KMmO_4$ using thiosulphate

II.ORGANIC ANALYSIS

A study of reactions of the following organic compounds

1. *Acid 2. Phenol 3. Aldehyde 4.Ketone 5.Carbohydrate 6.Amine 7.Amide.*

The students may be trained to perform in specific reactions like test for element Nitrogen only) Aliphatic or Aromatic, daturated or Unsaturated and Functional group present and record their observations.

References:

- *V.Venkateswaran, R.Veeraswany and A.R.Kulandaivelu, basic principles of practical chemistry sultan chand& sons, New Delhi, second Edition (1977).*
- *ARTHUR I.VOGEL, Elementary practical chemistry Quantitative analysis, CB publishers and distribution, 6th edition,2000.*

CODE: 15XBY32	SKBC-II- Mushroom culture Techniques	SEM:III

Objectives:

To acquire the basic knowledge and develop suitable skills involved in mushroom cultivation.

To realize the nutritive and medicinal value of mushrooms.

To study the common cultivation methods for mushrooms.

Unit I:

Mushrooms-Introduction- Edible, non-edible mushrooms and medicinal mushrooms. Morphology and internal structure of mushrooms. Favourable conditions for mushroom cultivation, different applications and importance of mushrooms.

Unit II:

Mushroom- seed-spawn, spawn production-types, compost and substrate preparation, methods of spawning. Isolation and pure culturing methods-required media and maintenance of cultures. Commercial cultivation of mushrooms: *Agaricus* and *Pleuorotus*.

Unit III:

Storage and nutrition: Short-term storage and Long term Storage (canning, pickels, papads), drying, storage in salt solutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fiber content - Vitamins.

Unit IV:

Mushroom Cultivation, Farm design & Harvesting - Button Mushroom, Paddy Straw Mushroom and Oyster mushroom, Preservation & Processing of Mushrooms, mushroom recipes.

Unit IV:

Disease of Mushrooms – Bacterial diseases and Fungal diseases, Physiological factors, Insect Pest & Nematodes, Marketing of mushroom products.

Text Books:

- *Nita Bahl. 1996, Hand Book on Mushrooms. Oxford and IBH Publishing Company Ltd., New Delhi.*

- *Kapoor, J.N. 1989. Mushroom Cultivation, ICAR, New Delhi.*
- *Aneja, K.R.1993. Experiments in Microbiology, Plant pathology, Tissue culture and mushroom cultivation, Wishwa Prakashan, New Age International (P) Ltd., New Delhi.*
- *Chang,S. and Miles, P.G. 2004. Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact, CRC Press online.*

CODE:15GS	GS-Gender Studies (Self study)	SEM:III

Objectives:

To make boys and girls aware of each other's strengths and weakness.

To develop sensitivity towards both genders in order to lead an ethically enriched life.

To promote attitudinal change towards a gender balanced ambience and women empowerment.

Unit-I : **Concepts of Gender**

Sex – Gender- Biological Determination – Patriarchy -Feminism- Gender Discrimination- Gender Division of Labour – Gender Stereotyping- Gender Sensitivity – Gender Equity – Gender Equality- Gender Mainstreaming – Empowerment.

Unit –II: **Women's Studies vs. Gender Studies**

UGC's Guidelines –VII to XI Plans – Gender Studies: Beijing Conference and Convention on the Elimination of All forms of Discrimination against Women (CEDAW) - Exclusiveness and Inclusiveness

Unit –III: **Areas of Gender Discrimination:**

Family – Sex ratio – Literacy - Health – Governance- Religion- Work Vs Employment –Market-Media –Politics –Law – Domestic Violence-Sexual Harassment – State Policies and Planning.

Unit –IV: **Women Development and Gender Development**

Initiatives- International Women's Decade – International Women's Year –National Policy for Empowerment Year 2001 – Mainstreaming Global Policies.

Unit –V : Women's Movement and Safeguarding Mechanism in India

National Commission for Women (NCW) – All Women Police Station- Family Court- Domestic Violence Act – Prevention of Sexual Harassment at Work Place- Supreme Court Guidelines – Maternity Benefit Act –Pre-natal Diagnostic Act - Hindu Succession Act 2005- Eve Teasing Prevention Act – Self Help Group -73rd and74 th Amendment Act for PRIS.

Book for Study:

- *N.Manimekalai and S.Suba –Gender Studies- Bharathidasan University- Trichirappalli-620024.*

Reference Books:

- ✓ *V.S. Gurusamy- Empowerment of Women in India – New Century Publications-New Delhi-First Edition-2008.*

CODE: 15T404	LC-IV-செய்யுள் (பழந்தமிழ் இலக்கியம்), நாடகம், தமிழ் இலக்கிய வரலாறு, கட்டுரை வரைவியல்	SEM:IV

அலகு – 1

குறுந்தொகை – 05 பாடல்கள்

1. "நள்ளென் றன்றே ....." (பாடல் எண்- 6)
2. "கழனி மாஅத்து விளைந்துகு ...." (பாடல் எண் -8)
3. "கான மஞ்ஞை ..." (பாடல் எண் - 38)
4. "யாயும் யாயும் ....." (பாடல் எண் - 40)
5. "கடும்புனல் தொடுத்த ..." (பாடல் எண் - 103)

ஐங்குறுநூறு – மருதம் - வேழப் பத்து -10 பாடல்கள்

அகநானூறு - 05 பாடல்கள்

1. "அன்னாய வாழிவேண் டன்னை ...." (பாடல் எண் - 68)
2. "சிலம்பிற் போகிய ..." (பாடல் எண் - 302)
3. "பெரும் பெயர் மகிழ்ந பேணா ..." (பாடல் எண் - 306)
4. "நீலத் தன்ன நீர்பொதி ..." (பாடல் எண் - 314)
5. "சாரல் யாஅத்து உயர்சினை ..." (பாடல் எண் - 337)

புறநானூறு - 05 பாடல்கள்

1. "நளியிரு முந்நீர் ஏணியாக ..." (பாடல் எண் 35)
2. "பாணன் சூடிய..." (பாடல் எண் 141)
3. "உற்றுழி உதவியும்...." (பாடல் எண் 183)
4. "கேட்டன் மாத்திரை யல்லதி யாவதும்...." (பாடல் எண் 216)
5. "யாதும் ஊரே..." (பாடல் எண் 192)

அலகு – 2

திருக்குறள் 2 அதிகாரங்கள் -- ஊக்கமுடைமை , அவையடக்கம்

இனியவை நாற்பது – 10 பாடல்கள்

1. கற்றல் சான்றோரைச் சார்தல் - (பாடல் எண் 1)
2. அன்பும் நிலவும - (பாடல் எண் -9)
3. குழந்தை அவையஞ்சாமை–(பாடல் எண்-12)
4. கற்றது உரைத்தல் பழகுதல் (பாடல் எண் -16)
5. துறவிகளின் இயல்பு - (பாடல் எண்-18)
6. புறங்கூறாமை (பாடல் எண் - 19)
7. வழங்கல் நல்லோராய் வாழ்தல் (பாடல் எண் -22)
8. செய்ந்நன்றி அடைக்கலம் வெளவாமை (பாடல் எண் -30)
9. இரவுப்பயணம், நற்பேச்சு வேண்டா நட்பு (பாடல் எண் -34)
10. கல்விக்கு நிகரான இனியது இல்லை (பாடல் எண் - 40)

நல்வழி – 10 பாடல்கள் (பாடல்

1. காலம் அறிந்து செய்க (பாடல் எண் -4)
2. பேராசை கூடாது – (பாடல் எண் - 6)
3. குடிபிறந்தார் வறுமையிலும் உதவுவார் (பாடல் எண் -9)
4. சிவாய நமவென்று - (பாடல் எண் - 15)
5. உயர் நோக்கம் இன்மை – (பாடல் எண் -19)
6. வஞ்சனை யில்லார்க்கு வாழ்வு சிறக்கும் - (பாடல் எண்- 21)
7. மன அமைதி வேண்டும் - (பாடல் எண் -28)
8. பொருள் இருக்கும் போதே அறம் செய்க (பாடல் எண்-32)
9. வன்சொல்லும் இன்சொல்லும் - (பாடல் எண்-33)
10. உண்மை நிலை – (பாடல் எண் 38)

திரிகடுகம்– 10 பாடல்கள்

1. "கல்லார்க்கு இன்னாய..."(பாடல் எண் - 3)
2. "தொல்லவையுள் தோன்றுங் ..."(பாடல் எண் - 8)
3. "பெருமை யுடையா..." (பாடல் எண் - 9)
4. "கணக்காயர் இல்லாத..."(பாடல் எண் – 10)
5. "விளியாதான் கூத்தாட்டுக்..."(பாடல் எண் – 11)
6. "ஆசை பிறன்கட்..."(பாடல் எண் – 20)
7. "சிலசொற் பெருந்தோள்...."(பாடல் எண் - 47)
8. "காவோ டறக்குளந்..."(பாடல் எண் – 70)
9. "கயவரைக் கையிகந்து ..." (பாடல் எண் - 77)
10. "பத்திமை சான்ற..."(பாடல் எண் - 100)

அலகு – 3 நாடகம்

பாடநூல் - பிசிராந்தையார் - பாரதிதாசன், தமிழ் நாதன் பதிப்பகம், சென்னை – 110

அலகு – 4 தமிழ் இலக்கிய வரலாறு

சங்க காலம் - சங்க இலக்கியங்கள், சங்க காலம் பொற்காலம்,சங்க மருவிய காலம் - கீழ்க்கணக்கு நூல்கள் தொல்காப்பியம்,அகத்தியம், பிற்காலப் புலவர்கள், நாடகம் தோற்றம் வளர்ச்சி.

அலகு – 5 கட்டுரை வரைவியல் - பொதுக்கட்டுரை

பாடநூல் - பொதுக்கட்டுரைகள், மகிழினி பதிப்பகம், சென்னை-106.

<u>பாடநூல்கள்</u>

செய்யுள் திரட்டு (நான்கு பருவங்கள்), தமிழ்த்துறை வெளியீடு.

தமிழ் இலக்கிய வரலாறு, மு.அருணாசலம், இராஜா வரதராஜா, அருண் பதிப்பகம், திருச்சி-1. (2017-2018 கல்வியாண்டுக்கு).

CODE: 15H404	ELC-IV – English Through Literary Texts	SEM:IV

Objectives:

To expose students to the creative use of the English language and make them appreciate it

To familiarize students with various forms and styles of writing in English

UNIT I --- British Poetry

1.Incident of the French Camp – *Robert Browning*

2. Ozymandias – *P.B.Shelley*

3.Lotus Eaters – *Alfred Tennyson*

UNIT II --- Indian Poetry in English

1.Where the Mind is Without Fear – *Rabindranath Tagore*

2.Very Indian Poem in Indian English – *Nissim Ezekiel*

3.On Killing a Tree – *Gieve Patel*

UNIT III --- American Poetry

1.Brahma – *Ralph Waldo Emerson*

2.Stopping by Woods on a Snowy Evening – *Robert Frost*

3.Strange Meeting – *Wilfred Owen*

UNIT IV --- Poetry from the Third World and Indian Fiction

Australia – *A.D.Hope*

Telephone Conversation – *Wole Soyinka*

Five Point Someone – *Chetan Bhagat*

UNIT V --- One Act Plays

The Rising of the Moon *by Lady Gregory (One-act play)*

Little Man *by John Galsworthy (One-act play)*

Seven Slaves – *A.Ball (One-act play)*

CODE: 15BY411	CC- VI - Cell Biology and Plant Anatomy	SEM:IV

Objectives:

To know the components and structure of plant cell.

To understand the internal structure and organization of the various parts of the plant.

Unit I:

Difference between plant and animal cell -Ultra structure of plant cell – structure of cell wall, Plasma membrane – Fluid mosaic model. Structure and function of cytoplasmic organelles: Cytosol – cytoskeleton organization — endoplasmic reticulum, peroxisomes, lysosomes, vacuoles, ribosome, golgi apparatus, ergastic substances.

Unit II:

Mitochondria –Plastids – Ultra structure of chloroplasts, structure and function. Nucleus – structure and function. Structure of chromosome – Euchromatin, heterochromatin, abnormal structure in chromosome – lampbrush and polytene structures. Cell cycle – mitosis – meiosis.

Unit III:

Meristematic tissues – Characters and types – structure and function of apical meristems – root apex and shoot apex. Theories of meristems - Tunica Corpus Theory. Structure and function of simple– parenchyma, collenchyma, sclerenchyma. Secretary tissues.

Unit IV:

Primary structures of dicot root (*Vigna*), monocot root (*Maize*), dicot stem (*Tridax*), monocot stem (*Maize*), dicot leaf (*Tridax*) and monocot leaf (*Polyanthus*).

Unit V:

Secondary growth: normal secondary growth in dicot stem and root. Anomalous secondary growth in *Nyctanthes*, *Boerhaavia* and *Dracaena*. Nodal anatomy: unilacunar node (*Polyalthia*), trilacunar node (*Azadirachta*) and multilacunar node (*Aralium*).

Text books:

- *Becker, W.M., L.J. Kleinsmith and J. Hardin, 2011. The World of the Cell, Dorling Kindersley (India) Pvt. Ltd., New Delhi.*

- *Verma P.S. and V. K. Agarwal, 2006. Cytology, S. Chand and Co. Ltd., New Delhi.*
- *Pandey, B.P. 2010. Plant Anatomy, S. Chand and Co. Ltd., New Delhi.*
- *Vashista P.C., 1986. Plant Anatomy, Pradeep Publications, Jalandhar, India.*

Reference Books:

- *Fahn, A. 1990. Plant Anatomy, Pergman press, Oxford, London.*
- *Prakash, E.J.J. 1987. A text book of Plant Anatomy, Emkay Publications, New Delhi.*
- *Pandey, S. N. and A. Chandha. 2009. Plant Anatomy and Embryology, Vol III, Vikas Pub. House Ltd., New Delhi.*

CODE: 15BY412A	AC- VI – Allied Chemistry -II	SEM:IV

Objectives:

To learn interhalogen compounds and Co-Ordination compounds
To study some biological molecules.

Unit-I: Chemical bonding and interhalogen compounds.

1.1 Molecular orbital theory –bonding, antibonding and non bonding orbital's. Molecular orbital's Molecular orbital configuration of H_2, N_2, O_2, F_2,bond order, diamagnetism and paramagnetism.

1.2 ICl, BrF_3, IF_7-preparation, hybridization, structure and shape.

Unit-II: Coordination and industrial chemistry.

2.1 Nomenclature of mononuclear complexes-Werner and sidgwick theories, Chelation examples.

2.2 Biological role of hemoglobin. Fuel gases-natural, water gas, carburatted water gas, producer gas and LPG.

Unit-III: Chemotheraphy and Water chemistry.

3.1 Chemotherapy:-sulpha drugs-sulpha pyridine, sulphathiazole and sulphadiazine-structural formula and use only. Antibiotics'-Pencillin-G and Chloromycetin-structural formula and use only.

3.2 Water chemistry: Hard water and soft water-Temporary and permanent hardness-purification methods-Desalination.

Unit-IV: colloids and catalysis.

4.1 Colloids-Types-properties-Tyndall effect-Brownian movement-Electrophoresis-Electro osmosis.

4.2 Catalysis- Homogeneous and Heterogeneous catalysis- types of catalysis , promoters and poisons -Enzyme catalysis. Definition of P^H –Determination of P^H by calorimetric methods.

Unit-V : Polymer chemistry

5.1 An introduction to polymers and macromolecules. Natural and synthetic polymers.

5.2 Classification of polymers –addition and condensation polymers. General methods of preparation of polymerization through function

groups (step growth), multiple bonds (chan growth) and ring opening.

5.3 Coordination polymerization. Mechanisms of free radical, cationic and anionic polymerization reactions.

Text Books

1. J.D.Lee, Concise Inorganic Chemistry, 5th edition, Blackwell sciene, London 1996.
2. Puri and Sharma. Principles of physical chemistry.40th edition.2003.
3. I.L.Finar, Organic Chemistry, ELBS 1990.
4. Polymer Science, V.R.Gowariker, N.V.Viswanathan and J.Sreedhar, Wiley Eastern.

References:

1. *B.R.Puri, L.R.Sharma, principles of inorganic chemistry, S.Naginchand& Co., Jalandhar, 1982.*
2. *B,S.Bahl, Arunbhal, A text book Organic Chemistry, S.Chand&CCompany Ltd. New Delhi, 16th edition,2001.*
3. *I.L.Finar, Organic Chemistry, ELBS and Longman Group Ltd, London, 6th edition, 1973.*
4. *Gurdeep Raj, Advanced Physical chemistry, Goel publishing House, Meerut,2002.*

CODE: 15SSC	SSC-Soft skills course	SEM-IV

Objectives:

"Soft skills" or behavioral skills are those that are crucial to an employee's ability to work "smarter". A survey of employers has revealed a list of specific "soft skills" that they believe as essential for employees. The skills most frequently mentioned for fresh entrant engineers are English communication, knowing how to learn; competence in reading, writing, effective listening and oral communication skills; grammar and vocabulary; and initiative; interpersonal skills; the ability to work in teams, Knowledge of industry.

Unit I

Importance of Spoken English: Indian and Global Context; Native and NonNative Accents of English and Issue of Intelligibility

• Aspects of English Pronunciation: Individual sounds: Vowels and Consonants

Unit II

• Features of Connected Speech: Word Stress, Rhythm and Intonation

• Fluency in Spoken English: Rate of Speaking, Volume of Voice, Pitch, Articulation, Clarity of Expression, Lack of Hesitation, Confidence

• Speaking Politely in English: Use of Can, Could, May, Might, Will, Would,

Expressing Requests, Gratitude, Compliments, Agreement, Disagreement

Unit III

Definition and Functions of Communication, Types of Communication:

Interpersonal (Dyadic), Group Communication, Mass Communication

• Maxims of Good Conversation

Unit IV

• Characteristics of Competent Speaker

• Styles of Speaking

• Interview and Group Discussion

Unit V

• Speaking with Confidence: Speech Anxiety, Ways to Overcome Speech Anxiety, Building Credibility as a Speaker: Competence, Character, Charisma

Situational Conversations: Meeting People, Greetings, Introducing Yourself, Introducing People, Saying Thanks.

CODE: 15BY513	CC – VII - Plant Embryology and Tissue culture	SEM :V

Objectives:

To provide students with a fundamental understanding of study about plant embryology

To familiarize the students with the basic principles and techniques in tissue culture

To know about the various techniques employed in plant tissue culture

Unit I:

structure and development of anthers- Microsporangium-Development of male gametophyte. Structure and development of Megasporangium-female gametophyte, Structure and types of Ovule.

Unit II:

Fertilization: types of fertilization (Porogamy, Chalazogamy and Mesogamy), Process and significance of double fertilization, Post fertilization changes, Endosperm: Types-Nuclear, Cellular and Helobial, Embryo: Structure and development - Monocot embryo-*Luzula*, Dicot embryo-*Capsella*-Polyembryony.

Unit III:

History of plant cell and tissue culture, Nutrient media: Composition of commonly used culture media. The concept of totipotency of cells, Role of plant growth hormones in tissue culture, various types of cultures: callus, cell suspension.

Unit IV:

Micropropagation, Organogenesis - formation of shoot and root, Somatic embryogenesis - Process of somatic embryogenesis, Synthetic seeds-applications.

Unit V:

Plantlets from haploids, Protoplast isolation and fusion and regeneration, Applications of tissue culture in forestry, horticulture, agriculture and pharmaceutical industry.

Text books:

- *Rahavan, V. 1976. Experimental Embryogenesis in Vascular plants, Academic Press, London.*
- *Maheswari, P. 1963 An Introduction to Embryology of Angiosperms, International Society of Plant Morphologies, University of Delhi.*
- *Smith, R. H. 1992. Plant Tissue Culture: Techniques and Experiments, Academic Press, San Diego*
- *Gupta, P. K. (2000). Elements of Biotechnology, Rastogi Publications, Meerut.*
- *Dubey, R. C. 2001. A text book of biotechnology, S Chand & Co., New Delhi.*
- *Ignacimuthu, S. J. 2003. Plant Biotechnology, Oxford & IBH Publishing, New Delhi.*
- *John Jothi Prakash, E. 2005. Outlines of Plant Biotechnology, Emkay Publishers, New Delhi.*
- *Kalyankumar De. 2008. Plant tissue culture, New Central Book Agency, Calcutta.*

Reference books:

- ✓ *Bhojwani, S. S. and Razdan, M. K. 2004. Tissue Culture: Theory and Practice, Elsevier, New Delhi.*
- ✓ *Purohit, S. S. 2010. Plant tissue culture, Student edition, S.S. Publication, Jodhpur.*
- ✓ *Smith, R. 2012. Plant Tissue Culture, Techniques and Experiments, Third Edition, Academic Press, Sandiego.*
- ✓ *Bhojwani, S. S. and P.K. Dantu. 2013. Plant Tissue Culture: An Introductory Text, Springer, India.*

CODE: 15BY514	CC – VIII - Morphology and Taxonomy of Angiosperms	SEM:V

Objectives:

- *To learn the systematic classification of angiosperms and to get acquainted with the local flora.*
- *To learn the principles of Systematics.*

Unit- I:

Morphology – Modifications of tap root and fibrous root system – Modification of stem – aerial and underground stem – Modification of leaf; Inflorescence types – Racemose, Cymose, mixed and special types. Fruits – simple, aggregate and multiple fruits.

Unit- II:

Binomial Nomenclature, Herbarium technique – Classification – Bentham & Hooker (**1862–1883**) - ICBN and its role, Botanical survey of India (BSI) - National herbarium– Regional Centers and their role.

Unit- III:

Study on the key features, vegetative and floral characters of the following families of Polypetalae and their economic importance 1.Annonaceae, 2. Capparidaceae, 3. Rutaceae, 4. Ceasalpiniaceae, 5. Cucurbitaceae.

Unit- IV:

Study on the key features, vegetative and floral characters of the following families of Gamopetalae and their economic importance 6. Sapotaceae, 7. Convolvulaceae, 8.Asclepiadaceae, 9. Acanthaceae, 10. Lamiaceae.

Unit- V:

Study on the key features, vegetative and floral characters of the following families of Monochlamydeae and Monocotoyledons with their economic importance 11. Amaranthaceae 12. Euphorbiaceae, 13. Orchidaceae, 14. Lilliaceae,15. Poaceae.

Text Books:

- *Venkateswarlu, V. 1982. External morphology of Angiosperms, S.Chand and Co.Ltd., New Delhi.*
- *Narayanswami, R.V., K.N. Rao and A.Raman. 1992. Outlines of Botany, S.Viswanathan Printers and Publishers, Chennai.*
- *Singh, V. and K.Jain. 1991. Taxonomy of Angiosperms, Rastogi Publications, Meerut.*
- *Vasishta, P.C.1992. Taxonomy of Angiosperms, R.Chand and Co. Ltd., New Delhi.*
- *Lawrence, G.H.M. 1951. Taxonomy of Vascular plants. The Mac-Millan Co., New York.*
- *Heywood, V.K. 1967. Plant Taxonomy Edward Arnold Pub. Ltd., London.*

Reference Books:

- ✓ *Sharma, O.P. 2009. Plant Taxonomy, Tata McGraw-Hill publishers, New Delhi.*
- ✓ *Pulliah, T. 2007. Taxonomy of Angiosperms, Third Edition, Regency Publication, New Delhi.*
- ✓ *Tod, F. Stueesy, 2009. Plant Taxonomy; the systematic evaluation of comparative data. Colambia Uni. Press. NewYork.*
- ✓ *Stace, C.A. 1980. Plant Taxonomy and Biosystematics, Edward Arnold Publishing Limited, London.*

CODE: 15BY515	CC – IX - Biochemistry and Plant Physiology	SEM:V

Objectives:

To introduce to the students, the structure and properties of various biomolecules.

To help the students learn the various biotechniques

To help the students acquire the basic knowledge on the processes of plant functions.

To make the students realize the importance of inter relationship between all plant physiological processes.

Unit I:

Biochemistry: definition and scope. Biomolecules and Biomacromolecules (Brief account). Carbohydrates – Classification – structure and properties of mono, di, tri saccharides. Starch and cellulose-structure and function. Lipids – Classification – Properties – saturated and unsaturated fatty acids.

Unit II:

Amino acids – classification – properties – basic structure. Protein structure: primary, structures – classification and properties, functions of protein. Secondary metabolites – alkaloids. terpenoids and flavonoids (a brief account). Enzymes - classification – physico-chemical properties – mechanism of enzyme action-facors affecting enzyme action – theories of enzyme action – enzyme activation and inhibition – co enzymes and isoenzymes. Enzyme regulation: Allosteric enzymes with coenzyme function.

Unit III:

Absorbtion of water – imbibition, diffusions, osmosis, plasmolysis. Mechanism of water absorbtion – osmotic theory, Non –osmotic theory and Passive theory. Ascent of sap: Apoplast and symblast - Transpiration: Types- stomatal, cuticular and lenticular –factors affecting transpiration – Guttation - Solute Translocation- Evidences and theories. Mineral nutrition: role of minerals in plants- major, minor and trace elements active and passive absorption of minerals.

Unit IV:

Photosynthesis: Chloroplast pigments- Photosystem I & II- quantum yield- Red drop effect and Emerson enhancement effect- Hill reaction- Z scheme of Photosynthesis- cyclic and non-cyclic photophosphorylation- Calvin & Benson (C3) cycle- C4 cycle and CAM pathway, factors affecting photosynthesis – photorespiration (in brief).

Unit V:

Respiration: aerobic respiration – Glycolysis – TCA cycle – Oxidative Phosporylation. Factors affecting respiration - Biological nitrogen fixation: asymbiotic and symbiotic. Growth regulators – Physiological effect of auxins, gibberellins, cytokinins and ethylene. Physiology of flowering- photoperiodism, vernalization. Seed dormancy – Factors affecting seed dormancy.

Text Books:

- *Lea, P.J and Leegood, R.C. 2001. Plant Biochemistry and Molecular Biology, 2nd Ed. John Wiley and Sons Ltd., England.*
- *Jain, J. L. 2000. Fundamentals of Biochemistry. S. Chand & Co. Ltd., New Delhi.*
- *Satyanarayana, U. and U. Chakrapani, 2013. Biochemistry. Elsevier Co-published with Books and Allied Press, New Delhi*

Reference Books:

- ✓ *Nelson, D. L. and M. M. Cox. 2008. Lehninger Principles of Biochemistry. W. H. Freeman Publishers, New York.*
- ✓ *2. Berg, J. M., J. L. Tymoczko and L. Stryer, 2010. Biochemistry, W. H. Freeman Publishers, New York.*

CODE: 15BY516L	CC – X - Practical –III (Plant Embryology and tissue culture , Morphology and Taxonomy of Angiosperms, Biochemistry and Plant Physiology)	SEM:V

Objectives:

To impart training on the physiological, biochemical, genetical and embryological techniques.

Plant Embryology and Tissue Culture

1. Demonstration of Murashige and Skoog's medium
2. Explant preparation
3. Isolation of protoplast from leaves
4. Study of different types of pollen grains
5. Dissection of endosperm haustoria – *Cucumis*
6. Dissection of embryo – *Tridax*

Morphology and Taxonomy of Angiosperms

1.Study on the morphological and floral characters of the following families using Gamble flora

(a) Annonaceae, (b) Sapotaceae, (c) Amaranthaceae, (d) Capparidaceae, (e) Convolvulaceae

(f) Euphorbiaceae, (g) Rutaceae, (h) Asclepiadaceae, (i) Orchidaceae, (j) Ceasalpiniaceae (k)Acanthaceae, (l) Amaryllidaceae, (m) Cucurbitaceae, (n) Lamiaceae, (o)Poaceae

2. Field trip for Preparation of Herbarium (10 sheets)

Biochemistry and Plant Physiology

1. Quantitative tests for sugars. 2. Quantitative tests for proteins. 3. Qualitative analysis of amino acids

4. Enzyme activity – Amylase. 5. Preparation of buffer solution. 6. Measurement of pH

7. Demonstration of osmosis by potato osmoscope. 8. Demonstration of water potential by gravimetric method.

9. Demonstration of water potential by falling drop method.

10. Effect of CO_2 concentration on photosynthesis. 11. Determination of stomatal index.

CODE: 15BY517a	EC-I- Bioinstrumentation	SEM:V

Objectives:

To learn basic and necessary laboratory techniques and their principles and applications.

Unit- I:

General safety -Basic principles - operating mechanism and applications of autoclave, hot air oven, laminar air flow, pH meter and Incubator.

Unit- II:

Basic principles and applications of spectroscopy, colorimeter, light microscopy, SEM and TEM and centrifuge

Unit- III:

Electrophoresis- SDS PAGE, Agarose gel electrophoresis- Basic principles, components and applications of chromatography- Paper, TLC, GC.

Unit- IV:

Basic principles of Polymerase chain reaction-Southern blotting- Northern blotting- Western blotting.

Unit- V:

Basic principles and general methods- freezing of tissues, storage, thawing, reculture of frozen materials- Vitrification- Lyophilization.

Text Books:

- ✓ *1.R.C. Dubey, A text book of Biotechnology, S. Chand and Company Ltd. 2006.*
- ✓ *2.Manipal Singh Shekhawat, Plant cell and tissue culture, Saras Publication, 2010.*

CODE: 15BY517b	EC-II - PLANT TISSUE CULTURE	SEM:V

Objectives:

To understand the organization and functioning of tissue culture laboratory

To learn techniques of plant tissue culture.

Unit- I:

Introduction - History of plant culture - Laboratory organization - Tools and techniques of plant tissue culture.

Unit- II:

Sterilization- methods of sterilization- media preparation- Plant Growth Regulators (PGR), Macro & Micro nutrients, Vitamins and its role in tissue culture. Inoculation - Methodology & precautions.

Unit- III:

Culture initiation- Explant- Totipotency- Dedifferentiation- Re differentiation- Various types of culture- Callus culture, Cell culture, Anther culture, Meristem culture. Organogenesis- Direct & Indirect.

Unit- IV:

Micropropagation- Methods of micro propagation, somatic embryogenesis- Plant protoplast- Isolation, culture and Somatic hybridization, Secondary metabolites of plants, elicitors.

Unit- V:

Bio-transformation- Bio reactor- Cell immobilization- Synthetic seed technology, Importance and application of tissue culture- impacts on industry, forestry, agriculture and horticulture.

Text Books:

- *Mahipal Shingh Shekawat, Plant cell and Tissue culture, Saras Publication, 2010.*
- *R. C. Dubey A text book of Biotechnology, S. Chand and Company, 2006.*

CODE: 15BY5Na	NMEC - GARDENING	SEM:V

Objectives:

To acquire knowledge about different components of home garden.

To learn about Indoor garden, Bonsai and Kitchen garden

Unit I:

Garden implements and tools. Spade – Sprayer, Pruning scissors, Digging Fork, Garden rake, Tiller, Pick axe.

Unit II:

Ornamental garden and its components: Climbers & creepers, trees,shrubs, rock garden, water garden, Hedges & Edges. Lawn, Flower beds,Path, Indoor, garden-Choice of plants and Maintenance.

Unit III:

Garden and its parts, Hedges, Edges, Tress, Flowers beds, Lawn, Shrubs, Climbers and Creepers, Paths Arches, Pergola, Rockery, Carpet beds, Topiary, Trophy Green house .

Unit IV:

Garden plants – Annuals, Biennials and Perennials. Shrubs, Tress, Climbers, Succulents, Cacti, Ferns, Gymnosperm, plants, orchids.

Unit V:

Bottle garden-Hanging pots- Bonsai- Kitchen garden: Layout and choice of plants-Flower arrangement; Different designs and do‘s and don‘ts – Dry flower preparation and arrangement- Preparation of Greeting cards.

Text Books:

.Rao, K.M.1991. Text book of Horticulture. Mac Millan India Ltd. New Delhi.

- *V. Kumarsan, Horticulture and Plant breeding, Saras Publication, 2009.*
- *Pratibha P Trivedi, Home Gardening, Indian council of Agricultural Research,New Delhi, 1983.*

CODE: 15BY5Nb	NMEC - Horticulture	SEM:V

Objectives:

To know the basic aspects of horticulture

To learn the methods of propagation

Unit I:

Importance of horticulture- Classification of horticultural crops - Garden implements- Transplanting- Pruning and Training- Irrigation methods- Manure: Types and application.

Unit II:

Propagation techniques: Separation or division- Cutting: Root, Stem, Leaf cutting. Layering- Ground and Air layering, Grafting-Detached scion grafting, Approach grafting, Repair grafting - Budding

Unit III:

Ornamental garden and its components: Climbers & creepers, trees, shrubs, rock garden- water garden- Hedges & Edges, Lawn, Flower beds preparation, Path- Indoor garden: Choice of plants and Maintenance-Bottle garden, Hanging pots, Bonsai, Kitchen garden, Layout and choice of plants.

Unit IV:

Flower arrangement: methods and different designs, colour scheme, Ikebana, Dry flower preparation: techniques &arrangement-Greeting card making processing of horticulture crop products-Jam, Jelly, Squash, Tomato ketchup, Citrus Pickle.

Text Books:

- *Rao,K.M.1991. Text book of Horticulture, Mac Millan India Ltd., New Delhi.*
- *Vishnu Swarup, 1999. Ornamental horticulture. Mac Millan India Ltd,, New Delhi.*
- *Chandha,K.L 2001. Hand book of Horticulture, New Delhi.*
- *Kumar, N. 1994. Introduction to Horticulture. Rajalakshmi Publications, Nagarcoil.*
- *Randhawa, G.S. and A. Mukhopadhyay. 1986. Floriculture in India. Allied Publishers Pvt. Ltd., Ahamedabad.*
- *Sadhu, M.K. 1996. Plant propagation. New age international publishers, New. Delhi.*

- *Sing.B.D.2009. Plant breeding principles and methods. Kalyani Publishers, New Delhi.6th revised ed.*
- *Sinha,V and Sunita sinha., 1990. Cytogenetics, Plant breeding and Evolution,Vikas Publishing Home Pvt.Ltd.*
- *Sundararaj, D., D, G.Thulasidas and M.Stephan Dorairaj. 1997. Introduction to cytogenetics and plant breeding, Popular Book Depot., Chennai.*

Reference Books:

- ✓ *Adariana, ,F.R.W. and Brison. 1979. Propagation of Horticultural plants, Tata Mc Graw-Hill Publishing Company Ltd., New Delhi.*
- ✓ *Acquaah, G.1999. Horticulture, Principles & Practices, Prentice Hall, New Jersey.*
- ✓ *Prasad and Kumar,U. 2005. Commercial Floriculture, Agrobios (India). Jodhpur.*
- ✓ *Pohelman J.M. and Borthakur.D.1969. Breeding Asian field crops, Oxford & IBH publishing Co. New Delhi.*

CODE: 15BY618L	CC – XI - Practical –IV (Ecology and conservation Biology, Genetic and Evolution, Biotechnology)	SEM:VI

Ecology and Conservation Biology:

1. Study of plant community by Quadrat method.
2. Determination of dissolved oxygen in the given water sample.
3. Determination of chlorides in the water sample.
4. Study of morphology and anatomy of hydrophytes: Nymphaea petiole, Hydrilla, Opuntia.

Genetics and Evolution:

1. Monohybrid cross and Test cross.
2. Dihybrid cross and incomplete dominance.
3. Interaction of genes: 9:7 and 9:3:4.
4. Interaction of genes: 12:3:1 and 15:1.1

Biotechnology:

1. Isolation of genomic DNA from Onion
2. Demonstration of wine fermentation – estimation of ethanol
3. Yeast biomass estimation by turbidity method
4. Cell counting using haemocytometer
5. Antibiotic disc diffusion using cultures of *Penicillium* and actinomycetes
6. Amylase production using fungi (Plate assay)

CODE: 15BY619	CC – XII - Ecology and Conservation Biology	SEM:VI

Objectives:

To understand the concept and varying features of ecosystem and biodiversity

To know about organisms and their interaction with the environment

To learn the principles and basic methods of conservation of biodiversity

Unit I:

Ecology – Introduction, concept and scope. Ecosystem –types- aquatic, terrestrial Components and their interrelationships; Food chain, Food web; Energy flow in ecosystems, Ecological pyramid models; biogeochemical cycles – Carbon cycle and nitrogen cycle.

Unit II:

Ecological succession – Definition and terminologies – Hydrosere and Xerosere; Autecology –Plant adaptations (External and internal morphology only) – Hydrophytes and Xerophytes, Synecology - Interrelationships among organisms – Mutualism and Parasitism, Methods of vegetation analysis – Quadrat method – frequency, density, abundance.

Unit III:

Pollution – Categories – Causal factors, effects and control measures – Air pollution, water pollution and noise pollution; Global Warming and Green House effect, Climate Change .

Unit IV:

Biodiversity – Scope of the study – Components and Categories of biodiversity; Diversity Hotspots – Hotspots in India, Biodiversity values – Consumptive, productive, ethnobotanical values.

Unit V:

Biodiversity conservation – Categories – *In-situ* and *ex-situ* methods: Reserve forests, National Park, Wildlife sanctuaries – *Ex-situ* methods: Botanical garden, seed bank, IUCN Red Data Book – Forest Protection Act and Biodiversity Protection Act (Key features only).

Text Books:

- *T.K. Saha. 2011. Text Book of Ecology & Environmental Biology, Books and Allied Publishers, Kolkatta.*
- *Krishnamurthy, K.V. 2004. Text Book of Biodiversity, Oxford and IBH Publishing Company Pvt. Ltd., New Delhi.*
- *Jeffries, M.J. and Jeffries, M.J. 2005. Biodiversity and Conservation, Routledge, Taylor & Francis Group, UK.*

Reference Books:

- ✓ Peter Stiling. 2002. Ecology: Theories and Applications, Prentice-Hall of India, New Delhi.
- ✓ Daniels, R.J.B. and J.K. Krishnamoorthy. 2009. Environmental Studies, Wiley India, New Delhi.
- ✓ Colin R., Townsend, M. Begon and J.L. Harper. 2006. Essentials of Ecology, Second Edition, Blackwell Publications, USA.
- ✓ Dan L. Pelman and Glenn Adelson. 2007. Biodiversity: Exploring values and Priorities in Conservation. Blackwell Publishers, UK.
- ✓ David William Pearce and Dominic Moran. 2013. The Economic value of Biodiversity, Routledge, Taylor & Francis Group, UK.

✓

CODE: 15BY620	CC – XIII - Genetics and Evolution	SEM:VI

Objectives:

To understand the basic principles of genetic and hereditary mechanism and function of genetic materials

To acquire the knowledge of Evolution

Unit –I:

Introduction to genetics; Germplasm theory, fluid theory, mendelism-monohybrid, Dihybrid experiments, Alleles, Back cross, test cross. Mendel's laws.

Unit –II:

Genic introduction :(Factor hypothesis) non allelic gene, interactions- Complementary factors, supplementary factors, Epistasis. Allelic gene interaction – Complete dominance, incomplete dominance co-dominance.

Unit – III:

Linkage, crossing over, significance, mechanism of crossing over incidence of crossing over. Sex determination- sex determination in man, drosophila. Haney bee, chromosome, theory of sex determination in plant, chromosome map- procedure for mapping.

Unit –IV:

Sex linked inheritance- colour blindness, Eye colour in drosophlila, example from plants gene and gene concept. Mutation –physical, chemical mutagens. Chromosomal aberrations – deletion, duplication, incursion and translocations.

Unit –V:

Evolution- Introduction. Evidences of evolution Lamarck, Derives theory, neco darulinism, mutation theory.

Reference Books:

- *1.Agarwal, V.K. Simplified Course in Genetics (B.Sc. Zoology), S. Chand & Co., New Delhi, 2000.*

- *2. Gardner, E.J. and Shusted, D.P. Principles of Genetics (7th Edn.,) John Wiley &sons,N.Y., Chichester, Brisbane, Toronto, Singapore, 1984.*
- *3. Gupta, P.K. Genetics, Rastogi Publishers, Meerut, India, 2000.*
- *4. Meyyan, R.P. Genetic & evolution, Saras Publication, Nagarcoil, India, 2000.*
- *5. Sinott, E.W., L.C.Dunn and J. Dobshansky Principles of genetics (5th Edn.,)McGraw Hill Publishing Co., N.Y., Toronto, London, 1985.*
- *6. Sundara Rajan, S Cytology Anmol Publication, New Delhi, 2004.*
- *7. Shukla, R.S. and P.S. Chandel Cytogenetic, Evolution & Plant Breeding, S. Chand,NewDelhi, 1996.*

CODE: 15BY621	CC – XIV - Biotechnology	SEM:VI

Objectives:

To learn the basic principles of the biotechnological innovations.

To understand the techniques involved in gene transfer

To know about the industrial applications of biotechnology

Unit- I:

Biotechnology-definition and application in various fields. Genetic engineering tools: restriction endo nuclease, DNA ligase, reverse transcriptase, alkaline phosphatase. Vectors-Plasmid vectors, lambda bacteriophage vectors, methods of transferring desired gene into vectors – transformation techniques. Screening for selection of clones – replica plating method, colony hybridization.

Unit- II:

Fermentation – Types of fermentation – design and parts of fermentor. Alcoholic fermentation. Industrial production of beer, wine and alcohol.

Unit- III:

Biofuels: Methanogenesis and biogas production, Petrocrops, Biodegradable plastics. Biopesticides – *Bacillus thuringiensis*. Mass production of single cell protein- Yeast and *Spirulina.*

Unit - IV:

Vector and vector less methods of gene transfer in plants- Genetic engineering for pest, herbicides, virus, fungal and bacterial resistance-golden rice-Plant as bioreactors- agar production, alginate production, Cultivation of sea weeds.

Unit V:

Industrial production of organic acid (citric acid), amino acid (glutamic acid), vinegar, enzymes (protease), Immobilization of enzymes, antibiotics – penicillin, Monoclonal antibodies.

Text books:

- *Dubey R.C., 2002. A Text Book of Biotechnology, S. Chand and Co. New Delhi.*

- *Kumar H.D., 2001. A Text Book on Biotechnology. 2nd Ed. East-West Press. New Delhi.*
- *Subba Rao, N.S. 2001. Soil Microbiology, 4th Ed. Oxford and IBH Publishing Co. New Delhi.*
- *Singh B.D., 1998. Biotechnology. Kalyani Pubs. New Delhi.*
- *Patel A.H., 1996. Industrial Microbiology. Mac Millan India Ltd. Delhi.*
- *Slater, A., N.W. Scott and M.R.Fowler. 2009. Plant Biotechnology: the genetic manipulation of plants, Oxford University Press, US.*

Reference books:

- ✓ *Ignacimuthu, S.J., 1997. Plant Biotechnology, Oxford and IBH Publishing Company, New Delhi.*
- ✓ *Kumaresan V. 1994. Biotechnology. Saras Publications, Nagercoil.*

CODE: 15BY622b	EC –II- Economic Botany	SEM:VI

Objectives:

To know the economically important groups of plants

To study the morphology and useful parts commonly used plants

To acquire knowledge about the medicinal plants

Unit - I:

Introduction to Economic Botany – Classification of economically important plants: Food plants, Plants and plant products of commercial value, Medicinal plants, Food Adjuncts – Economic importance of lower plants: Food, medicinal, industrial and ornamental uses of Algae, Fungi, Lichens and Bryophytes.

Unit - II:

Morphology, useful parts and uses of the following Food plants: *Oryza sativa* (Rice), *Triticum aestivum* (Wheat), *Vigna mungo* (Black gram), *Glycine max* (Soybean), *Prunis dulcis* (Almonds), *Cocos nucifera* (Coconut), *Manihot esculenta* (Tapioca), *Solanum tuberosum* (Potato), *Mangifera indica* (Mango), Beverages: *Coffea arabica* (Coffee) and *Camellia sinensis* (Tea) Spices and Condiments: *Zingiber officinale* (Ginger) and *Cuminum cyminum* (Cumin) Oil yielding plants: *Helianthus annus* (Sunflower), *Sesamum indicum* (Sesame), *Eucalyptus globulus* (Eucalyptus) and *Jasminum sambac* (Jasmine).

Unit - III:

Morphology, process and uses of the following Fibre and fibre yielding plants: *Gossypium hirsutum* (Cotton) and *Corchorus capsularis* (Jute). Wood and Cork: *Dalbergia latifolia* (Rose wood), *Tectona grandis* (Teak) and *Quercus suber* (Cork oak). Morphology and useful parts of the following Tannin and Dye yielding plants: *Albizzia lebbeck (*Vagai) *and Lawsonia inermis* (Maruthani) Gums and Resins: *Acacia senegal* (Sudday keeray), *Moringa oleifera* (Murungai), *Shorea robusta* (Sal) *and Pinus roxburghi* (Chir).

Unit - IV:

Morphology and uses of the following Plantation crops: *Tectona grandis* (Teak) and *Hevea brasiliensis* (Rubber) Morphology, useful parts and uses of the following Medicinal Plants: *Rauvolfia serpentina* (Serpentine), *Allium cepa* (Onion), *Cinnamomum zeylanicum* (Cinnamon),

*Ephedra sinica (*Ephedrine), *Ocimum tenuiflorum*.(Holy Basil), *Piper nigrum* (Pepper), *Curcuma longa* (Turmeric) and *Azadirachta indica* (Neem).

Unit - V:

Commercial Plant Products: Extraction of Tannins and Dyes, Production of Agar and Alginate, Organic manures: Panchakavya - Biofertilizers: *Azolla* – Biopesticides: *Trichoderma* - Basketand Plate making from plant parts: *Borassus flabellifer* (Palmyrah palm) and *Areca catechu* (Areca nut palm).

Text Books:

- *Sambamurthy, A.V.S.S. and N.S. Subramanyam, 1989. A Text Book of Economic Botany, Wiley-Eastern Ltd, New Delhi.*
- *Pandey, B.P. 2012. Economic Botany, S.Chand & Company Ltd, New Delhi.*

Reference Books:

- ✓ *Kochhar, S.L. 1995. Economic Botany in the Tropics, Macmillan India Ltd., Delhi.*
- ✓ *Sharma, O.P. 1996. Hill's Economic Botany, Tata McGraw Hill Co. Ltd., New Delhi.*

CODE: 15BY622a	EC –II- Biostatistics and Bioinformatics	SEM:VI

Objectives:

To enlighten our students on various aspects of bioinformatics and its beneficial products

Unit -I:

Biostatistics- Definition and application –Sampling methods – Measures of central value- Mean- median and mode- Graphical methods: Histogram, Bar chart and pie diagram.

Unit -II:

Measures of central tendency- Mean, median and mode- Standard deviation and standard Error. Theories of probability - students t –test, chi square test.

Unit -III:

Introduction: Bioinformatics, Scope and applications. Types of computers- mini-macro systems. Anatomy of computers. I/O devices. Operation systems. File management. Editor, package- Basic, Sequence files- Text file, direct access files, sequence symbols. Internet and Email.

Unit –IV:

Structure data base - PDB; specialized database, literature database; file format, of gene bank, Swissprot, PDB, NCBI data model.

Unit - V:

Biological sequence analysis – pair wise sequence comparison – BLAST and FASTA – Multiple sequence alignments – phylogenetic alignment- Protein structure visualization tools- RasMol, Swiss PDB Viewer.

Text Books:

- *Murthy, C.S.V. 2004. Bioinformatics. Himalaya Publishing House. Delhi.*
- *Sundaralingam, R. and V.Kumaresan. 2008. Bioinformatics. Saras Publication. Nagercoil.*

- *Smith H, J, Smith & William. 1988. Introduction to the Principles of Drug Design, 2nd ed, Wright London.*
- *Lesk, A.M. 2007. Introduction to Bioinformatics (Second edition). Oxford University press, New Delhi.*
- *Sundararajan, S and Balaji, R. 2003. Introduction to Bioinformatics. Himalaya Publishing House, Delhi.*

Reference Books:

- ✓ *Campbell, A.M and Heyer, L.J. 2004. Discovering Genomics, Proteomics and Bioinformatics. Pearson Education, Delhi.*
- ✓ *Attwood, T.K and Parry-Smith, D.J. 2001. Introduction to Bioinformatics. Pearson Education, Delhi.*
- ✓ *Bal, H.P. 2007. Bioinformatics Principle and applications. Tata McGraw-Hill Publishing Company Ltd., New Delhi.*
- ✓ *Krane, D.E and Raymer, M.L. 2006. Fundamental Concepts of Bioinformatics. Pearson Education, USA.*
- ✓ *Gladis HelenHepsyba, S. and Hemalatha, C.R. 2009. Basic Bioinformatics, MJP Publishers, Chennai.*
- ✓ *Lohar, P.S. 2009. Bioinformatics, MJP Publishers, Chennai.*
- ✓ *Westhead, D.R., Parish, J.H and Twyman, R.M. 2003. Bioinformatics. Viva Books Private Ltd., New Delhi.*