ALAGAPPA UNIVERSITY

(A State University Established in 1985)
Karaikudi - 630003, Tamil Nadu, India

2017 — Accredited with A+ Grade by NAAC (CGPA : 3.64)

2018 — MHRD Govt. of India; UGC University Grants Commission — Graded as Category - 1 & Granted Autonomy

2018 — MHRD Government of India — Swachh Campus Rank : 4

2019 — nirf National Institutional Ranking Framework — Rank : 28

2019 — QS — India Rank : 20; BRICS Rank : 104; Asia Rank : 216

DEPARTMENT OF BOTANY

M.Sc., BOTANY

[Choice Based Credit System (CBCS)]

[For the candidates admitted from the academic year 2019-2020]

Department of Botany
Alagappa University
Degree of Master of Science (M.Sc.) Botany
Choice Based Credit System (CBCS)
Scheme and Syllabus
(With effective from 2019 onwards)

REGULATIONS AND SYLLABUS

[For the candidates admitted from the academic year 2019 onwards]

1. Programme general objectives

The general objectives of this M.Sc Botany course fosters on the supreme prospect of learning and research in various arena of plant sciences. It would constantly promote sustainable environmental development by ensuring the contribution of all students. This precise curriculum will provide basic and advanced knowledge for the substantial learning and understanding. The ultimate aspiration in learning about various groups of plants and study their utilization and conservation can be fulfilled. In the progress, the student would envisage the potentials of plant sciences in environment and human values. The applications of Botany in various fields will assure each student the employability and also opportunities in higher education for empowerment.

2. Programme specific objectives

1. To obtain knowledge of various groups of plants and study their use and conservation
2. To gain knowledge of about the internal organization of plants and their functioning
3. To attain essential knowledge about the application in biological studies
4. To acquire techniques of plant sciences precisely in improving economically important crops
5. To understand Botany comprehensively for the welfare of human beings
6. To facilitate the students for preparing various competitive examinations

3. Programme outcome

At the culmination of this course, the student would be competent in

1. The students will be skilled in scientific production of bioactive compounds of economic value.
2. The students will be confidently skilled on bioprocess technology for self-employability
3. The students will acquire knowledge about botany which plays a significant role in field of agriculture and medicine.
4. Finally, the students will be equipped themselves to write all kinds of competitive exams for better future.

4. Eligibility for Admission

A candidate who has passed the B.Sc. degree examination in Botany/ Plant Science/ and Plant Biology & Plant Biotechnology of the University or an Examination of any other University accepted by the Syndicate as equivalent there to shall be eligible to appear and qualify for the M.Sc. Degree in Botany of this University after a course of study of two academic years.

5. Duration of the Course

The course for the degree of Master of Science in Botany shall consist of two academic years divided in to four semesters. Each semester consist of 90 working days.

6. Course of Study

M.Sc. Botany (CBCS - Structure of the Course)

7. Teaching Methodologies

The classroom teaching would be through conventional lectures and use of OHP and Power Point presentations. The lecture would be such that the student should participate actively in the discussion. Periodic field visit enable the student for gathering the practical experience and up to date industrial

scenario. Student seminars would be conducted and scientific discussions would be arranged to improve their communicative skill.

In the laboratory, instruction would be given for the experiments followed by demonstration and finally the students have to do the experiments individually.

Periodic tests would be conducted and for the students of slow learners would be given special attention.

8. Examinations

The examinations shall be conducted separately for theory and practicals to assess the knowledge acquired during the study. There shall be two systems of examinations viz., internal and external examinations. The internal examinations shall be conducted as Continuous Internal Assessment test I, II and III (CIA Test I, II & III). The internal assessment shall comprise of maximum 25 marks for each subject.

The external examination shall be three hours duration to each paper at the end of each semester. The external examinations shall comprise of maximum of 75 marks for each subject. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination. Practical examinations for M.Sc. Course in Botany should be conducted at first, second and third semester. At the end of fourth semester viva-voce will be conducted on the basis of the Dissertation report submitted by the student. One internal and one external examiner will conduct the viva-voce examination jointly.

9. Question Paper Pattern

Answer all questions (one question from each unit with internal choices Time: 3 Hours Max. Marks: 75

Part A- 10 x 2 Marks = 20 Marks
Part B - 5 x 5 Marks = 25 Marks
Part C- 3 x 10 Marks = 30 Marks

10. Distribution of marks

Theoretical Examinations

Practical	**Marks**
Internal examination	25
External examination	75
Total	**100**

Internal examination

The following procedure shall be followed for awarding internal marks.

Component	**Marks**
Internal test (best 2 out of 3)	15
Seminar	5
Assignment	5
Total	**25**

Practical examinations

Practical	**Marks**
Internal – Practical	25
External Practical	75
Total	**100**

Mark allotment for Internal - Practical

Internal –Practical	Marks
CA	10
Record	10
Viva	5
Total	**25**

11. Dissertation / Project Work

Dissertation / Project Work: 100 Marks

Component	Marks
Internal (Periodic presentation of learning) 2 reviews (1 Internal / 1 External)	25
Dissertation- External	50
Viva-voce	25
Total	**100**

(a) Plan of work:

The student should prepare plan of work for the dissertation, get the approval of the guide and should be submitted to the University during the fourth semester of their study. In case the student wants to avail the facility from other University/laboratory, they will undertake the work with the permission of the guide and acknowledge the alien facilities utilized by them. The duration of the dissertation research shall be a minimum of three months in the fourth semester.

(b) Dissertation work outside the Department:

In case the student stays away for work from the Department for more than one month, specific approval of the University should be obtained.

(c) No. of copies/distribution of dissertation:

The students should prepare four (4) copies of dissertation and submit the same for the evaluation by examiners. After evaluation one copy is to be retained in the Department library and one copy is to be submitted to the University (Registrar) and one copy for guide and one copy can be held by the student.

(d) Format to be followed:

The format / certificate for dissertation to be submitted by the students are given below:

Format for the preparation of project work:

(a) Title page
(b) Bonafied Certificate
(c) Acknowledgement
(d) Table of contents

CONTENTS

S.No.	Title	Page No.
1	Introduction	
2	Review of Literature	
3	Materials and Methods	
4	Results	

5	Discussion or Results and Discussion	
6	Summary	
7	Acknowledgement	
8	References	

Format of the Title Page:

TITLE OF THE DISSERTATION

Dissertation submitted to the Alagappa University, Karaikudi – 630 003 in partial fulfillment of the requirement for the Degree of Master of Science in Botany.

By
(Student Name)
(Register Number)

Department of Botany
Alagappa University
(Re-accredited with A+ by NAAC)
Karaikudi – 630003
(Year)

Format of the Certificate:

CERTIFICATE

This is to certify that the dissertation entitled ---------- submitted to the Alagappa University, Karaikudi in partial fulfillment of the requirement of the degree of Master of Science in Botany is a record of bonafied research work carried out by (student name) under my supervision and guidance and that no part of the dissertation has been submitted for the award of any degree, diploma, fellowship or other similar titles or prizes and that the work has not been published in part or full in any scientific or popular journals or magazines.

Date:
Place: Signature of Guide

Approved by
Head of the Department

External Examiner

12. Village Extension Programme (VEP)

The Sivaganga and Ramnad districts are very backward districts, where a majority of the people lives in poverty. The rural mass is economically and educationally backward. Thus the aim of the introduction of this Village Extension Programme (VEP) is to extend outreach programs in environmental awareness, hygiene and health to the rural masses of this region.

The students in their Third semester have to visit any one of the villages within the jurisdiction of Alagappa University and can arrange various programmes to educate the rural masses in the following areas for three days. A minimum of two faculty members can accompany the students and guide them.

1. Environmental awareness
2. Hygiene and health

This course is a compulsory for all the M.Sc. Botany students. Students will be awarded TWO credits apart from the minimum credits 90 to be earned for the M.Sc. Programme.

13. Passing Minimum

The candidate shall be declared to have passed the examination if the candidate secures a minimum of 50% (50 marks out of 100 marks) in the University external examination. Then half of the total marks secured by the candidate will be taken and add with his/her internal marks (Maximum marks 25).

For a pass in the Practical paper, a candidate has to secure a minimum of 50 % (37.5 marks) marks in the University (external) (75 marks) examination. He/she should get a minimum of 50 marks out of 100, an aggregate of internal (25 marks) and external marks (75 marks) and the record notebook taken together.

There is no passing minimum for the record notebook. However submission of a record notebook is a must.

For the project work and viva-voce a candidate should secure 50% of the marks for pass. The candidate should compulsorily attend viva-voce examination to secure pass in that paper.

Candidate who does not obtain the required minimum marks for a pass in a paper/Project Report shall be required to appear and pass the same at a subsequent appearance.

14. Classification of Successful Candidates

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in First Class. All other successful candidates shall be declared to have passed in the Second Class.

Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in First Class with Distinction provided they pass all the examinations prescribed for the course at the first appearance.

Candidates who pass all the examinations prescribed for the course in the first instance and within a period of two academic years from the year of admission to the course only are eligible for University Ranking.

A candidate is deemed to have secured first rank provided he/she
i) Should have passed all the papers in first attempt itself
ii) Should have secured the highest overall grade point average (OGPA)

15. Maximum duration for the completion of the course

The maximum duration for completion of M.Sc., Degree in Botany programme shall not exceed eight semesters from their first semester.

16. Commencement of this Regulation

These regulations shall take effect from the year 2019 onwards for students who are to be admitted to the first year of the course during the academic year 2019 onwards and thereafter.

17. Code and Grading

1. Legend

5	**2**	**5**	**X**	**Y**	**Z**

Botany – M.Sc.
X Semester No:
Y Course : 0 – Core; 1 – Elective / interdisciplinary

Z Course number in the semester

2. Each student should take 90 credits including core course, elective course and interdisciplinary courses and 2 credits in village development programme, totaling at least 90 + 2 credits to complete M.Sc., Botany degree course.

3. Students may be allowed to take more than 3 or 4 credits in elective / interdisciplinary courses in a semester from the courses offered by the department in inter-disciplinary subjects as suggested by the course advisor.

4. Each paper carries 4 or 3 or 2 credits with 75 marks in the University examination and 25 marks in C.I.A. The University examination will be of three hours duration.

5. For a pass in each paper, the candidate is required to secure at least 50% in the University examination and 50% in the aggregate (Including C.I.A).

1. If the total aggregate marks obtained by the candidate is X%, put together for all papers comprising the 90 credits, then,

Raw Score	**Grade**	**Description**	**Grade Points**
90 and above	O	Out standing	9.0 – 10.0
80 to 89	A	Very Good	8.0 – 8.9
70 to 79	B	Good	7.0 – 7.9
60 to 69	C	Satisfactory	6.0 – 6.9
50 to 59	D	Poor	5.0 – 5.9
Less than 50	F	Re-Do	

S. No	Paper Code	Title of the paper		Credits	Hours/ Week	Marks		
I Semester						**I**	**E**	**Total**
1	525101	Core 1	Plant Diversity – I	5	5	25	75	100
2	525102	Core 2	Plant Diversity – II	5	5	25	75	100
3	525103	Core 3	Microbiology and Plant Pathology	5	5	25	75	100
4	525104	Core 4	Cell Biology and Genetics	5	5	25	75	100
5	525105	Core 5	Lab – I	4	8	25	75	100
6			Library and Yoga		2			
7			**Total**	**24**	**30**	**-**	**-**	**500**
II Semester								
8	525201	Core 6	Taxonomy of Angiosperms	5	5	25	75	100
9	525202	Core 7	Plant Anatomy, Embryology and Plant Breeding	5	5	25	75	100
10	525203	Core 8	Plant Physiology and Biochemistry	5	5	25	75	100
11	525204	Core 9	Lab – II	4	8	25	75	100
12	525501/ 525502/ 525503/ 525504	-	EC – I	4	4	25	75	100
13		Non-Major Elective	NME – I	2	3	25	75	100
14	MOOCs	-	*SLC-I	Extra Credit				
			Total	25+ Extra credit	30			600
III Semester								
15	525301	Core 11	Evolution, Ecology and Phytogeography	5	5	25	75	100
16	525302	Core 12	Plant Biotechnology and IPR	5	5	25	75	100
17	525303	Core 13	Biotechniques, Biostatistics and Bioinformatics	5	5	25	75	100
18	525304	Core 14	Lab – III	4	8	25	75	100
19	525501/ 525502/ 525503/ 525504		EC – II	4	4	25	75	100
20		Non-Major Elective	NME – II	2	3	25	75	100
21	MOOCs	-	*SLC-II	Extra Credit				
			Total	25+ EC	30	-	-	600

IV Semester								
22	525501/ 525502/ 525503/ 525504		EC – III	4	4	25	75	100
23	525999		Project Work	12	24	25	75	100
24			Library/ Yoga/ Career Guidance	-	2	-	-	-
			Total	**16**	**30**	**-**	**-**	**200**
Grand Total				**90 +extra credits**	**120**	**-**	**-**	**1900**

*Additional 2 hours will be adjusted in any of the weekdays after 5 PM

Elective Courses

S.No.	Course	Subject Code	Credit	Hours/week	Marks		
					Int	Ext	Total
1	Plant Tissue Culture	525501	4	4	25	75	100
2	Economic Botany	525502	4	4	25	75	100
3	Herbal Technology	525503	4	4	25	75	100
4	Plant Genetic Engineering	525504	4	4	25	75	100

Non-Major Elective Courses

S.No.	Course	Subject Code	Credit	Hours/week	Marks		
					Int	Ext	Total
1	Algal Technology	525701	2	3	25	75	100
2	Mushroom Cultivation	525702	2	3	25	75	100
3	Horticulture	525703	2	3	25	75	100

Courses:

I	Semester	=	24 credits	(Core: 24; Elective Course: 0)
II	Semester	=	25 credits	(Core: 19; Elective Course: 4; Non-Major Elective: 2)
III	Semester	=	25 credits	(Core: 19; Elective course: 4; Non-Major Elective: 2)
IV	Semester	=	16 credits	(Elective Course: 4; Dissertation Work: 12)
	Total credits	**=**	**90+ Extra credits**	**(Core: 62; Elective Course: 12; Non-Major Elective: 4; Dissertation Work: 12 + MOOCs extra credits)**

Semester –I			
Course code : 525101	**Plant Diversity – I (Phycology, Mycology, Lichenology and Bryology)**	**Credits:5**	**Hours:5**
Objectives	➢ To study about the characteristic feature of algal diversity. ➢ To study about the characteristic feature of fungal and lichen diversity. ➢ To learn about mosses and liverworts. ➢ To get knowledge on economic value of algae, fungi, lichens and bryophytes.		
Unit-I	Phycology – Introduction – Definition – History and Development of Phycology – Classification of algae (F.E. Fritch, 1945) – Occurrence and distribution of algae – range of thallus structure – Ultra-structure of Prokaryotic (Cyanobacteria) and Eukaryotic algal cells (cell wall, flagella, eye spots, chloroplast, pyrenoid, nucleus) – Origin and evolution of sex in algae – Phylogeny and inter-relationship of algae – Life cycle patterns in algae and alternation of generations.		
Unit-II	Salient features: -Occurence – Thallus organisation – Reproduction – Life cycles of Chlorophyceae, Bacillariophyceae, Xanthophyceae, Myxophyceae, Phaeophyceae, Rhodophyceae and their comparative account. Economic importance of algae.		
Unit-III	Mycology:- Introduction – Evolution of fungi – Classification of Fungi (Alexopoulos and Mims, 1979) – General features – Occurrence and distribution – Thallus organization – Cell structure – Fructification – Growth – Mode of Nutrition –Reproduction and life cycles – Hetrothallism and parasexuality in fungi – General characters of major classes: Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina – Phylogeny and interrelationship of major groups of fungi – Economic importance of fungi.		
Unit-IV	Lichens: - Introduction – Classification of lichens – Distribution – Interrelationship of phycobionts and mycobiants – Thallus organization – Reproduction – Ecological and Economic importance of lichens.		
Unit-V	General features: - Distribution – Classification of Bryophytes – Range of vegetative structure – evolution of gametophytes and sporophytes – Reproduction and life cycle –General characters of major groups: Marchantiales, Jungermaniales, Anthocerotales, Sphagnales, Funariales and Polytrichales - Fossil bryophytes-Economic importance of bryophytes.		

Reference and Text Books :-

Bilgrami, K. S. (2010). *A Textbook of Algae*. New Delhi: CBS Publisher & Distributors.

Chandrakant Pathak. (2013). *A textbook of Algae*. New Delhi: Black Prints India Inc.

Hu, Z. M. & Fraser, C. (2016). *Seaweed phylogeography: Adaptation and evolution of seaweeds under environmental change.*Netherlands: Springer.

Johri, R. M., Lata,S. &Tyagi, K. (2011). *A textbook of Fungi*. India:Dominant Publishers & Distributors Pvt Ltd.

Johri, R. M., Lata, S.,&Tyagi, K. (2012). *A Textbook of Bryophyta*. New Delhi, India: Dominant Publishers & Distributors Pvt., Ltd.

Michael Allaby. (2012). *A Dictionary of Plant Sciences*. U.S.A.: Oxford University Press.

Vashishta, B. R., Sinha, A. K.,&Singh, V. P. (2012). *Botany for degree students Algae*. India: S chand and Company LTD.

Outcomes	➢ Knowledge about the characteristic feature of algal, fungal, lichen and bryophyte species. ➢ Understanding on the classification and life cycle of algae, fungi, lichens and bryophytes. ➢ Knowledge on the importance and economic value of algae, fungi, lichen and bryophytes.

Name of the Course Teacher:**Dr.R.Kottaimuthu**

Semester -I			
Course code :525102	**Plant Diversity – II (Pteridophytes, Gymnosperms and Palaeobotany)**	**Credits:5**	**Hours:5**
Objectives	➢ To define and characterize the diversity of lower vascular plants. ➢ To understand the dynamics of Pteridophytes and Gymnosperms diversity ➢ To realize the significance of fossil plants.		
Unit-I	Introduction-Origin and Phylogeny: -General Characters and Classification of Pteridophytes (Sporne, 1954). Morphology, Anatomy and Reproduction of the following groups: Psilophytes, Lycophytes, Sphenophytes and Pteropsida.		
Unit-II	Evolution of Sorus: -Apogamy and Apospory. Evolution of Sporangium; Eusporangium and Leptosporangium. Gemetophyte development-Homosporous and Heterosporous ferns. Origin of leaf and Telome concept - Heterospory and seed habit. Stelar evolution in Pteridophytes. Ecology and Economic importance of Pteridophytes.		
Unit-III	General characters of Gymnosperms: -origin and phylogeny-classification of gymnosperms (sporne)- Morphology, Anatomy and Reproduction of the following groups: Cycads, Conifers and Gnetophytes.		
Unit-IV	Structure and reproduction : -Cycadales, Ginkgoales, Coniferales, Ephedrales, Welwitschiales and Gnetales-Comprative structure of ovules of *Cycas, Pinus, Taxus, Araucaria, Ginkgo* and *Gnetum*. Economic Importance of Gymnosperms.		
Unit-V	Fossil Pteridophytes- *Sphenophyllum, Lepidodendron*. Fossil gymnosperms - *Heterangium, Lyginopteris, Lagenostoma*; Fossil pollen analysis- fossil fuels.		

Reference and Text Books :-

Chandrakant Pathak. (2003). *The Latest Portfolio of Theory and Practice in Pteridophyta*. New Delhi: Dominant Pvt Ltd.

James D. Mauseth. (2016). *Botany: An Introduction to Plant Biology*. University of Texas, Austin: Jones & Bartlett Learning.

Johri, R. M., Lata, S. & Sharma, S. (2012). *A textbook of Pteridophyta*. India: Dominant Pvt Ltd.

Johri, R. M., Lata, S. &Tyagi, K. (2012). *A textbook of Gymnosperm*. India: Dominant Pvt Ltd.

PratibhaSaxena,&Chandrakant Pathak. (2012). *A textbook of Pteridophyta*. New Delhi, India: Wisdom Press.

Sanjeev Kumar. (2014).*Plant Science*. New Delhi: DBS Imprint.

Suresh Kumar. (2014). *Textbook of Gymnosperms*. New Delhi: K. K. Publications.

Outcomes	➢Knowledge about the origin and classification of lower vascular plants. ➢Information about geological scale.

Name of the Course Teacher: **Dr.N.KamalaDhasan**

Semester -I			
Course code :525103	**Microbiology and Plant Pathology**	**Credits:5**	**Hours:5**
Objectives	➢ To get basic idea about scope and fundamental of organisms. ➢ To study about the general features of viruses and bacteria. ➢ To study the characteristics of plant pathogens and their spread. ➢ To get knowledge about control of plant diseases.		
Unit-I	Introduction, History and Scope of Microbiology: – Classification of microorganisms – Fundamentals of Microbiology – Principles of Disease and Epidemiology- Microscopy in microbiology - Functional structure of Prokaryotic cells (bacteria) – Bacterial growth – Bacterial Genetics – Bacterial metabolism - Economic importance of bacteria-Disease caused by bacteria and virus to human.		
Unit-II	Virology :– General features – Classification of viruses – viruses of Eukaryotic microorganisms – pathogenic properties of viruses – Ultra structure – Replication pathways – Transmission – plant Viruses, Virions, Viroids and Prions – Virus induced cancer - Phytoplasma (including mycoplasma).		
Unit-III	Introduction to Plant Pathology: – History - Classification of plant diseases – Types of plant diseases – Methods of studying plant diseases –Symptoms of plant diseases – Etiology - Plant disease epidemics - Plant disease forecasting – Disease triangle – Disease cycle.		
Unit-IV	Host-pathogen interactions: – Defense mechanisms in plants – Control measures – Cultural practices – Chemical control: Label claim of the chemical, safe harvest interval, maximum residual limit-safety measures for application of pesticides– Biological control - Integrated plant disease management.		
Unit-V	Plant diseases:- Tobacco mosaic virus – Bunchy top of banana –Blast and sheath blight of paddy – Citrus canker – Red rot of sugarcane – Downey mildew of grapes – Late blight of potato – Leaf spot diseases of groundnut - Anthracnose of mango – Wilt of cotton – Rust of wheat-Diseases caused by root knot nematodes.		

Reference and Text Books :-

Chaube, H. S.,& Singh, R. (2015).*Introductory Plant Pathology.*New Delhi: CBS Publishers & Distributors Pvt. Ltd.

Deepak, G.P.A. (2017). *Microorganisms for Green Revolution.* Singapore: Springer.

Kumar, S. (2018). *Plant Pathogens and principles of plant pathology.* New India: NIPA.

Mukta Bhargava. (2008). *Handbook of Fungal Diseases of Plants and their Control*. New Delhi: Dominant Publishers and Distributors.

Stakman, E. C. (2016).*Principles of Plant Pathology*. New York, USA: John Wiley & Sons Inc.

Talaro, K. P. (2008).*Foundations in Microbiology: Basic principles*. 7th edit. New York, NY: McGraw-Hill Education.

Tortora, G.J. (2007). *Microbiology: An Introduction.* San Francisco: Pearson Benjamin Cummings.

Willie, J. & Sherwood, L. (2016).*Prescott's Microbiology.* New York, NY: McGraw-Hill Education.

Outcomes	➢ Fundamental knowledge on microbial community and their classification. ➢ Knowledge about the plant pathogens, plant diseases and plant defense mechanism against the pathogens and plant disease control.

Name of the Course Teacher: **Dr.M.Jothibasu**

Semester -I			
Course code :525104	**Cell Biology and Genetics**	**Credits:5**	**Hours:5**
Objectives	➢ To understand the structure and functionsof plant cells. ➢ To know the dynamics of cell division. ➢ To understand the genetic makeup of living organisms. ➢ To learn genetically inheritance and gene expression.		
Unit-I	Membrane structure and function:- (Structure of model membrane, lipid bilayer and membrane protein diffusion, osmosis, ion channels, active transport, membrane pumps, mechanism of sorting and regulation of intracellular transport, electrical properties of membranes. Structural organization and function of intracellular organelles –Plant Cell wall, nucleus, mitochondria, Golgi bodies, endoplasmic reticulum, peroxisomes, plastids, vacuoles, chloroplast, structure and function of cytoskeleton and its role in motility.		
Unit-II	Architectural changes of chromosomes:-euchromatin, hetero chromatin giant chromosome-polytene, lambrush, chromosomal aberration. Cell cycle- cell division-mitosis, meiosis, amitosis, synopsis, synaptimal complex. Cytology of polyploids, auto and allopolyploids. Role of polyploids in evolution. Karyotype analysis cytology in research to taxonomy of plants.		
Unit-III	History - concept of genetics: - Introduction – Mendelian, genetics - laws of Mendel, mono-di hybrid crosses- non-mendelian genetics-interaction of genes - inhibitory, co-dominnce, duplicate genes, polygenic interaction. Mutation – types - sources of mutagens - Role of mutation in evolution.		
Unit-IV	Linkage: - Crossing over and recombination-gene mapping, chromosome theory of inheritances. Sex determination in plants - sex linked inheritance and diseases - Cytoplasmic inheritance - Male sterility in plants and Quantitative inheritance.		
Unit-V	Gene chemistry and its modern concept: - DNA and RNA as the genetic materials - Transposable elements - Gene regulation - Lac operon concept.		
Reference and Text Books :- Lewin, B. (2007). *Genes IX.*United State: Jones & Bartlett Publishers. Surendra Jain. (2017). *Textbook of Genetics*. Delhi, India: Arjun Publishing House. Sushil Kumar. (2016). *Plant Breeding and Genetics*. Jaipur: Book Enclave. Verma, P.S. (1999). *Textbook of Cytology.* New Delhi: S.Chand Publication. Wayne, R. (2009).*Plant Cell Biology: From Astronomy to Zoology*. United State: Elsevier Publication.			
Outcomes	➢ Knowledge on the dynamics, structure, functions and mechanisms involved in plant cell. ➢ Know the history and concepts of Genetics along with theory of inheritances		

Name of the Course Teacher: **Dr. A. Arumugam**

Semester -II			
Course code : 525201	**Taxonomy of Angiosperms**	**Credits:5**	**Hours:5**
Objectives	➢ To acquire the fundamental knowledge of plant systematics. ➢ To know about the basic concepts and principles of plant systematics. ➢ To know how to identify the plants and adequate characterization. ➢ To aware of the importance of taxonomic relationships in plant systematic studies.		
Unit-I	Taxonomy: Definition, scope, principles, aims and objectives of taxonomy. History of Botanical Explorations in India (with special reference to Tamil Nadu)-Phylogeny of Angiosperms: A general account of origin of Angiosperms with reference to time and place and possible ancestors.		
Unit-II	Introduction - History of classification - A detailed study of classification - Basic principle, outline, merits and demerits for the following Systems: Natural System (Bentham and Hooker) - Phylogenetic System (Engler and Prantl, Hutchinson, Takhtajan and APG). Chemotaxonomy-Numerical Taxonomy.		
Unit-III	International code of Botanical Nomenclature - Types and typification – Principles of priority and their limitations – Effective and valid publications - Author citation, retention, choice and rejection of names – Botanical literature – Monographs, periodicals and floras – A general account on Taxonomic Keys – Herbaria and Herbarium preparation – Botanical Survey of India and its role.		
Unit-IV	Systematic position, Diagnostic characters and economic importance of the following families: Annonaceae, Menispermaceae, Capparaceae, Rutaceae, Vitaceae, Sapindaceae, Fabaceae, Combretaceae, Myrtaceae, Cucurbitaceae, Apiaceae, Aizoaceae.		
Unit-V	Systematic position, Diagnostic characters and economic importance of the following families: Rubiaceae, Asteraceae, Sapotaceae, Apocynaceae, Ascelpiadaceae, Convolvulaceae, Solanaceae, Acanthaceae, Lamiaceae, Loranthaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Amaryllidaceae, Commelinaceae, Poaceae.		

Reference and Text Books :-

Gamble, J. S. (2012). *Flora of Presidency of Madras*. New Delhi: Revised Edit, Pragun Publications.

Heywood, V. H. (2015). *Modern Methods in Plant Taxonomy*. Jodhpur: Scientific Publisher.

Khan, A.S. (2017). *Flowering Plants: Structure and Industrial Production*. Hoboken, NJ: John Wiley& Sons, Inc.

Malhotra, M. & Das, S. M. (2012). *A Text of Taxonomy*. New Delhi: Wisdom Press.

Mukherjee, P. (2016). *Flora of Southern Western Ghats and Palnis: A field guide*.New Delhi: Niogi Books.

Pandey, B. P. (2013). *Taxonomy of Angiosperms*. New Delhi: S Chand and Company Pvt. Ltd.

Outcomes	➢ Know the ideas of botanical nomenclature and classification of higher plants. ➢ Understand the principles of plant taxonomy, diagnostic characters and economic importance.

Name of the Course Teacher: **Dr. C.Rajaseker**

Semester -II			
Course code : 525202	**Plant Anatomy, Embryology and Plant Breeding**	**Credits:5**	**Hours:5**
Objectives	➢ To learn about plant internal structures. ➢ To learn about the plant reproductive biology ➢ To learn about plant breeding		
Unit-I	General account and theories of organisation of apical meristems of shoot apex and root apex, quiescent centre: - Structural diversity and phylogenetic trends of specialization of xylem and phloem. Cambium - origin – fascicular and interfascicular cambium- duration, function, structure and cellular structure- cell division of cambium- Cambium in budding and grafting - wound healing role- Cambium in monocotyledons.		
Unit-II	Anatomical characteristics and vascular differentiation in primary and secondary structures of root and stem in Dicot and Monocot:-Anamalous structure of Stem- Origin of lateral roots - Root stem transition -Leaf and petiole anatomy, types of stomata, abscission of leaves, nodal anatomy, vascularisation of flower and seedling, ecological anatomy.		
Unit-III	Microsporangium: -Microsporogenesis, Microspores - arrangement – wall morphology - Microgametogenesis - Megasporangium - Megagametogenesis – Female gametophyte - Monosporic - Bisporic and Tetrasporic - Pollen and Stigma Incompatibility - Methods to overcome incompatibility- Pollination- fertilization.		
Unit-IV	Embryo development in Dicot and Monocot:- Nutrition of embryo - Polyembryony – values of polyembryony, Apomixis, Agamospory, Apospory - Their role in plant improvement programmes - Endosperm - Types - Endosperm haustoria - Cytology and physiology of endosperms, functions of endosperms - seed development.		
Unit-V	Plant Breeding:- Introduction and scope - Methods of plant breeding - Mass selection, Pure line selection, Clonal selection, Hybridization, Backcross breeding, inbreeding, heterosis, polyploidy, mutation breeding - Resistance breeding; principles, methodology, basis of resistance, vertical and horizontal resistance, artificial epiphytotic condition, screening procedures for resistance.		

Reference and Text Books :-

Bhosjwani, S. S. & Bhatnagar, S. P. (2010). *The Embryology of Angiosperms*, 5th Revised Edition. New Delhi: Vikas Publishing House.

Khan, I.U. (2017). *Essentials of Plant Breeding*. Delhi: Rajat Publications.

Maheshwari, P. (2012). *An Introduction to Embryology*. New Delhi: Tata McGraw Hill Publishing Co. Ltd.

RajaramChoyal. (2013). *Economic Botany*. Varanasi, India: Green Leaf Publication.

Scott, R.J. (2008). *Molecular and Cellular Aspects Plant Reproduction*. Cambridge, UK: Cambridge University Press.

Susheela M. Das. (2017). *A Textbook of Plant Anatomy: Theory & Objectives*. Delhi: Dominant Publishers And Distributors Pvt Ltd.

Outcomes	➢ Understand the internal structures of various plant parts and their significance. ➢ Knowledge on the development of gametes, pollination and fertilization reveals the various steps involved in development of new plant. ➢ Knowledge on how to generate the plants with desired traits and improve yield of plants.

Name of the Course Teacher:**Dr. N. Anusuya**

Semester -II			
Course code : 525203	**Plant Physiology and Biochemistry**	**Credits:5**	**Hours:5**
Objectives	➢ To study about the basic concept of Plant Physiology and Plant functions. ➢ To understand the metabolic pathways in plant cells. ➢ To know aboutthe significant of plant growth regulators. ➢ To understand the structure and properties of biomolecules.		
Unit-I	Water :- Biological significance - Water relationship to the plants – osmosis, permeability, diffusion, chemical potential, water potential, metric potential, pressure potential – soil-plant atmosphere continuum – General account of absorption and translocation of water, solutes and assimilates – Transpiration and stomatal mechanism. Photosynthesis – organization of thylakoids – Photosynthetic pigments and functions - Mechanism of photosynthesis-light reaction - two transport chains – Emerson's effect – photophosphorylation – carbon fixation – glycolate metabolism and its significance.		
Unit-II	Respiration: **–** glycolysis – energy conversion stages of glycolysis – metabolism of fats and storage proteins to carbohydrates – regulation of glycolysis – outline of pentose phosphate path way – Pyruvate metabolism – TCA cycle – electron transport system coupled with oxidative phosphorylation – inhibitors of electron transport system – Mechanism of nitrogen fixation – Nitrogen uptake and assimilation.		
Unit-III	Plant growth regulators: **–** Mode of action and physiological effects – Stress physiology – Physiology of flowering - Photoperiodism, importance, induction, florigen – Vernalization – hypothesis, mechanism, hormonal involvement and significance – Biological clock – Physiology of Dormancy break – Senescence and aging.		
Unit-IV	Structure of atoms, molecules and chemical bonds: **–** enzyme as catalysts – enzyme kinetics, classification, nomenclature, properties and mechanisms of enzyme action – Biomolecules: A concise account of biomolecules – carbohydrates – classification, structure and properties.		
Unit-V	Amino acid :- structure, classification, properties, isoelectric points and zwitter ions- Proteins - classification, properties primary and secondary, tertiary and quaternary, structures (general account) – Lipids - Classification, properties, saturated and unsaturated fatty acids, plant waxes and steroids (general account) – Secondary metabolites – phenolic compounds, alkaloids and flavonoids.		

Reference and Text Books :-

Jenks, M.A. & Wood, A.J. (2009). *Genes for Plant Abiotic Stress.* Singapore: Blackwell Publishing, Wiley.

Mandavia, C. & Patel, S.V. (2009). *Glimpses in Plant Physiology.* Lucknow: IBDCHB publisher.

Moore, Thomas C. (1989). *Biochemistry and Physiology of Plant Hormones.*Verlag, New York: Springer.

Mohr, H. (1995). *Plant Physiology.* Berlin, Heidelberg: SpringerVerlag.

Samantary, K. (2012). *Principles of Biochemistry: With Special Reference to Fishes.*Delhi: Narendra Publishing House.

Satyanarayana, U. &Chakrabani. (2014). *Biochemistry*. India: Elsevier.

Outcomes	➢ Knowledge on Plant Physiology, Plant functions and plant growth regulators. ➢ Understand the metabolism inside and outside the cell along within plants and its responsible biomolecules.

Name of the Course Teacher: **Dr.N.Vasanth**

Semester -III			
Course code : 525301	**Evolution, Ecology and Phytogeography**	**Credits:5**	**Hours:5**
Objectives	➢ To aware the origin, evolution of plants and animals ➢ To introduce various concepts of Ecosystem, and population biology ➢ To introduce various components of biogeography.		
Unit-I	Origin of life: - Evolutionary time-scale (Major events) –theories of evolution – Lamarckism, Darwinism, Mutation theory, modern synthetic theory - types of evolution and evolution in action – Population Genetics – Population, Gene pool, Gene frequency-Hardy-Weinberg Law - rate of change in gene frequency through natural selection, migration and random genetic drift - founder effect – convergent, divergent and co-evolution- Speciation – types and mechanism of speciation –polymorphism.		
Unit-II	Ecosystem:- Ecosystem concept and dynamics – Abiotic and biotic components, energy input in ecosystem, Biomass, primary and secondary production – Concept of food chain and food web – Ecosystem structure and function – Grassland, pond and estuarine – Mineral cycling: carbon, nitrogen and phosphorus–community organization – Concept of habitat, functional role and niche – ecotone – edge effect – ecological succession.		
Unit-III	Population biology:- Basic concepts – food chain, food web, niche concept, Gause's principle, survivorship curves - self regulating mechanisms. Species interaction - evolution of cooperation, inter-specific competition, competition coexistence, Negative interaction: predation, herbivory, parasitism - Positive interaction - commensalisms and mutualism.		
Unit-IV	Forest Ecology:- Introduction and Scope- Forest types – Dynamics – Structure and composition – Type of Forest Inventory – Choosing a sampling design – Approaches –Characterizing stand structure - Species Richness and Diversity – Analysis of floristic composition - Quantification of vegetation - Energy and Nutrition in various Forests- Forest Conservation and Management- Forests and Climate Change-Human impacts on Forest Ecology.		
Unit-V	Biogeography:- Phytogeography- Phytogeographical regions of the world - theory of island biogeography, continental drift, continuous and discontinuous distribution, endemic distribution - floristic regions of the world.		

Reference and Text Books :-

Anuj Kumar Purwar. (2012).*Environment and Ecology*. New Delhi, India: I K International Publishing House Pvt. Ltd.

Bruenig, E.F. (2016) *Conservation and Management of Tropical Rain Forests*. 2nd Ed.: An Integrated Approach to Sustainability. Croydon, UK: CPI Group.

Coll, M.,&Wajnberg, E. (2017). *Environmental Pest Management: Challenges for Agronomists, Ecologists, Economists and Policy Makers*. New Jersey: John Wiley & Sons Ltd.

Michael, P. N. (2018). *Ecology*. New Delhi: CBS Publishers & Distributors.

Vandermeer, J. (2017). *Ecological Complexities and Agroecology*. USA: Routledge Publisher.

Verma. P. (2011) *Plant Ecology*. New Delhi: Ane Books Pvt. Ltd.

Verma, V. (2011). *Plant Ecology*. New Delhi: Ane Books Pvt. Ltd.

Outcomes	➢ Know the origin, theories of evolution, types, specification, adaption in plants and animals. ➢ Understand the information about populations and dynamics in ecosystem.

Name of the Course Teacher: Dr.N.KamalaDhasan

Semester -III			
Course code : 525302	**Plant Biotechnology, Bioethics and IPR**	**Credits:5**	**Hours:5**
Objectives	➢ To teach the fundamentals Plant Biotechnology. ➢ To know about the basic concepts and principles of Plant Biotechnology. ➢ To study the molecular organization of plants. ➢ To teach the genetic manipulation in plants ➢ To teach bioethics and IPR.		
Unit-I	Plant Biotechnology :– Scope and importance- The nuclear and Chromatin organization – DNA replication – Nuclear DNA amounts and the C – value paradox – Organization of DNA sequences – Satellite DNAs – Nuclear gene for rRNA – Function of repeated DNA sequences – Genes coding for proteins – genome variation – Transposable elementsStructure and Expression of Nuclear Genes-RNA polymerase – Transcription and processing of rRNA and tRNA – Synthesis and properties of mRNA – Regulatory signals in plant genes – RNA splicing – Post- translational modifications and the direction of proteins to different cellular compartments – Gene expression and plant development.		
Unit-II	Plastid interrelationships: **–** Chloroplast organization and function – Chloroplast genetics and the extent of plastid autonomy – Structure and function of the plastome – Chloroplast ribosomes and protein synthesis – Transcription and processing of chloroplast RNA – Transit peptides and the genetic specification of protein transport into chloroplasts-Evolution and function of mitochondria – Plant mitochondrial DNA – Mitochondrial protein synthesis *in vitro* – Senescence in *Podosporaanserina* – Mitochondrial DNA and cytoplasmic male sterility – import of proteins into mitochondria.		
Unit-III	*Rhizobium* recognition of legume roots and elicitation of nodule development: **–** Nitrogen fixation in root nodules – Genetic determinants of nodule formation – Functions of *Rhizobium* genes in nodule development – Plant nodulin genes – Time course of nodule gene expression.		
Unit-IV	Characteristics of tumour induction and growth: **–**Tumour inducing (Ti) plasmids – Genetic organization of the Ti plasmid – Activation of Ti plasmid genes controlling T-DNA mobilization – Functions encoded by integrated T- DNA – *Agrobacterium tumifaciens* – Summary of the transformation process – Regeneration of *Agrobacterium* transformed plants – *Agrobacterium* and *Rhizobium.*		
Unit-V	Biology of plant virus infections: **–** Distribution of genome types among the plant viruses – Studying plant viruses – Expression strategies of RNA virus genomes – DNA viruses – Viroids and virusoids. Plant breeding – Gene vectors – *Agrobacterium* Ti plasmid vectors – Plant virus vectors – Direct transformation – Chimaeric gene vectors – Genetically engineered plants.		

Reference and Text Books :-

Alam, M.A. (2016). *Genetic Engineering for Crop Production*. Rajasthan: Oxford Book Co.

Dubey, R. C. (2014). *Text Book of Biotechnology*. 5th Edition.New Delhi: S. Chand & Company Ltd.

Richard (2006). *Recombinant DNA*. USA: Cold Spring Harbor Laboratory Press.

Singh, M. P. (2012). *Plant Biotechnology*. New Delhi: Enkay Publishing House.

Verma, P.S. & Agarwal, V. K. (2009). *Genetic Engineering*. New Delhi: S. Chand & Company Ltd.

Outcomes	➢ The study of scope and importance of plant biotechnology. ➢ Having awareness of growth, regulation and genetic determination of gene expression plant studies

Name of the Course Teacher:**Dr.A.Arumugam**

Semester -III			
Course code : 525303	**Biotechniques, Biostatistics and Bioinformatics**	**Credits:5**	**Hours:5**
Objectives	➢ To teach the biological data collection and statistical analysis. ➢ To get knowledge about various biotechniques. ➢ To learn the biological databases for sequence system. ➢ To know about the database sequences		
Unit-I	Principles, technique and applications of the following biotechniques:- Centrifugation-Ultra centrifugation. Chromatography: Gas-liquid chromatography (GLC) and High performance liquid chromatography (HPLC), HPTLC. Electrophoresis: SDS-PAGE, Agarose gel electrophoresis-Two dimensional (2D) gel electrophoresis. Blotting: Southern blot and Western blot- Flow Cytometry -Radiolabelling techniques: GM counter, Scintillation counter and Autoradiography.		
Unit-II	Data collection and interpretation:-Types of population - sample – non probability sampling techniques - random sampling techniques - choice of sampling methods-sampling and non sampling errors. Diagrammatic and graphical representation of data; Measures of central tendency: Mean - median - mode. Measures of dispersion: Range - mean deviation - standard deviation.		
Unit-III	Test of significance:- Null hypothesis - alternate hypothesis - confidence interval - level of significance - p value - S.E of mean - S.E of standard deviation - Z test - t test - chi square test.		
Unit-IV	Bioinformatics: - introduction - biological data bases - nucleotide sequence data bases, protein sequence data bases, specialized sequence data bases. Data retrieval and analysis, sequence and retrieval system.		
Unit-V	Sequence alignment: - sequence similarity searches, amino acid substitution matrices, Data base searches - FASTA, BLAST - PSI BLAST. Multiple sequence alignment – Clustered W: Phylogenetic analysis, PHYLODRAW: Phylogenetic tree.		

Reference and Text Books :-

Agarwal, B.L. (2011). *Statistics for Professional Courses*. New York: CBS Publisher.

Alonso, J. M. (2016). *Plant Functional Genomics: Methods and Protocols.*Springer Science and Business Media, New York: Humana Press.

Brownstein, M. (2007). *Functional Genomics: Methods and Protocols.*Berlin: Springer.

Mount, D. W. (2004). *Bioinformatics: Sequences and Analysis*. New York: Cold Spring Press.

Palanichamy, U. (2008). *Handbook of Statistics for Teaching and Research in Plant and Crop Science*. Binghamton, New York: Food Products press.

Outcomes	➢ Understand the biological data collection, statistical analysis, standard deviation and graphical representation. ➢ Know the biological database for identification of sequenced DNA using bioinformatics analysis

Name of the Course Teacher:**Dr. N. Anusuya**

Semester -IV			
Course code : 525501	**Plant Tissue Culture** **Elective Course - I**	**Credits:4**	**Hours:4**
Objectives	➢ To acquire the fundamental knowledge on tissue culture techniques. ➢ To know about the basic concepts and principles of plant tissue culture. ➢ To aware of the importance of conservation of plants especially medicinal and aromatic plant studies.		
Unit-I	Plant Tissue Culture – Introduction – History and Scope – Concepts of Plant tissue culture – Laboratory requirements and organization – Media: Components and composition of important culture media (MS, Whites and Gamborg's media) – Aseptic manipulation: Sterilizing culture rooms, instruments and vessels, media and plant materials.		
Unit-II	Cell, tissue and organ culture: Isolation of single cells – selection and types of cells - tissue explants and organs for culture - Paper, raft nurse technique - Plating method - Microchamber techniques – Cell suspension cultures – Synchronization of suspension culture – Cellular totipotency: Vascular differentiations - Culture systems, Cytological, cytochemical and physiological aspects –Totipotency of epidermal and crown - gall cells.		
Unit-III	Micropropagation: Clonal propagation of elite germplasm, factors affecting morphogenesis and proliferation rate, troubleshoots in micropropagation – Organogenesis: formation of shoots and roots, Role of growth regulators and other factors, somaclonal and gametoclonal variations – Somatic embryogenesis: Process of somatic embryogenesis, structure, stages of embryo development, factors affecting embryogenesis, synthetic seeds.		
Unit-IV	Haploid production: Androgenesis, gynogenesis, Techniques of anther culture, segmentation pattern in microspore, isolated pollen culture, plantlets from haploids, factors influencing androgenesis– *In vitro* pollination: ovule and ovary culture, importance, embryo rescue – Protoplast culture: Isolation of protoplasts, mechanical and enzymatic sources, culture of protoplasts, viability, Protoplast fusion, Spontaneous, mechanical, induced electrofusion, selection of somatic hybrids-cybrids.		
Unit-V	*In vitro* production of secondary metabolities-cell suspension cultures, immobilized plant cell cultures and biotransformation, elicitors and hairy root culture– Cryopreservation and gene bank - Modes of preservation, preparation of materials for deep freezing, cryoprotectors, storage strategies, assessment of successful cryopreservation, application and limitations – Application of tissue culture in forestry, horticulture, agriculture and pharmaceutical industry.		

Reference and Text Books :-

Arora, R. (2010). *Adaptation and Response of Woody Plants to Environmental Stress.*Binghamton, New York: Food Products press.

Gayatri, M. C. &Kavyasree, R. (2015). *Plant Tissue Culture: Protocols in Biotechnology.*New Delhi: Alpha Science International Ltd.

Herren, R.V. (2014). *TheScience of Agriculture: A Biological Approach*. India: Cengage Publisher.

Misra, S. P. (2009). *Plant Tissue Culture.*New Delhi: ANE Books Pvt. Ltd.

Smith, R. H. (2012). *Plant Tissue Culture: Techniques and Experiments.* 3rd Edition.London, New York: Academic Press.

Outcomes	➢ Knowledge about plant tissue culture. ➢ Know the techniques involved in micro propagation and cryopreservation in endangered plants. ➢ Knowledge on the conservation of plant diversity through plant tissue culture.

Name of the Course Teacher: **Dr.N.Vasanth**

Semester -IV			
Course code : 525502	**Economic Botany** **Elective Course – II**	**Credits:4**	**Hours:4**
Objectives	➢ To understand the utility of different plant families. ➢ To have a first- hand knowledge on Economic Botany.		
Unit-I	Origin and History: - Botanical description, Cultivation, Harvesting and uses of the following Cereals and Legumes: Wheat, Rice, Maize, Sorghum, Barley, Black gram, Red gram, Chick pea, Pigeon pea and Broad beans.		
Unit-II	Origin and History: - Botanical description and economic importance of Vegetables and Fruits: Banana, Grapes, Citrus, Mango, Jack fruit, Potato, Cassava, Dioscorea and Tomato.		
Unit-III	Botanical description, Cultivation and uses of Spices and Condiments: - Ginger, Pepper, Cardamom, Clove, Nut-Meg, Chilly, Coriandrum, Turmeric and Allspice (*Pimentadioica*). Beverages plants: Tea, Coffee and Cocoa. Sugars and Starch: Sugarcane and Cassava (Manihot).		
Unit-IV	Morphology, useful parts and uses of the following: -Fibre and Timber yielding plants: Fibers and Timber: Cotton, Jute, Sun hemp, Teak, Rosewood, Ebony, Sal and Mahogany.		
Unit-V	Origin and History: - Botanical description, Harvesting, Extraction and uses of Fatty oils and Vegetable Fats: Sun flower, Soya bean, Peanut, Palm Oil, Coconut and Gingelly. Medicinal Plants: *Rauvolfia*, *Aconitum*, Jatamansi, Sathavari, Goggul, Basil, *Saraca* and Neem.		
Reference and Text Books :- Bob ShuinLuh. (2013). *Commercial vegetable processing*. New Delhi: Medtech publisher. Prasad, R. L. (2016). *Essential of Economic Botany*. New Delhi: Medtech. Ryall, A.L. (2013). *Handling, transportation and storage of fruits and vegetables*, Vol. 1: Vegetables and Melons. Warrier, P.K. (1993-1996). *Indian Medicinal Plants*. Vol.1-5. KottakalAryavaidhya Sala.			
Outcomes	➢ Knowledge on the origin and history of cultivation and harvesting in economic important plants. ➢ Knowing the botanical description of cereals, vegetables, spices, fruits and oils.		

Name of the Course Teacher: **Dr.C.Rajaseker**

Semester -IV			
Course code : 525503	**Herbal Technology** **Elective Course – III**	**Credits:4**	**Hours:4**
Objectives	➢ To get knowledge about medicinal plants. ➢ To study the diagnostic features and medicinal uses of plants. ➢ To know about the clarification and properties of drugs. ➢ To understand the importance of agrotechniques and seed propagation.		
Unit-I	Herbal medicine - History and general account of different systems of Medicines - Indian systems of medicine – Siddha, Ayurveda and Unani. Introduction to medicinally important plants and their parts: fruits, leaves, stem and its modifications and roots. Importance of medicinal plants in human health care.		
Unit-II	Study of some medicinally important plant families with reference to systematic position. Diagnostic features and medicinal uses: Meliaceae, Apiaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae and Zingiberaceae. Poisonous plants - Types of plant poison; action of poisons; treatment for poisons; some poisonous plants; their toxicity and action.		
Unit-III	Classification and properties of drugs - Chemical constituents of pharmaceutical importance: (a) alkaloids, (b) steroids, (c) terpenoids, (d) flavonoids and (e) coumarins. Techniques in isolation of bio-molecules and their medicinal importance.		
Unit-IV	Herbal plants - Cultivation methods – Crop protection – Harvesting – Storage and Protection – Marketing and utilization - medicinally important Endangered Plants – Conservation: *Ex-situ* and *In-situ* methods – Importance of Red data book (IUCN) – Patenting and IPR, intellectual property rights.		
Unit-V	Study of agrotechniques developed for medicinal plants with special reference to important medicinal & aromatic plants: *Centellaasiatica, Withaniasomnifera, Aloe vera, Catharanthusroseus, Andrographispaniculata, Menthaarvensis, Ocimum species, Curcuma longa* and*Phyllanthusamarus.*		

Reference and Text Books :-

Douglass F. T. (2015). *Organic Synthesis: State of the Art 2011—2013*. New Jersey: Wiley & Sons.

Kumar, N. (2018). *A Textbook of Pharmacognosy*. New Delhi: Aitbs Publishers.

Lackey, K. & Bruce Roth (2013). *Medicinal Chemistry Approaches to Personalized Medicine*. New Jersey: Wiley, VCH.

Mukul Kumar (2015). *Botanical Analysis of Plant Cells*. New Delhi: Random Publications.

Nidhi Jooni (2018). *Biodiversity Management.* New Delhi: Z.Biogreen Publisher.

Santhosh Kumar Jha (2018). *Advances in Ethnobotany*. New Delhi: SS Publishing House.

Outcomes	➢ Knowledge about different systems of medicines in human health care. ➢ Know the classifications and properties of herbal drugs and their pharmaceutical importance.

Name of the Course Teacher: **Dr. A. Arumugam**

Semester -IV			
Course code : 525504	**Plant Genetic Engineering** **Elective Course – IV**	**Credits:4**	**Hours:4**
Objectives	➢ To learn about principle of plant genetic engineering. ➢ To learn about various gene transfer methods. ➢ To learn about applications and implications of plant genetic engineering.		
Unit-I	Restriction and Modification of DNA: Principles of genetic engineering - Restriction enzymes; nomenclature , classification , types- DNA modifying enzymes; ligases – alkaline phosphatase, DNA polymerase- Holoenzyme – RNases – reverse transcriptase – Poly(A) polymerase, S1 nuclease, terminal deoxy nucleotide transferase.		
Unit-II	Gene cloning vectors- Plasmids: types – isolation and amplification – bacterial plasmids as cloning vectors- Shuttle vectors –Cosmid and Phasmid vectors- Biology and molecular basis of *Agrobacteriumtumifaciens* mediated plant transformation and its application- Gene transfer methods.		
Unit-III	Core techniques in gene manipulation: Cloning strategies, sticky and blunt end cloning- Cloning from mRNA - Construction of genomic libraries and cDNA libraries-Site directed mutagenesis; DNA sequencing- DNA polymorphic markers; RFLP.		
Unit-IV	Methods of selection and screening of recombinant DNA- Blotting techniques- Southern, Northern and Western. Gene amplification: Basic principles and applications of PCR- Types of PCR- DNA foot printing, finger printing.		
Unit-V	Application of plant genetic engineering; Genetic engineering of plants for herbicide resistance, insect resistance, virus and abiotic stress resistance- Molecular pharming and Plantibodies-Golden Rice- Genetic Engineering and public Concerns-IPR-Bio-safety issues in Indian contest- Indian rules, regulation and procedures for handling transgenic plants.		
Reference and Text Books :- Abhinandan, (2013). *Genetic Engineering*. Uttara Pradesh: Green Leaf Publication. Grotewold, E. (2003). *Plant Functional Genomics*. Humana Publisher. Nair, L. N. (2010). *Methods of Microbial and Plant Biotechnology*. New Delhi: New Central Book Agency Publication. SubodhSaxena. (2014). *Genetic Engineering*. New Delhi: Black Prints. Verma, P.S. & Agarwal, V. K. (2009). *Genetic Engineering*.New Delhi: S. Chand Publishing.			
Outcomes	➢ Knowledge on principles of restriction and modification of DNA. ➢ Know the core techniques involved in gene manipulation and various transfer methods. ➢ Knowledge about various applications of genetic engineering and implications of the same in the natural environment.		

Name of the Course Teacher: **Dr.N.Vasanth**

Non-Major Elective course - I			
Course code : 525701	**Algal Technology**	**Credits:2**	**Hours:3**
Objectives	➢ To know the economic importance of algae. ➢ To study the multiple technique on algae cultivation. ➢ To know about the seaweed liquid fertilizers. ➢ To study about the genetics of algae.		
Unit-I	Economic importance of algae: Fresh water and marine algae – Macro and Micro algae – Occurrence – distribution - Cultivation – Importance of cultivation.		
Unit-II	Mass cultivation techniques of microalgae: Upstream and downstream processes of algal cultivation - *Spirulina*, *Dunaliella*, *Hematococcus*and*Botryococcus*. Single cell protein – bioactive compounds, industrial enzymes, biofuel and other byproducts from algae.		
Unit-III	Micro algae used as biofertilizers – nitrogen fixing forms – free living and symbiotic nitrogen fixers – Azolla – Mass cultivation of blue green algae in field – Importance and selection of carrier materials – Immobilization technique.		
Unit-IV	Mass cultivation of macro algae: rope cultivation – culturing in the laboratory – Applications of seaweeds in biotechnology – Seaweed liquid fertilizers preparation and their potential in agriculture and horticulture.		
Unit-V	Algal products-SCP, Agar-agar, Biodiesel, Phycoremediation.		
Reference and Text Books :- Bilgrami, (2015). *A Textbook of Algae*. New Delhi: CBS Pulisher. Das, D. (2015). *Algal Biorefinery: An Integrated Approach*. Springer. Inniya Kumar Minniraj (2018). *Microbial Biodiesel Scope, Production Technologies, Feasibility and Commercialization.*New Delhi: Narendra Publishing House. Jaiswal, A.P. (2013). *Biofertilizer Technology*. New Delhi: Enkay Publication.			
Outcomes	➢ Awareness about algal cultivations. ➢ Know the seaweed cultivation and their potential applications in agriculture and horticulture development.		

Name of the Course Teacher: **Dr.N.Anusuya**

Non-Major Elective course - II			
Course code : 525702	**Mushroom Cultivation**	**Credits:2**	**Hours:3**
Objectives	➢ To understand the scope and importance of mushroom. ➢ To know about the preparation of compost for mushroom cultivation. ➢ To learn the cultivation techniques in paddy. ➢ To study the various packing and preservation techniques for mushroom.		
Unit-I	Introduction to mushroom cultivation – History – scope of edible Mushroom – Types of edible mushroom available in India – Medicinal and other uses - Poisonous mushroom. *Calocybeindica, Volvariellavolvacea, Pleurotuscitrinopileatus* and *Agaricusbiosporus.*		
Unit-II	Pure culture – preparation of medium (PDA and Oatmeal Agar medium) Sterilization – preparation of test tube slants – Spawn preparation: Spwan substrate, Mother spawn in saline bottle – Inoculation, incubation, storage and transportation of spawn – Quality of spawn and contaminants – Preparation of compost and cultivation of white button mushroom (*Agaricusbisporus*).		
Unit-III	Cultivation of paddy straw mushroom (*Volvariellavolvacea*) and oyster mushroom (*Pleurotus*spp.) with details of bed and spawn preparation, cultivation and harvest. Low cost mushroom farm design. Factor affecting mushroom cultivation (Temperature, pH, air and water management). Insect and pests attacking mushroom – fungal, bacterial, viral diseases.		
Unit-IV	Packing and preservation techniques for mushroom - Storage and nutrition: short-term storages, long term storages, drying, storages in salt solution, nutritive value – amino acids, mineral elements – carbohydrates, crude fiber – vitamins.		
Unit-V	Food preparation from mushroom: soup, cutlet, omelette, somasa, pickles, curry. Other value added products from mushroom - Cost benefit ratio – Marketing in India and abroad, export value.		
Reference and Text Books :- Sharma, O. P. (2008). *Fungi and Allied Microorganisms.*New Delhi: Tata Mc Graw Hill PVT Ltd. Singh, J.K. (1993). *Mushroom: The Future Vegetable Cultivation, Processing, Marketing*. New Delhi: Enkay Publishers Pvt Ltd. Singh, J.K. (2012).*Mushroom: Diseases and its Control*. New Delhi: Enkay Publishers pvt Ltd Sanjay Kumar Sharma (2017). *Beneficial Fungi: Importance and their Use.* New Delhi.			
Outcomes	➢ Getting the knowledge about medicinal uses and cultivation methods of mushroom. ➢ Obtaining knowledge about packing and preservation of mushroom.		

Name of the Course Teacher: **Dr.R.Kottaimuthu**

Non-Major Elective course - III			
Course code : 525703	**Horticulture**	**Credits:2**	**Hours:3**
Objectives	➢ To learn about horticulture and its various branches viz., floriculture, olericulture and pomology. ➢ To learn about scope and requisite of horticulture. ➢ To learn about various types of gardening and maintenance of the same.		
Unit-I	Scope of horticulture - relation to agriculture, agronomy and forestry - Divisions of horticulture - Climate, soil and nutritional needs; Importance of macro and micronutrients, different types of soil- Sterile soil mixtures (vermiculite, perlite, etc.). Different types of organic manure's and inorganic fertilizers - Water irrigation; advanced irrigation system such as drip, microtube and sprinkler systems.		
Unit-II	Gardening and landscaping - Vegetative propagation using stem, leaf and root cuttings. Propagation by division and layering, bulbs, corms, tubers and rhizomes-budding and grafting- Production of seeds, their certification, storage and germplasm collection. Tissue culture and micropropagation.		
Unit-III	Outdoor Gardening: Principles and methods of designing outdoor garden - hedges, edges, fences, trees, climbers, rockeries, arches, terrace garden - Lawn making and maintenance – Water garden - cultivation of water plants- Layout for a model college garden-Indoor gardening: Foliage plants, flowering plants, hanging basket, Bonsai plants - Training and pruning.		
Unit-IV	Floriculture: Cultivation of commercial flower crops - Rose, Jasmine and Chrysanthemum- Flower decoration - Dry and wet decoration- Olericulture: Classification of vegetables- cultivation of important vegetable - Tomato, potato, onion, cabbage and snake guard-Model kitchen garden-Pomology: Fruit crops - Induction of flowering, flower thinning, fruit setting, and fruit development- Cultivation of important fruit crops - Mango, Grapes, Banana, Papaya and Guava.		
Unit-V	Pests and Diseases: Viral, mycoplasmic, bacterial and fungal pathogens- insect and pests of horticultural plants- chemical control, biological control and integrated pest and disease management- Weed Management: Weed problem in horticulture- ecological perspective- biological control of weeds in Indian region-Harvesting and Post -Harvesting techniques: seed storage-preservation of fruits and vegetables.		

Reference and Text Books :-.

Aggarwal, B.S. (2016). *Pest Control in Gardening Plants.*New Delhi: Medtech Publication.

Doijode, S. D. (2002). *Seed storage of Horticultural crops*. New Delhi: CBS Publisher.

Jaswal, A. P. (2012). *Handbook of Soil, Fertilizer & Manure.* New Delhi:Enkay Publishing House.

Sheela, V.L. (2011). *Horticulture.*Chennai: Mjp Publishers.

Tomlekowa (2016). *Plant Science now: Genes, Horticulture and Botany*. London: Intech Publication.

Outcomes	➢ Knowledge about the art, science, technology and business of growing plants. ➢ Knowledge about cultivation of flowers, vegetables, fruits, seeds, nuts, etc., ➢ Knowledge about diseases, pests and weeds of horticultural plants and their control measures.

Name of the Course Teacher: **Dr.N.KamalaDhasan**

Practical - I			
Course code :525105	Practical – I [Plant Diversity – I ((Phycology, Mycology, Lichenology and Bryology),II (Pteridophytes, Gymnosperms and Palaeobotany), Microbiology and Plant Pathology, Cell Biology and Genetics]	**Credits:4**	**Hours:8**
Objectives	➢ To understand the morphology and anatomy of plants. ➢ To know about the permanent slide preparation of selected plants. ➢ To learn the sectioning of plant specimens.		

Phycology

*Gloeocapsa, Spirulina, Anabaena, Volvox, Spirogyra, Ulothrix, Acetabularia, Nitella, Vaucheria, Cyclotella*and*Navicula*(Diatoms),*Padina, Sargassum, Gelidium*and *Gracilaria*

Mycology

Study of diagnostic features of the following types of fungi - *Phytophthora, Albugo, Mucor, Aspergillus, Penicillium, Pilobolous, Saccharomyces, Xylaria, Peziza, Puccinia, Pleurotus, Auricularia, Polyporus, Fusarium* and *Alternaria*.

Lichens

Parmelia and *Usnea*.

Bryophytes

Morphological and anatomical study of representative members of the following genera: *Marchantia, Lunularia, Tarzionia, Reboulia, Porella*and*Polytrichum*

Pteridophytes

Study of vegetative, anatomy and reproductive structure of *Selaginella, Ophioglossum, Equisetum, Gleichenia, Marselia*and*Azolla.*

Gymnosperms

Study of morphology, anatomy and reproductive structure of *Araucaria, Cupressus, Podocarpus, Ginkgo, Taxus, Ephedra* and*Gnetum*

Microbiology and Pathology

Isolation of microorganism from soil, water and food.
Serial dilution and plating.
Preparation of NA, sterilization, pouring, inoculation and culturing of bacteria.
Gram's staining of bacteria found in milk, curd, root -nodule.
Preparation of PDA, sterilization, pouring, inoculation and culturing of fungi.
Staining of fungi including AM fungi.
Identification of different groups of fungi occurring on substrates.
Study of the following diseases: Groundnut Rust, Wilt of cotton, White rust of mustard, Anthracnose of mango, Citrus canker, rice sheath blight, Tobacco mosaic virus, Cucumber mosaic virus, Little leaf of Brinjal.

Cell biology and Genetics

Squash and smear preparations to study mitosis and meiosis: Mitosis in onion root tips. Meiosis in maize and onion flower buds.
Squash preparation of onion root tips to study mitosis.
Smear preparation of maize or onion flower buds to study meiosis.
Problems in Genetics:-Monohybrid, dihybrid, Test cross and Incomplete dominance
Interaction of genes studied in the theory syllabus.
Chromosome mapping in eukaryotes.

Reference:-

Bendre Kumar (2010). *A Text Book of Practical Botany*. Vol. I & II. Meerut: Rastogi Publications.

Choudhary, S. S., Choudhary, P. & Prasad, T. (2001). *Practical Botany (Cryptogams & Gymnosperms).* New Delhi: CBS Publisher & Distributors.

Suresh Kumar (2003). *Manual of Practical Algae.* New Delhi: Campus Book International. SundaraRajan, S. (2002). *Practical Manual of Pteridophyta*. Karnataka: Anmol Publications Pvt. Limited. SundaraRajan, S. (2004). *Practical Manual of Fungi*. Karnataka: Anmol Publications Pvt. Limited.	
Outcomes	➢ Getting the knowledge about exomorphic and internal structure of plants. ➢ Obtaining knowledge about slide and specimen preparation.

Practical - II			
Course code :525204	**Practical – II** [Taxonomy of Angiosperms, Plant Anatomy, Embryology and Plant Breeding and Plant Physiology and Biochemistry]	**Credits:4**	**Hours:8**
Objectives	➢ To understand the taxonomic hierarchy. ➢ To know about the salient features of selected angiosperm families. ➢ To learn the techniques commonly employed in Biochemistry and Physiology. ➢ To study the anatomical structure of various plants.		

Taxonomy

Study the characters of the plant families mentioned in the theory. Preparation of artificial key, submission of Field note and Herbarium sheets – 50.

The students should undertake as part of their course, a tour and field study of vegetation under the guidance of the staff for three to five days within the state and neighbouring states. Students who have not undertaken the above activities shall forfeit the appropriate marks allotted for this purpose (10 marks) for practical examination.

Anatomy

Dissection of shoot apex in *Hydrilla* and whole mount.

Examination of LS of shoot and root apices.

Microscopic examination of transverse sections of leaves such as *Nerium*, maize to understand the internal structure of leaf tissues and trichomes, glands, etc.

Study of the C3 and C4 anatomy of plants.

Study of epidermal peels of different kinds of leaves to study the development and nature stomata and prepare stomatal index.

Study of elements of wood from macerations and sections taken in three planes T.S., T.L.S. and R.L.S.

Embryology

Some basic techniques to study pollen; *In vitro* pollen germination studies through hanging drop techniques.

In vivo pollen germination and pollen tube growth.

Pollen viability tests (Calorimetric method using TTC and acetocarmine).

Pollen physiology-Simple experiments to demonstrate the effect of various nutrients, pH and temperature.

Slides showing developmental stages of anther, embryosac, endosperm and embryo.

Study of different types of pollen grains.

Dissection of endosperm haustoria - *Cassia, Cucumis*and*Peltophorum*

Dissection of Embryo - *Abelmoschus, Cyamopsis*and*Tridax*

Plant Breeding

Emasculation, crossing and bagging.

Plant Physiology

Determination of Osmotic Pressure (OP) of cell sap of given specimen (Rheo leaf). Determination of Diffusion Pressure Deficit (DPD) with potato tubers. Effect of light intensity on transpiration. Measurement of respiratory rate in germinating seeds and flower buds using simple respirometer.

Biochemistry

pH: operation of pH meter to measure the pH of expressed cell sap and soil solutions.

Buffers: preparation of phosphate buffer and citrate buffer.

Paper and Thin layer chromatographic technique to separate sugars, aminoacids, chloroplast pigments.

Determination of absorption spectra of chlorophyll a and b with spectrophotometer.

Demonstrations

Calorimetric/spectrophotometric estimation of the following biomolecules:

Total free aminoacids (ninhydrin reagent method)

Proteins [Biuret and Lowry et al. (1951) method]

Total soluble carbohydrates (Anthrone reagent method)

Estimation of Starch (Clegg's, 1956 method)
Estimation of Alpha-amylase activity in germinating seedlings.
Protein analysis by native and SDS PAGE methods.

References:-

Bajracharya, D. (1999). *Experiments in Plant Physiology: A Laboratory Manual*.New Delhi: Narosa Pub. House.

Bendre Kumar (2010). *A Text Book of Practical Botany*. Vol. I & II. Meerut: Rastogi Publications.

Plummer, D. T. (1996). *An introduction to practical Biochemistry*. New Delhi: Tata McGraw Hill.

Subramaniam, N. S. (1996). *Laboratory Manual of Plant Taxonomy*. New Delhi: Vikas Publishing House Pvt. Ltd.

Sundararajan, S. (2000). *Practical Manual of Plant Anatomy and Embryology*.Karnataka: Anmol Publications Pvt. Limited.

Outcomes	➢ Getting the knowledge about identification of an unknown plant by using floras.

Practical - III			
Course code :525304	**Practical – III** [Evolution, Ecology and Phytogeography, Plant Biotechnology, Biotechniques, Biostatistics and Bioinformatics]	**Credits:4**	**Hours:8**
Objectives	➢ To understand the evolutionary concepts. ➢ To know about the sampling protocols of ecology. ➢ To learn the vegetation analysis of particular area. ➢ To study the various tissue culture techniques.		

Evolution, Ecology and Phytogeography

Photo graphs of evolutionists and any other photograph related to Evolution.

Determination of linear changes in vegetation by using line and Belt transect methods.

Determination of frequency, density, abundance, dominance, IVI, dominance index. Similarity index and diversity index by using quadrate frame.

Estimation of Soil moisture

Simple quadrat method of studying vegetation

Line transect method of studying vegetation

Spotting of phytogeographical regions of India.

Plant Biotechnology

Preparation of media for plant tissue culture, Sterilization, inoculation and incubation of explants, Isolation of protoplasts, Protoplast fusion, Callus induction in Carrot.

Micropropagation of Plants through shoot tip culture and anther culture.

DNA isolation, restriction digestion, separation and analysis by submarine electrophoresis.

Industrial production of ethanol from sugar and its estimation alcohol meter.

Preparation of biofertilizers such as Rhizobium and seed testing.

Single cell protein production-Shake flask culture- Spirulina and Chlamydomonas.

Biogas production from waste from anaerobic digester.

Mushroom cultivation *Pleurotus* and *Agaricus*.

Biostatistics

Calculation of various patterns in fruits/leaves/seeds – standard deviation – standard error, based on the data given. Chi square test.

Bioinformatics

Learning gene bank formats- EMBL format, FASTA format, Swiss- PROT, Ex PASy.

Reference:-

Asubel, F. M. (1993). *Current Protocols in Molecular Biology*. New Jersey: John Wiley & Sons, Inc.

Palanivelu, P. (2000). *Laboratory manual for analytical biochemistry and separation techniques*. Madurai: School of Biotechnology, Madurai Kamaraj University.

Plummer, D. T. (1996). *An introduction to practical Biochemistry*. New Delhi: Tata McGraw Hill.

Sadasivam, S. &Manickam, A. (1996). *Biochemical methods*. 2nd edition, New Delhi: New Age International (P) Ltd.

Srimahadevan Pillai, P. R. (2009). *A comprehensive laboratory manual for Environmental Science and technology*. New Delhi: New Age International (P) Ltd.

Outcomes	➢ Getting the knowledge on sequence submission. ➢ Handson experience on DNA isolation.

CURRICULUM VITAE

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Educational qualification:
Ph.D
M.Phil
M.Sc

Professional experience:
Professor and Head - March 2010 – till date
Research Scientist - May 2007 – March 2010
Researcher -June 2003 – May 2007
PDF - January 2000 – May 2003

Recent publications:

1. Santosh Kumar Chaudhary, YuvarajIyyappan, MohanapriyaElayappan, **JeyakanthanJeyaraman**and K. Sekar., Insights into product release dynamics through structural analyses of Thymidylate kinase, ***International Journal of Biological Macromolecules,*** 2018. **(IF: 3.9)**
2. Boobalan T, Mohan Rasu K, Arumugam N, Saravanan S, JothiBasu M, **Jeyakanthan J**, Arun A. Studies on the diversity of macrofungus in Kodaikanal region of Western Ghats, Tamil Nadu, India. ***Biodiversitas,*** 19 (6), 2283-2293, 2018.
3. Langeswaran K, **Jeyakanthan J**, Biswas A, Gowtham KS and Santhoshkumar S. Identification of potential inhibitors for Penicillin binding protein (PBP) from *Staphylococcus aureus.* ***Bioinformation***14(9): 471-476, 2018.
4. MutharasappanNachiappan, Vitul Jain, Amit Sharma, ManickamYogavel, **JeyeramanJeyakanthan.** Structural and functional analysis of Glutaminyl-tRNAsynthetase (TtGlnRS) from *Thermusthermophilus*HB8 and its complexes, ***International Journal of Biological Macromolecules***, 120;1379-1386, 2018. **(IF: 3.9)**
5. Sindhu T, Venkatesan T, Prabhu D, **JeyeramanJeyakanthan,** Gandhi R. Gracy, Sushil Kumar Jalali, Anil Rai. Insecticide-resistance mechanism of *Plutellaxylostella*(L.) associated with amino acid substitutions in acetylcholinesterase-1: a molecular docking and molecular dynamics investigation, ***Computational Biology and Chemistry***, 77:240-250, 2018. **(IF: 1.4)**

Cumulative Impact Factor (as per JCR) : 298.9
h-index : 15
i10 index : 28
Total Citations : 1016

CURRICULUM VITAE

Name : **Dr. A. Arumugam**
Designation : Associate Professor
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Educational qualification:
Ph.D
M.Sc
Professional experience:
Associate Professor July 2019-till date
Associate Professor and Head (i/c)- July 2016 – April 2019

Recent publications:

1.Kasi Gopinath, Natarajan Parimala Devi, MarimuthuGovindarajan, Kasi Bhakyaraj, ShanmugasundaramKumaraguru, AyyakannuArumugam , Naiyf S. Alharbi, Shine Kadaikunnan, Giovanni Benelli. One-pot green synthesis of silver nanoparticles using the orchid leaf extracts of Anoectochiluselatus: growth inhibition activity on seven microbial pathogens" Journal of Cluster Science. **2017**

2. V. Karthika, A. Arumugam , K. Gopinath , P. Kaleeswarran , M. Govindarajan, N. S. Alharb S. Kadaikunnan, J. M. Khaled , G. Benelli, Guazumaulmifoliabarksynthesized Ag, Au and Ag/Au alloy nanoparticles: Photocatalytic potential,DNA/protein interactions, anticancer activity and toxicity against 14 species of microbial pathogens, *Journal of Photochemistry & Photobiology, B: Biology***, 167.(2017) 189–199**. **ISSN: 1011-1344.**

3. K.Gopinath, M. Govindarajan, M.Chinnadurai, N.Parimala Devi, K.Bhakyaraj, S. Kumaraguru, T. Baranisri, A. Sudha, M. Zeeshan, **A. Arumugam,** N.S. Alharbi, S.Kadaikunnan, G. Benelli. One-pot synthesis of dysprosium oxide nano-sheets: antimicrobial potential and cyotoxicity on A549 lung cancer cells. Journal of Cluster Science. **DOI:10.1007/s10876-016-1150-4. (2016), ISSN Number: 1572-8862.**

4. K. Bhakyaraj, S. Kumaraguru, K. Gopinath, V. Sabitha, PR. Kaleeswarran, V.Karthika, A. Sudha, U. Muthukumaran, K. Jayakumar, S. Mohan, **A. Arumugam,** Eco-Friendly Synthesis of Palladium Nanoparticles Using Melia azedarach Leaf Extract and Their Evaluation for Antimicrobial and Larvicidal Activities, Journal of cluster science, **DOI 10.1007/s10876-016-1114-8. (2016). ISSN Number: 1572-8862.**

5. K.S. Venkatesh, K. Gopinath, N.S. Palani, **A. Arumugam**, Sujin P. Jose,S. Asath Bahadur, R. Ilangovan, Plant pathogenic fungus *F. solani*mediated biosynthesis of Nanoceria: Antibacterial and antibiofilm activity, RSC advances, **2016, (6), 2016 42720–42729. ISSN Number: 2046-2069.**

Cumulative Impact Factor (as per JCR) : 18.4
h-index : 11
i10 index : 10
Total Citations : 260

CURRICULUM VITAE

Name : **Dr. N. Anusuya**
Designation : **Assistant Professor**
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Educational qualification:
Ph.D
M.Sc

Professional experience:
Assistant Professor from July 2016 -till date

Recent publications:

1. **Anusuya, N**. and Manian, S., 2013, "Essential oil composition and antioxidant properties of*Curcumaaromatica*Salisb. Rhizome", *South Indian Horticulture*, 60, 242 – 247.

2. Inthirakanthi, R.N., Malathy, N.M. and **Anusuya, N.,** 2013, "Antidiabetic, antihyperlipidemic and antioxidant effect of ethanolic extract of *Curcuma raktakantha*J.K. Mangaly& M. Sabu on streptozotocin induced diabetic rats", International Journal of Pharmacy and Pharmaceutical Sciences, Academic Sciences, India, 5 (3), 201 - 206.(Impact Factor: 0.55)

3. **Anusuya, N.,** Durgadevi, P., Dhinek, A. and Mythily, S., 2013, "Nephroprotective effect of ethanolic extract of garlic (*Allium sativum*L.) on cisplatin induced nephrotoxicity in male wistar rats", Asian Journal of Pharmaceutical and Clinical Research, Innovare Academic Sciences, India, 6 (4), 97-100.

4. Gomathi, R., **Anusuya, N.** and Manian, S., 2013, "A dietary antioxidant supplementation of Jamaican cherries (*Muntingiacalabura*L.) attenuates inflammatory related disorders", Food Science and Biotechnology, Korean Food Society, Korea, 22 (3), 787-794. (Impact Factor: 0.55).

5. **Anusuya, N.,** Gomathi, R., Tharani, J. and Murugesan, G.S., 2013, "Impact of polyphenols from banana pseudostem on sunflower oil stability", Food Science and Biotechnology, Korean Food Society, Korea, 22 (3), 773-780. (Impact Factor: 0.55).

Cumulative Impact Factor (as per JCR) : 12
h-index : 05
i10 index : 04
Total Citations : 337

CURRICULUM VITAE

Name : **Dr. M. JothiBasu**
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Ph.D
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Professional experience:
Programme Coordinator, M. Sc., Botany, DDE

Recent publications:

1. Arun A, M. JothiBasu , R. Vigneshwari, G.H. Dinesh, K. Mohan Rasu, G. Siva Prakash, and R. SatheeshMurugan. 2015. Biological corrosion inhibition of steel alloy by paninano fiber. *African Journal of Microbial Research.* 9 (12): 886–891. ISSN 1996-0808

2. ManikandanRamar, BeulajaManikandan, Thiagarajan Raman, KoodalingamArunagirinathan, Narayanan MarimuthuPrabhu , MuthuramalingamJothiBasu ,MuthulakshmiPerumal ,Subramanian Palanisamy, ArumugamMunusamy , 2014. Biosynthesis of silver nanoparticles using ethanolic petals extract of Rosa indica and characterization of its antibacterial, anticancer and anti-inflammatory activities. *SpectrochimicaActa Part A: Molecular and Biomolecular Spectroscopy* 138: 120–129.ISSN 1386-1425 (Impact Factor: 2.653)

3. JothiBasu, M., and Yogananth, N. 2011. *In vitro* anti-inflammatory activity and tissue culture studies on *Andrographispaniculata*(Burm. F.) Wallich Ex. Nees.: a medicinalbplant. *Journal of Pharmacy Research,* 4(5):1368-1369. ISSN 0974-6943

4. Deepadevi, M. Basu, M.J., and Santhaguru, K. 2010. Response of *Sorghum bicolour*(L.) Monech to dual inoculation with *Glomus fasciculatum*and*Herbaspirillumseropedicae*. *General and Applied Plant Physiology* 36:176-182. ISSN 1312-8183

5. JothiBasu, M., Ramanathan, R., Yogananth, N and Baburaj, S. 2009. Micropropagation of *Crataevareligiosa*Hook. f. &Thoms. *Current Trends in Biotechnology and Pharmacy* 3:287-290. ISSN 0973-8916

Cumulative Impact Factor (as per JCR) : 3.618
h-index : 4
i10 index : 3
Total Citations : 81

CURRICULUM VITAE

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Professional experience:
Director, CAS in Botany i/c (present)-till date
Associate Professor, 2012;
Senior Assistant Professor, 2009-2012;
Assistant Professor, 2006-2009;
Senior Lecturer, 2004-2006

Recent publications:

1. Morphological and pathological variations of rice sheath blight inciting south Indian Rhizoctoniasolani isolates, Jayaprakashvel, M. and Mathivanan, N., Archives of Phytopathology and Plant Protection, (2011), 10.1080/03235408.2011.587983.

2. Establishment, purification, maintenance and serological diagnosis of Sunflower necrosis virus in callus, Srinivasan, K. and Mathivanan, N., Phytoparasitica, 39, (2011), 509-515.

3. Antimicrobial potential of a marine Streptomyces sp. strain MML1672 isolated from the Indian Ocean of Andaman and Nicobar Islands coast, India, Ramesh, S. and Mathivanan, N., Indian Journal of Geo-Marine Sciences, (2011).

4. Diversity of marine actinomycetes in the Bay of Bengal and their antibacterial activity against human pathogens., Krishnaraj M and Mathivanan, N, Journal of Marine Biology Association of India, 53, (2011), 46-49.

5. Purification, crystal structure and antimicrobial activity of phenazine-1-carboxamide produced by a growth promoting biocontrol bacterium, Pseudomonas aeruginosa MML2212, Shanmugaiah, V., Mathivanan, N. and Babu Varghese, Journal of Applied Microbiology, 108, (2010), 703-711.

CURRICULUM VITAE

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M.Sc

Professional experience:
Associate Professor- February 2013-Present
September 2008-January 2013 - Senior Lecturer
August 2004-August 2008 -Lecturer
May 1999-August 2004 - Tutor

Recent publications:

1.MY Wong*, JS Huang and EL Davis. 2006. Physiological and immunoblot analysis of a nitric oxide synthase (NOS)-like protein of pea (*Pisumsativum*L.). Journal of Bioscience 17(1): 87-97.

2. **MY Wong***, JS Huang and EL Davis. 2007. Isolation and characterization of a nitric oxide synthase (NOS)-like protein of pea (*Pisumsativum*L.). Journal of Bioscience 18(2): 9-23.

3. Serenella A. Sukno, Jamie McCuiston, **Mui-Yun Wong***, Xiaohong Wang, Michael R. Thon, Richard Hussey, Thomas Baum and Eric Davis. 2007. Quantitative Detection of Double-Stranded RNA-Mediated Gene Silencing of Parasitism Genes in *Heteroderaglycines*. Journal of Nematology 39(2):145-152. [IF: 1.087]

4. R. Khakvar, K. Sijam, **M.Y. Wong**, S. Radu, J. Jones and K.L. Thong. 2008. Genomic Diversity of *Ralstoniasolanacearum*Strains Isolated from Banana Farms in West Malaysia. The Plant Pathology Journal 7(2): 162-167. [IF: 0.980]

5. Reza Khakvar, KamaruzamanSijam, **Wong Mui Yun**, Son Radu and Thong Kwai Lin. 2008. Improving a PCR-Based Method for Identification of *Ralstoniasolanacearum*in Natural Sources of West Malaysia. American Journal of Agricultural and Biological Sciences 3(2): 490-493. [IF: 1.000]

H-Index: 8 -Total citations: 220 (as of March 2019)
Google Scholar
H-Index: 10-Total Citations: 459 (as of March 2019)

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