

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)-POLLACHI

502	M.Com (CA)	Human Resources Management	21PCC415	2021
503	M. Sc. Physics	Thin Film & Nano Science	21PPS3E5	2021
504	M.A Tamil	Ikkala illakiyam	21PTM101	2021
505	M.A Tamil	Bhakthi ilakkiam	21PTM205	2021
506	M.A Tamil	Ikkala mozhiyal	21PTM208	2021
507	M.A Tamil	Tamilar Panpadu/Pechukalai	21PTM2N1/ 21PTM2N2	2021
508	M.A Tamil	Kappiyangal	21PTM310	2021
509	M.A Tamil	HTML and collaborative communication tools	21PTM313	2021
510	M.A Tamil	Thonami Ilakkiam	21PTM414	2021
511	M.Sc. Botany	Economic Botany	21PBY1E2	2021
512	M.Sc. Botany	Elective 1-Seed technology	21PBY1E3	2021
513	M.Sc. Botany	Non- Major Elective Commercial Horticulture	21PBY1N1	2021
514	M.Sc. Botany	Elective 2-Organic forming	21PBY2E6	2021
515	M.Sc. Botany	Laboratory Course III	21PBY312	2021
516	M.Sc. Botany	Pharmacognosy	21PBY3E9	2021
517	M.Sc. Botany	Economic Botany	21PBY3N3	2021
518	M.Sc. Botany	Field/Industry/ Institute Visit	21PBYFV1	2021
519	M.Sc Computer Science	Advanced Database Management System	21PCS104	2021
520	M.Sc Computer Science	Programming Lab II:Android Programming	21PCS210	2021
521	M.Sc Computer Science	Design and Analysis of Algorithms	21PCS101	2021
522	M.Sc Computer Science	Advanced Operating System	21PCS103	2021
523	M.Sc Computer Science	Advanced Database Management System	21PCS104	2021
524	M.Sc Computer Science	Programming Lab I:Design and analysis of Algorithm	21PCS105	2021
525	M.Sc Computer Science	Elective -1: Advanced Networks	21PCS1E1	2021
526	M.Sc Computer Science	Elective -1:Wireless Network	21PCS1E2	2021

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Metric : 1.2.1



New Course Introduced

Dr. R. MUTHUKUMARAN,
M.A., M.Phil., B.Ed., Ph.D.,
PRINCIPAL
N.G.M. College, Pollachi - 642 001
Coimbatore District

PG AND RESEARCH DEPARTMENT OF BOTANY
NALLAMUTHU GOUNDER MAHALINGAM COLLEGE
POLLACHI - 642001

7th Board of Studies Meeting in the PG and Research Department of Botany

Date & Time: 22 May 2021 & 10.00 am

Agenda

BoS / MB7.1	:	Welcome address and Opening Remarks by Chairman, Board of studies in the PG and Research Department of Botany
BoS / MB7.2	:	Confirmation of the Minutes of the 6 th meeting of Board of studies in the PG and Research Department of Botany, 22-02-2020 and Action taken report of 6 th meeting of Board of studies
BoS / MB7.3	:	7.3.1 Syllabus of I M.Sc., Botany under Regulation 2021 -2023
	:	7.3.2 Syllabus of II M.Sc., Botany under Regulation 2021 -2023
	:	Any other Discussions if any
BoS / MB7.4	:	Suggestion given by BOS Members
BoS / MB7.5	:	Any other items

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE

POLLACHI

PG and Research Department of Botany

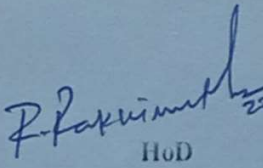
MINUTES OF BOS MEETING

The 7th Meeting of the Board of studies of the PG and Research Department of Botany was held on 22th May 2021 at 10.00 a.m. on an online platform.

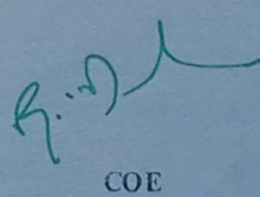
1. The following members were present:

1	Dr. R. Rakkimuthu Assistant Professor and Head, PG and Research Department of Botany NGM College, Pollachi	Chairman
2	Dr. P. Sathish Kumar Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	Internal Members
3	Dr. A.M. Ananda Kumar Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	
4	Mrs. D.Sowmiya Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	
5	Dr. T. Parimelazhagan Professor of Botany School of Life Sciences Bharathiar University, Coimbatore – 641 046	University Nominee
6	Dr. R. Karthiyayini Assistant Professor of Botany School of Biosciences Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore.	Subject expert
7	Dr. V. Ramesh Assistant Professor of Botany Vivekananda College Tiruvadakam West, Madurai, Tamil Nadu -625214	Academic auditor
8	Dr. N. Loganayagi Manager Product innovation, Ojas to Aura company Ltd. Muvattupuzha, Kerala	Industrial Expert

9	Ms. M. Meenmbigai Science Teacher Adithya Vidhya Mandir Matric Higher Secondary school, Suleswarenpatti, Pollachi	Alumnus nominated by Principal / HoD
10	B. Mahalakshmi (19MB13) PG and Research Department of Botany Nallamuthu Gounder Mahalingam College, Pollachi	Student Members


HoD


CDC Co-ordinator
K. SRINIVASAN, M.C.A.,
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001.


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N. G. M. COLLEGE, POLLACHI

Dr. R. MANICKA CHEZIAN
Controller of Examinations
NGM College (Autonomous)
POLLACHI - 642 001.

**BoS/MB7.1 WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN,
BOARD OF STUDIES IN THE PG AND RESEARCH DEPARTMENT OF
BOTANY**

The Chairman, BoS of the PG and Research Department of Botany welcomed and introduced the members of 7th Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.

**BoS/CS7.2 TO CONFIRM THE MINUTES OF 6th BOS MEETING HELD ON
22.02.2020.** The minutes of the 6th Board of Studies meeting held on 22.02.2020 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by the 6th Academic council.

~ Action Taken Report (Enclosed in Annexure 1)

BoS/MB7.3

BoS/MB7.3.1

I M.Sc., Botany I & II SEMESTER

- 21PBY101 - Plant Diversity I
- 21PBY104 -Laboratory course –I
- 21PBY1E1 -Ecology and Phytogeography
- 21PBY 205- Plant anatomy and reproductive biology
- 21PBY 206- Plant physiology

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

1. Plant Diversity I
 - Heterothallism topic was added in Unit III
 - Watson 1955 classification for Bryophytes was replaced with Proskauer 1957 classification in Unit V.
2. Core - 4 Laboratory course –I Micrometry was added in Microbiology part
3. Ecology and Phytogeography
 - The topic phytosociological studies was added in Unit II
 - Aconitum, jatamansi and neem were removed in unit V.
4. Plant anatomy and reproductive biology paper
 - Rename the title accordingly, the topic Krant's Anatomy was removed (since it was highly related with Physiology) and Pollen – stigma interaction was added in unit IV.
5. Plant physiology
 - The topics imbibition and Guttation were added in Unit I
 - The topic cadmium and cellular signaling were replaced with calcium and protein signaling in Unit II
 - Replacement of photorespiration after C3 cycle in Unit III
6. Core – 8 Laboratory course –II
 - Determination of Total Antioxidant activity by phosphomolybdenum reduction method and determination of Superoxide radical scavenging activity were added

The following papers from M.Sc., Botany were accepted by the experts fully without further suggestions

- 21PBY102 - Core – 2 Plant Diversity II
- 21PBY103 Core – 3 Applied Microbiology and Plant Pathology
- 21PBY207 Core – 7 Cytology, Genetics and Plant Breeding
- 1PBY2E4 - Elective 2-Horticulture and Landscaping
- 21PBY2E5 - Elective 2- IPR and Bioethics
- 21PBY2INT- Industrial Training / Internship

New Course Added:

The following papers from M.Sc., Botany were accepted by the experts fully without further suggestions

- **21PBY1E2- Economic Botany**
- **21PBY1E3-Seed technology**
- **21PBY2N1 Non- Major Elective Commercial Horticulture**
- **21PBY2E6- Organic forming**

BoS/CS 7.3.2

II M.Sc., Botany III & IV SEMESTER

- **21PBY3E7 -Forestry and Wood science**
- **21PBY4P1 Core - 16 Project Work and Viva –Voce**

The presented syllabus was accepted by the experts and a few suggestions were given as follows:

1. Forestry and Wood science
 - The topic Seed dormancy was removed. Since the same topic was repeated in Plant physiology course.
2. Project Work and Viva –Voce
 - Project evaluation mark was changed as 100.

The following papers from M.Sc., Botany were accepted by the experts fully without further suggestions:

- **21PBY309 Core - 9 Taxonomy of Angiosperms**
- **21PBY310 Core -10 Plant Biochemistry and Biophysics**
- **21PBY311 Core -11 Plant Biotechnology and Nanobiology**
- **21PBY3E8 Elective 3 Herbal Technology**
- **21PBY413 Core - 13 Research Methodology**
- **21PBY414 Core - 14 Bioinformatics and CyberSecurity**
- **21PBY415 Core – 15 Laboratory course –IV**

Research Methodology course was shifted to IV semester and Plant Biotechnology and Nanobiology course was shifted to III semester

New Course Added:

The following papers from M.Sc., Botany were accepted by the experts fully without further suggestions

- **21PBY312-Laboratory course-III**
- **21PBY3E9 –Pharmacognosy**
- **21PBY3N3- Economic Botany**
- **21PBYFVI- Field / Industry / Institute visit**

These changes have been made effect for the students admitted in 2021 with I Semesters accordingly.

BoS/CS7.4 SUGGESTIONS GIVEN BY THE BoS MEMBERS

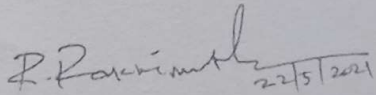
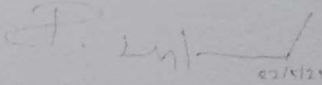
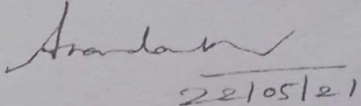
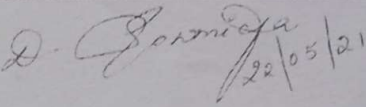
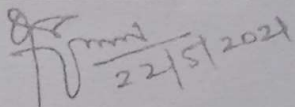
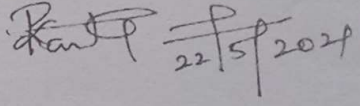
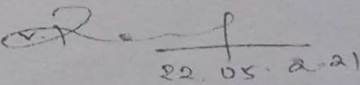
- 7.4.1: Rewrite the Vision and mission in a better way
- 7.4.2: Make some corrections over Program educational objective
- 7.4.3: Use better sentence to start writing with POs and PSOs
- 7.4.4: Make some necessary changes in project guidelines
- 7.4.5: Add more points on course objective for all course
- 7.4.6: Include the period of internship and it may be permitted for the period of 7 – 15 days accordingly. The marks for internship were allotted as 25.
- 7.4.7: MOOC course was made compulsory
- 7.4.8: Specify the name of the phytochemical tests in Biochemistry practical
- 7.4.9: Give the no. of text books and reference books uniformly to all the subjects
- 7.4.10: Give the recent editions of textbooks and reference books as possible and available

The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

- a) The syllabus of First Year M.Sc., Botany under Regulation 2021.
- b) The syllabus of Second Year M.Sc., Botany under Regulation 2021
- c) Any other discussion

Members Present:

<i>Chairman</i>	
Dr. R. Rakkimuthu Assistant Professor and Head, PG and Research Department of Botany NGM College, Pollachi	 22/5/2021
<i>Internal Members</i>	
Dr. P. Sathish Kumar Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	 22/5/21
Dr. A.M. Ananda Kumar Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	 22/05/21
Mrs. D.Sowmiya Assistant Professor PG and Research Department of Botany NGM College, Pollachi.	 22/05/21
<i>University Nominee</i>	
Dr. T. Parimelazhagan Professor of Botany School of Life Sciences Bharathiar University, Coimbatore - 641 046	 22/5/2021
<i>Subject expert</i>	
Dr. R. Karthiyayini Assistant Professor of Botany School of Biosciences Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore	 22/5/2021
<i>Academic auditor</i>	
Dr. V. Ramesh Assistant Professor of Botany Vivekananda College Tiruvadakam West, Madurai, Tamil Nadu - 625214	 22.05.2021
<i>Industrial expert</i>	
Dr. N. Loganayaki Manager Product innovation Ojas to Aura company Ltd, Muvattupuzha, Kerala.	ABSENT

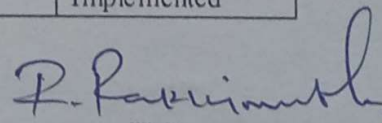
<i>Alumni</i>	
Ms. M. Meenambigai Science Teacher Adithya Vidhya Mandir Matric Higher Secondary school, Suleswarenatti , Pollachi	<i>Meenambigai. M</i> <i>20/5/2021</i>
<i>Student Member</i>	
B. Mahalakshmi II nd M.Sc., Botany PG and Research Department of Botany. NGM College, Pollachi	<i>B. Mahalakshmi</i> <i>22/5/21</i>

ANNEXURE I

Minutes of the 6th Meeting – Action Taken Report

S.No	Suggestion given by expert members	Action taken
1.	Phycology, Mycology, Lichenology and Bryology was changed as Plant Diversity I	Reviewed and Implemented
2.	Pteridophytes, Gymnosperms and Palaeobotany was changed as Plant Diversity II	Implemented
3.	Microbiology and Plant Pathology was changed as Applied Microbiology and Plant Pathology	Implemented
4.	Practical I, II, III, IV and V were changed as Laboratory course –I, II, III, IV and V	Implemented
5.	Anatomy and Embryology was changed as Plant Anatomy and Reproductive Biology	Implemented
6.	Plant systematics was changed as Taxonomy of Angiosperms	Implemented
7.	Horticulture was changed as Horticulture and landscaping	Implemented
8.	Forestry was changed as Forestry and Wood science	Implemented
9.	Molecular Biology and Plant Biotechnology was changed as Plant Biotechnology and Nanobiology	Implemented
10.	Plant ecology, tissue culture and Phytochemical techniques – for Advanced Learners (Extra credit course) has been incorporated in Semester III	Reviewed and Implemented
11.	Online comprehensive examination(Extra credit course) has been incorporated in Semester IV	Reviewed and Implemented
12.	Two value added courses has been introduced for every semester 1. Medicinal plants for Human Welfare 2. Biological entrepreneurship	Reviewed and Implemented
13.	Internship has been incorporated in Semester III	Reviewed and Implemented
14.	The scheme, COs, methodology and evaluation pattern has been changed for final semester Project Viva -voce.	Reviewed and Implemented
15.	<i>Phytophthora</i> and <i>Rhizopus</i> type study, fossil fungi,	Reviewed and

	alternation of generations in the life-cycle of bryophytes, fossil bryophytes has been included and <i>Neurospora</i> and <i>Fusarium</i> has been removed in Plant diversity paper I	Implemented
16.	Cordiales and taxales has been included in the unit III of the paper Plant diversity II and Unit V -Paleobotany has been entirely restructured	Reviewed and Implemented
17.	Isolation of microbes from industrial waste, concept of prebiotics and probiotics, biotechnology in relation to plant pathology and Agriculture terrorism has been included in the paper of Applied Microbiology and Plant Pathology	Reviewed and Implemented
18.	In Ecology and Phytogeography paper, subject experts suggested to incorporate few topics like types of ecosystem, cause for loss of biodiversity, theories of succession, Environment Act, Disaster management and application remote sensing in ecological studies, types of ecosystem, altitudinal and longitudinal variation in vegetation and also suggested to remove the topic like adaptation of plants.	Reviewed and Implemented
19.	In Laboratory course I, <i>Ginkgo biloba</i> , fossils like Amber, Impression and Petrification has been incorporated.	Reviewed and Implemented
20.	Krant's anatomy has been included in the paper of Plant anatomy and Reproductive Biology	Reviewed and Implemented
21.	Radical scavenging activity has been included in plant physiology paper	Reviewed and Implemented
22.	Cytoplasm male sterility in plants and Double Haploid has been included in cytology, Genetics and Plant breeding paper	Reviewed and Implemented
23.	Removed Effect of varying concentrations of CO ₂ on the rate of photosynthesis in Laboratory course II	Reviewed and Implemented
24.	Fruit and vegetable carving techniques has been included in Unit V of Horticulture and Landscaping paper	Reviewed and Implemented
25.	Plumbaginaceae, Orchidaceae family and Software's, mobile APPS for plant identification has been included in Unit IV and V of Taxonomy of Angiosperms respectively.	Reviewed and Implemented
26.	Scanning electron microscopy and Gas chromatography with mass spectrum has been included in Research methodology paper	Reviewed and Implemented
27.	Herbal technology paper Unit IV fully replaced	Reviewed and Implemented
28.	Silver Nanoparticle synthesis has been added in Plant biotechnology and Nanobiology paper	Reviewed and Implemented


 HoD 22/5/22

List of Courses having focus on local, national, regional and global developmental needs
offered by the PG and Research Department of Botany

PG and Research Department of Botany						
Programme: M.Sc., Botany						Year: 2021 -2023
Course Code	Course Title	Need				Rationale
		Local	National	Regional	Global	
21PBY101	Plant Diversity I	✓	✓	-	-	Utilizing the algae and fungi as food, medicine, fertilizer and algae as indicators of pollution.
21PBY102	Plant Diversity II	✓	✓	-	-	Identifying the ecology and evolutionary significances of Pteridophytes and Gymnosperms in environmental sustainability.
21PBY103	Applied Microbiology and Plant Pathology	✓	✓	✓	-	Knowledge about microbes. Knowledge about plant infectious microbes and their diagnostic methods
21PBY1E1	Ecology and Phytogeography	-	-	-	✓	To understand the mechanism of environmental and biodiversity management
21PBY1E2	Economic Botany	✓	-	-	-	To study the local herbs and their medicinal properties to treat diseases
21PBY1E3	Seed technology	✓	✓	-	-	Awareness on storage reserves in seeds, seed longevity and seed viability to quality yield of crops.

21PBYIN1	Commercial Horticulture	✓	-	-	-	To understand the principle and techniques of improving horticultural plants
21PBY207	Cytology, Genetics and Plant Breeding	-	-	-	✓	To study genes and their mode of expression Awareness on the conventional methods of plant breeding to producing new variety.
21PBY2E4	Horticulture and Landscaping	✓	-	-	-	To understand the principle and techniques of improving horticultural plants
21PBY2E5	IPR and Bioethics	-	✓	-	-	Fundamentals of patenting, copyright and trademark
21PBY2E6	Organic farming	✓	-	-	-	The preparation and application of organic manures locally
21PBY2N2	Entrepreneurship Botany	✓	✓	✓	✓	Production of various value added products from plants
21PBY309	Taxonomy of Angiosperms	✓	✓	-	-	To learn the method of identifying plants to arrive at local and national flora
21PBY310	Plant Biochemistry and Biophysics	-	-	-	✓	Knowledge in the synthesis of biomolecules and their role in metabolic pathways along with their regulation.
21PBY311	Plant Biotechnology and Nanobiology	-	-	-	✓	Demonstrates the role of transgenic plants and bionano particles in the fields of medicine, agriculture and environment. To inculcate the techniques of plant tissue culture, so that students can get placed in plant tissue culture industries
21PBY312	Laboratory course - III	✓	✓	✓		Knowledge on the preparation of solutions, to carry out the experiments on biochemistry and plant tissue culture.

21PBY3E8	Herbal Technology	-	-	✓	-	To learn the medicinal value of plants and the students will study the medicinally used traditional herbs
21PBY3E9	Pharmacognosy	-	✓	-	-	To study the medicinal plants and their utilization in the preparation of herbal pharmaceuticals
21PBY3N3	Economic Botany	✓	-	-	-	To study the local herbs and their medicinal properties to treat diseases
21PBY4I3	Research Methodology	-	-	-	✓	Scientific understanding of analytical techniques and detail interpretation of results.
21PBY4I4	Bioinformatics and Cyber Security	-	-	-	✓	Modern competences in the handling of bioinformatics tools.

P. Lakshminath
HoD 24/5/21

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**List of Courses having focus on employability/ entrepreneurship/ skill development offered
by the PG and Research Department of Botany**

PG and Research Department of Botany						
Programme: M.Sc., Botany					Year: 2021-2023	
Course Code	Course Title	Employability (EM) / Entrepreneurship (EN) / Skill Development (SD)			Focus	Year of Introduction
		EM	EN	SD		
21PBY101	Plant Diversity I (Phycology, Mycology, Lichenology and Bryology)	-	-	✓	Understanding characters of lower diversity for cultivation sustainable growth of species	2015
21PBY102	Plant Diversity II (Pteridophytes, Gymnosperms and Palaeobotany)	-	-	✓	To be clear with evolutionary trends for better understanding of biodiversity	2015
21PBY103	Applied Microbiology and Plant Pathology	✓	✓	✓	Etiology of the plant diseases and control measures. Job opportunities in microbiology lab	2019
21PBY104	Core 4 Laboratory course	✓	✓	✓	Cultivation practice of phytoplanktons, macroalgae, Microbes and morphological anatomical features	2015
21PBY1E1	Ecology and Phytogeography	✓	✓	✓	The paper deals with distribution, energy transfer,	2017

21PBY3E8	Herbal Technology	-	-	✓	-	To learn the medicinal value of plants and the students will study the medicinally used traditional herbs
21PBY3E9	Pharmacognosy	-	✓	-	-	To study the medicinal plants and their utilization in the preparation of herbal pharmaceuticals
21PBY3N3	Economic Botany	✓	-	-	-	To study the local herbs and their medicinal properties to treat diseases
21PBY4I3	Research Methodology	-	-	-	✓	Scientific understanding of analytical techniques and detail interpretation of results.
21PBY4I4	Bioinformatics and Cyber Security	-	-	-	✓	Modern competences in the handling of bioinformatics tools.

P. Lakshmi
HoD 22/5/21

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					assessing the environment using plant communities, importance of plants towards ecological balance.	
21PBY1E2	Economic Botany	✓	✓	✓	Importance of various crops, mode of cultivation practice of various important crop species	2020
21PBY1E3	Seed technology	✓	✓	✓	Seed characters and features, processing, storage and seed certification	2021
21PBY1N1	Commercial Horticulture	✓	✓	✓	Deals with some important crops mode of cultivation, maintenance harvesting and process on crops. They also provide idea over commercial products made of plant	2021
21PBY205	Plant Anatomy and Reproductive Biology	-	-	✓	Anatomical features of angiosperms their architecture, evolution and process of reproduction	2017
21PBY206	Plant physiology	-	-	✓	Behaviour and response of plant on various stimuli internal	2015

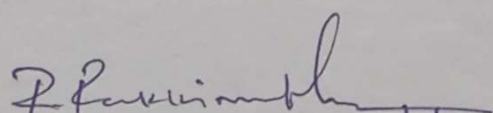
					and external plant level physiology	
21PBY207	Cytology, Genetics and Plant Breeding	✓	✓	✓	Mainly the course deals with cell features, crop improvement, process of production of new varieties with good qualities	2017
21PBY208	Laboratory course-II	✓	✓	✓	The paper deals with anatomical features cytological details and genetical influence towards crop improvement	2015
21PBY2E4	Horticulture and Landscaping	✓	✓	✓	Deals with economically important crops and land scaping methods	2020
21PBY2E5	IPR and Bioethics	✓	✓	✓	The course deals with importance of IPR and its various features, traditional knowledge, legal issues regarding materials and products	2020
21PBY2E6	Organic farming	✓	✓	✓	The course focus on organic farming practices and methods to grow crops organically,	2021

					their beneficial effects on health	
21PBY2N2	Entrepreneurship Botany	✓	✓	✓	The course focuses on botanical products having market value and converting the botanicals to value added products.	2020
21PBY2INT	Industrial Training / Internship	✓	-	✓	It involves industrial exposure methods, knowledge on prerequisite qualities for fetching jobs	2020
21PBY309	Taxonomy of Angiosperms	-	-	✓	To identify the plants perfectly using classical and recent methods. The main focus for the pharma industry where the identification of the plants is most important thing	2015
21PBY310	Plant Biochemistry and Biophysics			✓	The paper focuses on biochemical cycles and its kinetics, details on biochemical products and its importance	2015
21PBY311	Plant Biotechnology and Nanobiology	✓	✓	✓	The paper focus on applied aspects of biological science which gives wide	2015

					knowledge on various tools used in the biological sciences and its applications in industry.	
21PBY312	Laboratory course - III	✓	✓	✓	The paper deals with identification of plant specimens, plant components and estimation of various important plant components	2015
21PBY3E7	Forestry and Wood science	✓	✓	✓	The course which deals with importance, types, silviculture, timber values, methods to conserve the forest, importance of value added products, laws and commercial forest products	2020
21PBY3E8/	Herbal Technology	✓	✓	✓	The course focuses the importance of herbs and isolation of various drugs without disturbing the natural population. The course gives aspects on cultivation and propagation of	2020

					drugs.	
21PBY3E9	Pharmacognosy	✓	✓	✓	The course deals with production of plant based quality drugs, adulteration for the welfare of human	2021
21PBY3N3	Economic Botany	✓	✓	✓	Courses focuses on economically important species and its values both commercially and in day to day life	2019
21PBY413	Research Methodology	✓	-	✓	The course focus on statistical aspects, interpreting the data and analyzing the data while preparing thesis	2015
21PBY414	Bioinformatics and Cyber Security	✓	-	✓	Students are being taught with basic computational biology tools and their applications. Hence, the students will enrich their ICT skill to suit themselves in the job market.	2015
21PBY415	Laboratory course -IV	✓	✓	✓	The course deals with applied aspects on bioinformatics protein modeling using	2015

					drug online softwares	
21PBYFVI	Field / Industry / Institute visit	✓	✓	✓	To visit reputed Institute / Industry. It will help for students career.	2021
21PBY4P1	Project Work and Viva –Voce	-	-	✓	Students will choose the problem based the society needs and apply their skills to solve the problem	2015


 HoD 22/5/21


 PRINCIPAL
 PRINCIPAL
 N. G. M. COLLEGE, POLLACHI

SCHEME OF EXAMINATION

Semester	Course Code	Course Title	Class hours /Week		Exam Hrs	Maximum marks			Credits
			T	P		CI A	ES E	CIA	
I	21PBY101	Core – 1 Plant Diversity I (Phycology, Mycology, Lichenology and Bryology)	4	3	3	30	70	100	4
	21PBY102	Core – 2 Plant Diversity II (Pteridophytes, Gymnosperms and Palaeobotany)	4	2	3	30	70	100	4
	21PBY103	Core – 3 Applied Microbiology and Plant Pathology	4	1	3	30	70	100	4
	21PBY104	Core – 4 Laboratory course-I (for core papers 1, 2, 3)	-	-	4	40	60	100	4
	21PBY1E1/ 21PBY1E2/ 21PBY1E3	Elective -I Ecology and Phytogeography/ Economic Botany/ Seed technology	4	-	3	30	70	100	4
	21PBY1N1	Non- Major Elective I Commercial Horticulture	2	-	2	-	50	50	2
		Total	18	6		160	390	550	22
II	21PBY205	Core – 5 Plant Anatomy and Reproductive Biology	4	3	3	30	70	100	4
	21PBY206	Core – 6 Plant physiology	4	2	3	30	70	100	4
	21PBY207	Core – 7 Cytology, Genetics and Plant Breeding	4	1	3	30	70	100	4
	21PBY208	Core – 8 Laboratory course-II (for core papers 5,6,7)	-	-	4	40	60	100	4
	21PBY2E4/ 21PBY2E5/ 21PBY2E6	Elective-2 Horticulture and Landscaping / IPR and Bioethics/ Organic farming	4	-	3	30	70	100	4
	21PBY2N2	Non- Major Elective 2 Entrepreneurship Botany	2	-	2	20	30	50	2
	21PBY2INT	Industrial Training / Internship	-	-	-	20	30	50	1
		Total	18	6		200	400	600	23
III	21PBY309	Core – 9 Taxonomy of Angiosperms	4	3	3	30	70	100	4
	21PBY310	Core -10 Plant Biochemistry and Biophysics	4	2	3	30	70	100	4
	21PBY311	Core -11 Plant Biotechnology and Nanobiology	4	1	3	30	70	100	4
	21PBY312	Core – 12 Laboratory course - III (for core paper 9,10 and 11)	-	-	4	40	60	100	4
	21PBY3E7/ 21PBY3E8/ 21PBY3E9	Elective-3 Forestry and Wood science / Herbal Technology/ Pharmacognosy	4	-	3	30	70	100	4
	21PBY3N3	Non- Major Elective 3 Economic Botany	2	-	2	20	30	50	2
		Total	18	6		180	370	550	22
IV	21PBY413	Core – 13 Research Methodology	4	3	3	30	70	100	4
	21PBY414	Core – 14 Bioinformatics and Cyber Security	4	3	3	30	70	100	4
	21PBY415	Core – 15 Laboratory course -IV (for core papers 13 and 14)	-	-	4	40	60	100	4
	21PBYFV1	Field / Industry / Institute visit	-	-	-	20	30	50	1
	21PBY4P1	Core – 16 Project Work and Viva –Voce	-	-	-	50	100	150	10
		Total	8	6	-	170	330	500	23
		Grand Total	62	24	-	710	1490	2200	90

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code:	21PBY1E2	Title : Elective -1 Economic Botany	Batch	2021 – 23
			Semester	I
Hrs/Week:	5		Credits	4

Course Objective

The main objectives of this course are:

- To study the economic importance of vegetables, fruits, spices, condiments, fibres, timber and oil yielding plants
- To know about the economic importance of medicinal plants

Course Outcomes (CO)

On the successful completion of the course, student will be able to:		
CO1	Understand the applied facet of botany	K2
CO2	Be familiar with the various commercial products of plant origin	K2
CO3	Apply and use of different plant families for human welfare	K3
CO4	Evaluate the medicinal and economic importance of plants.	K5
CO5	Understand and analyze about the economic importance of plants	K2 ,K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate		

Unit	Content	Hrs
Unit I	Cereals and legumes: Origin and History - Botanical description - Cultivation, Harvesting and uses of Cereals and Legumes: Wheat, Rice, Maize, Sorghum, Barley, Black gram, Red gram, Chick pea, Pigeon pea and Broad beans.	14
Unit II	Vegetables and fruits: Origin and History - Botanical description and economic importance of Vegetables and Fruits: Velvet bean, Canavalia, <i>Dioscorea</i> , Litchi, Butter fruit, Dragon fruit, <i>Elaeagnus</i>	14
Unit III	Spices and condiments: Origin and History - Botanical description, Cultivation and uses of Spices and Condiments: Ginger, Pepper, Cardamom, Clove, Nut-Meg, Chilly, <i>Coriandrum</i> , Turmeric and All-spice.	15
Unit IV	Beverages plants, fibres and timber: Origin and History - Botanical description, Cultivation, Processing and uses of Beverages plants: Tea, Coffee and Cocoa. <i>Sugars and Starch:</i> Sugarcane and <i>Manihot</i> . Fibers and Timber: Cotton, Jute, Sunhemp, Rosewood, Ebony and Mahogany.	15
Unit V	Oil yielding plants: 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: <i>Rauvolfia</i> , Sathavari, Guggul, Basil and <i>Saraca</i>	14

*Self study topics

Power point Presentations, Group discussions, Seminar ,Quiz, Assignment, Case study

Text Books

1. Vardhana, R. 2009. Economic Botany (1st ed.), Sarup Book Publishers Pvt. Ltd., New Delhi.
2. Hill, A.F. 1952. Economic Botany; A Textbook of Useful Plants and Plant Products (2nd ed.), McGraw- Hill Book Co., Inc., New York.
3. Pandey, B.P. 1990. Economic Botany (4th ed.), S. Chand & Company Ltd, New Delhi.

Reference Books

1. Thompson, H.C. 1949. Vegetable Crops (4th ed.), McGraw- Hill Book Co., Inc., New York.
2. Wallis, T.E. 1946. Text book of Pharmacognosy. J. & A. Churchill Ltd, London.
3. Verma, V.A. 1980. Textbook of Economic Botany (3rd ed.), Emkay Publications, New Delhi.
4. Maheshwari, P. and Singh, U. 1965. Dictionary of Economic plants in India. I.C.A.R. New Delhi.

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

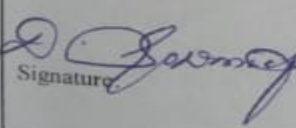
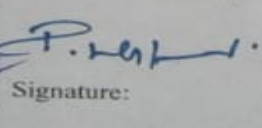
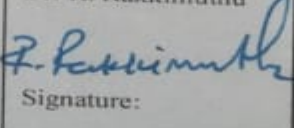
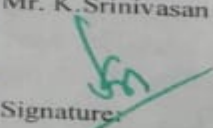
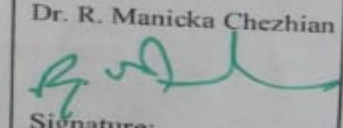
1. <https://www.slideshare.net/AtiyyahB/economic-botany-111132336>
2. <https://www.slideshare.net/BhimsenKumar2/economic-botany>
3. <https://www.biologydiscussion.com/economic-botany/economic-botany-questions-and-answers/56568>
4. <https://www.biologydiscussion.com/medicinal-plants/medicinal-plants-found-in-india-economic-botany/56868>

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	M	M	L	M	L	M	L	H	M	M	M
CO2	M	L	H	L	L	L	M	L	M	M	L	L
CO3	H	M	M	H	M	L	M	L	M	M	M	M
CO4	H	H	M	H	L	H	L	H	H	H	H	M
CO5	H	H	H	H	L	H	L	H	M	H	H	M

H- High

M- Medium

L-Low

Course Designed by Name and Signature	Checked by Module Coordinator	Verified by HOD Name and Signature	Checked by CDC	Approved by COE
Name: Mrs. D. Sowmiya Signature: 	Name: Dr. P. Sathishkumar Signature: 	Name: Dr. R. Rakkimuthu Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Dr. R. Manicka Chezian Signature: 

K. SRINIVASAN, M.C.A.
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001

Dr. R. MANICKA CHEZIAN, M.Sc., M.
Controller of Examination
NGM College (Autonomous)
POLLACHI - 642 001

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code:	21PBY1E3	Title :	Batch	2021 – 23
		Elective -1	Semester	1
Hrs/Week:	5	Seed technology	Credits	4

Course Objective

The main objective of this course is:

- To refresh the basic knowledge of seed development and structures and apprise students with its relevance to production of quality seed.

Course Outcomes (CO)

On the successful completion of the course, student will be able to:		
CO1	Express knowledge gained on the principles of seed technology	K1
CO2	Understand biological bases of technologies used in modern seed science and technology.	K2
CO3	Apply knowledge on the seed multiplication and certification.	K3
CO4	Gaining knowledge on principles of seed processing, Seed drying and methods.	K2
CO5	Get aware on biological and technological aspects of seed production.	K5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 – Evaluate		

Unit	Content	Hrs
Unit I	Type of seeds, Classification of seeds, Recalcitrant seeds, Dicot and monocot seeds - Morphology and types, Seed reserves. External and internal structures of seed and their functional significance, Albuminous and Ex-Albuminous seeds	14
Unit II	Types of dormancy - physical, Physiological, Morphological, Chemical and mechanical, Primary and secondary dormancy, Photo and Skoto dormancy. Methods to overcome dormancy. Ecological significance of seed dormancy	15
Unit III	Seed maturation and germination - metabolism during germination. Epigeal and Hypogeal germination, Germination mechanism. Brief account of Germination value, Germination rate, Germination percentage. Germination ecology: Environmental factors and germination behaviour.	14
Unit IV	Seed production in self and cross pollinated plants, Classes of seeds-traditional, breeder, foundation and certified seeds. Viability tests- their significance and importance. Seed harvesting, processing, treatments, testing and seed sampling, viability and vigour. Critical role of seed moisture content and environmental factors on viability. Viability period of Indian forestry Species.	15
Unit V	Effect of storage on seed longevity, Seed germplasm and storage in different conditions. Cryopreservation, Static conservation of seeds. Seed borne pathogens and pests - seed treatments. Seed certification, Standard inspection, registration and seed law enforcement. Clonal seed orchards, seed banks.	14

*Self study topics

Power point Presentations, Group discussions, Seminar ,Quiz, Assignment, Case study

Text Books

1. Copeland LO& McDonald MB. 2001. Principles of Seed Science and Technology. 4thEd. Chapman & Hall.
2. Desai BB. 2004. Seeds Handbook. Marcel Dekker.
3. Thompson JR. 1979. An Introduction to Seed Technology. Leonard Hill.
4. Murray DR. 1984. Seed Physiology. Vols. I, II. Academic Press.

Reference Books

1. Agarwal, R.L. 1997. Seed Technology, Scientific Publishers, Jodhpur.
2. Agarwal. P.K. and M. Dadlani, 1992. Techniques in seed science and technology, Scientific Publisher, Jodhpur.
3. Khan, A.A. 1977. Physiology and Biochemistry of Seed dormancy and germination, Oxford & IBH Publishing company (P) Ltd, New Delhi. Online resources available at internet sites

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

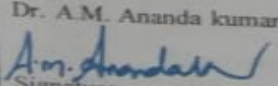
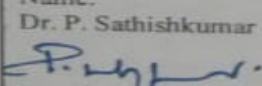
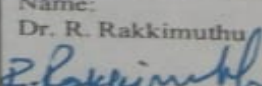
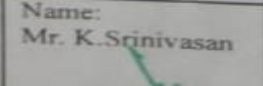
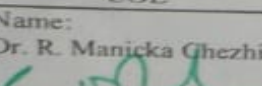
1. http://www.jnkvv.org/PDF/30032020194456Principles_of_Seed_Technology_Dr_Rudrasen_Singh.pdf
2. <https://www.slideshare.net/KarlLouisseObispo/seed-technology>

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	H	H	L	M	M	M	L	M	H	M	M
CO2	H	M	H	L	M	L	M	L	M	H	L	M
CO3	H	H	H	L	M	L	M	L	M	H	M	H
CO4	H	H	H	L	M	L	M	L	M	H	M	H
CO5	H	H	M	L	M	L	M	L	L	H	M	H

H- High

M- Medium

L-Low

Course Designed by Name and Signature	Checked by Module Coordinator	Verified by HOD Name and Signature	Checked by CDC	Approved by COE
Name: Dr. A.M. Ananda kumar Signature: 	Name: Dr. P. Sathishkumar Signature: 	Name: Dr. R. Rakkimuthu Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Dr. R. Manicka Ghezian Signature: 

K. SRINIVASAN, M.C.A.,

Co-ordinator

Curriculum Development Cell (CDC)

NGM College (Autonomous)

Pollachi - 642 001.

Dr. R. MANICKA CHEZIAN, M.Sc.

Controller of Examination

NGM College (Autonomous)

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code: 21PBY1N1		Title : Non Major Elective – 1 Commercial Horticulture	Batch	2021– 23
			Semester	II
Hrs/Week:	2		Credits	2

Course Objective

To understand the principles, aspects of horticulture

Course Outcomes (CO)

CO1	Understand about the importance of horticulture	K2
CO2	Apply knowledge on soil, climate and reclamation of soil	K3
CO3	Apply and analyze knowledge on crop establishment activities	K3,K4
CO4	Analyze plant growth structures in horticulture	K4
CO5	Understand about the importance of bioorganic fertilizers and crop establishment methods	K2,K5

Unit	Content	Hrs
Unit I	Brief history - scope and importance - divisions of horticulture - Classification of horticultural plants - Plant growth environment: biotic and abiotic factors	7
Unit II	Organic matter; fertilizers - organic, inorganic and potting media; bioinoculants; methods of fertilizer application; irrigation types- sprinkler irrigation, trickle irrigation- surface, furrow, surge, pitcher. directing plant growth - pruning and thinning.	8
Unit III	Direct and indirect seedling production in nurseries and transplantation - medicinal plant cultivation - adaptive cultivation. Propagation through specialized underground structures - corm, tuber, sucker, bulb, bulbil, rhizome;	6
Unit IV	Vegetative propagation - cutting, layering, grafting and budding. Soil-less production of horticultural crops - hydroponics, sand culture, gravel culture, terrace garden, rockery, vertical gardening.	6
Unit V	Esthetics of horticulture - flower arrangement - cut flowers - Significance of cut flower industry in India; terrarium culture; bonsai; growing plants indoors; - pomology - cultivation of apple and pineapple. Commercial floriculture – cultivation of jasmine and rose. Commercial horticulture - extraction of Jasmine concrete and papain-fruit and vegetable carving techniques.	9

**Self study topics*

Power point Presentations, Group discussions, Seminar, Quiz, Assignment and Field visit

Text Books:

Text Books :

1. Kumar, N.2020. Introduction to Horticulture, Published by Oxford &Ibh Publishing Co PvtLtd.New Delhi.
2. Bansil, P.C. 2008. Horticulture in India. CBS Publishers and Distributors, New Delhi.
3. Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth – Heinemam, Oxford University Press.

Reference Books:

1. Tolanus, S. 2006. Soil fertility, Fertilizer and Integrated Nutrient management. International Book Distributory Co.
2. Bose, T.K., Maiti, R.G., Dhua, R.S. and Das, P. 1999. Floriculture and Landscaping. NayaProkash, Calcutta.
3. Denisen, E.L. 1979. Principles of Horticulture. MacMillan Publishing co, Inc. New York.
4. Janik, J. 1972. Horticultural Science. W.H. Freeman & Company, San Francisco.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. <https://ncert.nic.in/textbook/pdf/ievs101.pdf>
2. <https://www.youtube.com/watch?v=rgc2UnxJhNI>
3. <https://www.slideshare.net/biologyexams4u/horticulture-introduction-definition-and-branches-of-horticulture>

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	M	H	H	H	M	H	H	M	H	H	H
CO2	M	H	M	H	L	H	L	M	H	H	L	L
CO3	M	M	M	M	M	L	H	H	L	M	M	M
CO4	H	H	H	M	M	H	M	H	M	H	M	H
CO5	M	H	H	M	H	M	H	L	M	H	M	H

H- High M- Medium L -Low

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code: 21PBY2E6		Title :	Batch	2021 – 23
		Elective-2 Organic farming	Semester	II
Hrs/Week:	5		Credits	4

Course Objectives

The main objectives of this course are to:

- Know the about the organic farming and its practice for sustainable agriculture.
- Know the about the marketing and export potential of organic farming products

Course Outcomes (CO)

On the successful completion of the course, student will be able to:		
CO1	Remembering the importance and practice of organic farming	K1
CO2	Will get an idea on organic farming and eventual characterization	K2
CO3	Apply economic values of organic way for holistic development	K3
CO4	Review the various stages of organic farming to make eco-friendly agriculture	K4
CO5	Understand and learn the organic farming multidimensional improvement of society	K2 & K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 – Evaluate		

Unit	Content	Hrs
Unit I	Organic farming – concept and definition, its relevance to India and global agriculture and future prospects; land and water management – land use, minimum tillage; shelter zones, hedges, pasture management, agro-forestry.	14
Unit II	Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures and biofertilizers.	14
Unit III	Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity.	13
Unit IV	Weeds – introduction to weeds -definition- common weeds on crop fields – Types of weed Control- Biological weed control, plant diseases and insect pest management, biological agents and pheromones, biopesticides.	16
Unit V	Socio-economic impacts; marketing and export potential: inspection, certification, labeling and accreditation procedures; organic farming and national economy.	15

**Self study topics*

Power point Presentations, Group discussions, Seminar, Quiz, Assignment, Field study
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Text books:

1. Dahama AK. 2005. Organic Farming for Sustainable Agriculture. 2nd Ed. Agrobios.
2. Palaniappan, S.P and Annadurai, K. (1999) Organic Farming – Theory and Practice. Scientific Publ.
3. Sharma, A. (2002) Hand Book of Organic Farming.
4. Agrobios. Veeresh, G. K. Shivashankar, K. and Singlachar, M. A. (1997) Organic Farming and Sustainable Agriculture. Association for Promotion of Organic Farming, Bangalore.

Reference Books:

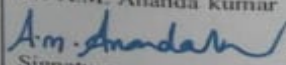
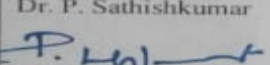
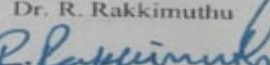
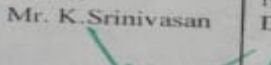
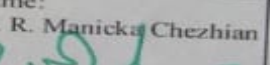
1. Ananthakrishnan, T. N. (ed.) (1992) Emerging Trends in Biological Control of Phytophagous Insects. Oxford & IBH.
2. Lampkin, N. (1990) Organic Farming. Press Books, Ipswich, UK.
3. Rao, B.V.V. (1995) Small Farmer Focused Integrated Rural Development: Socio-economic Environment and Legal Perspective: Publ.3, Parisaraprajna Parishtana, Bangalore.
4. Subba Rao, N.S. (2002) Soil Microbiology. Oxford & IBH.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. <https://www.slideshare.net/GhulamAsghar8/organic-farming-148631470>
2. <https://www.youtube.com/watch?v=WhOrIUlnPo>
3. https://www.youtube.com/watch?v=iwIlyXTr_bQ

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	M	H	L	M	M	M	L	M	H	M	M
CO2	H	H	M	L	M	M	M	L	M	H	M	H
CO3	H	M	H	L	M	M	M	L	M	H	M	M
CO4	H	M	M	L	M	M	M	L	M	M	M	M
CO5	H	M	H	L	M	M	M	L	M	M	H	H

H-High M- Medium L-Low

Course Designed by Name and Signature	Checked by Module Coordinator	Verified by HOD Name and Signature	Checked by CDC	Approved by COE
Name: Dr. A.M. Ananda kumar Signature: 	Name: Dr. P. Sathishkumar Signature: 	Name: Dr. R. Rakkimuthu Signature: 	Name: Mr. K. Srinivasan Signature: 	Name: Dr. R. Manicka Chezian Signature: 

K. SRINIVASAN, MCA.

Co-ordinator

Curriculum Development Cell (CDC)

NGM College (Autonomous)

Pollachi - 642 001.

Dr. R. MANICKA CHEZIAN, M.Sc., M.S., Ph.D.

Controller of Examinations

NGM College (Autonomous)

POLLACHI - 642 001.

Programme code	M.Sc.	Programme Title: Master of Science in Botany		
Course Code: 21PBY312		Title : Core – 12 Laboratory course – III Taxonomy of Angiosperms	Batch	2021- 23
			Semester	III
Hrs/Week:	3		Credits	4

Course Objectives

The main objectives of this course are to:

- Understand and develop skill sets in plant morphological, floral characteristics and artificial key preparation
- Expedite skilled workers to carry out research in frontier areas of plant sciences

Course Outcomes (CO)

On the successful completion of the course, student will be able to:		
CO1	Identify salient features of families	K3
CO2	Understand about different floral characteristics and artificial key preparation which employed for plant identification and conservation	K4, K5
CO3	Apply techniques to conserve importance of forests	K3
CO4	Develop a skill sets to work with plant systematic field	K3
CO5	Evaluate the economic importance of plants.	K5
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate		

Part	Content	Hrs
Part 1	Taxonomy of Angiosperms 1. Terminologies related to taxonomy. 2. Identification of taxonomic features from plant parts 3. Desection of flower parts 4. Identification and description of families belongs to Polypetalae (Magnoliaceae, Portulacaceae, Caryophyllaceae, Zygophyllaceae, Oxalidaceae, Tiliaceae, Aizoaceae, Lythraceae, Rhamnaceae, Sapindaceae and Combretaceae) 5. Identification and description of families belongs to Gamopetalae (Oleaceae, Plumbaginaceae, Verbenaceae, Gentianaceae, Boraginaceae, Pedaliaceae and Bignoniaceae). 6. Identification and description of families belongs to Monochlamydeae (Moraceae, Loranthaceae, Nyctaginaceae and Chenopodiaceae) 7. Identification and description of families for Monocots (Commelinaceae, Liliaceae, Orchidaceae, Aroideae, Cyperaceae and Poaceae)	45

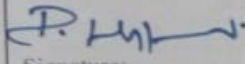
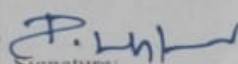
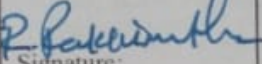
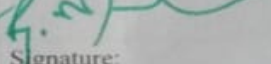
Part 2	1. Preparation of artificial keys at family, generic and species level by locating key characters. 2. Field identification of plants 3. Economic importance of all the families given in the theory 4. Herbarium techniques 5. Preparation of herbarium sheets — 50 minimum. 6. Identification of plants using software's and mobile apps. 7. Botanical tour to any vegetation rich places.	
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PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	M	H	L	H	L	M	L	H	H	M	H
CO2	H	H	H	H	H	H	M	M	L	H	M	H
CO3	H	H	H	H	M	H	M	M	H	L	H	H
CO4	H	H	H	M	H	H	H	H	M	H	H	H
CO5	H	M	H	H	H	M	H	H	H	H	H	H

H-High

M- Medium

L-Low

Course Designed by Name and Signature	Checked by Module Coordinator	Verified by HOD Name and Signature	Checked by CDC	Approved by COE
Name: Dr. P. Sathishkumar  Signature:	Name: Dr. P. Sathishkumar  Signature:	Name: Dr. R. Rakkimuthu  Signature:	Name: Mr. K. Srinivasan  Signature:	Name: Dr. R. Manicka Chezian  Signature:

K. SRINIVASAN, M.C.A.,
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
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Dr. R. MANICKA CHEZIAN, M.Sc., M.S., Ph.D.,
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Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code: 21PBY3E9		Title: Elective-3 Pharmacognosy	Batch	2021 – 23
			Semester	III
Hrs/Week:	5		Credits	4

Course Objectives

The main objectives of this course are to:

- Enrich knowledge on some important medicinal plants and their usage.
- Afford information on extraction, separation, identification and evaluation techniques of plant derived drugs.
- Provide the scientific temper to find a suitable job in relevant industries or to become a potential entrepreneur by using medicinal plants in efficient commercialization way.

Course outcomes (CO)

On the successful completion of the course, student will be able to:

CO1	Recall the knowledge about modern concept and scope of Pharmacognosy.	K1
CO2	Identify their professional role in the healthcare system	K2
CO3	Design methods of standardization for herbal drug or formulations	K3
CO4	Analyze herbal extracts for the identification of phytoconstituents	K4
CO5	Analyze various pharmacognostic parameters of crude drugs	K4
K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate		

Unit	Content	Hrs
Unit I	Pharmacognosy– definition and scope – drug adulteration, drug evaluation, organoleptic, microscopic, chemical, physical and biological evaluation – phytochemical investigations – standardization and quality control of herbal drugs.	14
Unit II	Types of Plant drug and their Pharmacognostic study – root drugs: <i>Glycyrrhiza</i> and <i>Ipecac</i> , <i>Rauvolfia</i> , <i>Satavari</i> , <i>Withania</i> – rhizome drugs: Ginger – leaf drugs – <i>Andrographis</i> , <i>Clitoria</i> , <i>Senna</i> – bark drugs: <i>Terminalia arjuna</i> , <i>Holorrhena</i> – flower drugs: Saffron – Seed drugs: <i>Piperlongum</i> , <i>Mucuna</i> – Fruit drugs: Cumin, Amla, <i>Senna</i> pods – Whole plant drugs: <i>Catheranthus roseus</i> .	15
Unit III	Medicinal Principles and powder analysis of Curcuma, cloves, senna, Fennel and cinnamon – large scale Industrial preparation of Crude Drugs – limport and export potentials of Crude Drugs	14
Unit IV	Nutraceuticals and cosmeceuticals – Ayurvedic pharmacy- principles, formulations of drugs-Natural pesticides- Pyrethrum, Neem, Derris, Tobacco – Immuno-modulatory medicinal plants.	14
Unit V	Perfumes and flavorings agents- peppermint oil, Lemon oil, Orange oil, Lemon grass oil and Sandal wood. Pharmaceutical aids- honey. Starch, Kaolin, Pectin, Olive oil, Lanolin, Bees wax, Sodium alginate, Agar, and Gelatin.	15

*Self study topics

Text Books:

1. John Jothi Prakash, E. 2003. Medicinal Botany and Pharmacognosy. JPR Publication, Vallioor, Tirunelveli.
2. Kokate, C.K. Gokhale, S.B., and Purohit, A.P. 2003. Pharmacognosy. Nirali Prakashan, Pune.
3. Kumar, N.C. 1993. An Introduction to Medical Botany and Pharmacognosy.
4. Prajapathi, Purohit, Sharma and Kumar, 2003. A Hand book of Medicinal plants. Agrobios Publications, Jodhpur.

Reference Books:

1. Horborne, J.B. 1983. Phyto chemical methods. Chapman and Hall. London.
2. Biren Shah and A.k. Seth 2010. Textbook of pharamcognosy and Phytochemistry. 8th Edn. Reed Elsevier India Pvt. Ltd.
3. Pharmacopoeia of India. Govt. of India. Ministry of health 1955 and 1966.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

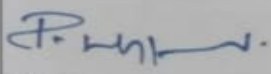
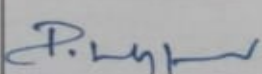
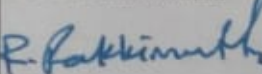
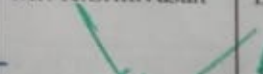
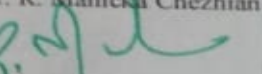
1. <https://www.biologydiscussion.com/botany/pharmacognosy/short-notes-on-pharmacognosy/42921>
2. <https://www.slideshare.net/SudheerKandibanda/introduction-to-pharmacognosy-and-scope-of-pharmacognosy>
3. <https://www.youtube.com/watch?v=bwC2vmLmLKQ>

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO												
CO1	H	M	H	H	M	M	M	L	M	M	M	H
CO2	H	M	H	H	H	M	M	L	M	M	M	H
CO3	H	H	H	L	M	M	M	M	M	M	M	H
CO4	H	M	H	L	M	M	M	M	M	M	M	H
CO5	H	M	M	L	M	M	M	M	M	M	M	H

H-High

M- Medium

L-Low

Course Designed by	Checked by	Verified by HOD	Checked by	Approved by
Name and Signature	Module Coordinator	Name and Signature	CDC	COE
Name: Dr. P. Sathishkumar	Name: Dr. P. Sathishkumar	Name: Dr. R. Rakkimuthu	Name: Mr. K. Srinivasan	Name: Dr. R. Manicka Chezian
				
Signature:	Signature:	Signature:	Signature:	Signature:

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Dr. R. MANICKA CHEZIAN, M.Sc., M.S., Ph.D.,
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POLLACHI - 642 001.

Programme code	M.Sc.	Programme Title : Master of Science in Botany		
Course Code:	21PBY3N3	Title : Non Major Elective -3 Economic Botany	Batch	2021 – 23
			Semester	III
Hrs/Week:	2		Credits	2

Course Objective

To enable the students to study the economic importance of vegetables, fruits, spices, condiments, fibres, timber and oil yielding plants

Course Outcomes (CO)

CO1	Understand the applied facet of botany	K1
CO2	Be familiar with the various commercial products of plant origin	K2
CO3	Understand the utility of different plant families	K3
CO4	Evaluate the medicinal and economic importance of plants.	K4
CO5	Understand and analyze about the economic importance of plants	K2 K4

Unit	Content	Hrs
Unit I	Cereals and legumes: Origin and History - Botanical description - Cultivation, Harvesting and uses of Cereals and Legumes: Wheat, Rice, Black gram, Red gram and Broad beans.	7
Unit II	Vegetables and fruits: Origin and History - Botanical description and economic importance of Vegetables and Fruits: Canavalia, <i>Dioscorea</i> , <i>Dragon fruit</i> and <i>Elaeagnus</i>	7
Unit III	Spices and condiments: Origin and History - Botanical description, Cultivation and uses of Spices and Condiments: Ginger, Pepper, Cardamom, Clove, Nut-Meg, Chilly, <i>Coriandrum</i> , Turmeric and All-spice.	7
Unit IV	Beverages plants, fibres and timber: Origin and History - Botanical description, Cultivation, Processing and uses of Beverages plants: Tea, Coffee and Cocoa. <i>Sugars and Starch:</i> Sugarcane and <i>Manihot</i> . Fibers and Timber: Cotton, Jute, Rosewood and Mahogany.	8
Unit V	Oil yielding plants: Origin and history - botanical description – harvesting - extraction and uses of fatty oils and vegetable fats: sun flower, soya bean, coconut and gingelly - medicinal plants: <i>Rauvolfia</i> , Basil and <i>Saraca</i>	7

**Self study topics*

Power point Presentations, Group discussions, Seminar ,Quiz, Assignment, Case study

Text Books

1. Vardhana, R. 2009. Economic Botany (1st ed.), Sarup Book Publishers Pvt. Ltd., New Delhi.
2. Hill, A.F. 1952. Economic Botany; A Textbook of Useful Plants and Plant Products (2nd ed.), McGraw- Hill Book Co., Inc., New York.
3. Pandey, B.P. 1990. Economic Botany (4th ed.), S. Chand & Company Ltd, New Delhi.

Reference Books

1. Thompson, H.C. 1949. Vegetable Crops (4th ed.), McGraw- Hill Book Co., Inc., New York.
2. Wallis, T.E. 1946. Text book of Pharmacognosy. J. & A. Churchill Ltd, London.
3. Verma, V.A. 1980. Textbook of Economic Botany (3rd ed.), Emkay Publications, New Delhi.
4. Maheshwari, P. and Singh, U. 1965. Dictionary of Economic plants in India. I.C.A.R. New Delhi.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1. <https://www.slideshare.net/AtiyyahB/economic-botany-111132336>
2. <https://www.slideshare.net/BhimsenKumar2/economic-botany>
3. <https://www.biologydiscussion.com/economic-botany/economic-botany-questions-and-answers/56568>
4. <https://www.biologydiscussion.com/medicinal-plants/medicinal-plants-found-in-india-economic-botany/56868>

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	H	M	M	L	M	L	M	L	H	M	M	M
CO2	M	L	H	L	L	L	M	L	M	M	L	L
CO3	H	M	M	H	M	L	M	L	M	M	M	M
CO4	H	H	M	H	L	H	L	H	H	H	H	M
CO5	H	H	H	H	L	H	L	H	M	H	H	M

H-High M- Medium L -Low