B.Sc. BOTANY

Syllabus: 2020 - 2023

BON SECOURS

ARTS & SCIENCE COLLEGE FOR WOMEN

RUCKMANIPALAYAM, MANNARGUDI

Tel : 04367-260019

DEPARTMENT PROFILE

Department of Botany was established with an intention to enlighten and to understand the authoritative scenery of life sciences to student sector. The department holds the people of enthusiastic students, dedicated professors with updated scientific knowledge; sovereign academicians working and learning together to shape the future of young minds. It is well equipped with infrastructure and facilities that fill the requirement of syllabus as per the guidelines of the University. It has brought a new hope for remediation and conservation of environment and also in the field of medicine and food etc. It has opened a great avenue for higher education and employment for the future generation. Hence it has formulated an employment for the future generation too. It has methodology, skill development to students at various inter disciplinary area of life sciences, which directly contribute to the society. In addition, there is a wide job opportunity as well as research sector in several fields' viz., Archeology, Paleontology, Ecology, Pathology, Forensic science, Herbal medicine, Cosmetic, Neutraceutical, Environmental protection, Agricultural and Economic productivity development.

Vision

To serve the nation through advancement of knowledge by creating technologist of good caliber with high ethics, noble ideas and values

Mission

To inspire and to work with the students by imparting quality Education to meet the societal challenge that will empower and strengthen the student Community.

Objectives of the Department

- ✓ To empower and strengthen the student Community with advancement of theoretical knowledge through Noble ideas and values.
- ✓ To face the challenging environment, emerging vicinity and the Pros and Cons, Boons or Bans of the competitive field through personality development programme.

- ✓ To radiate our academic performance in addition to research and extension for the transformation of scientific knowledge to social welfare.

Industrial visits and field trip

- ➢ Plant collection; Field study and visiting of scientific laboratories.

Placement

- ➢ Campus interview and Higher education in Research fields.

COURSE STRUCTURE

PART	COURSE	CREDIT
I	Language Course – Tamil	12
II	Language Course – English	12
III	13 Major Core Course	65
III	6 Allied Course	20
III	3 Maor Electives	13
IV	2 Non-Major Electives	4
IV	3 Skill Based Electives	6
IV	1 Environmental Studies	2
IV	1 Value Education	2
IV	1 Soft Skill	2
IV	1 Gender Studies	1
V	Extension Activities	1
	Total Credits	**140**

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI-620 024.

B.Sc. Botany Course Structure under CBCS

(For the candidate admitted from the academic year 2016-2017 onwards)

Semester	Part	Course	Title	Instru. Hours / Week	Credit	Exam Hours	Marks		Total
							Int.	Extn.	
I	I	Language Course-I (LC) – Tamil#/Other Languages**#		6	3	3	25	75	100
	II	English Language Course-I (ELC)		6	3	3	25	75	100
	III	Core Course-I (CC)	Bacteria, Viruses, Algae, Fungi and Lichens	5	5	3	25	75	100
		Core Practical-I (CP)	Bacteria, Virus, Algae and Fungi Andlichens & Plant Pathology and Plant Protection (P)	3	-	***	-	-	-
		First Allied Course-I (AC)	Zoology-I	5	4	3	25	75	100
		First Allied Course-II (AP)	Zoology (P)	3	-	***	-	-	-
	IV	Value Education	Value Education	2	2	3	25	75	100
		Total		**30**	**17**				**500**
II	I	Language Course-II (LC) – Tamil#/Other Languages**#		6	3	3	25	75	100
	II	English Language Course-II (ELC)		6	3	3	25	75	100
	III	Core Course-II (CC)	Plant Pathology and Plant Protection	5	5	3	25	75	100
		Core Practical-I (CP)	Bacteria, Viruses, Algae, Fungi and Lichens & Plant Pathology and Plant Protection (P)	3	4	3	40	60	100
		First Allied Course-II (AP)	Zoology (P)	2	2	3	40	60	100
		First Allied Course-III (AC)	Zoology-II	5	4	3	25	75	100
	IV	Environmental Studies	Environmental Studies	3	2	3	25	75	100
		Total		**30**	**25**				**700**
III	I	Language Course-III (LC)-Tamil#/Other Languages**#		6	3	3	25	75	100
	II	English Language Course-III (ELC)		6	3	3	25	75	100
	III	Core Course-III (CC)	Bryophytes, Pteridophytes, Gymnosperms and Paleobotany	6	5	3	25	75	100
		Core Practical-II (CP)	Bryophytes, Pteridophytes, Gymnosperms and Paleobotany & Anatomy and Embryology	3	-	***	-	-	-
		Second Allied Course-I (AC)	Chemistry-I	5	4	3	25	75	100
		Second Allied Course-II (AP)	Chemistry (P)	2	-	***	-	-	-
	IV	Non-Major Elective-I - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Biofertilizers and Biopesticides	2	2	3	25	75	100
		Total		**30**	**17**				**500**

IV	I	Language Course-IV (LC)-Tamil#/Other Languages**#		6	3	3	25	75	100
	II	English Language Course-IV (ELC)		6	3	3	25	75	100
	III	Core Course-IV (CC)	Anatomy and Embryology	5	5	3	25	75	100
		Core Practical-II (CP)	Bryophytes, Pteridophytes, Gymnosperms and Paleobotany & Anatomy and Embryology (P)	3	4	3	40	60	100
		Second Allied Course-II (AP)	Chemistry (P)	2	2	3	40	60	100
		Second Allied Course-III (AC)	Chemistry-II	4	4	3	25	75	100
	IV	Non Major Elective-II – for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Horticulture	2	2	3	25	75	100
		Skill Based Elective-I	Skill Based Elective-I	2	2	3	25	75	100
		Total		**30**	**25**				**800**
V	III	Core Course-V (CC)	Cell and Molecular Biology	5	5	3	25	75	100
		Core Course-VI (CC)	Genetics, Biostatistics and Evolution	5	5	3	25	75	100
		Core Course-VII (CC)	Morphology, Taxonomy and Economic Botany	4	4	3	25	75	100
		Core Practical-III (CP)	Cell and Molecular Biology & Genetics, Biostatistics and Evolution & Morphology, Taxonomy of Angiosperms and Economic Botany	6	5	3	40	60	100
		Major Based Elective-I	Medical and Applied Botany	4	4	3	25	75	100
	IV	Skill Based Elective-II	Skill Based Elective-II	2	2	3	25	75	100
		Skill Based Elective-III	Skill Based Elective-III	2	2	3	25	75	100
		Soft Skills Development		2	2	3	25	75	100
		Total		**30**	**29**				**800**
VI	III	Core Course-VIII (CC)	Plant Physiology, Biochemistry and Biophysics	6	6	3	25	75	100
		Core Course-IX (CC)	Plant Ecology and Conservation	6	6	3	25	75	100
		Core Practical-IV (CP)	Plant Physiology, Biochemistry and Biophysics & Plant Ecology and Conservation (P)	6	4	3	40	60	100
		Major Based Elective-II	Plant Breeding, Horticulture and Landscaping	6	5	3	25	75	100
		Major Based Elective-III	Plant Biotechnology and Bioinformatics	5	4	3	25	75	100
	V	Extension Activities	Extension Activities	-	1	-	-	-	-
		Gender Studies	Gender Studies	1	1	3	25	75	100
		Total		**30**	**27**				**600**
		Grand Total		**180**	**140**				**3900**

List of Allied Courses

Group – I	**Group – II**
Zoology	Chemistry

Language Part – I	-	4
English Part –II	-	4
Core Paper	-	9
Core Practical	-	4
Allied Paper	-	4
Allied Practical	-	2
Non-Major Elective	-	2
Skill-Based Elective	-	3
Major-Based Elective	-	3
Environmental Studies	-	1
Value Education	-	1
Soft Skill Development	-	1
Gender Studies	-	1
Extension Activities	-	1 (Credit only)

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]
The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

* for those who studied Tamil upto +2 (Regular Stream)

** Syllabus for other Languages should be on par with Tamil at Degree level

those who studied Tamil upto 10th or +2, but opt for other languages in degree level under Part I should study special Tamil in Part IV

*** Examination at the end of the next semester.

Note :

1. As a part of Botany Degree Course every student shall undertake a tour and Field study of Vegetation under the guidance of the staff for not less than (FIVE DAYS within the state) in the III year and submit a minimum number of 25Herbarium sheets. Students shall submit duly certified record of their practical Work for all the practical examinations and those who do not submit the record shall not be permitted to the concerned practical examination.

2. The IA components for the practicals are skill – 10 marks, Test 2 x 10 = 20 Marks, Observation – 10 Marks [for Taxonomy practicals Herbarium marks to be included in the IA component in the place of skill Marks]

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620 024

UG Programme - Part-1 Tamil Syllabus Under CBCS

(Applicable to the candidates admitted from the Academic year 2016-2017 onwards)

பருவம்	பகுதி	பாடம்	பயிற்றுக் காலம் மணிகள்	தரப் புள்ளி	தேர்வுக் காலம் மணிகள்	மதிப்பெண்கள்		கூட்டு மதிப்பெண்
						அகம்	புறம்	
1	1	இக்கால இலக்கியம்	6	3	3	25	75	100
2	1	இடைக்கால இலக்கியமும் புதினமும்	6	3	3	25	75	100
3	1	காப்பியமும் நாடகமும்	6	3	3	25	75	100
4	1	பண்டைய இலக்கியம்	6	3	3	25	75	100

முதற்பருவம் - தாள் I

இக்கால இலக்கியம் - 16LCT1

பாடநோக்கம்

1. இக்காலத் தமிழ்க்கவிதை, சிறுகதை முதலானவற்றை அறிமுகப்படுத்துதல்
2. புதுக்கவிதை, ஹைகூ கவிதை முதலான புதிய இலக்கிய வடிவங்களை அறிமுகப்படுத்துதல்
3. தமிழ் இலக்கியத்தின் மீதான ஈர்ப்பை மிகுவித்தல்

மாணவர்பெறும் திறன்

1. தமிழ் இலக்கியத்தின் மீதானஆர்வம் மிகுகிறது.
2. புதிய இலக்கிய வடிவங்களை அறிவர்.
3. சிறுகதை, கவிதை எழுத முயல்வர்.

அலகு- I

பாரதியார்
1. செந்தமிழ்நாடு
2. புதுமைப்பெண்

பாரதிதாசன்
1. அழகு
2. தமிழனுக்கு வீழ்ச்சியில்லை

கவிமணி தேசிகவிநாயகம் பிள்ளை

1. சுகாதாரக்கும்மி
2. தொழிலாளியின் முறையீடு

சுரதா

1. கலப்பை
2. போலி உடும்பு

அலகு- II

நாமக்கல் கவிஞர்

1. தமிழ் வாழ்க
2. தருணம் இதுவே

கவிகாமு ஷெரீப்

1. தமிழே!
2. நிலவே சொல்
3. அறிய முயல்

கண்ணதாசன்

1. அனுபவம்
2. நட்பு

வாணிதாசன்

1. வாழ்க இளம்பரிதி
2. உயிர்வாட்டும் காலம்

அலகு- III

நாட்டுப்புறப் பாடல்கள்

1. தாலாட்டுப் பாடல்
2. தொழிற் பாடல்
3. ஒப்பாரிப் பாடல்

புதுக்கவிதைகள்

1. அப்துல் ரகுமான் - வெற்றி
2. அரங்கமல்லிகா - அக்குளுக்கு அல்ல இடைத்துண்டு
3. அறிவுமதி - நட்புக்காலம்
4. ஆண்டாள் பிரியதர்ஷினி - நிலாச்சோறு
5. ஈரோடு தமிழன்பன் - மறைக்க இடம் தேடும் மனம்
6. சிற்பி – ஓடு சங்கிலி ஓடு
7. தாமரை - தீர்ப்பு
8. மீரா - தலைகுனிவு
9. மேத்தா.மு - வெளிச்சம் வெளியே இல்லை
10. வைரமுத்து - ருசி

ஐக்கூ கவிதைகள்

1. இராசன்.எ.மு.
2. புதுவைதமிழ் நெஞ்சன்
3. செந்தமிழினியன்
4. அரிமதி இளம்பரிதி
5. உயிர்வேலி ஆலா
6. அன்பாதவன்
7. கார்முகில்
8. அமுதபாரதி
9. அரிமதிதென்னகன்
10. புதுவை இளவேனில்

அலகு- IV

சிறுகதை

கைவண்ணம்...(தேர்ந்தெடுக்கப்பட்டசிறுகதைகள்)
தொகுப்பாசிரியர் முனைவர் தங்க. செந்தில்குமார்
அய்யாநிலையம்
கதவுஎண், 1603, ஆரோக்கியநகர்
ஐந்தாம் தெரு,E.B.காலனி,
நாஞ்சிக்கோட்டைச் சாலை,
தஞ்சாவூர் - 613 006
விலைரூ.70/-

உரைநடை

சிந்தனைச்சுடர்
பேராசிரியர்பி.விருத்தாசலம்
தென்காவேரிப் பதிப்பகம்
9, கனகசபைநகர்
மருத்துவக் கல்லூரிச்சாலை
தஞ்சாவூர் - 613 007
விலைரூ.50/-

அலகு- V

இலக்கியவரலாறு

1. மரபுக் கவிதை
2. புதுக்கவிதை
3. உரைநடை
4. சிறுகதை

மனப்பாடப் பகுதி

பாரதியார் கவிதைகள்
1. துடிக்கின்ற நெஞ்சம்
2. புதிய ஆத்திசூடி பரம்பொருள் வாழ்த்து
3. தமிழ் 4. கேட்பன
5. வேண்டும்.

பாரதிதாசன் கவிதைகள்
1. தமிழ் வளர்ச்சி 2. இன்பத்தமிழ்
3. தென்றல் 4. செந்தாமரை
5. வள்ளுவர் வழங்கிய முத்துக்கள்.

இணைய முகவரிகள்

1. www.tamilvu.org
2. www.sirukathaigal.com
3. www.noolulagam.com
4. www.katuraitamilblogspot.com

Part II – ENGLISH – 16ELCE1

(Applicable to the candidates admitted from the Academic year 2016 -2017 onwards)

Semester I : Prose for Effective Communication

Objectives:

- *To make learners read, understand and appreciate texts from various genres of literature*
- *To familiarize learners with various rhetoric devices*
- *To help learners read and comprehend literary texts to communicate effectively*
- *To train learners to improve their comprehension and composition skills*

Unit – I

C.E.M. Joad : "Civilization and History"
Issac Asimov : "The Fun They Had"

Unit – II

George Gamow : "Big Numbers and Infinities"
G.C. Thornley : "Oil"

Unit – III

Desmond Morris : "An Observation and an Explanation"
M.W.Thring : "A Robot about the House"

Unit – IV

Rabindranath Tagore : "A Wrong Man in Worker's Paradise"
Horace Shipp : "Making Surgery Safe"

Unit – V

Swami Vivekananda's Chicago Addresses : i) "Response to Welcome"
ii) "Why We Disagree"

Textbook:

W.W.S. Bhaskar and N.S. Prabhu. *English through Reading* Vol.I Laxmi Publications. (for Unit I to Unit IV)

CORE COURSE - I

BACTERIA, VIRUSES, ALGAE, FUNGI AND LICHENS – 16SCCBO1

Objectives:

1. *To understand the structure, reproduction, culture, classification and economic importance of bacteria and viruses.*
2. *To study the classification, ecology, distribution, morphology, life-cycle and economic importance of Algae and Fungi.*
3. *To impart knowledge on distribution, classification, structure, physiology, reproduction and function of lichens and significance of ectomycorrhiza and endomycorrhiza.*

Unit I Bacteria

Bacteria - Discovery, General characteristics and cell structure; Nutritional types of bacteria (based on carbon, nitrogen and energy sources); Reproduction - vegetative, asexual and recombination (conjugation, transformation and transduction); techniques in sterilization, bacterial culture and staining (simple and differential); Economic importance.

Unit II Viruses

Viruses - Discovery, general structure, Symptoms of virus infection in plants; transmission of plant viruses; genome organization, replication of plant virus (tobacco mosaic virus); techniques in plant viruses – purification; structure and multiplication of bacteriophages; structure and multiplication of viroids. Economic importance.

Unit III Algae

General characteristics of various divisions; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae (F.E. Fritsch); Morphology and life-cycles of the following: Nostoc, Chlamydomonas, Oedogonium, Vaucheria, Diatoms, Ectocarpus, Dictyota, Polysiphonia. Economic importance of algae.

Unit IV Fungi

General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification (Alexopolous); True Fungi – General characteristics, ecology and significance, life cycle of Rhizopus (Zygomycota) Penicillium, Alternaria (Ascomycota), Puccinia, Agaricus (Basidiomycota); Economic importance.

Unit V Lichens

Symbiotic Associations - Lichens: General account, occurrence, thallus organization, classification, structure, physiology, reproduction, and role in environmental pollution and uses; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance.

Books

1. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology (4th edition). John Wiley and Sons (Asia), Singapore.
2. Kumar, H.D. (1999). Introductory Phycology (2^{nd} edition). Affiliated EastWest Press Pvt. Ltd. Delhi.
3. Pandey, B.P. (2001). College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.
4. Sambamurthy, A.V.S.S. (2006). A Textbook of Algae. I.K. International Pvt. Ltd., New Delhi.
5. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies. MacMillan Publishers Pvt. Ltd., Delhi.
6. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction (10^{th} edition). Pearson Benjamin Cummings, U.S.A.
7. Vashishta, B.R. (1990). Botany for Degree Students: Fungi. S. Chand & Company Ltd., New Delhi.
8. Vashishta, B.R., Sinha, A.K. and Singh, V.P. (2008) Botany for Degree Students: Algae. S. Chand & Company Ltd., New Delhi.

CORE PRACTICAL - I

BACTERIA, VIRUS, ALGAE, AND FUNGI AND LICHENS & PLANT PATHOLOGY AND PLANT PROTECTION (P) – 16SCCBO1P

Tools and equipments used in microbiology: Spirit lamp, Inoculation loop, Hot air oven, Autoclave, Pressure cooker, Laminar air flow chamber, Incubator, etc.

Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule.

EMs/Models of viruses-T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle.

Study of vegetative and reproductive structures of Nostoc, Chlamydomonas (electron micrographs), Oedogonium, Vaucheria, Diatoms, Ectocarpus, Dictyota and Polysiphonia through temporary preparations and permanent slides.

Rhizopus and Penicillium: Asexual stage from temporary mounts and sexual structures through permanent slides.

Alternaria: Specimens/photographs and tease mounts.

Puccinia: Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; section/tease mounts of spores on Wheat and permanent slides of both the hosts.

Agaricus: Specimens of button stage and full grown mushroom; Sectioning of gills of Agaricus.

Lichens: Study of growth forms of lichens (crustose, foliose and fruticose) Mycorrhiza: ectomycorrhiza and endomycorrhiza (Photographs).

Field visit

1. Make suitable micropreparations and identify the diseases mentioned theory with due emphasis on symptoms and causative organisms.
2. A detailed study of diseased specimens included in the theory.
3. Identification of various plant protection appliances mentioned in the syllabus and their working mechanism.

ALLIED COURSE - I

ZOOLOGY – I – 16SACZO1
BIOLOGY OF INVERTEBRATES AND CHORDATES

Objectives:

1. *To enlighten the students about the diverse forms of Invertebrate and Vertebrate animals present around us.*
2. *To help our students to distinguish various animals and to know the evolutionary sequence of them.*

UNIT I

General characteristics and classification of Nine Invertebrate Major Phyla up to Class level with examples. Type study: Protozoa: Paramecium- *Paramecium caudatum;* Porifera: Canal System in Sponges; Coelenterata: Aurelia–*Aurelia aurita*; Platyhelminthes: Liver fluke *Fasciola hepatica;* Nemathelminthes*:* Parasitic adaptations in helminthes.

UNIT II

Type study: Annelida: Earthworm- *Lampito mauritii;* Arthropoda: Mouthparts and their modifications in Insects and Insect Pests of Crops (Paddy, Cotton, Coconut and Brinjal) and their management, Mollusca: *Pila*; Echinodermata: Water vascular system in Echinoderms.

UNIT III

General characteristics and classification of Chordates up to class level with examples. Type study: Pisces: Shark- *Scoliodon sorrakowah.*(except Endoskeleton); General essay: Migration in fishes.

UNIT IV

Type study: Amphibia: Frog- *Rana hexadactyla*, (except Endoskeleton); Reptiles: Poisonous and non- poisonous snakes in India; Aves: Pigeon - *Columba livia*. (Except Endoskeleton).

UNIT V

Type study*:* Mammals: Rabbit - *Oryctolagus cuniculus*. (Except Endoskeleton); General essay: Prototherian mammals, Metatherian mammals.

Text book

1. Manual of Zoology (Invertebrata), Ekambaranatha Ayyar and T.N. Ananatha Krishnan (1992) Part-I & II Vishwanathan Pvt.Ltd.
2. Manual of Zoology (Vertebrata), Ekambaranatha Ayyar and T.N. Ananatha Krishnan (1992) Part-I & II Vishwanathan Pvt.Ltd.

References

1. Jordon EL and Verma P.S. (1995), Invertebrate Zoology, S Chand and Co, Zoology Delhi.
2. Kotpal, R.L, S.K. Agarwal, R.P.R. Khetarpal 1998. Modern text Book of Zoology. Rastogi Publication,
3. N. Arumugam, Invertebrata, Saras Publication, Nagercoil.

ALLIED ZOOLOGY (P)
BIOLOGY OF INVERTEBRATES & CHORDATES AND COMMERCIAL ZOOLOGY- 16SACZO1P

Objectives:

To impart training on the techniques of dissecting the animals and to understand the various systems present in their body. To demonstrate the technique of in silico dissection of invertebrate and chordate animals. To make them aware of commercially important animals.

Dissection:

Cockroach and Fish: Digestive system and Nervous system/Demo/CD/ Virtual.

Mountings/Slide:

Mouth parts - Honey bee, Cockroach, Mosquito, (slides).
Earthworm –Body setae (slide).
Identification of Cycloid, Placoid and Ctenoid scales – (slides).

Spotters

Invertebrates: Amoeba, Paramecium, Entamoeba, Euglena, Sycon, Leucosolenia, Aurelia, Obelia, Planaria, Liver fluke, Tapeworm, Neries, Leech, Crab, Cockroach, Honey bee, Mosquito, Scorpion, Scolopendra, freshwater mussel, Octopus, Sepia, Oyster, Star fish, Sea urchin, Sea cucumber.

Chordates: Shark, Teleost, Frog, Icthyophis, Calotes, Chameleon, Cobra, Viper, Pigeon, Parrot, Rat and Rabbit.

Commercial Importance: Newton’s Bee hive, Honey extracting devices, Honey, Wax, Bombyx mori, Mulberry leaves, Silk worm rearing appliances, Cocoons, Silk thread, Lampito mauritii, Eudrilus eugeniae, Perionyx excavates, Eisenia fetida, Vermicompost.

PART IV - VALUE EDUCATION – 18UGVED

Unit I : Philosophy of Life and Social Values

Human Life on Earth (Kural 629) Purpose of Life (Kural 46) Meaning and Philosophy of Life (Kural 131, 226) Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

Unit II : Human Rights and Organizations

Definitions, Nature of Human Rights. Universal Declaration of Human Rights, International covenent on Civil and Political Rights - International covenent of Economic, Social and Cultural Rights. Amnesty International Red Cross.

Contemporary Challenges: Child Labour – Women's Right - Bonded Labour – Problems of refugees - Capital punishment. National and State Human Rights Commissions.

Unit III : RTI Act, 2005 & Consumer Protection Act, 1986

Definition of RTI Act, 2005 and obligations of Public Authorities – The Central Information Commission – The State Information Commission – Powers and Functions of the Information Commissions – Appeal and Penalties.

Definition of The Consumer Protection Act, 1986 – State and Central Consumer Protection Councils – Consumer Disputes Redressal Agencies.

Unit IV : Yoga and Health

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

Unit V : Role of State Public Service Commission

Constitutional provisions and formation - Powers and Functions - Methods of recruitment -Rules and notification, syllabi for different exams - written and oral - placement.

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. திருக்குறள் - ஜி.யு.போப் - ஆங்கில மொழியாக்கத்துடன் உமா நூல். வெளியீட்டகம், தஞ்சாவூர்.
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.
7. Right to Information Act, 2005-Website: www.tnpsc.gov.in/RTI%20ACT%202005.pdf
8. The Consumer Protection Act, 1986 – Website: http://ncdrc.nic.in/bare_acts/consumer%20Protection%20Act-1986.html

இரண்டாம் பருவம் - தாள் - II

இடைக்கால இலக்கியமும் புதினமும் - 16LCT2

பாடநோக்கம்

1 சமய இலக்கியத் தோற்றத்திற்கான வரலாற்றுப் பின்புலத்தை அறிவித்தல்
2 தமிழ் சைவ, வைணவ இலக்கியங்களை அறிமுகப்படுத்தல்
3 தமிழ் மொழியின் செம்மொழிப் பண்புகளை அறியச் செய்தல்
4 தமிழ்ச் சிற்றிலக்கியங்களின் இலக்கியச் சிறப்பைக் கற்பித்தல்

மாணவர்பெறும் திறன்

1. தமிழ்ப் பக்தி இலக்கியங்கள் பற்றி அறிவர்
2. நாயன்மார், ஆழ்வார்களின் பக்தியில் விளைந்த கவிச்சுவை உணர்வர்
3. சிற்றிலக்கியங்களின் இலக்கியச் சுவையையும் கட்டமைப்பையும் அறிவர்
4. தமிழ்மொழி, செம்மொழி என்பதையும் அதன் பண்புகளையும் அறிவர்.

அலகு- I

பன்னிரு திருமுறைகள்

1. திருநாவுக்கரசர் தேவாரம் - திருப்பூந்துருத்தி (திருஅங்கமாலை)
2. சுந்தரர்தேவாரம் - திருவையாற்றுப் பதிகம்
3. மாணிக்கவாசகர் திருவாசகம் - சிவபுராணம்
4. திருமூலர்திருமந்திரம் - இளமைநிலையாமை

அலகு- II

நாலாயிரதிவ்வியப் பிரபந்தம்

1. பெரியாழ்வார் திருமொழி - நற்றாய் புலம்பல்
2. தொண்டரடிப் பொடியாழ்வார் - திருமாலை
3. திருப்பாணாழ்வார் - அமலன் ஆதிபிரான்
4. மதுரகவியாழ்வார் - கண்ணிநுண்சிறுத்தாம்பு

அலகு- III

அ) முத்துக்குமாரசுவாமிபிள்ளைத்தமிழ் : 2 பாடல்கள்
1. செங்கீரைப் பருவம் - பாடல் 8 - விரல்சுவைஉண்டு
2. அம்புலிப் பருவம் - பாடல் 6 - ஒழியாதபுவனத்து
ஆ) நந்திக்கலம்பகம் : 5 பாடல்கள்
1. வாடைநோக 2. உரைவரம்பு 3. மயில்கண்டால்
4. சூழிவன் 5. கோலக்கொடி
இ) தமிழ்விடுதூது : 17முதல் 46வரை - 30 கண்ணிகள்
ஈ) குற்றாலக் குறவஞ்சி : குறத்திமலைவளம் கூறல்-3 பாடல்கள்
1. வானரங்கள் 2. முழங்கு 3. ஆடும் இரவு
உ) கலிங்கத்துப் பரணி-களம் பாடியது - 4 பாடல்கள்
1. ஆடல் 2. நெருங்கு 3. வாய்மடித்து 4. தரைமகளும்
ஊ) தனிப்பாடல்கள் : 5 பாடல்கள்
1. காளமேகப் புலவர் - 3 பாடல்கள்
1. கத்துகடல் 2. பூநக்கி 3. பண்பு
2. ஔவையார்- 1 பாடல் : மதியாதார்முற்றம்

1. பலபட்டடைச் சொக்கநாதப்புலவர்-1
பாடல்:படிக்காசுப் புலவர்பாடல் சிறப்பு

அலகு- IV

புதினம்

1. ஆத்தங்கரைஓரம் - வெ.இறையன்பு, இ.ஆ.ப. நியூ செஞ்சுரிபுக் ஹவுஸ் (பி)லிமிடெட் 41B, சிட்கோதொழிற்பேட்டை அம்பத்தூர், சென்னை- 600 098 விலைரூ.80/-

அலகு- V

தமிழ்ச் செம்மொழி வரலாறு

மொழிவிளக்கம் - மொழிக் குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச் செம்மொழி - தமிழின் தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள் - பரிதிமாற் கலைஞர் அவர்கள் முதல் பல்வேறு அறிஞர்கள் அமைப்புகள் - நிறுவனங்கள் - இயக்கங்கள் ஆகியவற்றின் தொடர்முயற்சிகள் - அறப்போராட்டங்கள்- தமிழ்ச் செம்மொழி அறிந்தேற்பு.

மொழிபெயர்ப்பியல்

பார்வை நூல்கள்:

1. உலகச்செவ்வியல் மொழிகளின் வரிசையில் தமிழ்- வா.செ.குழந்தைசாமி
2. செம்மொழிகள் வரிசையில் தமிழ் - ஜி.ஜான் சாமுவேல்
3. செம்மொழி - உள்ளும் புறமும், மணவை முஸ்தபா "அறிவியல் தமிழ் அறக்கட்டளை", சென்னை.
4. சாலினி இளந்திரையன், தமிழ் செம்மொழி ஆவணம், மணிவாசகர் பதிப்பகம், சென்னை.
5. தமிழ்ச் செம்மொழி வரலாறு, முனைவர் மு. சாதிக்பாட்சா, ராஜா பப்ளிகேஷன்ஸ், திருச்சி.23

இணைய முகவரிகள்

1. www.tamilheritage.org
2. www.thehistoryofsrivaishnavam.weebly.com
3. www.sivasiva.dk
4. www.shaivam.org
5. www.periyapuraana.minhinduism.blogspot.com
6. www.thevaram.org
7. www.ta.wikipedia.org/wiki/செம்மொழி

Semester II : Poetry for Effective Communication – 16ELCE2

Unit – I

William Shakespeare : "All the World's a Stage"
Robert Frost : "Road Not Taken"

Unit – II

P.B. Shelley : "Ode to the West Wind"
John Keats : "La Belle Dame sans Merci"

Unit – III

Alfred Tennyson : "Ulysses"
Robert Browning : "My Last Duchess"

Unit – IV

W.B.Yeats : "A Prayer for My Daughter"
T.S.Eliot : "Journey of the Magi"

Unit – V

W.H.Auden : "The Unknown Citizen"
Nissim Ezekiel : "Night of the Scorpion"

Textbook:

Ambiga, Sen Gupta, ed. *Selected College Poems*. Chennai: Orient BlackSwan, 2009.

CORE COURSE - II

PLANT PATHOLOGY AND PLANT PROTECTION - 16SCCBO2

Objectives:

1. *To understand plant pathogenesis, classification and host-parasite interaction.*
2. *To study plant diseases in crops and their management, significant contributions of plant pathologists and usage of various techniques in plant protection.*
3. *To impart knowledge on distribution, classification, structure, physiology, reproduction and function of lichens and significance of ectomycorrhiza and endomycorrhiza.*

Unit I

Plant Pathology: History, losses due to pathogens, importance of study of Plant pathology; Classification of plant diseases based on; (a) Major causal agents - biotic and abiotic, (b) General Symptoms. Process of infection and pathogenesis: (a) Penetration and entry of pathogen into host tissue – mechanical, physiological and enzymatic. (b) Host-parasite interaction, enzymes and toxins in pathogenesis.

Unit II Plant Disease Management

Chemical means of disease control: Fungicides-Definition, classification, characters of an ideal fungicide; antibiotics and nematicides. Biological Control of Plant Diseases – Definition, Importance, Biological control agents and their role in plant disease control

Unit III Common Plant Diseases

Study of plant diseases with respect to symptoms, causal organism, disease cycle and their management: (a) Cereals: Rice – blast disease; (b) Vegetables: Brinjal – Little leaf; (c) Fruits: Banana – bacterial leaf blight, Citrus – bacterial canker; (d) Oil seeds: Groundnut – Tikka disease; (e) Sugar yielding: Sugarcane - red rot. Research in Plant Pathology - Contribution of Indian Plant Pathologists: Rangasami, G. Mahadevan, A., Bilgrami, K.S. and Mehrotra, R.S.), Contribution of Research institutes – IARI (Indian Agricultural Research Institute), ICRISAT (International Crop Research Institute for Semi-Arid Tropics)

Unit IV Plant Protection

Scope, Importance, equipments used in plant protection - Sprayers - dusters - soil injector - seed dressing drum; Seed treatment: objectives of seed treatment, Traditional and modern methods of seed treatment. Soil sterilization: Objectives, Traditional and modern methods of soil sterilization. Role of soil sterilization in Polyhouse farming.

Unit V Methods of Plant Protection

a) Cultural – Tillage, sowing and planting dates, crop hygiene, crop rotation, trap crops, fertilizer.
b) Mechanical – Field sanitation: For diseases – collection and destruction of diseased plant-debris; For pests – hand picking and destruction of egg masses; shaking of plants, rope dragging, netting, bagging, physical barriers, use of sticky bands, tin-bands and light traps.
c) Physical – Heat and soil solarizations.
d) Chemical – Brief account and uses of Bactericides, Fungicides, Insecticides, Nematicides, Acaricides, Molluscicides, Rodenticides and Herbicides.
e) Biological – Introduction, biological control of Insect pests and diseases
f) Legal (Plant Introduction, domestic quarantine, need of plant quarantine) quarantine in India

Books:

1. Bap Reddy, D. and Joshi, N.C. (1991). Plant Protection in India (Second Edition). Allied Publishers Ltd., New Delhi.
2. Bilgrami, K.S. and Dubey, R.C. (1985). Text book of Modern Plant Pathology. Vikas Publishing House Private Limited, New Delhi.
3. Mehrotra, R.S. (2003). Plant Pathology (Second edition). Tata McGraw-Hill Education, New Delhi.
4. Pandey, B.P. (2001). Plant Pathology. S. Chand & Company Limited, New Delhi.
5. Rangasami, G. and Mahadevan, A. (1998). Diseases of Crop Plants in India. Prentice Hall of India Ltd. New Delhi.

CORE PRACTICAL - I

BACTERIA, VIRUS, ALGAE, AND FUNGI ANDLICHENS & PLANT PATHOLOGY AND PLANT PROTECTION (P) – 16SCCBO1P

Tools and equipments used in microbiology: Spirit lamp, Inoculation loop, Hot air oven, Autoclave, Pressure cooker, Laminar air flow chamber, Incubator, etc.

Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule.

EMs/Models of viruses-T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle.

Study of vegetative and reproductive structures of Nostoc, Chlamydomonas (electron micrographs), Oedogonium, Vaucheria, Diatoms, Ectocarpus, Dictyota and Polysiphonia through temporary preparations and permanent slides.

Rhizopus and Penicillium: Asexual stage from temporary mounts and sexual structures through permanent slides.

Alternaria: Specimens/photographs and tease mounts.

Puccinia: Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; section/tease mounts of spores on Wheat and permanent slides of both the hosts.

Agaricus: Specimens of button stage and full grown mushroom; Sectioning of gills of Agaricus.

Lichens: Study of growth forms of lichens (crustose, foliose and fruticose) Mycorrhiza: ectomycorrhiza and endomycorrhiza (Photographs).

Field visit

1. Make suitable micropreparations and identify the diseases mentioned theory with due emphasis on symptoms and causative organisms.
2. A detailed study of diseased specimens included in the theory.
3. Identification of various plant protection appliances mentioned in the syllabus and their working mechanism.

ALLIED COURSE - II

ZOOLOGY-II

COMMERCIAL ZOOLOGY – 16SACZO2

Objectives:

To enlighten the students about the honey bees, its life style, the social behavior. The silkworm and Vermiculture and its self- employment opportunities. Students may be benefitted by the culture practices and the economic importance.

UNIT I

Apiculture: Bees and their Economic Importance: Wild Bees – Species of Honey Bees– Colony Organization and Life Cycle - Bee Keeping Equipments: Newton's Bee Hive – Other Bee Keeping Equipment – Equipment for Handling Bees. Social Behaviour of Bees.

UNIT II

Bee Pasturage: Nectar Composition – Honey Extraction - Bee Hive Products: – Honey - Chemical composition of honey – Nutritional and Medicinal values of Honey - Wax – Bee Venom – Propolis – Royal Jelly;

UNIT III

Sericulture: Silk producing organisms: Mulberry Silk worm, Tasar silk worm, Muga silk worm and Eri silkworm. Moriculture: Optimum conditions for mulberry growth; Methods of propagation: Vegetative propagation - Irrigation, manuring, pruning, harvesting and storing of mulberry leaves.

UNIT IV

The Mulberry Silk worm - *Bombyx mori*: Commercial races of India; Rearing Facilities: Rearing house - Rearing appliances - Appliances used for feeding - Bed cleaning - disinfection and maintaining optimum culture conditions; Rearing methods. Storage of cocoons - Cocoon and silk Marketing.

UNIT V

Vermiculture: Organic farming –Biology of Earthworm- types –Materials required for vermiculture – preparation of predigested materials – selection of suitable earthworm species – optimal culture conditions required –Methods of harvesting, packing and storage, Nutrient composition of vermicompost. Advantages of using vermicompost and their benefits to environment.

Text Books

1. Mishra.R.C. 1995. Honey Bees and Their Management in India. Indian Council of Agricultural Research. New Delhi.
2. Ganga, G. and Sulochana Chetty, J. An Introduction to Sericulture (2nd Edition). Oxford and IBH Publishing co. Pvt-Ltd., New Delhi.
3. Ranganathan, L.S. 2006.Vermibiotechnology. From Soil Health to Human Health. Agrobios (India), Jodhpur.

Reference Books

1. Taxima, Y. 1972. Hand Book of Silkworm Rearing. Fuji Publication, Tokyo.
2. Ullal, S.R. and Narasimhanna, M.N. 1979. Hand book of Practical Sericulture. Central Silk Board, Bombay.
3. Tomar, B.S and N.Singh. A Text Book of Applied Zoology. 2007. Emkay publications. Delhi
4. Fenemore, P.G. and A. Prakash. 2006. Applied Entomology. New Age International Publishers. Chennai.
5. Abrol, D.P. 1997. Bees and Beekeeping in India. Kalyani Publishers, Ludhiana.
6. Gupta, P.K. 2005. Vermicomposting for sustainable agriculture (SE) Agrobios [India], Jodhpur, India 210p.
7. Bhatnagar, R.K. and Palta, R.K. 1996. Earhtworm vermiculture and vermicomposting. Kalyani Publishing. Luthiana. India. 106p.
8. Ismail, S.A. 2005. The Earthworm Book. Other India Press. Goa.
9. Talashilkar, S.C. and Dosani, A.A.K. 2005. Earthworms in agriculture. Agrobios (India), Jodhpur.

ALLIED ZOOLOGY (P)
BIOLOGY OF INVERTEBRATES & CHORDATES AND COMMERCIAL ZOOLOGY- 16SACZO1P

Objectives:

To impart training on the techniques of dissecting the animals and to understand the various systems present in their body. To demonstrate the technique of in silico dissection of invertebrate and chordate animals. To make them aware of commercially important animals.

Dissection:

Cockroach and Fish: Digestive system and Nervous system/Demo/CD/ Virtual.

Mountings/Slide:

Mouth parts - Honey bee, Cockroach, Mosquito, (slides).
Earthworm –Body setae (slide).
Identification of Cycloid, Placoid and Ctenoid scales – (slides).

Spotters

Invertebrates: Amoeba, Paramecium, Entamoeba, Euglena, Sycon, Leucosolenia, Aurelia, Obelia, Planaria, Liver fluke, Tapeworm, Neries, Leech, Crab, Cockroach, Honey bee, Mosquito, Scorpion, Scolopendra, freshwater mussel, Octopus, Sepia, Oyster, Star fish, Sea urchin, Sea cucumber.

Chordates: Shark, Teleost, Frog, Icthyophis, Calotes, Chameleon, Cobra, Viper, Pigeon, Parrot, Rat and Rabbit.

Commercial Importance: Newton’s Bee hive, Honey extracting devices, Honey, Wax, Bombyx mori, Mulberry leaves, Silk worm rearing appliances, Cocoons, Silk thread, Lampito mauritii, Eudrilus eugeniae, Perionyx excavates, Eisenia fetida, Vermicompost.

ENVIRONMENTAL STUDIES

(Applicable to the candidates admitted from the Academic year 2019-20 onwards)

Unit: 1 The Multidisciplinary nature of environmental studies
Definition, scope and importance. (2 lectures)
Need for public awareness

Unit: 2 Natural Resources:
Renewable and non-renewable resources:
Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.
f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.
   - Role of an individual in conservation of natural resources.
   - Equitable use of resources for sustainable lifestyles.

(8 lectures)

Unit: 3 **Ecosystems**

- Concept of an ecosystem.
- Structure and function of an ecosystem.

- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-
  a. Forest ecosystem
  b. Grassland ecosystem
  c. Desert ecosystem
  d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

Unit: 4 Biodiversity and its conservation

- Introduction – Definition : Genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of :

a. Air Pollution
b. Water Pollution
c. Soil Pollution
d. Marine Pollution

e. Noise pollution
f. Thermal Pollution
g. Nuclear hazards
   - Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
   - Role of an individual in prevention of pollution
   - Pollution case studies
   - Disaster management: floods, earthquake, cyclone and landslides.
   - Ill-Effects of Fireworks: Firework and Celebrations,
     Health Hazards,
     Types of Fire,
     Firework and Safety

(8 lectures)

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.

Case studies

- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

(7 lectures)

Unit: 7 Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education
- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

Unit: 8 Field Work

- Visit to a local area to document environmental assets-river / forest / grassland/ hill / mountain.

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p.
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.

12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB).
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p.
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p (M) Magazine (R) Reference (TB) Textbook.
23. http://nbaindia.org/uploaded/Biodiversityindia/Legal/33% 20Biological%20Diversity%20 Rules,%202004.pdf.

மூன்றாம் பருவம் - தாள் - III
காப்பியமும் நாடகமும் - 16LCT3

பாட நோக்கம்

1. தமிழ்க் காப்பியங்களை அறிமுகப்படுத்துதல்.
2. காப்பியங்கள் கூறும் வாழ்வியல் அறங்கள் உணர்த்துதல்.
3. நாடக இலக்கியங்களின் இலக்கியச் சுவையைப் பயிற்றுவித்தல்
4. நாடக இலக்கியத்தின் தனித்துவத்தைக் கற்பித்தல்.
5. காலந்தோறும் நாடக இலக்கியம் தந்த சமூகப் பங்களிப்பை உணர்த்துதல்.

மாணவர் பெறும் திறன்

1. காப்பிய இலக்கியத்தின் சிறப்புகளை அறிவர்.
2. காப்பியக் கதைகள் வழி அறச்சிந்தனை பெறுவர்.
3. பல்வேறு காப்பிய வடிவங்களைப் பற்றிய அறிவு பெறுவர்.
4. நாடகப் படைப்பாக்கத்திற்கான தூண்டுதலைப் பெறுவர்.
5. தமிழ்ச் சமூக வளர்ச்சியோடு நாடகக்கலை தொடர்ந்து வரும் தன்மையை உணர்வர்.

அலகு – I

1. **சிலப்பதிகாரம்** - அடைக்கலக் காதை
2. **மணிமேகலை** - சிறைக்கோட்டம் அறக்கோட்டமாக்கிய காதை
3. **சீவகசிந்தாமணி** - விமலையார் இலமபகம்

அலகு – II

4. **கம்பராமாயணம்** - குகப் படலம்
5. **வில்லிபாரதம்** - உலூகன் தூதுச் சருக்கம்

அலகு – III

6. **பெரிய புராணம்** - திருநாளைப்போவார் நாயனார் புராணம்
7. **சீறாப்புராணம்** - ஈத்தங்குலை வரவழைத்த படலம்
8. **தேம்பவாணி** - நீர் வரம் அடைந்த படலம்

அலகு – IV

நாடகம் : **சாபம்?.... விமோசனம்.**
மு. இராமசுவாமி, செண்பகம் இராமசுவாமி
பாவை பிரிண்டர்ஸ் பி லிட்,
ஜானிஜான்கான் சாலை, சென்னை. 14
அலைபேசி : 94425 88495, 4437 78719

அலகு – V

இலக்கிய வரலாறு:

பக்தி இலக்கியங்கள்
சிற்றிலக்கியங்கள்
இரட்டைக் காப்பியங்கள்
காப்பியங்கள்
நாடக இலக்கியம்

Semester III : Drama for Effective Communication - 16ELCE3

William Shakespeare : *The Merchant of Venice*

Textbook:

Romagil. *The Merchant of Venice.* Delhi: Oxford UP, 1992.

CORE COURSE - III

BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY – 16SCCBO3

Objectives:

1. *To understand the salient features of Bryophytes, Pteridophytes and Gymnosperms.*
2. *To study the structure and reproduction of various genera mentioned in the syllabus.*
3. *To understand the salient features and importance of fossils and fossilization process in tracing evolution.*

Unit I

Bryophytes – General Characteristics, Classification – Liverworts (Stotler et al., 2009), hornworts (Renzaglia et al., 2009), and Mosses (Goffinet et al., 2009); Morphology, Structure, Reproduction and life history of the following genera: Riccia, Marchantia, Anthoceros and Polytrichum.

Unit II

Pteridophytes – General characteristics and classification by Smith; Morphology, Structure, Reproduction and life-history of the following genera: Psilotum, Lycopodium, Selaginella and Equisetum.

Unit III

Morphology, structure, Reproduction and life-history of Adiantum, Marsilea; Stelar evolution in Pteridophytes; Heterospory and origin of seed habit.

Unit IV

Gymnosperms – General characteristics and classification of Gymnosperms by Sporne; Morphology, structure, mode of reproduction and life-history of the following genera: Cycas, Pinus and Gnetum.

Unit V

Paleobotany – fossils and methods of fossilization – Geological time – scale – an elementary knowledge of the computation of the age of fossils –

Radio - Carbon dating technique. A brief study of the following fossil forms: Rhynia, Lepidodendron, Lepidocarpon, Calamites & Williamsonia.

Books

BRYOPHYTES

1. Chopra, R.N. and Kumara, P.K. (1988). Biology of Bryophytes. Wiley Eastern Ltd., New Delhi.
2. Jeyaraman, (1978). Indiyavin liverwortugal (In Tamil). Tamil Nadu Textbook Society, Madras.
3. Palaniyappan, S. (1988). Bryophyta (In Tamil). T.K. Publishing House, Chennai.
4. Prem, P. (1981). Bryophytes: Morphology, Growth and differentiation. Atma Ram and Sons, New Delhi.
5. Rashid, A. (1998). An Introduction to Bryophyta. Vikas Publishing House (P) Ltd., New Delhi.
6. Smith, G.M. (1955). Cryptogamic Botany Vol. II Bryophytes and Pteridophytes (2nd edn.). Tata McGraw Hill Publishing Co., New Delhi.
7. Srivastava, N.N., (1996). Bryophyta. Pradeep Prakashan, Meerut.
8. Vashista, B.R. (1983). Botany for Degree Students – Bryophyta. S. Chand and Company Ltd., New Delhi.

Pteridophytes

1. Rashhed, A. (1999). An Introduction to Pteridophyta. Vikas Publishing House (P) Ltd., New Delhi.
2. Sharma, O.P. (1990). Textbook of Pteridophyta. MacMillan India Ltd., New Delhi.
3. Smith, G.M. (1955). Cryptogamic Botany. Vol. II, Bryophytes and Pteridophytes (2nd Edn.). Tata McGraw-Hill Publishing Co., New Delhi.
4. Sporne, K.R. (1970). The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants). Hutchinson University Library, London.

5. Sundara Rajan, S. (1994). Introduction to Pteridophyta. New Age International Publishers Ltd., Wiley Eastern Ltd., New Delhi.
6. Vashista, P.C. (1997). Botany for Degree Students Pteridophyta. S. Chand and Company Ltd., New Delhi.

Gymnosperms

1. Bhatnagar, S.P. and Alok M. (1997). Gymnosperms. New Age International (P) Ltd., Publisher, New Delhi.
2. Coulter, J.M. and Chamberlain, C.J. (1964). Morphology of Gymnosperms. Central Book Depot, Allahabad.
3. Sharma, O.P. (1997). Gymnosperms. Pragati Prakashan, Meerut.
4. Sporne, K.R. (1971). The Morphology of Gymnosperms (The Structure and Evolution of Primitive seed Plants). Hutchinson University Library, London.
5. Srivastava, H.N. (1998). Gymnosperms. Pradeep Publications, Jalandhar.
6. Vashishta, P.C. (1996). Botany for Degree Students-Gymnosperms (2^{nd} Edn.,). S. Chand and Company Ltd., New Delhi.

Paleobotany

1. Delavoryas, T. (1962). Morphology and Evolution of Fossil Plants. Holt, Rinehart and Winston, New York.
2. Scott, D.H. (1962). Studies in Fossil Botany (Vol. I and Vol. II). Hafner Publishing Co., New York.
3. Seward, A.C. (1959). Plant Life Through the Ages. Hafner Publishing Co., New York.
4. Shukla, A.C. and Misra, S.P. (1975). Essentials of Paleobotany. Vikas Publishing House (P) Ltd., New Delhi.
5. Stewart, W.N. (1983). Paleobotany and the Evolution of Plants. Cambridge University Press, Cambridge, London.
6. Venkatachala, B.S., Shukla, M. and Sharma, M. (1992). Plant Fossils-a Link with the Past (A Birbal Sahni Birth Centenary Tribute). Birbal Sahni Institute of Paleobotany, Lucknow.

CORE PRACTICAL - II
BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY & ANATOMY AND EMBRYOLOGY – 16SCCBO3

Practical for Core Course IV: A study of both vegetative and reproductive structures (wherever available) of Genera included in the theory.

Practical for Core Course VI: A study of the morphology and anatomy of both vegetative and reproductive parts of the living genera and fossil forms of the following Genera.

PTERIDOPHYTES

Psilotum - Demonstration only
Lycopodium - Stem and Cone only
Selaginella - Stem and Cone only
Equisetum - Stem, cone slide Demonstration only
Adiantum - Rachis, Sorus
Marsilea - Stem, Sporocarp slides

GYMNOSPERMS

Cycas Rachis, Leaflet – T.S.; Coralloid root, male cone microsporophyll, Megasporophyll - Demonstration only
Pinus - Needle – T.S., Young stem – T.S.; Male & Female cone – Demonstration only
Gnetum - Stem – T.S.; Male & Female Strobilus – Demonstration only

PALEOBOTANY

Rhynia, Lepidodendron, Lepidocarpon, Calamites (slides), Williamsonia.

SECOND ALLIED COURSE - I
CHEMISTRY – I – 16SACCH1

OBJECTIVES

1. *To understand the various theories of coordination chemistry.*
2. *To study the various concepts of resonance and halogen compounds.*
3. *To study the properties of aromatic compounds and organic reactions.*
4. *To learn the concepts of solid state chemistry.*

UNIT I COORDINATION CHEMISTRY AND INDUSTRIAL CHEMISTRY

1.1 Coordination Chemistry: Nomenclature – Werner's, sidgwick and Pauling's theories. Chelation - industrial importance of EDTA, Biological role of heamoglobin and Chrophyll.

1.2 Industrial Chemistry: Fuel gases – Water gas, producer gas, LPG gas, Gobar gas and natural gas. Fertilizers – NPK and mixed Fertilizers- soaps and detergents.

UNIT II ELECTRON DISPLACEMENT EFFECTS AND HALOGEN COMPOUNDS

2.1 Polar effects: Inductive effect – Relative Strength of Aliphatic monocarbocylic acid and aliphatic amines. Resonance – Condition for resonance. Consequences of resonance – resonance of energy. Basic property of aniline and acidic property of phenol. Hyperconjugation – Heat of hydrogenation - Bond length and dipole moment. Steric effect.

2.2 Halogen containing compounds: Important chlorohydrocarbons used as solvents. Pesticides – Dichloromethane, chloroform, carbon tetrachloride, DDT and BHC Types of solvents: - Polar, Non polar.

Unit III AROMATIC COMPOUNDS AND ORGANIC REACTIONS

3.1 Aromatic compounds: Structure, stability resonance and aromaticity of benzene. Substitution reaction: Nitration, Halogenations, Alkylation. Naphthalene – Isolation, properties and uses.

3.2 Organic reaction: Biuret, Decarboxylation, Benzoin, Perkin, Cannizaro, Claisen and Haloform reactions

3.3 Chemotherapy: Explanation with two examples each for analgesics, antibacterial, anti-inflammatory, antibiotics, antiseptic and disinfectant, anesthetics local and general (Structures not necessary).

UNIT IV SOLID STATE, ENERGETICS AND PHASE RULE

4.1 Solid state: Typical crystal lattices - unit cell, elements of symmetry, Bragg's equation, Weiss Indices, Miller indices, simple body centered and face centered lattices

4.2 Energetics: First law of thermodynamics – state and path function – need for the second law – carnots cycle and thermo- dynamic scale of temperature, spontaneous and Non – spontaneous processes – entropy – Gibbs free energy.

4.3 Phase rule: Phase, component, degree of Freedom, phase rule definitions - one component system– water system.

UNIT V CHEMICAL EQUILIBRIUM AND CHEMICAL KINETICS

5.1 Chemical equilibrium: Criteria of homogeneous and heterogeneous equilibria, -decomposition of HI, N2O4, CaCO3 + Pd5.

5.2 Chemical Kinetics: Order of reaction and their determinations - activation energy, effects of temperature on reaction rate.

REFERENCES

1. Gopalan R, Text Book of Inorganic Chemistry, 2nd Edition, Hyderabad, Universities Press, (India), 2012.
2. Morrison R.T. and Boyd R.N., Bhattacharjee S. K. Organic Chemistry (7^{th} edition), Pearson India, (2011).
3. Puri B.R., Sharma L.R. and Pathania M.S. (2013), Principles of Physical Chemistry, (35^{th} edition), New Delhi: Shoban Lal Nagin Chand and Co.

ALLIED COURSE - II
PRACTICAL
VOLUMETRIC AND ORGANIC QUANTITATIVE ANALYSIS

I. Volumetric Analysis

1. Acidimetry and alkalimetry

(a) Strong acid VS strong base (b) Weak acid VS strong base (c) Determination of hardness of water.

2. Permanganometry

(a) Estimation of ferrous sulphate (b) Estimation of oxalic acid.

3. Iodometry

(a) Estimation of potassium dichromate (b) Estimation of potassium permanganate.

II. Organic Analysis

Analyse the following organic Compounds.

1. Carbohydrate, 2. Amide, 3. Aldehyde, 4. Ketone, 5. Acid & 6. Amine

The students may be trained to perform the specific reactions like tests for elements (nitrogen only), aliphatic or aromatic, saturated or unsaturated and functional group present and record their observations.

REFERENCES

1. R. Gopalan, Elements of analytical chemistry, S. Chand, New Delhi, 2000.
2. N. S. Gnanapragasam and G. Ramamurthy, Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai-1998

Note: Scheme for Practical Evaluation.

Organic Qualitative Analysis - 20

Volumetric Estimation - 35

Record - 5

Internal Assessment - 40

Total : 100 4

Volumetric Analysis: 35

Procedure 5 marks

Results

< 2 % - 30 marks

2-3 % -20 marks

3-4 % - 10 marks

> 4 % - 5 marks

Organic Qualitative Analysis: 20

Identification of Nitrogen - 4 marks

Saturated and unsaturated - 3 marks

Aliphatic or Aromatic - 3 marks

Preliminary reactions with

Procedure - 5 marks

Functional group identified

Correctly - 5 marks

Total: 20

NON-MAJOR ELECTIVE - I

BIOFERTILIZERS AND BIOPESTICIDES – 16NMEBO1

Objectives:

1. *To understand the basics of biofertilizers and their cultivation*
2. *To study about mycorrhiza and their isolation and production*
3. *To impart knowledge on pesticides and their control by biopesticides, including their production and commercialization*

Unit I

Biofertilizers – Definition, kinds of microbes as biofertilizers, Rhizobium-legume Symbiotic association – mass cultivation and carrier materials.

Unit II

Cultural method of *Azospirillum*, *Azotobacter*, *Azolla* and *Anabaena*, carrier materials.

Unit III

Mycorrhiza – VAM association, types, isolation and inoculum production.

Unit IV

Pesticides – Introduction – Biological Magnification concept. Biopesticides – Viral origin, fungal origin.

Unit V

Biopesticides – Bacterial origin, *Bacillus thuringiensis* mechanism of action and application. Advantages of biopesticides and commercialization.

Books

3. Subba Rao, N.S. (2000). *Soil Microbiology*. Oxford and IBH Publishing Co. Ltd., New Delhi.
4. Varma, A. and Hock, B. (1995). *Mycorrhiza*. Springer–Verlag, Berlin.
5. Wicklow, D.T. and Soderstrom, B.E. (1997). *Environmental and Microbial Relationships*. Springer–Verlag, Berlin.
4. Yaaco Vokan (1994). *Azospirillum/Plant Associations.* CRC Press, Boca Raton, FL.

நான்காம் பருவம் - தாள் - IV

பண்டைய இலக்கியம் - 16LCT4

பாட நோக்கம்

1. பழந்தமிழ் இலக்கிய வளத்தை உணர்த்துதல்.
2. சங்க அக, புற பாடல் மரபுகளைப் பயிற்றுவித்தல்
3. புற இலக்கியங்கள் காட்டும் வாழ்வியல் அறங்களை உணர்த்துதல்.

மாணவர் பெறும் திறன்

1. பழந்தமிழ் இலக்கிய மரபை அறிவர்
2. சங்க இலக்கிய மரபை அறிவர்.
3. வாழ்வியல் அறங்கள் மற்றும் வரலாற்றுச் செய்திகளை அறிவர்.

அலகு – I

1. குறுந்தொகை

1. **'வில்லோன்'** எனத் தொடங்கும் பாடல் (பா.எ. 07)
2. **'அகவன்'** எனத் தொடங்கும் பாடல் (பா.எ. 23)
3. **'கான'** எனத் தொடங்கும் பாடல் (பா.எ. 38)
4. **'தலைப்புணை'** எனத் தொடங்கும் பாடல் (பா.எ. 222)
5. **'பாலும்'** எனத் தொடங்கும் பாடல் (பா.எ. 396)

2. நற்றிணை

1. **'நின்றசொல்லர்'** எனத் தொடங்கும் பாடல் (பா.எ. 01)
2. **'தடமருப்பு'** எனத் தொடங்கும் பாடல் (பா.எ. 120)

3. ஐங்குறுநூறு

1. **பாலைத்திணை – தலைவி இரங்கு பத்து**
   (331 முதல் 340 வரை) – 10 பாடல்கள்

அலகு II

4. கலித்தொகை

1. **குறிஞ்சிக்கலி**
   'சுடர்தொடீஇ' எனத் தொடங்கும் பாடல் (பா.எ. 15)
2. **நெய்தற்கலி**
   'மாமலர்' எனத் தொடங்கும் பாடல் (பா.எ. 16)

5. சிறுபாணாற்றுப்படை

1. **சிறுபாணாற்றுப்படை** முழுவதும்

அலகு – III

6. அகநானூறு

1. **'அகல் அறை'** எனத் தொடங்கும் பாடல் (பா.எ. 105)
2. **'நோகோ'** எனத் தொடங்கும் பாடல் (பா.எ. 153)

7. புறநானூறு

1. **'வள்ளியோர்'** எனத் தொடங்கும் பாடல் (பா.ஏ. 47)
2. **'நின்னயந்து'** எனத் தொடங்கும் பாடல் (பா.எ. 163)
3. **'உண்டாலம்ம'** எனத் தொடங்கம் பாடல் (பா.எ. 182)
4. **'ஈயென'** எனத் தொடங்கும் பாடல் (பா.எ. 204)
5. **'நினைக்குங்காலை'** எனத் தொடங்கும் பாடல் (பா.எ. 217)

அலகு – IV

8. திருக்குறள்

1. புறங்கூறாமை (அதிகாரம் 19)
2. மானம் (அதிகாரம் 97)
3. நெஞ்சொடு கிளத்தல் (அதிகாரம் 125)

9. நாலடியார்

1. **'அரும்பெறல்'** எனத் தொடங்கும் பாடல் (பா.எ. 34)
2. **'கல்லாதுபோகிய'** எனத் தொடங்கும் பாடல் (பா.எ. 169)
3. **'கோட்டுப்பூப்போல'** எனத் தொடங்கும் பாடல் (பா.எ. 215)
4. **'நன்னிலைாக்கண்'** எனத் தொடங்கும் பாடல் (பா.எ. 248)
5. **'ஒருநன்றி'** எனத் தொடங்கும் பாடல் (பா.எ. 357)

10. பழமொழி நானூறு

1. **'புலமிக்கவரை'** எனத் தொடங்கும் பாடல் (பா.எ.. 07)
2. **'முல்லைக்கு'** எனத் தொடங்கும் பாடல் (பா.எ. 74)
3. **'பூத்தாலும்'** எனத் தொடங்கும் பாடல் (பா.எ. 93)
4. **'செயல்வேண்டா'** எனத் தொடங்கும் பாடல் (பா.எ. 263)
5. **'நாடிநமரென்று'** எனத் தொடங்கம் பாடல் (பா.எ. 346)

அலகு – V

1. **இலக்கிய வரலாறு** - சங்க இலக்கியம்
2. **பொதுக்கட்டுரை தலைப்புகள்:**
   மனித நேயம்
   வாழ்வியல் அறங்கள்,
   மொழி உணர்ச்சி,
   அறிவியல் வளர்ச்சி ஆகியன.

தமிழ் இலக்கிய வரலாறு

பார்வை நூல்கள்

(நான்கு பருவங்களுக்கும்)

1. தமிழ் இலக்கிய வரலாறு முனைவர்ச.சுபாஷ் சந்திரபோஸ் இயல் பதிப்பகம், 23பி/2739, தொப்புள் பிள்ளையார் கோவில் தெரு, தெற்கலங்கம், தஞ்சாவூர் - 613 001. அலைபேசி எண் : 9940558934 விலைரூ.120/-

2. தமிழ் இலக்கிய வரலாறு முனைவர் லட்சுமணன் கிருஷ்ணா வெளியீடு, 7, பிரகாஷ் நகர், திருவெறும்பூர், திருச்சிராப்பள்ளி-13. அலைபேசி எண் : 9442210128 விலைரூ.140/-

3. பண்முக நோக்கில் தமிழ் இல்ககிய வரலாறு முனைவர் க.வாசுதேவன் தேவன் பதிப்பகம் 16/43, திருநகர் திருவானைக்கோவில் திருச்சிராப்பள்ளி - 620 005. அலைபேசி : 9894847005 விலைரூ. 110/-

4. தமிழர் இலக்கிய வரலாறு முனைவர் கி. இராசா பார்த்திபன் பதிப்பகம் ஏ12, எல்.ஐ.சி. காலனி திருச்சிராப்பள்ளி - 620 001. அலைபேசி : 9003730416 விலை ரூ.60/-

5. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு முனைவர் பாக்யமேரி நியூ செஞ்சுரிபுக் ஹவுஸ் பி. லிமிடெட் 41B,சிட்கோ தொழிற்பேட்டை அம்பத்தூர், சென்னை - 600 098. அலைபேசி : 9443778719 விலை ரூ.150/-

Semester IV : Short Stories for Effective Communication – 16ELCE4

Unit – I

Rabindranath Tagore : The *Auspicious Vision*

Bhabani Bhattacharya : *Glory at Twilight*

Unit –II

Oscar Wilde : *The Nightingale and the Rose*

John Galsworthy : *Acme*

Unit – III

Isaac Bashevis Singer : *The Son from America*

Ray Bradbury : *The Pedestrian*

Unit – IV

Anton Chekhov : *A Nincompoop*

Guy de Maupassant : *The Diamond Necklace*

Unit –V

Katherine Mansfield : *Sun and Moon*

Saki : *Fur*

Textbook:

Syamala, V, ed. *Story Time*. Chennai: Anu Chithra Publications, 1988.

CORE COURSE - IV
ANATOMY AND EMBRYOLOGY – 16SCCBO4

Objectives:

1. *To inculcate the basics of tissues and anatomical features of plants.*
2. *To impart the knowledge about the various aspects of morphogenesis.*
3. *To understand the key aspects of embryology of Angiosperms*

Unit I

Anatomy: Plant tissue-classification, Meristems, definition, differentiation, redifferentation and dedifferentation. Classification of meristems – apical meristems and lateral meristerms intercalary meristem, various Concepts of apical meristem theories, apical cell theory, Tunica – Corpus and Histogen theory.

Unit II

Epidermal tissue system, stomatal types. Permanent tissue – simple – Parenchyma, collenchyma and sclerenchyma. Complex Permanent Tissues: Xylem - Components, Ontogeny and Phylogeny; Phloem – Components, Ontogeny and Phylogeny. Laticifer types.

Unit III

Primary structure of root, stem and leaf in dicots and monocots. Normal Secondary growth in stem and root - annual rings – heart Wood, sapwood. Periderm formation. Anomalous secondary growth in dicot stems: Nyctanthes and Boerhaavia and monocot stem-Dracaena. Nodal anatomy – uni and trilacunar types.

Unit IV

Embryology - Structure and development of anther. Microsporogenesis; Microgametogenesis; Ultrastructure of pollen wall - structure, development and types of ovules, megasprogenesis, Megagametogenis (Polygonum type of embryosac development), Fertilization.

Unit V

Endosperm – Nuclear, cellular and helobial and Ruminate types. Development of embryo – dicot and Monocot. Basic concepts of apomixis, apospory, Polyembryony and Parthenogenesis.

Books

ANATOMY

1. Cutter, E.G. (1978). Plant Anatomy Part-I: Cells and Tissues (2nd Edn.), Plant Anatomy Part-II: Experiments and Interpretations. Edward Arnold, London.
2. Esau, K. (1965). Vascular Differentiation in Plants. Holt, Rinehart and Winston, New York.
3. Esau, K. (1980). Plant Anatomy (2nd Edition). Wiley Eastern Ltd., New Delhi.
4. Fahn, A. (1997). Plant Anatomy. Pergamon Press, Oxford.
5. Foster, A.S. (1960). Practical Plant Anatomy. Van Nostrand and East–West Press, New Delhi.
6. Govindarajulu, A. (1980). "Marangal" (Trees) (In Tamil). Tamilnadu Textbook Society, Chennai.
7. Krishnamurthy, K.V. (1980). Wood. Tetrahedron Publications, Tiruchirappalli.
8. Vasishta, P.C. (1977). A Text Book of Plant Anatomy. S. Nagin and Co., New Delhi.

EMBRYOLOGY

1. Bhojwani, S.S. and Bhatnagar, S.P. (2000). The Embryology of Angiosperms (4th Edition). Vikas Publishing House (P) Ltd., UBS Publisher's Distributors, New Delhi.
2. Johri, B.M. (1982). Experimental Embryology of Vascular Plants. Springer – Verlag, Heidelberg.
3. Maheswari, P. (1985). An Introduction to the Embryology of Angiosperms. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Maheswari, P. (1963). Recent Advances in the Embryology of Angiosperms. International Society of Plant Morphologists, University of Delhi.
5. Rogland, A. (2000). Developmental Botany (Embrylogy of Angiosperms). Saras Publications, Nagercoil.
6. Swamy, B.G.L. and Krishnamoorthy, K.V. (1980). From Flower to Fruit. Tata McGraw Hill Publishing Co. Ltd., New Delhi.

CORE PRACTICAL - II
BRYOPHYTES, PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY & ANATOMY AND EMBRYOLOGY – 16SCCBO3

Practical for Core Course IV: A study of both vegetative and reproductive structures (wherever available) of Genera included in the theory.

Practical for Core Course VI: A study of the morphology and anatomy of both vegetative and reproductive parts of the living genera and fossil forms of the following Genera.

PTERIDOPHYTES

Psilotum - Demonstration only
Lycopodium - Stem and Cone only
Selaginella - Stem and Cone only
Equisetum - Stem, cone slide Demonstration only
Adiantum - Rachis, Sorus
Marsilea - Stem, Sporocarp slides

GYMNOSPERMS

Cycas Rachis, Leaflet – T.S.; Coralloid root, male cone microsporophyll, Megasporophyll - Demonstration only
Pinus - Needle – T.S., Young stem – T.S.; Male & Female cone – Demonstration only
Gnetum - Stem – T.S.; Male & Female Strobilus – Demonstration only

PALEOBOTANY

Rhynia, Lepidodendron, Lepidocarpon, Calamites (slides), Williamsonia.

ALLIED COURSE - III
GENERAL CHEMISTRY – II – 16SACCH1

OBJECTIVES

1. *To learn the basics of nuclear chemistry and metallic bond.*
2. *To understand the properties and applications of carbohydrates, amino acids and proteins.*
3. *To study the basic concepts of polymers, heterocyclic compounds and stereoisomerism.*

UNIT I : NUCLEAR CHEMISTRY AND METALLIC BOND

1.1 Nuclear Chemistry : Fundamental particles of nucleus- isotopes, isobars, isotones and isomers – differences between chemical reactions and nuclear reactions, nuclear fusion and fission- radioactive series.

1.2 Metallic bond: Electron gas, Pauling and band theories, semiconductiors – intrinsic, extrinsic n-type and p-type semi conductors.

1.3 Compounds of sulphur and sodium thiosulphate

UNIT II: CARBOHYDRATES, AMINOACIDS AND PROTEINS

2.1 Carbohydrates: classification – glucose and fructose – preparation and properties –structure of glucose – Fischer and Haworth cyclic structures.

2.2 Amino acids and proteins: Amino acids – Classification based on structure. Essential and non – essentials amino acids – preparation, properties and uses – peptides (elementary treatment only) – proteins – Classification based on physical properties and biological functions. Structure of proteins – primary and secondary (elementary treatment).

UNIT III: POLYMERS, HETEROCYCLIC COMPOUND AND STEREOISOMERISM

3.1 Synthetic polymers: preparation, properties and uses of teflon, epoxy resins, polyester resin.

3.2 Heterocyclic compounds: Furan, pyrrole and pyridine – preparation, properties and uses – basic properties of pyridine and pyrrole.

3.3 Stereoisomerism: Optical isomerism – Lactic and tartaric acid – racemic mixture and resolution. Geometrical isomerism – maleic and fumaric acids. 6

UNIT IV: SURFACE AND PHOTO CHEMISTRY

4.1 Surface Chemistry: Emulsions, gels – preparation, properties - Electrophoresis and applications, chromatography – Column, paper and thin layer Chromatography.

4.2 Photochemistry : Laws of photochemistry and applications.

UNIT V: ELECTROCHEMISTRY, pH AND BUFFER

5.1 Electrochemistry: Specific and equivalent conductivity – their determination – effect of dilution on conductivity. Ostwald's Dilution law, Kohlrausch law, conductivity measurements, and conductometric titrations.

5.2 pH and buffer: Importance of pH and buffers – pH determination by colorimetric and electrometric methods.

REFERENCES

1. B.R. Puri, L.R. Sharma, K.C. Kalia, 'Principles of Inorganic Chemistry', 21st edition, Vallabh Publications, 2004-2005.
2. Bahl, B.S. and Bahl, A., Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (2010)
3. Puri B.R., Sharma L.R. and Pathania M.S. (2013), Principles of Physical Chemistry, (35th edition),New Delhi: Shoban Lal Nagin Chand and Co.

ALLIED COURSE - II
PRACTICAL
VOLUMETRIC AND ORGANIC QUANTITATIVE ANALYSIS – 16SACCH1P

I. Volumetric Analysis

1. Acidimetry and alkalimetry

(a) Strong acid VS strong base (b) Weak acid VS strong base (c) Determination of hardness of water.

2. Permanganometry

(a) Estimation of ferrous sulphate (b) Estimation of oxalic acid

3. Iodometry

(a) Estimation of potassium dichromate (b) Estimation of potassium permanganate

II. Organic Analysis

Analyse the following organic Compounds.

1. Carbohydrate, 2. Amide, 3. Aldehyde, 4. Ketone, 5. Acid & 6. Amine

The students may be trained to perform the specific reactions like tests for elements (nitrogen only), aliphatic or aromatic, saturated or unsaturated and functional group present and record their observations.

REFERENCES

1. R. Gopalan, Elements of analytical chemistry, S. Chand, New Delhi, 2000.
2. N. S. Gnanapragasam and G. Ramamurthy, Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai-1998.

Note: Scheme for Practical Evaluation.

Organic Qualitative Analysis - 20

Volumetric Estimation - 35

Record - 5

Internal Assessment - 40

Total : 100 4

Volumetric Analysis: 35

Procedure 5 marks

Results

< 2 % - 30 marks

2-3 % -20 marks

3-4 % - 10 marks

> 4 % - 5 marks

Organic Qualitative Analysis: 20

Identification of Nitrogen - 4 marks

Saturated and unsaturated - 3 marks

Aliphatic or Aromatic - 3 marks

Preliminary reactions with

Procedure - 5 marks

Functional group identified

Correctly - 5 marks

Total: 20

NON-MAJOR ELECTIVE - II
HORTICULTURE – 16SNMEBO2

Objectives:

1. *To study the importance of horticultural crops and their propagation methods*
2. *To understand the types of gardens and their establishment*
3. *To educate floriculture and fruit culture, green house and nursery management*

Unit I

Horticulture: Importance and scope of Horticulture, Classification of horticultural crops – fruits, vegetables crops, climate, soil, water, nutrition needs of horticultural crops.

Unit II

Plant propagation methods, cutting, layering, grafting, budding, stock-scion relationship. Use of plant regulators in horticulture.

Unit III

Garden designs, types of gardens – formal, informal and kitchen garden, units of garden, hedge, border, popiary arches and lawn maintenance.

Unit IV

Floriculture, cultivation of commercial flowers – rose and jasmines. Cultivation of important fruit trees – Mangoes and Banana.

Unit V

Green house, Indoor gardening – Bonsai – flower arrangements – nursery management and maintenance.

Books

1. Bose, T.K. and Mukherjee, D. (1972). Gardening in India. Oxford & IBH Publishing Co., Kolkatta.
2. Edmond, J.B., Musser, A.M. and Andrews, F.S. (1951). Fundamentals of Horticulture. McGraw-Hill Book Company, Inc., New York.

3. Jitendra Singh. (2014). Basic Horticulture. Kalyani Publishers, Chennai.
4. Kumar, N. (1997). Introduction to Horticulture. Rajalakshmi Publications, Nagercoil.
5. Lex Lauries and Victor, H.R. (1950). Floriculture – Fundamental and Practices. McGraw Hill Publishers, New York.
6. Naik, K.C. (1963). South Indian Fruits and Their Culture. Vardhachary & Co., Madras.
7. Randhawa, G.C. (1973). Ornamental Horticulture in India. Today & Tomorrow Publishers, New Delhi.
8. Sandhu, M.K. (1989). Plant Propagation. Wiley Eastern Ltd., New Delhi.
9. Sundararajan, J.S., Muthuswamy, J., Shanmugavelu, K.G. and Balakrishnan, R. A Guide to Horticulture. Thiruvenkadam Printers, Coimbatore.

MICROBIOLOGY
SKILL BASED ELECTIVE - I (SEMESTER IV)
MICROBIAL NANOTECHNOLOGY

Objectives

To introduce the students to the novel/emerging subject – nanotechnology as to sensitize them with the growing research and career opportunities in the field.

UNIT I

Definition - history of nanomaterials – Richard Feynman and his contributions – classification and properties of nanomaterials – concept of nanoscale engineering – size and confinement effects.

UNIT II

Nano architecture: strategies - bottom up, top down and functional approaches; Chemical and physical synthesis of nanoparticles - characteristics of nanoparticles; Characterization of nanoscale materials using UV spectroscopy, TEM, AFM/STM, XRD and FTIR.

UNIT III

Bionanomaterials – DNA, protein and lipids based nanostructures- synthesis, characterization and applications; Bionanopores- Microbial synthesis (bacteria, fungi and yeast) of nanoparticles – mechanism of synthesis – Molecular Self assembly in biology.

UNIT IV

DNA/protein-gold nanoparticle conjugates; DNA nanostructures for mechanics and computing; DNA as smart glue- DNA analyzer as biochips; Biologically inspired nanocomposites ; Peptide nanostructures and their applications– electronics, antibacterial agents.

UNIT V

Antimicrobial activity of nanoparticles- mechanism; Nanoanalytics- Quantum dots - Bioconjugates in cell and tissue imaging; Diagnosis of cancer and other diseases using bionano systems; Drug and gene delivery.

REFERENCES

1. Rao CNR, Muller A, Cheetham AK. The Chemistry of Nanomaterials - Synthesis, Properties and Applications – Published by John Wiley and Sons. 2006.
2. Pradeep T. Nano: The Essentials –Tata Mcgraw Hill, New Delhi. 2007.
3. Niemeyer CM and Mirkin CA. Nanobiotechnology: Concepts, Applications and perspectives - Wiley-VCH Verlag GmbH and Co., KgaA, Weiheim. 2004.
4. Claudio Nicolini. Nanobiotechnology and Nanobiosciences - Pan Stanford Publishing Pvt. Ltd. 2009.
5. David Goodsell S. Bionanotechnology, Lessons from Nature - Wiley-Liss, Inc. 2004.
6. Bhushan B. Handbook of Nanotechnology - Springer, Heidelberg. 2006.

CORE COURSE - V
CELL AND MOLECULAR BIOLOGY – 16SCCBO5

Objectives:

To enable the students

1. *To study microscopy, cell organelles of Prokaryotic and Eukaryotic cells, chromosomes, cell divisions, DNA and RNA.*
2. *To understand gene regulation and chloroplast and mitochondria genome organization.*

Unit I

Basic principles of microscopy. Differentiating features of Prokaryotic and Eukaryotic cells – Ultra structure and functions of plasma membrane – Ultra structure of cell organelles – Plastids, Mitochondria, Golgi bodies, Endoplasmic Reticulum, Lysosomes, Cell Inclusions.

Unit II

Nucleus – Nucleolus - Structure of euchromatin and heterochromatin – Special types of chromosomes – Lamp brush chromosomes and polytene chromosomes. Cell cycle, Cell Division: Mitosis and meiosis.

Unit III

Nucleic acids – DNA and RNA – Differentiating features – Griffith Experiment - Structure, properties (C-Value Paradox) & replication of DNA - Hershey and Chase experiment – RNA – Structure and functions of rRNA, mRNA and tRNA.

Unit IV

Gene regulation in Prokaryotes (Lac operon concept) and Eukaryotes – Initiation, Elongation and termination of Transcription and Translation. Gene regulation in prokaryotes and eukaryotes – Differences.

Unit V

Chloroplast and mitochondrial genome organization – Basic mechanism of signal transduction – Programmed Cell Death (PCD).

Books

1. De Robertis, E.D.P. and De Robertis, E.M.F. Jr. (1980). Cell and Molecular Biology (7^{th} Ed). Saunders College/Holt, Rinehart and Winson, Philadelphia.
2. Grierson, D. and Convey, S.N. (1989). Plant Molecular Biology. Blackie Publishers, New York.
3. Lea, P.J. and Leegood, R.C. (1999). Plant Biochemistry and Molecular Biology. John Wiley and Sons, London.
4. Old, R.W. and Primrose, S.B. (1994). Principles of Gene Manipulation. Blackwell Science, London.
5. Power, C.B. (1984). Cell Biology. Himalaya Publishing Co., Mumbai.
6. Sharma, N.S. (2005). Molecular Cell Biology. International Book Distributors, Dehradun.
7. Verma, P.S. and Agarwal, V.K. (1986). Cell Biology and Molecular Biology (Cytology). S. Chand and Company Ltd., New Delhi.

CORE COURSE - VI

GENETICS, BIOSTATISTICS AND EVOLUTION – 16SCCBO6

Objectives:

1. *To study Mendelian genetics, recombination of chromosomes, structure and function of genes and their various units*
2. *To educate on mutation*
3. *To impart knowledge on biostatistics and its applications biological experiments*
4. *To understand the mechanism of evolution and study of population genetics*

Unit I

Genetics: Mendel's laws, monohybrid, dihybrid, back cross and test cross. Allelic interactions: Incomplete dominance and co-dominance -complementary factor hypothesis, epitasis (Dominant and recessive), Non-allelic interaction – Lethal factor, Multiple factor hypothesis

Unit II

Recombination – Linkage & crossing over in Lathyrus odoratus, eye colour in Drosophila and colour blindness in man. Cytoplasmic inheritance. Sex determination in plants and Drosophila. Functional units of gene – cistron, recon, muton, codon and operon concept (lac). Mutation – classification, types, mechanism (physical and chemical mutagens) and application (role of mutation in evolution)

Unit III

Biostatistics: Definition and scope. Sampling techniques: Sample, population, Random and non – random sampling techniques. Data – Types of data. Presentation of data – Graphical methods: Histogram, Bar and Pie diagrams.

Unit IV

Measures of central tendency – Mean, median and mode. Measures of dispersion – range, variance, Standard Deviation and Standard Error. Chi Square analysis. Correlation and its types: Probability Distribution – normal, binomial and Poisson distribution.

Unit V

Evolution - Evolutionary concepts - Theories of Lamarck, Charles Darwin and the modern synthetic theories. Population genetics - gene pool, gene frequency and Hardy–Weinberg law. Factors affecting gene frequencies.

BOOKS

GENETICS

1. Adrin, M.S.R.B., Owen, R.D. and Edger, R.S. (1979). General Genetics. In: Mendelism. Eurasia Publishing House (P) Ltd., New Delhi.
2. Agarwal, V.K. (2000). Simplified course in Genetics (B.Sc., Zoology). S. Chand & Company Ltd., New Delhi.
3. Ahluwalia, K.B. (1990). Genetics. Wiley Eastern Ltd., Madras.
4. Chandrasekaran, S.N. and Parathasarathy, S.V. (1965). Cytogenetics and Plant Breeding. P. Varadhachari & Co., Madras.
5. Daniel Sundararaj, D. and Thulsidas, G. (1972). Introduction to Cytogenetics & Plant Breeding (3rd Ed.). Popular Book Depot, Madras.
6. Gardner, E.J. and Snusted, D.P. (1984). Principles of Genetics (7th edition). John Wiley & Sons, New York.
7. Gupta, P.K. (2000). Genetics. Rastogi Publishers, Meerut.
8. Herskowitz, I.H. (1977). Principles of Genetics (2nd Ed.). MacMillan Publishing Co. Inc., New York.
9. Hexter, W. and Yost, H.T. Jr. (1977). The Science of Genetics. Prentice Hall of India (P) Ltd., New Delhi.
10. Jain, H.K. (1999). Genetics-Principles, Concepts & Implications. Oxford & IBH Publishing Co., (P) Ltd., New Delhi.
11. Lewin, B. (1990). Genes IV. Oxford University Press, Oxford.
12. Meyyan, R.P. (2000). Genetics & Evolution. Saras Publication, Nagercoil.
13. Palaniyappan, S. (1987). Marabiyal (Genetics - In Tamil). V.K. Publishing House, Madras.
14. Pandey, B.P. (2012). Cytology, Genetics and Molecular Genetics. Tata McGraw-Hill Education Private Ltd., New Delhi.
15. Renganathan, T.K. and Shanmugavel, S. (1996). Genetics & Genetic Engineering. Commercial Offset Printers, Sivakasi.
16. Sandhya Mitra (1994). Genetics - A Blue Print of Life. Tata McGraw-Hill Education Private Ltd., New Delhi.

17. Sarin, C. (1994). Genetics. Tata McGraw-Hill Education Private Ltd., New Delhi.
18. Singleton, R. (1963). Elementary Genetics. D. Van Nostrand Co., Ltd. Inc., New York.
19. Sinha, U. and Sinha, S. (1989). Cytogenetics, Plant Breeding & Evolution. Vikas Publishing House, New Delhi.
20. Sinnott, E.W., Dunn, L.C. and Dobshansky, J. (1958). Principles of Genetics (5th Edition) McGraw Hill Publishing Co., New York.
21. Strickberger, M.W. (1976). Genetics (2nd Ed.). MacMillan Publishing Co. Inc., New York.
22. Watson, J.D. (1977). Molecular Biology of the Gene. W.A. Benjamin Inc., California.
23. Winchester, A.M. (1958). Genetics (3rd Ed.). Oxford & IBH Publishing House, Calcutta.
24. Winter, P.C., Hickey, G.I. and Fletcher, H.L. (1999). Instant Notes in Genetics. Viva Books (P) Ltd., New Delhi, Mumbai, Chennai.

BIOSTATISTICS

1. Nageswara Rao, G. (1983). Statistics for Agricultural Science. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Olive, J.D. (1995). Basic Statistics - A Primer for the Biomedical Sciences. John Wiley and Sons, New Delhi.

EVOLUTION

1. Gottlieb, LD. and Jain, S.K. (1988). Plant Evolutionary Biology. Chapman & Hall, London.
2. Savage, J.M. (1969). Evolution (2nd Ed.). Amerind Publishing (P) Ltd., New Delhi.
3. Shukla, R.S. and Chandel, P.S. (1996). Cytogenetics, Evolution & Plant Breeding. S. Chand & Company Ltd., New Delhi.
4. Sproule, A. (1998). Charles Darwin Scientists who have changed the world. Orient Longmans, Hyderabad.
5. Verma, P.S. and Agarwal, V.K. (1999). Concepts of Evolution. S.Chand & Company Ltd., New Delhi.

CORE COURSE - VII

MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY – 16SCCBO7

Objectives:

To enable the students

1. *To study morphological features of vegetative, inflorescence, fruits and seed characters.*
2. *To impart knowledge on botanical nomenclature, classifications, merits and demerits of various systems of classifications.*
3. *To understand the systematics of the selected families of the flowering plants with their economic importance.*
4. *To have knowledge on the economically important plants with their systematic treatment.*

Unit I

Morphology: vegetative, floral and fruit parts - Inflorescence - Types - racemose, cymose, mixed and special types. Fruit - simple, fleshy, dry dehiscent and dry indehiscent, aggregate and multiple fruits.

Unit II

Binomial nomenclature - ICBN rules - taxonomic types. Systems of Classification - Bentham and Hooker classification - Merits and demerits. Herbarium techniques.

Unit III

A detailed study of the following families with their economic importance - Annonaceae, Capparidaceae, Tiliaceae, Rutaceae, Anacardiaceae, Leguminosae (Papilionaceae, Cesalpinaceae and Mimosaceae) and Cucurbitaceae.

Unit IV

A detailed study of the following families with their economic importance – Rubiaceae, Asteraceae, Apocynaceae, Asclepiadaceae, Solanaceae, Verbenaceae, Euphorbiaceae, Orchidaceae and Poaceae.

Unit V

Economic Botany: A brief study of the following economically important plants: Food – Cereals (Oryza sativa, Eleusine coracana); Pulses – Black gram (Phaseolus mungo), Edible – Gingelly oil (Sesamum indicum); Root tubers – Tapioca (Manihot esculenta); Sugar – Sugarcane (Saccharum officinarum). Fibres – Textiles (Gossypium); Others – Crotalaria, Agave. Medicinal Plants – Ocimum, Phyllanthus, Solanum. Forest Products – Timber: Teak (Tectona grandis), Jack (Artocarpus heterophyllus). Tannins, Gums, Resins, Turpentine.

BOOKS

TAXONOMY

1. Gurcharan Singh (1999). Plant Systematics - Theory & Practice. Oxford & IBH Publishing Co. (P) Ltd., New Delhi.
2. Jaques, H.E. (1999). Plant Families-How to know them?. Agro Botanical Publishers (India), Bikaner.
3. Jefferey, C. (1968). An Introduction to Plant Taxonomy. J.A. Churchill, London.
4. Lawrence, G.H.M. (1953). Taxonomy of Vascular Plants. Oxford & IBH Publishers, New Delhi.
5. Lawrence, G.H.M. (1955). An Introduction to Plant Taxonomy. The Central Book Depot, Allahabad.
6. Mathews, K.M. (1987-90). Flora of Tamilnadu Carnatic (1-4vols.) Rapinat Herbarium, Trichy.
7. Mathur, R.C. (1970). Systematic Botany (Angiosperms). Agra Book Stores, Lucknow.
8. Mitra, J.N. (1964). An Introduction to Systematic Botany & Ecology. The World Press (P) Ltd., Calcutta.
9. Naik, V.N. (1996). Taxonomy of Angiosperms (9^{th} Ed.). Tata McGraw-Hill Publishing Co., (P) Ltd., New Delhi.
10. Narayanaswamy, R.V. and Rao, K.N. (1976). Outlines of Botany. S.Viswanathan Printers & Publishers, Chennai.
11. Palaniyappan, S. (2000). Angiospermgalin Vagaippadu (Taxonomy of Angiosperms). V.K. Publishing House, Chennai.

12. Pandey, B.P. (1997). Taxonomy of Angiosperms. S. Chand & Company Pvt. Ltd., New Delhi.
13. Porter, C.L. (1967). Taxonomy of flowering Plants. Eurasia Publishing House, New Delhi.
14. Ramaswami, S.N., Lakshminarayana, S. and Venkateswaralu, V. (1976). Taxonomy (Systematic Botany) for Degree Course. Maruthi Book Depot, Guntur, Hyderabad.
15. Sharma. O.P. (2007). Plant Taxonomy. Tata McGraw–Hill Publishing Co., New Delhi.
16. Singh, V. and Singh, D.K. (1983). Taxonomy of Angiosperms. Rastogi Publications, Meerut.
17. Sivarajan V.V. (1993). Introduction to the Principles of Plant Taxonomy (2^{nd} Edn.). N.K.P. Robson (Ed.). Oxford & IBH Publishing Co. (P) Ltd., New Delhi.
18. Subramaniyan, N.S. (1999). Laboratory Manual of Plant Taxonomy (2^{nd} Ed.). Tata McGraw-Hill Publishing Co., New Delhi.
19. Vashista, P.C. (1997). Taxonomy of Angiosperms. S. Chand & Company Pvt. Ltd., New Delhi.

ECONOMIC BOTANY

1. Ashok Bendre and Ashok Kumar (1998-99). Economic Botany. Rastogi Publications, Meerut.
2. Govinda Praksh and Sharma, S.K. (1975). Introductory Economic Botany. Jai Prakash Nath, Meerut.
3. Gupta, S.K. and Kaushik, M.P. (1973). An Introduction to Economic Botany. K. Nath & Co., Meerut.
4. Hill, A.W. (1952). Economic Botany. Tata McGraw–Hill Publishing Co., New Delhi.
5. Pandey, B.P. (2000). Economic Botany. S. Chand & Company Ltd., New Delhi.
6. Sambamurthy, A.V.V.S. and Subrahmanyan, N.S. (1989). A Text Book of Economic Botany. Wiley Eastern Ltd., Madras.
7. Sen, S. (1992). Economic Botany. New Central Book Agency, Calcutta.
8. Verma, V. (1974). A Text Book of Economic Botany. Emkay Publications, New Delhi.

CORE PRACTICAL - III

CELL AND MOLECULAR BIOLOGY & GENETICS, BIOSTATISTICS AND EVOLUTION & MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY – 16SCCBO3P

CELL AND MOLECULAR BIOLOGY

1. Observation of plant cells in Onion peeling and Rheo leaf
2. Non-living inclusions: Raphides, cystolith and Starch grains
3. Cell division: Mitosis and Meiosis – Squash technique in onion toot tips and Tradescantia/Rheo flower bud respectively
4. Isolation of cell organelles through differential centrifugation
5. Photographs: Ultra Structure of cell organelles

GENETICS, BIOSTATISTICS & EVOLUTION

- Problems on simple monohybrid and dihybrid ratios. Simple problems on interaction on factors included in the theory.
- Simple experiments to determine the mean, median and mode. Illustration of graphic representation of data using simple analysis.

MORPHOLOGY, TAXONOMY & ECONOMIC BOTANY

Training in dissection, observation, identification and sketching of floral parts of plants belonging to the families mentioned in the syllabus along with floral diagrams and floral formula.

Description of plants in technical terms.

Field study flora.

Submission of 25 Herbarium specimens.

Economic plants covered in theory part in taxonomy and economic botany and their importance.

MAJOR-BASED ELECTIVE - I
MEDICAL AND APPLIED BOTANY – 16SMBEBO1

Objectives:

1. *To understand the importance of the medicinal plant wealth in India and the role of Medicinal plants in human health care.*
2. *To know the medicinally useful plants, Herbal medicine preparation for common diseases and adulterants.*
3. *To understand the importance of biofertilizers and biopesticides*
4. *To understand the techniques involved in the cultivation of edible mushrooms.*

Unit I

Medical Botany: Importance and relevance of herbal drugs in Indian Systems of Medicine. Pharmacognosy – aim, scope and branches. Phytochemicals – reserve materials, secretory materials and excretory materials.

Unit II

Cultivation and marketing of Medicinal plants: Aloe vera, Cassia senna, Catharanthus roseus, Gloriosa superba and Withania somnifera. Poisonous plants – action and treatments for different types of plant poisons, rejuvenating herbs and medicinal uses of non-flowering plants

Unit III

Adulteration and substitution of crude drugs – methods, types and identification; botanical description and active principles in the drugs of roots, rhizomes, woods and bark, leaves, flowers and seeds (two examples each/plant part).

Unit IV

Biofertilizer Technology: biofertilizers – types and importance. Mass cultivation of Azospirillum, Azolla and Anabaena. Rhizobium-legume symbiotic association – mass cultivation and carrier materials. Mycorrhiza – types and importance. Biopesticides – importance; bacterial (Bacillus thuringiensis); Viral (NPV); Fungal (Trichoderma).

Unit V

Mushroom Technology: types and identification of edible and poisonous mushrooms; nutritive value; cultivation of button (Agaricus bisporus)

and oyster mushroom (Pleurotos sajorcaju); harvest and storage methods; mushroom research centres in India.

BOOKS

1. Agarwal, O.P. (2014). Organic Chemistry Natural Products, Vol. II. Krishna Prakashan Media (P) Ltd., Meerut.
2. Alice, D., Muthusamy and Yesuraja, M. (1999). Mushroom Culture. Agricultural College, Research Institute Publications, Madurai.
3. Chopra, R.N., Badhuvar, R.L. and Gosh, G. (1965). Poisonous Plants of India. CSIR Publications, New Delhi.
4. Chopra, R.N., Chopra, I.C., Handa, K.L. and Kapur, L.D. (1994). Indigenous Drugs of India. IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Gamble, J.S. and Fisher, C.E.C. (1915-1938). Flora of the Presidency of Madras. Adlard & Son Ltd., London.
6. Marimuthu, T. (1991). Oyster Mushroom. Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
7. Mathew, K.M. (1988). Flora of the Tamilnadu Carnatic. Rapinat Herbarium, Tiruchirappalli.
8. Nair, N.C. and Henry, A.M. (1983). Flora of Tamil Nadu, India. Botanical Survey of India.
9. Nita Bhal (2000). Handbook on Mushrooms Vol. I and II (2^{nd} Ed.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
10. Pathak, V.N. and Yadav, N. (1998). Mushroom Production and Processing Technology. Agrobios, Jodhpur.
11. Somasundaram, S. (1997). Medicinal Botany (Maruthuva Thavaraviyal) (Tamil Medium Book). Elangovan Publishers, Tirunelveli.
12. Srivastava, A.K. (2006). Medicinal Plants. International Book Distributors, Dehradun.
13. Subba Rao, N.S. (2000). Soil Microbiology. Oxford and IBH Publishing Co. Ltd., New Delhi.
14. Tripathi, D.P. 2005. Mushroom Cultivation. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
15. Varma, A. and Hock, B. (1995). Mycorrhiza. Springer–Verlag, Berlin.
16. Yaaco Vokan (1994). Azospirillum/Plant Associations. CRC Press, Boca Raton, FL.

Note: No Practical for this paper.

SKILL BASED ELECTIVE - II (SEMESTER V)
DIAGNOSTIC MICROBIOLOGY

Objectives

To provide the learners an overview of the clinical microbiology laboratory organization and its activities. To outline various diagnostic approaches covering representative techniques in each category starting from traditional to molecular diagnosis of various diseases caused by bacterial, viral, fungal and protozoan pathogens.

Unit I

Purpose and philosophy of diagnostic microbiology – Organization of clinical microbiology laboratory - responsibility – Laboratory safety: General safety considerations – biohazards and practices specific to microbiology – classification of biological agents on the basis of hazards

Unit II

Collection of bacterial, viral, fungal and protozoan diseases associated clinical specimens (oral cavity, throat, skin, blood, CSF, urine and faeces) for diagnosis and methods of transport and storage – rejection of specimen.

Unit III

Examination of clinical sample by staining - Gram stain, Ziehl - Neelson staining for tuberculosis Giemsa stained thin blood film for malaria - LCB for fungal identification - Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, MacConkey agar, Distinct colony and biochemical properties of various bacterial pathogens. Culture and identification of fungi.

Unit IV

Serological Methods – Agglutination based methods: WIDAL, immunofluorescence – Automated methods: ELISA, Nucleic acid based methods-PCR. Brief note on immunodiffusion and immunoelectrophoresis. Brief note on commercial kits for typhoid, dengue and HIV, swine flu detection.

Unit V

Importance and determination of resistance/sensitivity of bacterial pathogens using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method and E test – importance of MIC determination. Antimycotic susceptibility testing –reporting and expediting results – Computerization - Quality assurance - safe disposal of specimens and biohazards.

REFERENCES

1. Ananthanarayan R and Paniker CKJ. Textbook of Microbiology, 8th edition, Universities Press Private Ltd. 2009.
2. Brooks GF, Carroll KC, Butel JS, Morse SA and Mietzner TA. Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication. 2013.
3. Randhawa VS, Mehta G and Sharma KB. Practicals and Viva in Medical Microbiology 2nd edition, Elsevier India Pvt Ltd. 2009.
4. Tille P. Bailey's and Scott's Diagnostic Microbiology, 13th edition, Mosby. 2013.
5. Collee JG, Fraser, AG, Marmion, BP, Simmons A. Mackie and Mccartney Practical Medical Microbiology, 14th edition, Elsevier. 2007.
6. Rajan S. Manual for Medical Laboratory Technology. Anajanaa Book House, Chennai. 2012.
7. Betty A Forbes, Daniel F Sahm and Alice S Weissfeld. Bailey and Scott's Diagnostic Microbiology, 12th Edition, Mosby Elsevier. 2007.
8. Mackie and McCartney. Practical Medical Microbiology, 14th edition, South Asia Edition. 2006.
9. Rajan S and Selvi Christy R. Experimental Procedures in Life Sciences. Anajanaa Book House, Chennai Monica Cheesbrough. District Laboratory Practice in Tropical Countries - Part I and II, 2nd edition, Cambridge University Press, New Delhi.2011.
10. Monica Cheesbrough. District Laboratory Practice in Tropical Countries - Part I and II 2nd edition, Cambridge University Press, New Delhi.

SKILL BASED ELECTIVE - III (SEMESTER V)
ANTIMICROBIAL AGENTS

Objectives

To improve awareness and understanding of antimicrobial resistance through effective communication, education and training.

Unit I

Definition – disinfection – antiseptics – antibiotics – chemical agents (antibacterial, antifungal, antiviral and antiparasitic) – non pharmaceutical agents (essential oils) –physical agent (Ozone, heat, radiation).

UNIT II

Antibacterial agent - mechanism of action- cell wall synthesis inhibitor (penicillin, arabinoglycan), protein synthesis inhibitor (Tetracycline, Chloramphenicol), nucleic acid synthesis inhibitor (metronidazole, rifampin), alteration of cell membranes (gramicidin, polymyxin, antimetabolite (sulfanilamide).

Unit III

Antiviral agents - interferon – types- mechanism of action - amantadine, rimantadine, zanamivir, and oseltamivir - viral vaccines.

Unit IV

T - mode of action- amphotericin, nystatin and fluorocytosine. Antiprotozoal agents – mechanism of action – (Metronidazole – chloroquine, Paromomycin sulfate,– quinolines).

Unit- V

Emergence of drug resistance – bacteria, fungi and viruses. Alternative drugsantimicrobial peptides.

REFERENCES

1. Alan R Hauser. Antibiotics basics for clinicians: choosing the right antibacterial agent. Wolter Kluwer / Lipponcott Williams and Wilkins Publisher, New York. 2007.

2. Anthony J Trevor, Bertram G Katzung, Susan B Masters. Katzung and Trevor's. Pharmacology: examination and board review. McGraw-Hill Professional, New York. 2007.
3. Cohen MR. Medication errors, American pharmaceutical association, Washington, DC. 1999.
4. Erika J Ernst. Antifungal agent (methods in molecular medicine). Humana Press, New York. 2015.
5. Gale EF, Cundliffe E and Reynolds PE. The Molecular Basis of Antibiotic Action. 2nd edition. John Wiley and Sons, New York. 1981.
6. Hellen Geiband, Molly Miller, Petrie, Suraj Pant, Sumanth Gandra, Jordan lewinson, Devra Barter, Andrea White and Ramanan Laxminarayanan. The state of the Worlds antibiotic. CDDEP publisher, Washington, DC. 2015.
7. Jeffries DJ and De Clercq E. Antiviral Chemotherapy. John Wiley and Sons, Ltd., Chichester, Sussex, England. 1995.
8. Kucers A and Bennett N. The Use of Antibiotics. 4th edition. JB Lippincott, Philadelphia, Williams and Wilkins, New York. 1985.
9. Waxman DJ and Strominger JL. Beta-lactam antibiotics: biochemical modes of action. In: (Morin RB, Gorman M): Chemistry and Biology of Beta-Lactam Antibiotics. Academic Press, San Diego. 1982.
10. Wolfson JS and Hooper DC. Quinolone Antimicrobial Agents. 2nd edition. American Society for Microbiology, Washington.1993.

SOFT SKILLS DEVELOPMENT

Learning Objectives

Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This course intends to enable students to achieve excellence in both personal and professional life.

Unit I

Know Thyself / Understanding Self

Introduction to Soft skills – Self discovery – Developing positive attitude – Improving perceptions – Forming values.

Unit II

Interpersonal Skills / Understanding Others

Developing interpersonal relationship – Team building – group dynamics – Networking – Improved work relationship.

Unit III

Communication skills / Communication with others

Art of listening – Art of reading – Art of speaking – Art of writing – Art of writing e-mails – e-mail etiquette.

Unit IV

Corporate Skills / Working with Others

Developing body language – Practising etiquette and mannerism – Time management – Strees management.

Unit V

Selling Self / Job Hunting

Writing resume / cv – interview skills – Group discussion – Mock interview – Mock GD – Goal setting – Career planning.

Text Books

Meena. K and V. Ayothi (2013) A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R. Publishers & Distributors, No. B-20 & 21, V.M.M. Complex, Chatiram Bus Stand, Tiruchirappalli-620 002. (Phone No: 0431-2702824; Mobile No: 94433 70597, 98430 74472)

Alex K. (2012) Soft Skills – Know Yourself & Know the World, S. Chand & Company Ltd., Ram Nagar, New Delhi-110 055.
Mobile No: 94425 14814 (Dr. K. Alex)

Reference Books

(i) Developing the leader within you John C Maxwell.
(ii) Good to Great by Jim Collins.
(iii) The seven habits of highly effective people Stephen Covey.
(iv) Emotional Intelligence Daniel Goleman.
(v) You can win Shive Khera.
(vi) Principle centred leadership Stephen Covey.

CORE COURSE - VIII

PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS – 16SCCBO8

Objectives:

To enable the students

1. *To understand the metabolic activities of plants*
2. *To understand the role of enzymes in various metabolic activities of plants*
3. *To know the application of the laws of physics in biological phenomena*

Unit I

Plant - Water relationship: structure and properties and significance of water - osmotic and non-osmotic uptake of water. Ascent of sap-cohesion theory: root pressure, transpiration, physiology of stomatal action, Translocation of solutes and assimilates. Mass flow, Membrane permeability mineral uptake: Passive and active. Role of major and Minor elements, mineral deficiency symptoms.

Unit II

Photosynthesis: Absorption spectrum, Action spectrum, role of pigments, enhancement effect, photosystems I & II, Photophosphorylation, Carbon Assimilation: Calvin cycle, Hatch & Slack pathway, CAM pathway. photorespiration. Respiration: Aerobic and anaerobic. Glycolysis, Kreb’s Cycle and oxidative phosphorylation, energetics of respiration.

Unit III

Plant Growth regulatory substances; auxins, gibberellins, cytokinins, ethylene and abscissic acid - their chemical nature, physiological effects and function. Role of hormones in flowering, senescence and abscission - Photoperiodism, vernalization and seed dormancy.

Unit IV

Biochemistry: Enzymes - Nature and properties. Mechanism of enzyme action-factors affecting Enzyme action, substrate concentration – inhibitors, cofactors. Structure, classification and functions of carbohydrates, lipids and Proteins. Secondary metabolites – alkaloids, flavonoids, terpenoids and anthocyanins.

Unit V

Biophysics-physical forces and chemical bonds, biological effect of ionising radiations, basic principles of spectroscopy, Laws of Thermodynamics and entropy-electron transfer processes-a) Definition of pH - its determination; b) Buffers and electrolytes and their functions. c) Fractionation of biomolecules by paper chromatography, d) Centrifugation.

BOOKS

PLANT PHYSIOLOGY

1. Devlin, R.M. (1969). Plant Physiology. Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
2. Dulsy Fatima, R.P. et al., (1994). Elements of Biochemistry. Saras Publications, Nagercoil, Tamilnadu.
3. Jain, V.K. (1990). Fundamentals of Plant Physiology. S. Chand & Co., New Delhi.
4. Noggle, R. and Fritz (1989). Introductory Plant Physiology. Prentice Hall of India.
5. Pandey, S.N. (1991). Plant Physiology. Vikas Publishing House (P) Ltd., New Delhi.
6. Periyasamy, K. (1978). Cell Iyakka Viyal (Cell Physiology). Tamilnadu text Book Society, Chennai.
7. Salisbury, F.B. and Ross, C.W. (1999). Plant Physiology. CBS Publishers and Printers, New Delhi.
8. Saraswathy and Rangamannar (1973). Thaavara Valarchithai Martram (Metabolism & Biosynthesis). Tamilnadu Text Book Society, Chennai.

BIOCHEMISTRY

1. Day, P.M. and Harborne, J.B. (2000). Plant Biochemistry. Harcourt Asia (P) Ltd., India & Academic Press, Singapore.
2. Jain, J.L. (1998). Fundamentals of Biochemistry. S. Chand & Co., New Delhi.
3. Jayaraman, J. (1981). Laboratory Manual of Biochemistry. Wiley Eastern Ltd., New Delhi.
4. Lehninger, A.L. (1984). Biochemistry (2^{nd} Edition). Kalyani Publishers, Ludhiana, New Delhi.
5. Plummer, D.T. (1988). An Introduction to Practical Biochemistry (3^{rd} Edn.,). Tata McGraw Hill Publishing Co., Ltd., New Delhi.
6. Srivastava, H.S. (1990). Elements of Biochemistry. Rastogi Publications, Meerut, India.
7. Stryer, L. (1989). Biochemistrty. W.H. Freeman & Co., New York, San Francisco.
8. Wilson, K. and Walker, J. (1994). Principles and Techniques of Practical Biochemistry (4^{th} Edition). Cambridge University Press, U.K.

BIOPHYSICS

1. Annie and Arumugam, N. (2000). Biochemistry & Biophysics. Saras Publications, Nagercoil, Tamilnadu.
2. Casey, E.J. (1969). Biophysics-Concepts and Mechanisms. Van Nostrand Reinhold Co. & Affiliated East West Press (P) Ltd., New Delhi.
3. Narayanan, P. (2000). Essentials of Biophysics. New Age International Publishers (P) Ltd., New Delhi, Bangalore, Calcutta, Chennai, Guwahati, Hyderabad, Lucknow, Mumbai.
4. Salil Bose, S. (1982). Elementary Biophysics. Vijaya Printers, Madurai.

CORE COURSE - IX

PLANT ECOLOGY AND CONSERVATION – 16SCCBO9

Objectives:

To enable the students

1. *To realize the values of plants and animals of the ecosystem*
2. *To know about the hazards of pollution and the importance of keeping his/her environment clean*
3. *To know in detail on various types of vegetation*
4. *To know about his/her environment and mould the students to become managers of various ecological systems*

Unit I

General Ecology – Approaches to the study of Ecology, Autecology – Synecology, Plant environment – climatic, edaphic and Biotic factors (interference on Plant habitat by animals – Grazing and browsing, by humans – deforestation, Agriculture), Allelopathy.

Unit II

Ecosystem concept – components abiotic-biotic-autotrophic producers & heterotroophic consumers, biomass-ecological pyramids, Productivity – primary, secondary & gross; food chain – food web & energy flow – pond ecosystem.

Unit III

Vegetation – Units of vegetation – formation, association, consociation, society – Development of vegetation: Migration – colonization, ecesis, Methods of study of vegetation (Quadrat & transect). Plant succession – Hydrosere & xerosere. Ecological classification of Plants; Morphological and anatomical features of plants and their correlation to the habitat.

Unit IV

Pollution and its control: Air pollution, Radiation pollution, Noise pollution, Thermal pollution-Soil pollution: Industrial, agrochemicals

(insecticides, pesticides, fungicides, herbicides). Water pollution – Industrial effluents. Marine pollution.

Unit V

Phytogeography - Approaches to Phytogeography – Climate of India & its climatic zones, Botanical regions (provinces) of India – Vegetational types of Tamil Nadu: Evergreen, deciduous, scrub & Mangrove, Continuous and discontinuous distribution. Endemism. In situ and ex situ conservation. Application of remote sensing in conservation.

BOOKS

PLANT ECOLOGY & PHYTOGEOGRAPHY

1. Agrawal, K.C. (1987). Environmental Biology. Agro Botanical Publisher, India.
2. Arumugam, N. (1994). Concepts of Ecology (Environmental Biology). Saras Publications, Nagercoil, Tamilnadu.
3. Chandrasekaran, P. (1996). Chutruch choozhal Maasupadu (Environmental Pollution) T.K. Printers, Pudukkottai, Tamilnadu.
4. Kumar, H.D. (1992). Modern Concepts of Ecology (7th Edn.). Vikas Publishing Co., New Delhi.
5. Odum, E.P. (1971). Fundamentals of Ecology (2nd Edn.). Saunders & Co., Philadelphia & Natraj Publishers, Dehradun.
6. Sharma, P.D. (2000). Ecology & Environment. Rastogi Publications, Meerut, India.
7. Sundaram, R. (1972). Thaavara Chuyach Choozhnilai yiyal. Tamilnadu Text Book Society.
8. Vashishta, P.C. (1990). Plant Ecology. Vishal Publications, Delhi, Jalandhar.
9. Verma, P.S. and Agarwal, V.K. (1999). Concept of Ecology (Environmental Biology). S. Chand & Co., New Delhi.

PHYTOGEOGRAPHY

1. Cain, S.A. (1944). Foudations of Plant Geography. Harper & Brothers, N.Y.
2. Good, R. (1997). The Geography of flowering Plants (2nd Edn.). Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi.
3. Mani, M.S. (1974). Ecology & Biogeography of India. Dr. W. Junk Publishers, The Haque.

CORE PRACTICAL - IV

PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS & PLANT ECOLOGY AND CONSERVATION – 16SCCBO4P

PLANT PHYSIOLOGY, BIOCHEMISTRY & BIOPHYSICS

For demonstration only

1. Enzyme activity using amylase.
2. Colorimeter – Operation and working principle
3. pH meter – Operation and working principle
4. Centrifuge – Operation and working principle

To be performed by each student

1. Colorimetric estimation of sugars
2. Gravimetric estimation of Starch
3. Determination of osmotic pressure of onion/Rheo leaf.
4. Effect of light intensity on transpiration using Ganong's potometer.
5. Determination of stomatal frequency and estimation of transpiration rate.
6. Determination of absorption and transpiration ratio in plants.
7. Measurement of respiration rate using germinating seeds and flowerbuds with simple respiroscope.
8. Separation of plant pigments by paper chromatography.
9. Determination of photosynthetic rate in water plants under different CO_2 concentrations.
10. Measurement of oxygen evolution under different colours using Wilmott's bubbler.

PLANT ECOLOGY AND CONSERVATION

1. Study of morphological and anatomical features of hydrophytes and xerophytes.
2. Study of morphological features of epiphytes, parasites and halophytes.
3. Study of vegetation by the quadrat and line transect method.
4. Estimation of frequency, density & Dominance.
5. Determination of soil & water pH.
6. The light and dark bottle experiment for primary productivity study in the aquatic ecosystem.

MAJOR-BASED ELECTIVE - II

PLANT BREEDING, HORTICULTURE AND LANDSCAPING – 16SMBEBO2

Objectives:

This course introduces

1. *The various methods of plant breeding and plant propagation*
2. *Teaches students the art of growing plants for a pre-defined purpose and pleasure and facilitates students to become an entrepreneur*

PLANT BREEDING

Unit I

Methods of crop improvement – Introduction, acclimatization, selection methods (Mass, pure line and clonal). Hybridization techniques – interspecific and Intergeneric hybridization, Heterosis.

Unit II

Back crossing, Mutation breeding, Polyploidy and its application in plant breeding, Role of auto - and allopolyploid, breeding for crop improvement with reference to Paddy, Wheat, Sugarcane and Groundnut.

HORTICULTURE

Unit III

Horticulture - scope and importance. Horticultural crops - climate, soil, water and nutritional needs. Plant propagation methods – cutting, layering, grafting and budding. Plant growth regulators in horticulture.

Unit IV

Classification of horticultural crops - Pomology, Olericulture, Floriculture, Spices and Plantation crops. Green house, Indoor gardening, Bonsai. Flower arrangements – Nursery management and Maintenance.

Unit V

Landscaping: Principles, elements and design and layout - formal garden, Informal garden, Special types of gardens (bog garden, sunken garden, terrace, rock garden), and specific areas.

BOOKS

1. Allard, R.W. (1960). Principles of Plant Breeding. John Wiley & Sons, New York.
2. Bose, T.K., Maiti, R.G., Dhua, R.S. and Das, P. (1999). Floriculture and Landscaping. Naya Prakash, Calcutta.
3. Chopra, V.L. (1989). Plant Breeding. Oxford IBH, New Delhi.
4. Jenson, N.F. (1988). Plant Breeding Methodology. Wiley Inercience Publication, New York.
5. Kumar, N. (1997). Introduction to Horticulture. Rajalakshmi Publication, India.
6. Manibhushan Rao, K. (1991). Text Book of Horticulture. Macmillan Publications, New Delhi.
7. Mukherjee, D. (1972). Gardening in India. Oxford & IBH Publishing Co., Kolkatta, Mumbai, New Delhi.
8. Roy Choudhry, N. and Mishra, H.P. (2001). Text book on Floriculture and Landscaping. Raja Infotech Enterprise, India.
9. Sandhu, M.K. (1989). Plant Propagation. Wiley Eastern Ltd., New Delhi.
10. Sharma, J.R. (1994). Principles and Practice of Plant Breeding. Tata McGraw Hill, New Delhi.

MAJOR-BASED ELECTIVE - III

PLANT BIOTECHNOLOGY AND BIOINFORMATICS – 16SMBEBO3

Objectives:

1. *To comprehend the advances made in the field of plant biotechnology; and bioinformatics*
2. *To understand how mere jumbling of genes results in the creation of new organisms.*

Unit I

Biotechnology: definition and scope. Tissue culture: sterilization methods, media preparation (MS basal medium); use of different explants types; materials and callus growth; differentiation; subculturing and hardening.

Unit II

Plasmids: general features and types; plasmids as vectors - pBR 322, Tiplasmid; cosmids, phagemids, Lambda-phage; transposons; site directed mutagenesis.

Unit III

Steps involved in genetic engineering: generation of desired foreign genes by restriction enzymes and cDNA synthesis; joining DNA molecules; transfer of rDNA molecules into bacteria and plants. Southern and Western blotting. PCR technique. Role of Agrobacterium in plant genetic engineering.

Unit IV

Importance and application areas: biomass production - food (single cell proteins); bio-fertilizers. Environmental Biotechnology: Waste treatment – solid (compost), Liquid (industrial effluents), sewage treatment (domestic sewage).

Unit V

Bioinformatics: History, scope and applications. Types of biological databases. Nucleic acid databases - Genbank, NCBI, EMBL, DDBJ;

Primary protein databases - SWISSPROT, TrEMBL; Secondary protein databases - PROSITE, PROFILES, PRINTS, Pfam; Structural classification databases - SCOP, CATH; Literature databases - PubMed, Medline.

BOOKS

1. Arthur, M.L. (2005). Introduction to Bioinformatics (Ed:2). Oxford University Press, New York.
2. Attwood, T.K. and Parrysmith, D.J. (2001). Introduction to Bioinformatics. Pearson Education, New Delhi.
3. Chatterji, A.K. (2011). Introduction to Environmental Biotechnology. Prentice Hall India Pvt., Ltd., New Delhi.
4. Dubey, R.C. (2013). A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi.
5. Gupta, P.K. (1994). Elements of Biotechnology. Restogi Publications, Meerut.
6. Ignacimuthu, S. (1997). Plant Biotechnology. Oxford & IBM Publishing Co., New Delhi.
7. Kalyan Kumar De. (1997). Plant Tissue Culture. New Central Book Agency, Calcutta.
8. Kumar, H.D. (1991). A Textbook on Biotechnology. East West Press, New Delhi.
9. Parihar, P. (2014). A Textbook of Biotechnology. Argobios Publications, Jodhpur
10. Purohit, S.S. (2003). Agricultural Biotechnology. Agrobios Publications, Joshpur.
11. Trevan, M.D., Boffey, S., Goulding, K.H. and Stanbury, P. (1988). Biotechnology – The Biological Principles. Tata McGraw Hill Publishing Co., New Delhi.

GENDER STUDIES

Objectives

- *To make boys and girls aware of each others 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 Determinism – Patriarchy – Feminism – Gender Discrimination – Gender Division of labour – Gender Stereotyping – Gender Sensitivity – Gender Equity – Equality – Gender Mainstreaming – Empowerment.

Unit – II

Women's Studies vs Gender Studies: UGC's Guidelines – VII to XI Plans – Gender Studies: Beijing Conference and 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 Empowerment: Initiatives – International Women's Decade – International Women's year – National Policy for Empowerment of Women – Women Empowerment year 2001 – mainstreaming Global Policies.

Unit – V

Women's Movements and Safeguarding Mechanism: In India National / State 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 – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd and 74th Amendment for PRIS.

பாலின சமத்துவம்

அலகு – I

பாலினம் தொடர்பான கோட்பாடுகள்: பாலியல் - பாலினம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின பாகுபாடு – பாலின வேலைப்பாகுபாடு – பாலின ஒருபடித்தானவைகள் - பாலின உணர்வூட்டல் - பாலின சமவாய்ப்பு – பாலின சமத்துவம் - பாலின மையநீரோட்டமாக்கல் - அதிகாரப்படுத்துதல்.

அலகு – II

மகளிரியல் எள பாலின சமத்துவக்கல்வி – பல்கலைக்கழக மானியக்குழுவின் வழிக்காட்டுதல்கள் - ஏழாவது ஐந்தாண்டுத்திட்டம் முதல் பதினோராவது ஐந்தாண்டுத்திட்டம் - பாலின சமத்துவக்கல்வி: பெய்ஜிங் மாநாடு மற்றும் பெண்களுக்கு எதிரான அனைத்து வன்முறைகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை - இணைத்தல் / உட்படுத்துதல் - ஒதுக்கல்.

அலகு – III

பாலியல் பாகுபாட்டிற்கான தளங்கள்: குடும்பம் - பாலின விகிதாச்சாரம் - கல்வி – ஆரோக்கியம் - ஆளுமை – மதம் - வேலை vs வேலைவாய்ப்பு – சந்தை – ஊடகங்கள் - அரசியல் - சட்டம் - குடும்ப வன்முறை – பாலியல் துன்புறுத்தல் - அரசு கொள்கைகள் மற்றும் திட்டங்கள்.

அலகு – IV

பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு: முயற்சிகள், சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு – பெண்களின் மேம்பாட்டிற்கான தேசிய கொள்கை – பெண்கள் அதிகார ஆண்டு 2001 – சர்வதேச கொள்கைகளை மைய நீரோட்டமாக்கல்.

அலகு – V

பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு நிறுவன ஏற்பாடுகள்: தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதிமன்றங்கள் - குடும்ப வன்முறையிலிருந்து பெண்களைப் பாதுகாக்குகம் சட்டம் 2005 – பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான உச்சநீதிமன்ற வழிகாட்டுதல்கள் - தாய்சேய் சேமநலச்சட்டம் - பெண்சிசுவை கருவிலேயே கண்டறியும் தொழில்நுட்பம் (முறைப்படுத்துதல் மற்றும் தவறாக பயன்படுத்துதலை தடை செய்திடும்) சட்டம் - ஈவ்டீசிங் (பெண்களை தொல்லை செய்தல்) தடுப்புச் சட்டம் - சுய உதவிக்குழுக்கள் - பஞ்சாயத்து அமைப்புகளுக்கான 73வது மற்றும் 74வது சட்டத்திருத்தம்.

References

1. Bhasin Kamala, Understanding Gender: Gender Basics, New Delhi: Women Unlimited, 2004.
2. Bhasin Kamala, Exploring Masculinity: Gender Basics, New Delhi: Women Unlimited, 2004.
3. Bhasin Kamala, What is Patriarchy?: Gender Basics, New Delhi: Women Unlimited, 1993.
4. Pernau Margrit, Ahmad Imtiaz, Reifeld Hermut (ed.,) Family and Gender: Changing Values in Germany and India, New Delhi: Sage Publications, 2003.
5. Agarwal Bina, Humphries Jane and Robeyns Ingrid (ed.,) Capabilities, Freedom and Equality: Amartya Sen's work from a Gender Perspective, New Delhi: Oxford University Press, 2006.
6. Rajaduraia, S.V., Geetha, V., Themes in Caste Gender and Religion, Tiruchirappalli, Bharathidasan University, 2007.
7. Misra Geetanjali, Chandiramani Radhika (ed.,) Sexuality, Gender and Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi: Sage Publication, 2005.
8. Rao Anupama (ed.,) Gender & Caste: Issues in Contemporary Indian Feminism, New Delhi: Kali for Women, 2003.
9. Saha Chandana, Gender Equity and Gender Equality: Study of Girl Child in Rajasthan, Jaipur: Rawat Publication, 2003.
10. Krishna Sumi (ed.,) Livelihood and Gender: Equity and Community Resource management, New Delhi: Sage Publications, 2004.
11. Pludi, A. Michele (ed.,) Praeger Guide to the Psychology of Gender, London: Praeger Publisher, 2004.
12. Wharton, S. Amy, The Sociology of Gender: An Introduction to Theory and Research, USA: Blackwell Publishing, 2005.
13. Mohanty Manoranjan (ed.,) Class, Caste, Gender: Readings in Indian Government and Politics – 5, New Delhi: Sage Publications, 2004.

14. Arya Sadhna Women, Gender Equality and the State, New Delhi: Deep & Deep Publications, 2000.
15. பாலியலை புரிந்து கொள்வோம், மதுரை: ஏக்தா, ...
16. Mishra, O.P., Law Relating to Women & Child, Allahabad: Central Law Agency, 2001.
17. Chari Leelavathi, Know Your Rights, Madras: Tamilnadu Social Welfare Board, 1987.
18. Bhattacharya Malini, Sexual Violence and Law, Kolkata; West Bengala Commission for Women, 2002.
19. Sexual Harassment at the Workplace – A Guide, New Delhi, Sakshi, 1999.
20. அஜிதா, குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம், 2005, மதுரை: ஏக்தா, 2005.
21. கு. சாமிதுரை & இராதாகிருட்டிணன், பெண்கள் நலன் காக்கும் சட்டங்கள், மதுரை: Account Test Center: 2007.
22. பொன். கிருஷ்ணசாமி, ஜே. பால் பாஸ்கர் & ஆ. ஜான் வின்சென்ட், பெண்களும் உச்சநீதிமன்றமும், மதுரை: சோக்கோ வாசகர் வட்டம், 2004.
23. வனஜா & சியாமா சுந்தரி, பெண்களுக்கான சட்டங்கள், செகந்திராபாத்: உலகத்தோழமை மையம்.
24. க. உமாசங்கர், பி. பாலசந்தர், க. சசிகலா, செ. பழனிச்சாமி, சூரியன் (பெண்கள் தொடர்பான சட்டங்கள் குறித்த தொடக்கநிலை கையேடு: செகந்திராபாத்: உலகத்தோழமை மையம், 2006.
25. குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005– கையேடு, திருச்சி.
26. Women's Integrated National Developwent Trust.
27. ரவீந்திரநாத் ஜி.ஆர்., 'ராகிங் ஒழிப்போம்!' 'ஈவ்டீசிங் ஒழிப்போம்!', சென்னை I.D.P.D. வெளியீடு.

NON MAJOR ELECTIVES (ARTS)

(For the candidates admitted from the academic year 2016-2017)

S. No.	Department Offering the Non-Major Elective Courses	Title of the Non-Major Elective Courses
1.	Applied Tamil	I. தமிழ் நடைக்கூறுகள் II. சிந்தனையியல்
2.	B.Litt.	
3.	Pulavar Degree	
4.	Tamil	
5.	B.B.A. (Bachelor of Business Administration)	I. Management Principles (or) Stock Exchange Practices II. Banking Practices (or) International Business
6.	B.Com.	I. Personal Investment (or) Elements of Insurance II. Introduction to Accountancy (or) Salesmanship
7.	B.Com. (Applied)	
8.	B.Com. (Computer Applications)	
9.	B.Com. (Bank Management)	I. Banking Practices (or) Indian Banking System II. Rural Banking (or) Elements of Insurance
10.	Economics	I. Advertisement Management II. Economics of Transportation
11.	English	I. Presentation Skills II. Functional Skills
12.	History	I. Freedom Movement in India II. Working of Indian Constitution
13.	Journalism & Mass Communication	I. Basic Photography II. Freelance Journalism

S. No.	Department Offering the Non-Major Elective Courses	Title of the Non-Major Elective Courses
14.	Public Administration	I. Public Administration for Civil Services II. Indian Government and Administration
15.	Sanskrit	I. Introduction to Early Sanskrit Literature (or) History of Fables & Popular tales and Didactic Literature Pub. R.S. Vadhyer Pub. Palakad. II. Scientific Literature (or) Indian Aesthetics
16.	Social Work	I. Human Rights II. Contemporary Social Issues and Problems
17.	Sociology	I. Dynamics of Society II. Women Empowerment
18.	Tourism and Travel management	I. Basics of Tourism II. Cultural Tourism

NON MAJOR ELECTIVES (SCIENCE)

(For the candidates admitted from the academic year 2016-2017)

S. No.	Department Offering the Non-Major Elective Courses	Title of the Non-Major Elective Courses
1.	Apparel and Fashion Technology	I. Hand Embroidery (P) II. Jewellery Making (P)
2.	BCA	I. Working Principles of Internet II. Fundamentals of Information Technology
3.	Biochemistry	I. Health and diseases II. Hospital Management
4.	Biotechnology	I. Biotechnology for Human Welfare II. Food Processing
5.	Botany	I. Biofertilizers & Biopesticides II. Horticulture
6.	Chemistry	I. Chemistry in Everyday Life II. Health Chemistry
7.	Computer Science	I. Working Principles of Internet II. Fundamentals of Information Technology
8.	Electronics	I. Principles of Electronics II. Everyday Electronics
9.	Fashion Technology & Costume Designing	I. Fashion Accessories Designing II. Visual Merchandising
10.	Geography	I. Geography of Tourism II. Disaster Management
11.	Geology	I. Fundamentals of Geology II. Introduction to Minerals, Rocks and Fossils
12.	Home Science	I. Bakery and Food Preservation II. Apparel Designing

S. No.	Department Offering the Non-Major Elective Courses	Title of the Non-Major Elective Courses
13.	Hospital Administration	I. Personal Hygiene II. Role of Hospital Services
14.	Hotel Management & Catering Science	I. Basic Tamil / Special Tamil II. Basic Tamil / Special Tamil
15.	Information Technology	I. Fundamentals of Information Technology II. Information Security: Principles and Practices
16.	Mathematics	I. Quantitative Aptitude I II. Quantitative Aptitude II
17.	Microbiology	I. Mushroom Technology II. Biofertilizer Technology
18.	Nutrition & Dietetics	I. Nutrition for Women II. Nutrition for Health and Fitness
19.	Physics	I. Energy Physics II. Laser Physics
20.	Software Development	I. Working Principles of Internet II. Fundamentals of Information Technology
21.	Textile Science	I. Management and Entrepreneurship II. Marketing and Merchandising
22.	Visual Communication	I. Basics of Communication II. Communication Personality Development
23.	Zoology	I. Public Health and Hygiene II. Ornamental Fish Farming

SKILL BASED ELECTIVE PAPERS
(2016 ONWARDS)

S. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
1.	Clinical Microbiology	I	IV	Clinical Bacteriology
		II	V	Clinical Mycology and Virology
		III	V	Clinical Parasitology
2.	Computer Application	I	IV	Hardware Troubleshooting
		II	V	Ruby on Rails
		III	V	Web Services
3.	Customer Relationship Management	I	IV	Overview of Customer Relationship Management (CRM)
		II	V	CRM in Services Marketing & its Tools
		III	V	E-CRM (Virtual Marketing)
4.	Desktop Publishing	I	IV	Page Maker
		II	V	Corel Draw
		III	V	Dream Weaver
5.	Herbal Medicine	I	IV	Ethno Medicine
		II	V	Pharrmacognosy
		III	V	Herbs and Drug Action
6.	Journalism and Public Relations	I	IV	Journalism and Mass Media
		II	V	Reporting and Editing
		III	V	Public Relations

S. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
7.	Office Management	I	IV	Introduction to Office Management
		II	V	Office Management Tools
		III	V	Communication & Interpersonal Skills
8.	Sales and Marketing Management	I	IV	Introduction to Marketing Management
		II	V	Sales Management
		III	V	Retail Management
9.	Tourism and Travel Management	I	IV	Tourism and Travel Agency
		II	V	Cultural Tourism in India
		III	V	Tourism Product – 3
10.	Yoga and Stress Management	I	IV	Fundamentals of Yogic Practices
		II	V	Stress Management through Yoga
		III	V	Asanas and Pranayamas – Practical
11.	அச்சு ஊடகங்கள்	I	IV	தமிழ் இதழியல் வரலாறு
		II	V	நாளிதழ் உருவாக்கமும் வடிவமைப்பும்
		III	V	இலக்கிய இதழ்கள்
12.	Biotechnology	I	IV	Aqua Culture
		II	V	Biofertilizer
		III	V	Mushroom Cultivation and Value Addition

S. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
13.	Chemistry	I	IV	Food and Nutrition
		II	V	Agricultural Chemistry
		III	V	Dyeing Techniques and Water Treatment
14.	Electronics	I	IV	Home Appliance Maintenance and Servicing
		II	V	Computer Hardware and Networking
		III	V	Mobile Servicing
15.	Hotel Management and Catering Science	I	IV	Hospitality Marketing
		II	V	Information Technology in Hotel Industry
		III	V	Information Technology in Hotel Industry (P)
16.	Microbiology	I	IV	Microbial Nanotechnology
		II	V	Diagnostic Microbiology
		III	V	Antimicrobial Agents
17.	Zoology	I	IV	Apiculture
				Aquaculture
		II	V	Sericulture
				Poultry Farming
		III	V	Vermiculture
				Dairy farming

SKILL BASED ELECTIVE PAPERS

(2016-17 ONWARDS)

Updated on 19.02.2018

Sl. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
1.	Clinical Microbiology	I	IV	Clinical Bacteriology
		II	V	Clinical Mycology and Virology
		III	V	Clinical Parasitology
2.	Computer Application	I	IV	Hardware Troubleshooting
		II	V	Ruby on Rails
		III	V	Web Services
3.	Customer Relationship Management	I	IV	Overview of Customer Relationship Management (CRM)
		II	V	CRM in Services Marketing & its Tools
		III	V	E – CRM (Virtual Marketing)
4.	Desktop Publishing	I	IV	Page Maker
		II	V	Corel Draw
		III	V	Dream weaver
5.	Herbal Medicine	I	IV	Ethno Medicine
		II	V	Pharmacognosy
		III	V	Herbs and Drug Action
6.	Journalism and Public Relations	I	IV	Journalism and Mass Media
		II	V	Reporting and Editing
		III	V	Public Relations

Sl. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
7.	Office Management	I	IV	Introduction to Office Management
		II	V	Office Management Tools
		III	V	Communication & Interpersonal Skills
8.	Sales and Marketing Management	I	IV	Introduction to Marketing Management
		II	V	Sales Management
		III	V	Retail Management
9.	Tourism and Travel Management	I	IV	Tourism and Travel Agency
		II	V	Cultural Tourism in India
		III	V	Tourism Product – 3
10.	Yoga and Stress Management	I	IV	Fundamentals of Yogic Practices
		II	V	Stress Management Through Yoga
		III	V	Asanas and Pranayamas – Practical
11.	அச்சு ஊடகங்கள்	I	IV	தமிழ் இதழியல் வரலாறு
		II	V	நாளிதழ் உருவாக்கமும் வடிவமைப்பும்
		III	V	இலக்கிய இதழ்கள்
12.	Biotechnology!	I	IV	Aqua Culture
		II	V	Biofertilizer
		III	V	Mushroom Cultivation and Value Addition

Sl. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
13.	Chemistry	I	IV	Food and Nutrition
		II	V	Agricultural Chemistry
		III	V	Dyeing Techniques and Water Treatment
14.	Electronics	I	IV	Home Appliance Maintenance and Servicing
		II	V	Computer Hardware and Networking
		III	V	Mobile Servicing
15.	Hotel Management and Catering Science	I	IV	Hospitality Marketing
		II	V	Information Technology in Hotel Industry
		III	V	Information Technology in Hotel Industry (P)
16.	Microbiology	I	IV	Microbial Nanotechnology
		II	V	Diagnostic Microbiology
		III	V	Antimicrobial agents
17.	Zoology	I	IV	Apiculture
				Aquaculture
		II	V	Sericulture
				Poultry Farming
		III	V	Vermiculture
				Dairy farming

SUBJECT CODE

SEM	PART	PAPER	TITLE	SUB. CODE
I	I	Tamil-I (LC)	இக்கால இலக்கியம்	16LCT1
	II	English-I (ELC)	Prose for Effective Communication	16ELCE1
	III	Core-I	Bacteria, Viruses, Algae, Fungi & Lichens	16SCCBO1
		Allied-I	Zoology-I	16SACZO1
		Core-I (AP)	Bacteria, Viruses, Algae, Fungi & Lichens of Plant Pathology & Plant Protection (P)	16SCCBO1P
	IV	Value Education	Value Education	18UGVED
II	I	Tamil-II (LC)	இடைக்கால இலக்கியமும், புதினமும்	16LCT2
	II	English Language Course-II (ELC)	Poetry for Effective Communication	16ELCE2
	III	Core Course-II (CC)	Plant Pathology & Plant Protection	16SCCBO2
			Bacteria, Viruses, Algae, Fungi & Lichens & Plant Pathology & Plant Protection (P)	16SCCBO1P
		Core Practical (AP)	Zoology II	16SACZO2
		Allied Course-II (AP)	Zoology (P)	16SACZO1P
	IV	Environmental Studies	Environmental Studies	16UGCES

SEM	PART	PAPER	TITLE	SUB. CODE
III	I	Tamil-III (LC)	காப்பியமும், நாடகமும்	16LCT3
	II	English Language Course-III (ELC)	Drama for Effective Communication	16ELCE3
	III	Core Course-III (CC)	Bryophytes, Pteridophytes, Gymnosperms & Paleobotany	16SCCBO3
		Allied-I	Chemistry-I	16SACCH1
	IV	NME-1	Biofertilisers & Biopesticides	16NMEBO1
IV	I	Tamil (LC)	பண்டைய இலக்கியம்	16LCT4
	II	English (ELC)	Short Stories for Effective Communication	16ELCE4
	III	Core	Anatomy & Embryology	16SCCBO4
		Core (P)	Bryophytes, Pteridophytes, Gymnosperms and Paleobotany & Anatomy Subryology (P)	16SCCBOZP
		Allied-II (P)	Practical-II (Volume & Organic) Qualitative Analysis	16SACCH1P
		Allied-III	General Chemistry-II	16SACCH2

SEM	PART	PAPER	TITLE	SUB. CODE
V	III	Core Course	Cell & Molecular Biology	16SCCBO5
		Core Course	Genetics, Biostatistics and Evolution	16SCCBO6
		Core Course	Morphology, Taxonomy and Economic Botany	16SCCBO7
		Core (P)	Cell & Molecular Biology & Genetics	16SCCBO3P
	IV	NME-I (Medical & Applied Botany)	Biostatistics and Evolution & Morphology, Taxonomy of Angiosperms & Economic Botany	16SMBEBO1
VI	III	Core Course	Plant Physiology, Biochemistry and Biophysics	16SCCBO8
		Core Course	Plant Ecology & Conservation	16SCCBO9
		Core Practical (P)	Plant Physiology, Biochemistry & Biophysics & Plant Ecology & Conservation (P)	16SCCBO4P
	IV	NME-II	Plant Breeding, Horticulture & Landscaping	16SMBEBO2
		NME-III	Plant Biotechnology & Bioinformatics	16SMBEBO3