

DR.AMBEDKAR GOVT.ARTS COLLEGE, CHENNAI-600 039.

DEPT.OF PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

Meeting of Board of Studies in B.Sc., Plant Biology and Plant Biotechnology

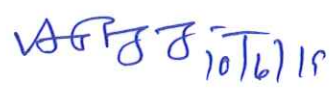
Date : 10. 06.2019, Monday

Time : 11.00

AGENDA

- To discuss the course content of the existing syllabus
- To suggest suitable modifications and
- To consider and approve the modified syllabus


Chairman

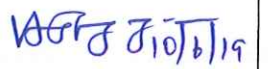
University Nominee	- Dr. S. Karpagam	-  10/6/19
Subject Expert 1	-Dr. S. Murugesan	-  10/6/19
Subject Expert 2	- Dr. Subashini	-  10/6/19
Industrial Nominee	- Mr. K. Thiagarajan	- 
Aluminee	- Mr.A. Lakshmi Narayanan -	-  10/6/19
Dept Staff Members		
	-Dr. P.Balaji	-  10/6/19
	- Dr. A. Thangaraja	-  10/6/19

DR.AMBEDKAR GOVT.ARTS COLLEGE, CHENNAI-600 039.

DEPT.OF PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

Minutes of the Meeting of Board of Studies in B.Sc., Plant Biology and Plant Biotechnology

- Meeting of the Board of Studies in Plant Biology and Plant Biotechnology was held on Monday, 10th June 2019 at 11.00 AM in the Department of Plant Biology and Plant Biotechnology.
- The Curriculum of B.Sc., Plant Biology and Plant Biotechnology, Allied Botany, Non Major electives and Environmental Science were revised based guidelines laid down by Tamilnadu State Council for Higher Education (TANSCH)
- The members of the Board discussed the course content in details and incorporated necessary changes.
- The following are the highlights of the changes introduced in the syllabus
 - The family Solanaceae and Economic botany introduced into Plant Taxonomy
 - Environmental studies subject shifted from IV to III semester
 - Value based education subject shifted from V to IV semester
 - Introduced Silva classification and restructured the unit, based on the morphology of organism and also added economic importance of Algae.
 - In Mycology and Lichenology paper, was revised the economic importance of fungi unit
- This syllabus is approved and decided to implement it with effect from the academic year 2019-20 onwards.

S.No	Members Present	Membership	Signature
1	Dr.G.Sampathkumar Assistant Prof., Dept., of Plant Biology and Plant Biotechnology, Dr.Ambedkar Govt Arts College, Chennai	Chairman	 10.6.19
2	Dr.S.Karpagam Associate Prof., & Head Dept., of PBPB Queen Mary's College, Ch-5 Mob : 9444944835 E.mail : s.karpagam98@gmail.com	University Nominee	 10/6/19
3	Dr.S. Murugesan Associate Prof., in Botany Pachaiyappas College, Ch-30 Mob : 9840276446	Subject Expert (1)	 10/6/19
4	Dr.A.Subashini Assistant Prof., Dept., of PBPB Quaid-e-Millath Govt., College for Women. Ch-2 Mob : 9940186018	Subject Expert (2)	 10/6/19
5	Mr.K. Thiagarajan M.Sc., B.L India Cast Sp-34, IIrd Main Road, Ambattur Industrial Estate Chennai – 600 058. Mob : 9500098981	Industry Nominee	
6	Mr. A. Lakshmi Narayanan AGS, Health Private Ltd., No. 5, Tidel Park Chennai – 600 113. Mob : 6380340047	Alumni	 10/6/19
7	Dr.P.Balaji Assistant Prof., Dept., of Plant Biology and Plant Biotechnology, Dr.Ambedkar Govt Arts College, Chennai	Member	 10/6/19
8	Dr.A.Thangaraja Assistant Prof., Dept., of Plant Biology and Plant Biotechnology, Dr.Ambedkar Govt Arts College, Chennai	Member	 10/6/19

Dr. AMBEDKAR GOVERNMENT ARTS COLLEGE
(AUTONOMOUS)
VYASARPADI, CHENNAI – 600 039

(Reaccredited by NAAC at Level ‘B’)



SYLLABUS

B.Sc., PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

Under Choice Based Credit System
(With effect from 2019-2020)

***DEPARTMENT OF PLANT BIOLOGY AND PLANT
BIOTECHNOLOGY***

Dr. Ambedkar Government Arts College
(Autonomous)
Vyasarpadi, Chennai – 600 039

JUNE- 2019

Dr. AMBEDKAR GOVERNMENT ARTS COLLEGE (AUTONOMOUS)

VYASARPADI, CHENNAI - 600 039



(AFFILIATED TO UNIVERSITY OF MADRAS)

B.Sc. DEGREE COURSE IN PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

(Choice Based Credit System)

Dr. Ambedkar Government Arts College (Autonomous) offers the semester System of education with credits for UG courses. Credit is related to the number of hours a teacher teaches a particular subject as well as to the number of hours a student spends learning a subject or carrying out an activity. In the semester system of study, every academic year is divided into two semester sessions. Each semester will have a minimum of 90 working days and each day will have 5 working hours.

Differential weightage is given according to the content and duration of the course in the curriculum design. Each course is designed variously under lectures/ tutorials/ laboratory work/ seminar/ project work/ practical training/ viva etc., to facilitate effective teaching and learning and the credits are assigned accordingly depending on the content and the specialization.

Regulations

(Effective from the Academic year 2010-2020 onwards)

1. Eligibility for Admission:

Candidates for admission to the Degree of Bachelor of Science course in Plant Biology And Plant Biotechnology shall be required to have passed the Higher Secondary Examination (HSE), conducted by the Government of Tamil Nadu, or an examination accepted as equivalent thereto by the Syndicate, with Botany, Zoology, Agriculture, Biochemistry, Microbiology and biology as a subject of study.

2. Eligibility For the award of Degree:

A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a college affiliated to the University for a period of not less than 3 academic years, passed the examination of all the six semester prescribed earning. The Credit requirement for a two year UG course shall be 140 including 2 credits for Environmental Studies. 2 credits for Value Education and 1 credit for the compulsory Extension Services prescribed.

3. Duration

Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semester, the second academic year the third and the fourth semester and the third academic year the fifth and sixth semester respectively.

The odd semester shall consist of the period from June to November of each year and the even semester from December to April of each academic year. There shall be not less than 90 working days for each semester.

4. The CBCS System

All Programmes (named after the Core subject) mentioned earlier are based on Choice Based System (CBCS). It is an instructional package developed to suit the needs of students to keep pace with the developments in higher education and the quality assurance expected of it in the light of liberalization and globalization in higher education.

5. Course of Study

The UG programme consists of several courses. The term ‘course’ is applied to indicate a logical part of the subject matter of the programme and is invariably equivalent to the subject matter of a “paper” in the conventional sense.

The following are the various categories of Courses suggested for the UG programmes. Language Course (LC) (Tamil), English Language Course (ELC), Core Course (CC), Allied Courses (AC), Elective Courses (EC) (instead of Applied Course in the curriculum followed earlier) Non-major elective courses (NME) Skill based Elective courses (SBE) Environmental studies (ES), Value Education (VE) and Extension Activity (EA).

6. Credits

The term 'Credit' refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. For instance the course with six hour per week is assigned four credits, course with four / five hour per week is assigned three credits and course with two hour per week is given two credits. However, in no instance the credits of a course can be greater than the hours allotted to it.

The total minimum credits, required for completing and UG program is 140. The details of credits for individual components and individual courses are given below

Study Components	No.of Courses	Credit per Course	Total Credits
Part-I Tamil/ Other Languages	2+2=4	3	12
Part-II English	2+2=4	3	12
Part-III Core Courses Allied Courses Project/Electives with three Course	13-15 4 3	4-5 5 5	60 20 15
Part-IV 1. (a) Those who have not studied Tamil upto XII Standard and taken a non-Tamil Language under Part-I shall take Tamil comprising of two courses(level will be at 6 th standard) (b) Those who have studied Tamil upto XII Standard and taken a non-Tamil Language under Part-I shall take advanced Tamil comprising of two courses (c) Others who do not come under a+b can choose non-major elective comprising of two courses 2. Skill based courses (Elective) 3. Environmental Studies 4. Value Education	 1+1=2 2+2 1	 2 3 2	 4 12 2 2
Part-V Extension Activities	1	1	1
Total			140

IV (3) & (4) Environmental Studies and value Education:

All the students undergo a course on Environmental Studies during III and IV Semesters with examination in the IV Semester, Value education during V Semester.

V Extension Activity

All the students shall have to enroll for NSS/NCC/NSO (Sports & Games) RRC/ Youth Red Cross or any other service organizations in the college and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the College

before 31st March in a year. If a student LACKs 40 HOURS ATTENDANCE in the First Year, he/ shall have to compensate the same during the subsequent years.

Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will get ONE CREDIT

Literacy and Population Education Field work shall be compulsory components in the above extension service activities.

7. Selection of candidates to Non-Major Elective Courses and Skill based Elective Courses

The Non-Major and skill based elective Courses 2+4 in numbers for each UG degree, are open to all students irrespective of science, Arts or Commerce Programmes. A student shall choose at least two Non-Major Elective Courses and three skill based elective courses from outside his / her Department.

Selection of student to the EC (NME & SBE):

- a. The Department Committee shall follow a selection procedure on a first come first served basis, fixing the maximum number of students, giving counseling to the students etc. to avoid overcrowding to particular course(s) at the expense of some other courses.
- b. The failed candidates in one EC are permitted to opt for another EC in another programme or they are permitted to continue with the same EC.
- c. The College shall provide all information relating to the ECs in each programme to all the students so as to enable them to choose their ECs.

8. Attendance:

A Candidate shall be permitted to appear for the examinations only if he or she secures not less than 75% attendance in each subject / paper.

Students who have 74% to 60% of attendance shall apply for condonation in the prescribed form with the prescribed fee Rs.250/- each for Theory/Practical examination towards the condonation of shortage of attendance.

Students who have secured less than 60% but more than 50% of attendance are NOT Eligible for condonation of shortage of attendance and such candidates will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year / next Semester of the course and they may be permitted to take next End Semester Examination by paying the prescribed condonation fee of Rs.250/- each for Theory/Practical separately.

Students who have below 50% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme by paying the fee for the break of study as prescribed by the academic council from time to time.

9. Conduct of Examination:

Examination will be conducted by the college at the end of each semester. A candidate who does not pass the examination in any paper(s) shall be permitted to appear in such failed paper(s) in the subsequent examinations.

10. Ranking:

Candidates who pass all the examinations prescribed for the course in the first appearance only are eligible for ranking.

11. Scheme of Examinations:Theory

Continuous Assessment : 25 Marks

End semester Examination : 75 Marks

Total 100 Marks

The break up for continuous Assessment is as follows.

a) Test	(2 x 20)	:40 Marks
b) Assignment	(2 x 10)	:20 Marks
c) Model Examination	(1 x 40)	:30 Marks
d) Attendance		:10 Marks

Total 100 Marks

100 Marks for continuous assessment can be converted to 25 Marks.

For Major and Allied Practical:

The breakup of marks for continuous assessment year end practical examination is as follows

Continuous Assessment : 40 Marks

Practical : 60 Marks

Total 100 Marks

The break up for continuous assessment for major and Allied Practical are

a. Submission of Record/Observation :40 Marks

b. Practical Tests (2 x 15) :30 Marks

c. Model Practical Examination :20 Marks

d. Attendance :10 Marks

Total 100 Marks

The total marks will be converted to 40 Marks

The duration of the academic year end practical examinations for each paper shall be 3 hours carrying 60 Marks.

12. Requirements for proceeding to subsequent Semester

a. Candidates shall register their names for the First Semester Examinations after the admission in the UG Courses.

b. Candidates shall be permitted to proceed from the First Semester up to Final semester irrespective of their failure in any of the semester Examinations subject to the condition that the candidate should register for all the arrear papers of earlier semester along with current (subsequent) semester papers.

c. Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed therefore from time to time by the University of Madras.

Provided in case of a candidate earning less than 50% of attendance in any one of the semester due to any extraordinary circumstance such as medical grounds, such candidate who shall produce medical certificate issued by the Authorized Medical Attendant (AMA), duly certified

by the Principal of the College, shall be permitted to proceed to the next semester and to complete the Course of study. Such candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the Course, after paying the fee for the break of study as prescribed from time to time.

13. Valuation of Answer Papers:

For undergraduate courses, only single valuation is permissible. Re-totaling and revaluation of theory papers are allowed. The fee prescribed for Re-totaling is Rs.250/- per paper and for revaluation Rs.500/- per script. Photo copy of the Answer scripts will be supplied to the candidate applying for revaluation.

14. Passing Minimum:

- a. There shall be no Passing Minimum for Internal.
- b. For External Examination, Passing Minimum shall be of 40% (Forty Percentage) of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva-voce.
- c. In the aggregate (External + Internal) the passing minimum shall be of 40%.
- d. He / She shall be declared to have passed the whole examination, if he/she passes in all the papers and practicals wherever prescribed / as per the scheme of examinations by earning 140 CREDITS in Parts-I, II, III, IV & V. He/she shall also fulfill the activities prescribed earning a minimum of 1 Credit to qualify for the Degree.

15. Classification of successful candidates:

Grading system:

The following table gives the marks, grade points, letter grades and classification to indicate the performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade
(Performance in a Course/ Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	RA	Re-appear
ABSENT	0.0	AAA	ABSENT

‘C_i’ is the credit earned for the course *i* in any semester;

‘G_i’ is the Grade Point obtained by the student for the Course *i* and ‘*n*’ is the number of Courses **passed** in that semester.

For a Semester:

Grade Point Average [GPA]

$$= \frac{\text{Sum of the multiplication of the grade points by the credits of the courses}}{\text{Sum of the credits of the courses in a semester}}$$

$$\text{GPA} = \sum_i C_i G_i / \sum_i C_i$$

16. Classification of Final Results

Cumulative Grade Point Average [CGPA]

$$= \frac{\text{Sum of the multiplication of grade points by the credits of the entire programme}}{\text{Sum of the credits of the courses of the entire programme}}$$

$$\text{CGPA} = \sum_n \sum_i C_{ni} G_i / \sum_n \sum_i C_{ni}$$

CGPA	GRADE	Classification of Final Result
9.5-10.0	O+	First Class Exemplary
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+	Third Class
4.0 and above but below 4.5	C	
0.0 and above but below 4.0	RA	Re-appear

Note: The GPA and CGPA shall be calculated separately for the following three parts:

Part I:LCs; Part II: ELCs and Part III CCs, ACs and ECs.

- (i) Candidates who pass all the examinations prescribed for the Course in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking/Distinction.

Provided in the case of Candidates who pass all the Examinations prescribed for the Courses with a break in the First Appearance due to the reasons as furnished in the Regulations 12c supra are only eligible for Classification/ Distinction.

- (ii) For each of the three parts, there shall be separate classification on the basis of CGPA as indicated in the above Table.

- (iii) For purposes of declaring a candidate to have qualified for the Degree of Bachelor of Arts/Science/ Commerce/Management/Literature in the First class/Second class/Third class or First class with Distinction / Exemplary, the marks and the corresponding CGPA earned by the

candidate in Part III alone will be the criterion, provided he/she has secured the prescribed passing minimum in LCs and ELCs.

(iv) Grade in Part IV and Part V shall be shown separately and it shall not be taken into account for classification.

17. Pattern of Question Paper:

SECTION – A (50 words)

Answer 10 out of 12 Questions - $10 \times 2 = 20$ marks

SECTION – B (200 words)

Answer 5 out of 7 Questions - $5 \times 5 = 25$ marks

SECTION – C (500 words)

Answer 3 out of 5 Questions - $3 \times 10 = 30$ marks

TOTAL = 75 marks

B.Sc. Plant Biology and Plant Biotechnology
Course Structure under Choice Based Credit System
(For the candidates admitted from the academic year 2021-2022onwards)

Sem	Course	Sub. Code	Course Title	Inst. Hrs. / Week	Credit	Exam Hrs	Marks	
							Int.	Ext
I	LC I		Language – I	6	3	3	25	75
	ELC I		English – I	4	3	3	25	75
	CC I		Phycology – Theory	7	4	3	25	75
	CC III		Major Practical - I	2	-	*	-	-
	AC I		Allied Advanced Zoology and Biotechnology-I - Theory	4	3	3	25	75
	AC III		Allied Advanced Zoology and Biotechnology - Practical	3	-	*	-	-
	NME I		Non Major Elective – I Vermiculture technology	2	2	3	25	75
	SS I		Essential of Language and Communication	2	3	3	40	60
II	LC II		Language – II	6	3	3	25	75
	ELC II		English – II	4	3	3	25	75
	CC II		Mycology & Lichenology - Theory	7	4	3	25	75
	CC III		Major Practical - I	2	4	3	40	60
	AC II		Allied Advanced Zoology and Biotechnology-II - Theory	4	3	3	25	75
	AC III		Allied Advanced Zoology and Biotechnology - Practical	3	4	3	40	60
	NME II		Non Major Elective – II Bioresource Management	2	2	3	25	75
	SS II		Essential Spoken and Presentation skills	2	3	3	40	60

Sem	Course	Sub. Code	Course Title	Inst. Hrs. / Week	Credit	Exam Hrs	Marks	
							Int.	Ext
III	LC III		Language – III	6	3	3	25	75
	ELC III		English – III	4	3	3	25	75
	CC IV		Bryophytes & Pteridophytes -Theory	6	4	3	25	75
	CC VI		Major Practical - II	3	-	*	-	-
	AC I		Allied Chemistry - I - Theory	4	3	3	25	75
	AC III		Allied Chemistry - Practical	3	-	*	-	-
	EVS		Environmental Studies	1	2	3	25	75
	SS III		Personality Enrichment	3	3	3	40	60
IV	LC IV		Language – IV	6	3	3	25	75
	ELC IV		English – IV	4	3	3	25	75
	CC V		Gymnosperms & Palaeobotany - Theory	6	4	3	25	75
	CC VI		Major Practical - II	3	4	3	40	60
	AC II		Allied Chemistry - II - Theory	4	3	3	25	75
	AC III		Allied Chemistry - Practical	3	4	3	40	60
	VBE		Value Based Education	1	2	3	40	60
	SS IV		Computer Basics and Automation	3	3	3	40	60
	EA		Extension Activity	-	1	-	-	-

Sem	Course	Sub. Code	Course Title	Inst. Hrs. / Week	Credit	Exam Hrs	Marks	
							Int.	Ext
V	CC VII		Anatomy and Embryology – theory	5	4	3	25	75
	CC VIII		Genetics, Evolution and Plant breeding – theory	5	4	3	25	75
	CC IX		Morphology, Taxonomy Angiosperms and Economic botany – theory	5	4	3	25	75
	CC X		Cell and Molecular Biology - Theory	5	4	3	25	75
	CC XIV		Major Practical - III	3	-	*	-	-
	CC XV		Major Practical - IV	3	-	*	-	-
	CEC I		Core Elective Course I : Microbiology	4	5	3	25	75
VI	CC XI		Plant Biotechnology and Bioinformatics – theory	5	4	3	25	75
	CC XII		Ecology, Phytogeography & Biostatistics - Theory	5	4	3	25	75
	CC XIII		Plant Biochemistry And Plant Physiology - Theory	5	4	3	25	75
	CC XIV		Major Practical - III	3	4	3	40	60
	CC XV		Major Practical - IV	3	4	3	40	60
	CEC II		Core Elective Course II Mushroom technology	4	5	3	25	75
	CEC III		Core Elective Course III Plant Pharmacognosy	4	5	3	25	75

*** Examination at the end of even semester**

NON MAJOR ELECTIVE COURSE:

I Semester (Any one subject of the following Non Major Elective chosen by the candidate)		II Semester (Any one subject of the following Non Major Elective chosen by the candidate)	
Sub. Code	Non Major Elective	Sub. Code	Non Major Elective
	Vermiculture technology		Bioresource Management
	Medicinal Botany		Water Management
	Horticulture		Herbs & Home Remedies

CORE ELECTIVE COURSES:

V Semester (Any one subject of the following Core Elective chosen by the candidate)		VI Semester (Any two subject of the following Core Elective chosen by the candidate)	
Sub. Code	Core Elective Courses	Sub. Code	Core Elective Courses
	Mushroom Technology		Microbiology
	Fermentation Technology		Herbal Botany
	Plant Protection		Forest Technology

ALLIED: BOTANY(For B.Sc. Advanced Zoology and Biotechnology students' *wef* 2019 - 20)

Allied – I : Allied Botany– I

Allied – II : Allied Botany – II

Allied Practical : Allied Botany Practical

THEORY :

SEMESTER – I

Core Paper I

PHYCOLOGY

Subject Code:

- UNIT I:** Classification of Algae proposed by Silva PC (1982) ; General characters of Algae (occurrence and distribution)
- UNIT II:** General account of thallus structure, pigmentation, reserve food materials, reproduction and life cycle - Cyanophyta, Chlorophyta, Phaeophyta & Rhodophyta
- UNIT III:** Detailed study of structure, reproduction and life cycles (excluding developmental studies) of :
Unicellular - *Chlamydomonas*, Diatoms,
Colonial - *Volvox*,
Filamentous - *Anabaena*, *Oedogonium*,
- UNIT IV:** Detailed study of structure, reproduction and life cycles (excluding developmental studies) of :
Siphonous - *Caulerpa*,
parenchymatous - *Sargassum*, *Gracilaria*
- UNIT V:** Economic importance of algae: Algae as food and feed; Agar-agar, Alginic acid and Carrageenan; Diatomite,
- PRACTICALS:** A detailed study of structure of thallus and reproductive structures of types given in the syllabus and submission of record.
- REFERENCES:**
1. Chapman, V.J. & Chapman, D.J., 1980, The Algae, Macmillan.
 2. Fritsch, F.E. 1945, Structure and Reproduction of Algae. Vol. I & II, Cambridge University Press.
 3. Smith, G.M. 1955, Cryptogamic Botany, Vol. I. McGraw Hill
 4. Vashishta, B.R. 1990. Bombay for Degree students, Algae S. Chand & Co.
 5. Singh, V., Pandey, P.C. and Jain, D.K., 1998. A Text Book of Botany for undergraduate students, Rastogi Publications.
 6. South, G.R. & Whitlick 1989. Introduction to Phycology Black Well Scientific Publications.

THEORY:

SEMESTER – II
Core paper II
MYCOLOGY AND LICHENOLOGY
Subject code:

UNIT I: Classification of fungi proposed by Alexopoulos, 1962 - General Characters, occurrence and mode of nutrition of Fungi

UNIT II: Detailed study of structure, reproduction and life cycles of the following:

- a) Oomycetes - *Albugo*
- b) Ascomycetes - *Saccharomyces, Penicillium*

UNIT III: Detailed study of structure, reproduction and life cycles of the following:

- a) Basidiomycetes - *Agaricus*
- b) Deuteromycetes - *Fusarium*

Plant Pathology- Tikka disease and Citrus Canker

UNIT IV: Study of the General characteristics of Lichens – Structure & Reproduction of Crustose, Foliose and Fruticose Lichens (excluding developmental studies). Detailed study of *Usnea*.

UNIT V: Economic importance of Fungi: Medicine, food, biopesticides, biofertilizers and industrial uses such as Production of ethyl alcohol, citric acids and lipase enzyme.

PRACTICALS A detailed study of structure of thallus and reproductive structures of
: types given in the syllabus and submission of record

REFERENCES

- 1. Alexopoulos, C.J. & Mims. C.V. 1988. Introductory Mycology, John Willey & Sons.
- 2. Dube, H.C. 2008 An Introduction to Fungi. Vikas Publishing House Pvt. Ltd.
- 3. Vashishta B.R. 1990. Botany for Degree Students, Fungi. S.Chand & Co.

THEORY :

SEMESTER – III
BRYOPHYTES AND PTERIDOPHYTES
CORE PAPER – IV
Subject code:

UNIT I : Occurrence and distribution; General characters and Classification of Bryophytes.- Watson.

UNIT II : Study of thallus structure, reproduction and life cycle of the follow genera (excluding developmental studies) :
Hepaticopsida (*Marchantia*); Anthocerotopsida (*Anthoceros*) and Bryopsida (*Funaria*).

UNIT III : Occurrence & distribution; General characters, Classification of Pteridophytes - Reimer

UNIT IV: Study of structure, reproduction and life cycle of the follow genera (excluding developmental studies) :
Pteridophytes: (1) *Lycopodium* (2) *Selaginella* (3) *Equisetum* (4) *Adiantum*

UNIT V: Ecology and Economic importance of Bryophytes; Stelar evolution in Pteridophytes - Heterospory and Seed Habits

PRACTICALS: A detailed study of structure and reproductive structures of types given in the syllabus and submission of record.

- REFERENCES :**
1. Parihar, N.S. 1967. An introduction to Embryophyta Vol. I & II. General Book Dept.
 2. Prempuri, 1973, Bryophytes – A Broad Perspective, Atmaram& Sons.
 3. Smith, G.M. 1955, Cryptogamic Botany for Degree students Fungi, S. Chand & Co.
 4. Prempuri, 1973 Bryophytes – A broad perspective, Atmaram& Sons.
 5. Smith, G.M. 1955, Cryptogamic Botany, Vol. II McGraw Hill.

SEMESTER – IV
CORE PAPER - V
GYMNOSPERMS AND PALEOBOTANY

THEORY :

Subject code:

UNIT I: Distribution of gymnosperms – General characters – Economic importance – classification of Gymnosperms- K.R. Sporne 1962.

UNITII: Detailed study of the following types (Excluding developmental stages)
1. *Cycas*, 2. *Pinus*

UNIT III: Geological time scale; Introduction to fossils; Types of fossils

UNIT IV: Fossilization processes - compression, casts, molds, petrification, impressions and coal balls radio carbon dating.

UNIT V: ***Brief study of the following fossils***

1. *Lepidodendron*, 2 *Calamites* 3. *Williamsonia sewardiana*

PRACTICALS A detailed study of vegetative and reproductive structure of types given in the syllabus and submission of record.

REFERENCES

1. Chamberlain C.L. Gymnosperms, structure and evolution.
2. Sporne K.R. Morphology of Gymnosperms, B.I. Publications.
3. Vashista P.C. 1976. Gymnosperms, S.Chand& Co.
4. Arnold C.A. 1947. Introduction to Paleobotany, McGraw Hill
5. Shukla A and Mishra S.P. 1982, Essentials of Paleobotany, Vikas Publishing, House Pvt. Ltd.

THEORY :

SEMESTER – V
ANATOMY AND EMBRYOLOGY
CORE PAPER – VII
Subject Code:

- UNIT I:** Tissues - meristematic, simple, complex tissues. Theories of Shoot and root apex – (apical cell, histogen, tunica corpus)
- UNIT II:** Primary structure of stem and root of dicotyledons and monocotyledons. Dicot and monocot leaf.
- UNIT III:** Secondary structure of stem of dicotyledons. Anomalous secondary growth in stem – *Boerhaavia*, Secondary growth in monocot stem-*Dracaena*. Nodal anatomy. Periderm structure and development; Phellam, phellogen, phelloderm, rhytidome and lenticel.
- UNIT IV:** Structure of anther. Development of male gametophyte. Structure and types of ovule. Structure of female gametophyte.
- UNIT V:** Fertilization – double fertilization syngamy, triple fusion – endosperm – types (nuclear, cellular, helobial) ruminate endosperm, haustoria – function of endosperm, structure and development of mature dicot embryo (*Capsella*). Structure and development of monocot embryo (*Najas*)

PRACTICALS :

1. Study of simple & complex (Primary & Secondary) tissues by maceration
2. Study of internal structure of young & old stem & root of Dicots
3. Study of internal structure of normal stem & root of monocotyledons.
4. Study of internal structure of Dicot and Monocot leaves.
5. Anomalous stem of Dicot and Monocot.

REFERENCES:

1. Cutter E.G 1969, Plant Anatomy, Part I, Addison Wesley Publishing Co.
2. Cutter E.G 1971, Plant Anatomy, Part II, Edward Arnold.
3. Eames A.J and Mac Daniels L.H 1972, Introduction to Plant Anatomy, Tata McGraw Hill.
4. Esau K 1953, Plant Anatomy.
5. Esau K 1960 Anatomy of seed plants, John Wiley.
6. Fahn A 1974, Plant Anatomy, Pergamon Press.
7. Fahn A 1949, Practical Plant Anatomy, East West press.
8. Tayal M.S 1979, Plant Anatomy, Rastogi Publications.
9. Vashishta P.C 1968, A Text Book of Plant Anatomy, S.Negin & Co
10. Bhojwani S.S, & Bhatnagar S.P. 1978. The Embryology of Angiosperms. Vikas Publishing Pvt. Ltd
11. Maheswari. P, 1971. An Introduction to the embryology of Angiosperms. Tata McGraw Hill.
12. Swamy B.G.L and Krishnamurthy.K.V 1980. From Flower to Fruit. Tata McGraw Hill

THEORY:

SEMESTER – V
GENETICS, EVOLUTION AND PLANT BREEDING
CORE PAPER – VIII
Code No.

- UNIT I** Mendelian Genetics- Mendel's Laws, monohybrid and Dihybrid Cross – Test and Back crosses. Deviation from Mendelian ratio – incomplete dominance, lethal factor, Codominance; multiple alleles; Non allelic interactions – dominant epistasis, Recessive epistasis, Complementary gene, supplementary gene,.
- UNIT II** Linkage and crossing over. Sex determination in plants. Sex linked inheritance – Haemophilia and colour blindness. Extra nuclear inheritance in Maize
- UNIT III** Bacterial genetics – Transformation, conjugation, transduction.
- UNIT IV** Evolution: Origin of life, chemosynthetic theory– Evolutionary theory of Lamarck , Darwin and de Vries, Concept of species- Allopatric and Sympatric. Isolating mechanisms.
- UNIT V** Methods of crop improvement – Introduction, acclimatization, selection – mass, pure line and clonal. Hybridization – Hybrid vigour. Breeding for crop improvement for Paddy.

- PRACTICALS:**
1. Simple problems on monohybrid, Dihybrid ratio and interaction of factors.
 2. Demonstration of Hybridization techniques using potted plants.

- REFERENCES:**
1. Allard R.W. 1960, Principles of Plant breeding, John Wiley & Sons, New York.
 2. Verma, P.S. and V.K. Agarwal, 1998, Concepts of evolution.
 3. Levin, R.P. 1962 Genetics, Reinhart & Winston
 4. Verma & Agarwal Genetics, S. Chand & Co.

**MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND
ECONOMIC BOTANY**

- UNIT I: A brief account of Leaf: Phyllotaxy, simple, compound and modifications; inflorescence-types; Flower: description of floral parts; Fruits-types
- UNIT II: Systems of classification – outline classification of Linnaeus; Bentham & Hooker. Binomial nomenclature- IUCN- citation of authors - herbarium technique. Botanical survey of India (BSI)
- UNIT III: Detailed study of the range of characters and plants of economic importance of the following families.
Polypetalae - *Annonaceae, Caesalpinaceae, Rutaceae*
Gamopetale - *Rubiaceae, Asteraceae, Asclpiadaceae Solanaceae*
- UNIT IV: Detailed study of the range of characters and plants of economic importance of the following families.
Monochlamydae - *Euphorbiaceae, Amaranthaceae*
Monocotyledons - *Lilliaceae and Poaceae*
- UNIT V: Study of binomial, family and morphology useful parts and uses of the following - Cereals – paddy; Pulses – Red gram; Oil seeds – Groundnut; Fibers – Cotton; Timbers – Teak.
- PRACTICALS:
1. Description of a plant in technical terms
 2. A detailed study of the range of vegetative and floral characters of plants belonging to the families mentioned in the theory.
 3. Submission of 15 herbarium sheets with proper field notebook for Practical examination. Field trip to any place within or outside the state for 5 days for plant collection.
 4. Submission of record.
- REFERENCES :
1. Gupta R.K. 1972 Text book of systematic botany, Atma Rama & Sons
 2. Lawrence, G.H.M. 1967, Taxonomy of Vascular Plants, Oxford 7 IBH Publishing company.
 3. Vashista, P.C. 1974. Taxonomy of Angiosperms S. Chand & Co.
 4. Hill A.W. 1951. Economic Botany. MC Graw Hill
 5. Rao K.N.R. Krishnamurthi, K.V. 1980 Angiosperms, S.Viswanathan Pvt. Ltd.
 6. Pandey B.P. 1987, Taxonomy of Angiosperms.
 7. Venkateswarulu V., Morphology S. Chand & Co.

THEORY :

SEMESTER – V
CORE PAPER – X
CELL AND MOLECULAR BIOLOGY

UNIT I	Introduction – prokaryotic and eukaryotic cell. Occurrence, structure and function of Plasma membrane, endoplasmic reticulum, golgi bodies, lysosomes, ribosomes, mitochondria, chloroplast and nucleus.
UNIT II	Chromosomes – structure, number, euchromatin, heterochromatin, giant chromosomes– polytene and lampbrush, cell division -mitosis and meiosis – cell cycle.
UNIT III	Nucleic acid – DNA - structure and types (A, B, C & Z). Watson and Crick model of DNA. DNA as genetic material, DNA synthesis and replication (prokaryote)
UNIT IV	RNA - types - Transcription in Prokaryotes - Initiation, elongation, termination, Genetic code - Wobble hypothesis, Translation in prokaryotes.
UNIT V	General principles of Gene Regulation, Gene Regulation in prokaryotes, Operon concept, <i>lac</i> Operon
PRACTICALS:	1. Study of structure of plant cell organelles from electron micrographs and standard publications. 2. Study of mitosis by squash technique.
REFERENCES:	1. Brown W.V and Bertke E.M 1974, A Textbook of Cytology, C.V. Mosby Co, St.Louis. 2. Cohn N.S 1979, Elements of Cytology, Freeman Book Co 3. Hell J.I, Flowers T.J and Roberts R.M 1978, Plant cell structure and metabolism. Longman. 4. Swanson C.P 1971, The Cell, Prentice Hall of India 5. Verma P.S and Aggarwal V.K 1980, Cytology, S.Chand& Co Limited

THEORY :

SEMESTER –VI
CORE PAPER –XI
Code No.

PLANT BIOTECHNOLOGY AND BIOINFORMATICS

UNIT I	Introduction to Genetic Engineering; techniques- Restriction endonucleases- Ligation, Adapters and Linkers, Cloning Vectors-Plasmids; Hybridization- Southern Blotting.
UNIT II	Genetic Engineering in plants; Gene transfer technique using Agrobacterium, physical delivery methods:PEG stimulated, Microinjection Electroporation.
UNIT III	Plant tissue culture – totipotency, nutrient medium – MS medium. Sterilization, Root and shoot culture. Anther culture, Protoplast isolation and fusion – somatic hybrid,. Synthetic seeds. . .
UNIT IV	Application of Plant Tissue Culture - Transgenic plants – methods- Pest resistant plants – BT cotton; Golden rice; flavr savr tomato
UNIT V	Introduction to Bioinformatics – NCBI- EMBL- DDBJ; Biological database – Genbank- PDB; literature database (Pubmed); Sequence alignment – global – local ; gap- gap penalty: Pair wise and Multiple sequence alignment Sequence similarity search – BLAST
PRACTICALS:	Bio technology 1. Synthetic seeds, immobilization techniques using alginate (blue green algae). 2. M.S. Medium 3. Bio Informatics - Demonstration only. Data base searching techniques – Query search and analysis of protein & genes. molecular visualization of protein, Phylogenetic analysis, BLAST.
REFERENCES:	1. Dubey, R.C. 1993 A text book of Book of Biotechnology. S.Chand& Co. Ltd. 2. Treven M.D.S. Buffery, R.G. Goulding and F.Standardy 1987. Biotechnology. The Biological Principles. Tata Mc.Graw Hill. 3. Ignacimuthu S. 1996. Basic Technology, Tata McGraw hill. 4. Kumar H.O. 1993. A text book of Biotechnology, East West Affiliated Press

THEORY :

SEMESTER –VI
CORE PAPER – XII
Code:

ECOLOGY, PHYTOGEOGRAPHY&BIOSTATISTICS

- UNIT I Biotic and abiotic factors and their influence on vegetation – a brief account of microbes, plants, animals, soil, wind, light, temperature, rainfall and fire. Biogeochemical cycles (Nitrogen, Carbon)
- UNIT II Ecosystem - concept, processes and components. Food chain, food web, energy flow, pyramids. Nutrient cycling. Types of ecosystems - marine and grassland.
- UNIT III Autecology and Synecology - Methods of study of vegetation (Quadrat and transect) Plant succession - Hydrosere and Xerosere. Ecological classification of plants: Morphological and anatomical features of plants and their correlation to the habitat factors
- UNIT IV Phytogeographical regions of India. Endemism – Indian flora – Age and area hypothesis and continental drift – Endangered species; Hot spots.
- UNIT V Classification of data, mean, median and mode. Standard deviation, standard error, variance, chi square test.

- PRACTICALS:
1. Study of the morphological and anatomical features of xerophytes, hydrophytes, halophytes and epiphytes.
 2. Map of Phytogeographical regions of India.
 3. Simple problems in the statistics- Mean, Median, Mode, chi - square method.

- REFERENCES :
1. Odum, E.P. 1983. Basic Ecology Holt Saunders International editions.
 2. Kumar H.D. 1990. Modern concepts of Ecology. Vikas publishing.
 3. Shukla R. and Chandel P 1990. Plant Ecology. S.Chand & Co. Pvt. Ltd.
 4. Rangaswami, R.A. 1995. A. textbook of Agricultural statistics. New Age International publications, Chennai.

THEORY :

SEMESTER –VI
CORE PAPER – XIII
Code No.

PLANT BIOCHEMISTRY AND PLANT PHYSIOLOGY

- UNIT I: Structure and classification of carbohydrates, lipids, proteins and nucleic acids – Enzymes – Properties, nomenclature and classification as per IUBC (enzyme commission of the International Union of Biochemistry) cofactors, coenzymes and mode of action. Factors affecting enzyme action.
- UNIT II: Water relations – diffusion, permeability, osmosis, absorption of water – Apoplast and symplast. Mechanism – passive and active. Translocation of water – Ascent of sap – Transpiration – types and significance, factors. Stomatal mechanisms.
- UNIT III: Photosynthesis – Photosystem I and II, cyclic and non cyclic electron transport – C₃ and C₄ pathways – factors affecting photosynthesis – Photo respiration. Respiration – Aerobic – anaerobic – glycolysis – Kreb's cycle – electron transport system – oxidative phosphorylation – factors affecting respiration.
- UNIT IV: Nitrogen assimilation – biological nitrogen fixation – nitrogen fixing organisms, legume – *Rhizobium* symbiosis.
- UNIT V: Phytohormones - auxins, gibberellins, cytokinins, ethylene and abscissic acid. Photomorphogenesis – Photoperiodism - Phytochromes – Florigen concept. Dormancy (Seed and bud), Seed viability and germination.
- PRACTICALS: Experiments to be performed and recorded by students individually.
1. Determination of solute potential by plasmolytic method.
 2. Effect of temperature and chemicals on membrane permeability.
 3. Study of relative rates of transpiration in different plants.
 4. Determination of percentage of viability of seeds with Tetrazolium chloride.
 5. Separation of plant pigments by paper chromatography.
 6. Study of rate of photosynthesis under different light intensities.
 7. Comparison of rate of respiration on different respiratory substrates.
 8. Determination of pH of soil and plant sap using pH meter.

DEMONSTRATION EXPERIMENTS:

1. Test for starch and proteins.
2. Hydrolysis of starch by amylase.
3. Effect of temperature on catalase.

REFERENCES:

1. Salisbury F.B and Ross C.W 1991, Plant Physiology, Wassworth Publishing Co, Belmont.
2. Bidwell R.G.S 1974, Plant Physiology. Macmillan Publication Co, New York.
3. Rama Rao A.V.S.S 1988, Text Book of Biochemistry, L.K & S Publishers.
4. Rao K.N Sudakar Rao G and Bharathan S 1987, The Functioning of Plant. S.Viswanathan Pvt Ltd.
5. Ting I.P 1982, Plant Physiology, Addison Wesley Publication Co. Philippines.
6. Michealis I and Torrey J.C 1956, Plant in Action, W.H. Freeman.
7. Withem, F.H Blaydes D.F and Devlin R.N 1972, Experiments in Plant Physiology, Van Nostrand Reinhold Co.
8. Conn E.E, P.K. Stumpf, G.Brueming and R.H.Doi 1987, Outlines of Biochemistry, John Wiley & Co, New York.
9. William H, Elliot and Daphane C, Elliot 1997, Biochemistry and Molecular Biology, Oxford University Press.
10. Jain, J.L. 2007. Text book of Biochemistry. S. Chand & Co. Ltd., New Delhi

NON- MAJOR ELECTIVE COURSES

SEMESTER I

VERMICULTURE TECHNOLOGY

SUBJECT CODE:

UNIT-I

Earthworm classification – Morphological and Anatomical characteristics. Biology of *Lampitomarutti*.

UNIT-II

Vermicomposting materials and their classification. Feeding habits and food for composting worms.

UNIT-III

Vermicomposting methods such as – Small scale and Large scale pit method, heap method, window method etc., Factors affecting vermicomposting such as pH,, Moisture, Temperature etc.

UNIT-IV

Vermicomposting: General procedure in Homes. Maintenance of vermicomposting beds. Harvesting the worms. Earthworm Predators, Parasites and Pathogens.

UNIT-V

Application of Vermicomposting in Agriculture and Horticultural practices. Advantages of Vermicomposting.

References :

1. Edwards, C.A., and Bother, B. 1996 : Biology of Earthworms –Chapman Hall Publ. Co., London.
2. Ismail, S.A. 1997 :Vermitechnology – The Biology of Earthworms-Orient Longman Publ. – India.
3. Ranganathan, L.S. 2006 :Vermibiotechnology from soil health tohuman health – Agrobios – India.
4. Talashikar, S.C. 2008 : Earthworms in Agriculture – Agrobios – India
5. Gupta, P.K. 2008 : Vermicomposting for sustainable Agriculture (2nd Edition) – Agrobios – India.
6. Edwards, C.A & P.J Bohlen, 1996. Biology and ecology of earthworms III Edn. Chapman & Hall N.Y.U.S.A.

SEMESTER I
MEDICINAL BOTANY
SUBJECT CODE:

Unit I :

History definition and scope of ancient classical systems of medicine.

(a) Siddha (b) Ayurvedha (c) Unani

A detailed study of some of the useful medicinal plants with regard to

(a) Botanical Source (b) Morphology (c) Anatomy

(d) Medicinal Properties and (e) Uses

1. *Cyanodon dactylon* (Arugambul)
2. *Aloe vera* (Kumari or Sotrukkatrazhi)
3. *Embllica officimalis* (Peru Nelli)
4. *Mentha arvensis* (mint/Pudina)
5. *Allium sativum* (Poondu)

UNIT - II

Aromatherapy

History, Role of aroma oils in human life

1. Method of preparation of massage oils
2. A brief knowledge about few aroma oils and carrier oils (base oils)

a. Aroma Oils

1. Ginger Oil
2. Vetiver Oil
3. Lavender Oil
4. Eucalyptus Oil
5. Sandal wood oil

b. Base oils

1. Sesame oil
2. Olive oil
3. Badam oil
4. Coconut oil
5. Sunflower oil

Unit-III

A. General account of poisonous plants and their medicinal uses.

1. *Thevetia*
2. *Datura metel*
3. *Gloriosa superba*
4. *Strichos*
5. *Calotropis*

B. Phytochemicals

- | | | | |
|----|------------|---|-----------------------------|
| 1. | Alkaloids | - | Atropine |
| 2. | Glucosides | - | Hesperidin |
| 3. | Glycosides | - | Digitoxin |
| 4. | Tannins | - | <i>Cinchona officinalis</i> |
| 5. | Resins | - | <i>Asafoetida</i> |

Unit - IV

1. Herbal Garden (Layout, planning and designing a herbal garden)
2. Growing herbs in containers
3. Growing plants from seeds and seedlings
4. Soil Preparation
5. Potting and reporting

Unit-V

A general account of: Collection sterilization, drying, and preservation of Herbal productions. Adulteration of Herbal Products and detection of adulteration -Method of adulteration

- Practicals :
1. Study of medicinal plants mentioned in theory.
 2. Identification of medicinal products.

References:

1. Khare, C .P. 2007. Indian Medicinal Plants. An illustrated Dictionary, Springer, India.
2. Moshraffuddin Ahmed, 2010. Medicinal Plants. MJP Publishers, Chennai.
3. Warriar, P.K., Nambiar, V.P.K. and Ramankutty, C. 1996. Indian Medicinal Plants a compendium of 500 species Vol. 1- 5., Orient Longman, New Delhi.
4. Kochhar, S.L. 1981. Economic Botany in the tropics. Macmillan India Limited.
5. Andrew Chevallier, 2013. The Encyclopedia of Medicinal Plants: A Practical Reference Guide to over 550 Key Herbs and Their Medicinal Uses.DK publishers, Amazon.

SEMESTER I
HORTICULTURE
SUBJECT CODE:

Unit I

Importance of horticulture, divisions, garden tools and appliances, components of garden, planning the garden, types of garden.

Unit II

Fumigation, sterilization, irrigation, soil types, use of organic manures and fertilizers to improve the fertility of the soil.

Unit III

Lawn - types, maintenance, grass types, soil preparation, irrigation and weeding., Herbs, shrubs, trees, path, edges, hedges, borders, climbers, carpet beds, rockery. Water garden, topiary, Pot culture with special reference to Bonsai & green house.

Unit IV

A brief study of the methods of propagation of plants from seeds, raising of plants from cuttings, layering, budding and grafting.

Unit V

Soilless Plants and hydroponics. Green house - types, aeration, soil fertilizers, types of plants & Pest control - disease, infection & prevention. Specific pathogen -free plant production.

References:

1. Bose TK, Mitra SK & Rathore DS. (Eds.). 1988. Temperate Fruits -Horticulture. Allied Publ.
2. Chadha KL & Pareek OP. 1996. (Eds.). Advances in Horticulture. Vols. II-IV. Malhotra Publ. House.
3. Nakasone HY & Paul RE. 1998. Tropical Fruits. CABI. Peter KV. 2008. (Ed.). Basics of Horticulture. New India Publ. Agency.
4. Pradeepkumar T, Suma B, Jyothibhaskar & Satheesan KN. 2008. Management of Horticultural Crops. Parts I, II. New India Publ. Agency.
5. Radha T & Mathew L. 2007. Fruit Crops. New India Publ. Agency.
6. Singh HP, Negi JP & Samuel JC. (Eds.). 2002. Approaches for Sustainable Development of Horticulture. National Horticultural Board.

Bioresource and Management

Subject Code:

- Unit I:** Biodiversity – Definition- Types of Biodiversity – Protected areas – Biosphere reserves – National Parks and wildlife sanctuaries.
- Unit II:** Biodiversity assessment and inventory programs – Morphological and Molecular characterization of biodiversity – Methods for species identification and classification
- Unit III:** Conservation of biodiversity – National and International initiatives – IUCN categories-Endangered, Threatened, Vulnerable and extinct species.
- Unit IV:** Biodiversity informatics – Documenting biodiversity – Biodiversity databases – Red Book – Blue book and Green book – Biodiversity registers.
- Unit V:** Global biodiversity information system – Species 2000 and Tree of life – Overview of the UNEP/GEP biodiversity data management project (BDM) and bioethics.

References:

1. Kumar 2005, Biodiversity Principles and Conservation, Internation Book Distributors, Dehradun.
2. Kevin, J. Canton and John I Spicer, An introduction of Biodiversity
3. Global biodiversity, 1992, Status of the Earth Living Resources, Water conservation and monitoring center, Chapman hall, London.
4. Forey, P.L. Humphries C.J. and Vane R.I. Wright (Eds. 1994, Systematics and Conservation Evolution.
5. Krishnamurthy, K.V. 2003. An Advanced Textbook on Biodiversity, Principles and Practice. Oxford and IBH Publishing CO. Pvt. Ltd., New Delhi.

SEMESTER II
WATER MANAGEMENT

Subject code:

UNIT - I

Water, chemical properties and biological importance.

UNIT - II

Potable water, Measurement of water quality, BOD, COD, evaluation of drinking water quality.

UNIT - III

Water pollution, industrial, agricultural and heavy metal pollution. Water quality in and around industrial sites.

UNIT – IV

Sewage treatment. Drinking water treatment

UNIT -V

Water management, recreational aspects of water - quality of swimming pool water. Water quality monitoring. Environmental impact assessment.

REFERENCES:

1. Cech Thomas V., 2003. Principles of water resources: history, development, management and policy. John Wiley and Sons Inc., New York.
2. Mollinga .P. etal2006 “ Integrated Water Resources Management”, Water in South Asia Volume I, Sage Publications,
3. Technical Advisory Committee, Integrated Water Resources management, Technical Advisory Committee Background Paper No: 4. 2002. Global water partnership, Stockholm, Sweden.
4. Technical Advisory Committee, Effective Water Governance”. 2003. Technical Advisory Committee Background paper No: 7. Global water partnership, Stockholm, Sweden,
5. M. Thangarajan., 2006. Ground water management. Jain book Puplishers
- 6.A.KChaterjee.2010., Water supply waste disposal and Environmental Engineering. Jain books puplishers.

SEMESTER II

HERBS AND HOME REMEDIES

Subject code:

UNIT - I

History and role of the herbs in day-to-day life

UNIT - II

Beneficial aspects of herbal plants as food -common greens .vegetables and edible oils (general account only)

UNIT-III

Study of some common plants which are used as medicine.

Calotropis gigantea .*Centella asiatica*, *Cissus quadrangularis*, *Rosa centifolia*, *Piper betel*, *Ocimum sanctum*, *Azadirachta indica*, *Curcuma longa*, *Zingiber officinalis* *Lawsonia inermis*.

UNIT - IV

Herbal remedies - herbal first aid, home remedies-for common cold, fever, headaches, migraines, digestive and respirator) disorders, ear, eyes, mouth and throat infections.

UNIT - V

Skin care using herbal products.

Reference:

1. Ambasta, S.P. (ed) 1988. *The useful plants of India*. CSIR, New Delhi
2. Bhattacharjee, S.K. 2004. *Handbook of MedicinalPlants*(4thed.). Pointer Publishers, Jaipur
3. Chadha, K.L. and Gupta, R. 1995. *Advance in Horticulture: Vol. II: Medicinal and Aromatic Plants*. Malhotra Pub. House, New Delhi
4. CSIR. 1971. *The Wealth of India*. Vol. A-Z. Council for Industrial and Scientific Research, New Delhi

5. Farooqui, A.A., Khan, M.M. and Sreeramu, B.S. 1997. *Cultivation of Medicinal and Aromatic Crops in India*. NayaPrakash, Kolkatta
6. KameswaraRao, C.2000. *Database of medicinal plants*. KSCST, Bangalore
7. Honda, S.S. and Kaul, M.K. 1996. *Cultivation and Utilization of Medicinal Plants*. RRL, Jamu.
8. Hurtmann, H.T., Kester, D.E., Davies, F.T. and Geneva, R.L. 2004. *Plant Propagation: Principle and Practice*. Prentice-Hall of India, New Delhi
9. ICAR. 2003. *Handbook of Agriculture*. Indian Council Agricultural Research, New Delhi
10. Nair, C.K.N. and Mohanan, N. *Medicinal Plants of India*. Nag Publishers, Delhi
11. Nehra, S. 2005. *Plant Diseases: Biocontrol and Management*. Aavishkar Publishers and Distributors, Jaipur
12. Pearce, D. and Moran, D. 1994. *The economic value of biodiversity*. Earthscan Pub., London
13. Prajapati, N.S., Purohit, S.S., Sharma, A.K. and Kumar,T. 2003. *A Handbook of Medicinal Plants*. Agrobios-India.
14. Pushpangadan, P. and Nair, K.N. 1997. Medicinal Plants. In: *The Natural Resources of Kerala*. K. BalachandranThampiet *al.* (Eds.), World Wide Fund for Nature-India, Kerala Chapter, Thiruvananthapuram.
15. Reddy, T.Y. and Reddy, G.H.S. 2005. *Principles of Agronomy*. Kalyani Publishers, New Delhi.
16. Sharma J.R. 1994. *Principles and Practice of Plant Breeding*. Tata McGraw-Hill Publishing Co.Ltd, New Delhi
17. Sharma, R. 2004. *Agrotechniques of Medicinal Plants*. Daya Publishing House, Delhi
18. Sivarajan, V.V. and Indira Balachandran. 1988. *Ayurvedic Drugs and Their Plant Sources*. Oxford and IBH Pub. Co. Pvt. Ltd., New Delhi.
19. Trivedi, P.C. 2004. *Medicinal Plants: Utilization and Conservation*. Aavishkar Publishers and Distributors, Jaipur.

CORE ELECTIVE COURSES

THEORY:

SEMESTER –V
ELECTIVE (MAJOR) – I

Code:

MICROBIOLOGY

- | | |
|----------|---|
| UNIT I | The scope of microbiology – history of microbiology – classification of microorganisms – Whittaker's Five kingdom concept. |
| UNIT II | Bacteria – classification, (Bergey's classification), General Characters of bacteria, structure – Reproduction, Nutrition – Photosynthetic, Chemosynthetic, Mycoplasma, PPLO. |
| UNIT III | Structure of TMV and bacteriophage; bacteriophage replication – lytic and lysogenic cycle. |
| UNIT IV | Microbiology of food – food spoilage, types of microbes associated with food spoilage, food preservation. Food poisoning – Botulism. |
| UNIT V | Industrial Microbiology – organic acid – alcoholic beverage. |

- REFERENCES:
1. General microbiology Vol. I & II Power & Daginawala, Himalaya Publishing House.
 2. Atlas R.M. Microbiology – Fundamentals and applications. Mc. Millan Publishing Company, New York.
 3. Pelczar Jr. M.J., E.C.S. Chan and N.R. Krieg. 1986. Microbiology 5th edition. Mc.Graw Hill Book Company, New York.
 4. Anantharayan, R. and C.K.J. Paniker 2000 Text book of Microbiology, 6th Edition. Orient Longman.

SEMESTER –V
ELECTIVE (MAJOR) – II
Code:

FERMENTATION TECHNOLOGY

- UNIT I: Fermentation – Bioreactor – Types – design and applications.
- UNIT II: Microbes for reactor, microbial growth medium for bioreactor – fermentation enzymes, Batch culture, continuous culture.
- UNIT III: Applications in alcoholic beverage production - wine, beer.
- UNIT IV : Organic acid production- citric acid, acetic acid.
- UNIT V : Vitamins - cyanocobalamin, Antibiotics – penicillin

- REFERENCES:
1. Purohit, S.S. 2003. Microbiology – Fundamentals and Application. Sixth edition.
 2. Ramawat, K.G. 2007. Biotechnology: Secondary metabolites – Plant and Microbes, Science Publisher, India.
 3. Dubey R.C 1993, A Text Book of Biotechnology, S.Chand & Co Ltd, New Delhi.
 4. Kumar H.D 1993, A Text Book of Biotechnology, East West Affiliated Press Ltd. New Delhi.

SEMESTER –V
ELECTIVE (MAJOR) -III
Code:
PLANT PROTECTION

- UNIT I A general account of types of plant diseases and causal agents.
- UNIT II Study of symptoms, etiology and control measures of the under mentioned diseases:-
1. Damping off of seedlings, 2. Black rust of wheat, 3. Smut of maize, 4. Blast of paddy, 5. Wilt of cotton, 6. Bhendi mosaic and 7. Bunchy top of banana.
- UNIT III Principles of plant protection
1. Exclusion and eradication (quarantine) 2. Cultural practices, 3. Chemical – protectant fungicides and systemic fungicides. Definition and mode of action of sulphur fungicides, copper fungicides (Bordeaux), Organic fungicides (Thiocarbamates, Captan) Systemic fungicide (Benzimidazole) and 4. Biological.
- UNIT IV Epiphytotics : Definition. Types, factors affecting epiphytotics.
- UNIT V Plant protection appliances – sprayers – dusters – soil injectors – seed dressing drum.

- REFERENCES:
1. Bap Reddy – 1968. Plant Protection in India. Allied Publishers.
 2. Chattopadhyay, S.B. 2012. Principles and Procedures of Plant Protection.
 3. Chaudhury&Majid, S. 1954. Hand Book of Plant Protection, Department of Agriculture, Assam.
 4. Rangasami, G. 1994. Disease of Crop Plants. Printice Hall of India Ltd.
 5. Mukundan, T.K. 2003. Plant Protection, Principle and Practice, Asia Publishing House.
 6. Walker, J.C. 1969. Plant Pathology. Tata MC Graw – Hill Publishing Co. Ltd.

SEMESTER –VI
ELECTIVE (MAJOR) – I
Code:
MUSHROOMTECHNOLOGY

- UNIT I Introduction: Morphology, Types of Mushroom, identification of edible and poisonous mushroom, Nutritive value of mushrooms.
- UNIT II Scenario of Mushroom cultivation, prospects and scope of mushroom cultivation in small scale industry
- UNIT III Lifecycle of *Pleurotus*, *Agaricus* and *Volvariella*.
- UNIT IV Cultivation – conditions for tropical and temperate countries, isolation, spawn production, growth media, spawn running and harvesting of mushrooms.
- UNIT V Diseases and post harvest technology insect pests, nematodes, mites, viruses, fungal competitors and other important diseases. Post harvest technology: Harvesting, Freezing, dry freezing, drying, packaging, Marketing recipes from Mushrooms.

- References:
1. Handbook of Mushroom cultivation, 1999, TNAU publication
 2. Nita Bahl, 2002, Handbook on Mushroom 4th edition Vijay 73 Primlani for oxford & IBH publishing co. Pvt. Ltd.
 3. Suman, 2005, Mushroom Cultivation Processing and Uses, M/s. IBD publishers and Distributors, New Delhi.
 4. Sing, 2005 Modern Mushroom Cultivation, International Book Distributors, Dehradun.
 5. Bahl N., Handbook on Mushroom, Oxford and IBM, New Delhi.
 6. Dey, S.C. Mushroom growing, Agrobios (India), Jodhpur.
 7. Handbook of Edible Mushroom Today and Tomorrows printers and Publishers.
 8. Kapoor J.N. Mushroom cultivation, Krishi Bhavan, New Delhi.
 9. Manibushan Rao, K., Text Book of Horticulture, Mac Millan India Ltd.
 10. Parthiban, Malathi and BalaMohan, Mushroom culture (Tamil).
 11. Sharma V.P. 2006, Diseases and Pests of Mushrooms, M/S. IBD Publishers and Distributors, New Delhi.

THEORY

SEMESTER –VI
ELECTIVE (MAJOR) – III
Code:
PLANT PHARMACOGNOSY

- Unit I: Introduction, Traditional systems of Medicine – Siddha and Ayurveda. Present and future Status of Pharmacognosy. Classification. Classification of Organized Crude drugs.
Roots- *Hemidesmus*
Stem- *Tinospora*
Underground stem-*Zingiber*
Wood-*Santalum*
Barks-*Terminalia arjuna*
- Unit II: Leaves-*Ocimum*
Flowers-*Cloves*
Fruits-*Myriobalan*
Seeds-*Mucuna*
Whole plants-*Phyllanthusamarus*
- Unit III: Unorganized drugs –Excretory and Secretary Products.
Oleoresin – Turpentine
Hard Resin- Damars
Gum Resins – Asafoetida
Volatile Oil – Lemon grass oil
Non-volatile Oil- Castor Oil
Fungi-*Penicillium*
- Unit IV: Phytochemistry of medicinal plants: Alkaloids, Glycosides, Tannins, Saponins. Preliminary Phytochemical tests.
- Unit V Drug adulteration and detection. Poisonous plants. Importance of Herbal garden.
- References:
1. Kirtikar&Basu 2006, Indian Medicnal Plants, Bishen Singh Mahendra Pal Singh, Dehra Dun.
 2. Mohamed Ali, 2008 Pharmacognosy & Phytochemistry – Vol. I, CBS Publishers & Distributors
 3. Mohamed Ali, 2008 Pharmacognosy & Phytochemistry – Vol. II , CBS Publishers & Distributors
 4. The Wealth of India – A dictionary of Indian Raw Materials & Industrial products 2005 National Instt. Of Sc. N & Comm. Information Resources CSIR
 5. AshutoshKan 2009, Pharmacognosy&Pharmacobiotechnology,

New Age Pvt. Ltd. Publications.

6. Somasundaram. S 1997. MaruthuvaThavaraviyal, Elangovan Publications. Palayankottai.
7. Nadkarni K.M. 1976 Indian Material Medica Vol. I Popular Prakashan, Bombay.
8. Murudesamudaliar 1998. Siddha MateriaMedica (Gunapadam – Mooligai). Directorate of Indian Medicine and Homeopathy, Chennai.

THEORY

SEMESTER –VI
ELECTIVE (MAJOR) – III
Code:
FOREST TECHNOLOGY

- Unit I: Forestry – Definition, Classification, Scope of forestry utilization, major and minor forest products, commercial Timber Yielding plants of South India. Forest types of India, Social forestry, Village forestry, farm forest, avenues.
- Unit II: Principle and scope of forest management. Concept of sustainable utilization and conservation strategies, sustainable development. Major wild life in South India – Endangered species – causes for destruction and need for protection.
- Unit III: Elements of silviculture – Silviculture of the following species – a. *Tectona grandis* b. *Casuarina equisetifolia*. Silvicultural systems – clear felling, simple coppice and selective felling.
- Unit IV: Wood Structure, Physical, chemical and mechanical properties of wood. Wood preservation, wood seasoning and wood preservatives.
- Unit V Tree improvement methods – species introduction, hybridization, individual tree selection, vegetative propagation, grafting, and biotechnology for forestry.
- References:
1. Chacho, 1985, Sampling techniques
 2. Vinod Kumar, 1995, Nursery and plantation practices
 3. Nautiyal S., Non Timber Forest Products of India
 4. Champion, H.G. and Griffith, 1967, General Silviculture
 5. Troupe, 1975, Silviculture of Indian Trees
 6. Sudhir M, 2000, Applied biotechnology and Plant genetics
 7. Shrivastava M.B., 1998, Introduction to Forestry
 8. Agarwal A, Forest of India
 9. Tewari D.N. Tropical Forestry in India, International Book Distributors, Dehradun.
 10. Ward H.M. 2001, Trees A Handbook of Forest Botany, International Book Distributors, Dehradun.

PLANT BIOLOGY AND PLANT BIOTECHNOLOGY

WEBSITE REFERENCES:

GENERAL:

1. <http://www.botany.com>
2. <http://glossary.gardenweb.com/glossary>
3. <http://dallas.tamu.edu/weeds/anat.html>
4. <http://atlasveg.ib.usp.br/English/focara.html>
5. <http://www.rrz.uni-hamburg.de/biologie/b-online/e04/04.htm>
6. <http://home.teleport.com/~amobb/biology/botany.html>
7. <http://www.npwrc.usgs.gov/index.htm>

SUBJECT WISE WEBSITE REFERENCES:

PHYCOLOGY

1. www.csupomona.edu/~library/websites/botany - -flowering plants gateway
2. <http://www.botany.net/IDB>
3. <http://chapmanlab.lsu.edu/> -- algae gallery at chapman lab

MYCOLOGY & LICHENOLOGY

1. www.richard-seaman.com/Fungus/links.html
2. www.myfg.org.uk/links.htm
3. simple.wikipedia.org/wiki/Fungus
4. www.fungibank.csiro.au/topic_7_3.htm
5. www.accessexcellence.org/RC/botany.php -- explore lichenland

BRYOPHYTES

<http://www.bryophytes.biz>
bryophytes.plant.siu.edu/
en.wikipedia.org/wiki/Bryophyte
www.mobot.org/MOBOT/tropicos/most/bryolist.shtml --bryophytes name list
www2.una.edu/pdavis/bryophytes. (images)
www.accessexcellence.org/RC/botany.php - Bryophytes

PTERIDOPHYTES

en.wikipedia.org/wiki/Pteridophyte
www.cavehill.uwi.edu/FPAS/bcs/bl14apl/pter1.htm
www.csd.tamu.edu/FLORA/fsb/fsbfern1.htm
www.anbg.gov.au/fern/taxa/classification.html
www.cpbr.gov.au/fern/index.html - resources for ferns and allies

GYMNOSPERMS

en.wikipedia.org/wiki/Gymnosperm
www.gymnosperms.org/
hcs.osu.edu/hcs300/gymno.htm
www.geocities.com/heartland/plains/6761/ecycads.htm

PALEOBOTANY

www.mineralogie.uni-wuerzburg.de/palbot1.html

www.colby.edu/~ragastal/Paleobot.htm---- (introduction to paleobotany)

www.ucmp.berkeley.edu/IB181/VPL/Dir.html--(virtual paleobotany lab)

ANATOMY

www.stumbleupon.com/tag/plant-anatomy/ -- links to plant anatomy websites

www.mnstate.edu/weibust/internetresbiostu.htm (general website all topics in botany)

CELL BIOLOGY

www.biology.arizona.edu/CELL_BIO/cell_bio.html -

www.cellbio.com/ (online cell and molecular biology)

TAXONOMY

www.cartage.org.lb/en/themes/sciences/botanicalsciences/aboutbotany/PlantTaxonomy

www.colby.edu/info.tech/BI211/Bio211.html

101science.com/Taxonomy.htm

www.flickr.com/groups/taxonomy/

www.csdl.tamu.edu/FLORA/201Manhart/Homepage (lecture notes)

PHYTOGEOGRAPHY

<https://www.vedamsbooks.com/no10662.htm>

PLANT BIOTECHNOLOGY

www.molecular-plant-biotechnology.info/resources-for-molecular-plant-biotechnology.htm

www.studentsguide.in

MUSHROOM CULTIVATION

www.krishiworld.com/html/mushroom.html

www.nrcmushroom.org/mushroom_cultivation_technology

icargoa.res.in/oyster_mushroom.htm (cultivation technique for oyster mushroom)

mofpi.nic.in/.../EDII_AHMD/01%20Fruit%20&%20Vegetable/20%20Mushroom%20Cultivation%20&%20Proc.pdf

SOIL BIOLOGY

en.wikipedia.org/wiki/Soil_biology

www.dpi.nsw.gov.au/agriculture/resources/soils/biology/basics

Dr. AMBEDKAR GOVERNMENT ARTS COLLEGE
(AUTONOMOUS)
VYASARPADI, CHENNAI – 600 039

(Reaccredited by NAAC at Level ‘B’)



SYLLABUS

ALLIED BOTYANY – for B.Sc Zoology

Under Choice Based Credit System

(With effect from 2019-2020)

***DEPARTMENT OF PLANT BIOLOGY AND PLANT
BIOTECHNOLOGY***

Dr. Ambedkar Government Arts College
(Autonomous)
Vyasarpadi, Chennai – 600 039

JUNE- 2019

PAPER -I

**SEMESTER I
ALLIED BOTANY - I**

60 hrs

UNIT I:

12HRS

General outline of Bentham and Hooker's System of classification. Study of the range of characters and economic importance of Verbenaceae.

UNIT II:

12 HRS

Study of the range of characters and economic importance of Apocynaceae, Euphorbiaceae, Rubiaceae, Solanaceae and Poaceae

UNIT III:

12 HRS

Types of tissues - simple and permanent tissues. Primary structure of Dicot stem, root and leaf .Structure of mature Anther and Ovule and its types, Fertilization, Development of Dicot Embryo (CAPSELLA).

UNIT IV:

12HRS

Elementary knowledge of bacteria - Shape, Size and Flagellation - Classification. Ultra-structure of *E.coli*. Economic importance of Bacteria. General account of Plant Viruses (T.M.V).

UNIT V:

12 HRS

Horticulture: Scope and importance. Propagation methods (Cuttage, Layerage and Air layering), Grafting techniques. Bonsai techniques.

Economic Botany: Economic importance of the following: Cereals - Paddy; Pulses - Red gram; Oilseeds - Groundnut; Fibers - Cotton

BOOKS FOR REFERENCE:

1. Ganguly, A.K. (1971) General Botany: Vol. I. The New Book Stall, Calcutta.
2. Rao, K. N., Krishnamurthy, K.V. and Rao, G. (1979) Ancillary Botany, Viswanathan Private Ltd.
3. Dubey & Maheshwari (1999) A Textbook of Microbiology. Chand & Company New Delhi.
4. Priti Shukla and Shital P Misra (1979) An Introduction to Taxonomy of Angiosperms. Vikas Publishing House Pvt Ltd, New Delhi.
5. Jayaraman, P. (2000) Allied Botany I & II. V.K. Publishing House, Chennai -5.
6. Pandey, S.N., Misra, S.P. and Trivedi, P.S. (2006) A Textbook of Botany: Vol I & II. VIKAS Publishing house Pvt Ltd.
7. Singh, V., Pande, P.C. and Jain, D.K. (2010) A Text book of Botany (IV Edition). Rastogi Publications.
8. Mani hushan Rao, K. (1991) Textbook of Horticulture. MacMillan India Limited. New Delhi.

PAPER -II	ALLIED BOTANY - II	60Hrs
UNIT I:		12HRS

UNIT II:	12HRS
Structure and Reproduction of Fungi -Albugo, Yeast and Polyporus	

UNIT III:	12HRS
Structure and Reproduction ofthe following	
Bryophyta - Funaria;	
Pteridophyta -Lycopodium	
Gymnosperms - Cycas.	

UNIT IV:	12HRS
Absorption of Water; Photosynthesis -Light Reaction and Dark Reaction; Respiration - Glycolysis - Kreb's Cycle, Electron Transport System.	

UNIT V: 12HRS
Biotechnology -Principles and Applications; rDNA technology; Plant tissue Culture - Totipotency - MS medium, Sterilization methods, Shoot and Anther culture; Application of Plant tissue culture

1. Pandey, S.N., Misra, S.P. and Trivedi, P.S. (2006). A text book of Botany: Vol & II. VIKAS Publishing House Pvt Ltd.
2. Singh, V., Pande, P.C. and Jain, D.K. (2010). A Text book of Botany (IV Edition). Rastogi Publications.
3. Alexopoulos, C.J. and Mims, C.W. (1979). Introductory Mycology (III Edition), Wiley Eastern Ltd, New Delhi.
4. Noggle, G.R. and George, J.F. (1992). Introductory Plant Physiology. (II Edition), Prentice-Hall of India Pvt Ltd, New Delhi.
5. Jayaraman, P. (2000.) Allied Botany - Vol. I & II. V.K. Publishing House, Chennai - 5
6. Kumaresan, V. (2009). Biotechnology. Saras Publication, Nagercoil.
7. Dubey: R.C. (1993). A Text Book of Biotechnology, S. Chand & Co Ltd, New Delhi.
8. Ignacimuthu, S. (1996). Basic Biotechnology, Tata McGraw Hill Publishing Co Ltd New Delhi.

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PAPER -III - ALLIED BOTANY PRACTICAL

- I. To describe plants in technical terms & to identify the family by observed morphological characters of vegetative and floral parts.
2. To dissect flower and to construct the floral diagram.
3. To make suitable micro preparations of algae, fungi, bryophytes, pteridophytes, gymnosperms and to describe and identify the same.
4. To make suitable micro preparation of the stem, root of dicot and identify the same giving reasons.
5. To identify the habitat of the given plant by observing morphological features.
6. To critically comment simple experimental set-ups in plant physiology section of the syllabus.
7. To identify the horticultural implements/tools .

1	A	Families
		Apocynaceae - <i>Catharanthus roseus</i> , <i>Nerium oleander</i> , <i>Tabernaemontana divaricata</i> and <i>Thevetia peruviana</i>
		Solanaceae - <i>Datura metal</i> , <i>Solanum trilobatum</i> , <i>Solanum melongena</i>
		Euphorbiaceae - <i>Ricinus communis</i> , <i>Croton sparsiflorus</i> , <i>Euphorbia hirta</i>
		Rubiaceae – <i>Ixora coccinea</i> , <i>Oldenlandia corymbosa</i> , <i>Mussa endaluteola</i>
		Verbenaceae - <i>Lantana camara</i>
		Poaceae - <i>Chloris barbata</i>
2	B	Dissect flower and to construct the floral diagram - Any Flower
3	C	Micro-preparation - Dicot stem and Dicot Root
4	D	Micro-preparation - <i>Funaria</i> Stem, <i>Lycopodium</i> Stem and <i>Cycus</i> leaflet
5	E to J	identify and giving reasons:
	E	Chylamydomonas, Ectocarpus, Oscillatoria, Polysiphonia
	F	Albugo, Yeast, Polyporus
	G	Sclerenchymatous fibre, Sclerenchyma T.S., Xylem thickening (spiral), Phloem maceration, Parenchyma, Collenchyma, Anatrpus ovule.
	H	<i>Funaria</i> , <i>Cycas</i> - male cone, <i>Cycas</i> -Megasporephyll, <i>Lycopodium</i> habit
	I	<i>Eichornia</i> (Hydrophyte), <i>Opuntia</i> (Xerophyte), <i>Vanda</i> (Epiphyte)
	J	Trowel, Digging hoes, Sprayer, Secateurs
6	K	Comment on experimental set-ups: Plant-Tissue culture/ Plant Physiology / Mushroom cultivation

SEMESTER I
NON MAJOR ELECTIVE (NME) - APPLIED BOTANY

UNIT I

Medicinal Plants - Uses and their importance

- a. *Azadirachta indica* b. *Moringa oleifera* c. *Rauvolfia serpentina*
d. *Centella asiatica* e. *Zingiber officinale*.

UNIT II:

Plant protection -General account of insecticides and pesticides. Common diseases of Citrus (Canker disease), Groundnut (Tikka disease)

UNIT III:

Mycorrhiza- Types of Mycorrhiza and their uses. Lichens –its types (Crustose, Foliose and Fruticose) and their economic importance.

UNIT IV:

Biofertilizers- Mass cultivation of cyanobacteria, mass cultivation of Azolla.

UNIT V:

Mushroom Cultivation -Nutritive value and importance of Mushroom. Cultivation of Oyster mushroom. Spawn preparation. Preservation of mushrooms. Recipes made from mushrooms.

Books for Reference:

1. Vaidyaratnam P.S., Varier (1996) Indian Medicinal Plants- a compendium of 500 species. Vol.1-5, Orient Longman Ltd.
2. Pathak, V.N., Khatri, N.K. and Pathak, M. (1996) Fundamentals of Plant Pathology. Agro Botanical Publishers (India).
3. Chandrasekaran, P. (2002) Modern Mycology, T.K. Publication, Pudukkottai. (Tamil version).
4. Alexopoulos, C.J. and Mims, C.W. (1979) Introductory Mycology. III Edition, Wiley Eastern Limited, New Delhi
5. Kumaresan, V. (2009) Biotechnology. Saras Publication, Nagercoil.

SEMESTER II
NON MAJOR ELECTIVE (NME) - APPLIED BOTANY

UNIT I

Vermitechnology- Definition - An outline of Earthworm – importance in agriculture. Fishing food, therapeutics and pollution.

UNIT II:

Vermicomposting definition - types - small scale and large scale -pit method. Heap method, windrow method. Factors affecting vermicomposting – pH, moisture, temperature, nutritional value of feed, earthworm species – microbes and earthworms.

UNIT III:

Advantages of Vermicomposting - Application of vermicompost in agricultural and horticultural practices

Economies of Vermiculture – NABARD - Nationalized Banks - KVIC supports for vermiculture.

UNIT IV:

Biodiesel -Definition –Production –*Jatropha* sps. -Application of Biodiesel

UNIT V:

Economic importance of Woody plants - Definition –*Dalbergia latifolia* –*Tectona grandis* –*Hevea brasiliensis* - *Cocos nucifera*

Books for Reference:

1. Renganathan, L.S. (2006) Vermicomposting technology- from soil health to human health, AgroBios (India), Agrohouse, Chopasani Road, Jodhpur- 342 002.
2. R. K. Bhatnagar& R.K.Palta (1999) Earthworm (Vermiculture and Vermicomposting). Kalyani Publishers, New Delhi.
3. Sultan Ismail (1997) Vermieology - The Biology of Earthworm, Orient Longman Ltd., Chennai.
4. Ramalingam, R.(2007) Vermiculture. Tamilnadu State Council for Higher Education, Chennai
5. Saravanabahu, S (2007) Applied Botany. Tamil Nadu State Council for Higher Education, Chennai -5
6. Kumaresan, V. (2009) Biotechnology. Saras Publication, Nagercoil.