SEMESTER - III			
NMEI	**Plant Resource Utilization**		
Course Code:21UBON31	**Hrs/week: 2**	**Hrs/Semester:30**	**Credit:2**

Objectives:

- To provide knowledge on distribution, cultivation, harvesting techniques and uses of crop plants
- Toknowthecommercialvaluesofplantsresources
- Toappreciatetherelevanceofcropplantstotheeconomyofthepeople

CourseOutcomes:

CO. No.	Upon completionof thiscourse,studentswillbeableto	PSO addressed	CL
CO-1	comprehend history of agriculture and scope of agricultural crops	3	Re
CO-2	acquiretheknowledge ongeographicalareaofcultivation, productionandmarketing of various foodcrops andtheirfinishedgoods	1	Un
CO-3	graspimportanceoftropicalandtemperate fruitsforhumanwellbeing	3	Ap
CO-4	accessthevalueofspices,condimentsand beverage ininternationaltradesandconfectioneryindustries	3	Ev
CO-5	understandthewealthofcashcropsinIndiaandtheir importanceinimprovingtradeandindustrialgrowth	3	Ev
CO-6	substantiate fibersareanalternativesourceofplastics	5	Un
CO-7	explaintheuseofbeveragesandtheirproduction	6	Un
CO-8	learnaboutthecultivationpracticesandextractionof oilfromoilcrops	6	Cr

SEMESTER - III			
NMEI	**Plant Resource Utilization**		
Course Code:21UBON31	**Hrs/week: 2**	**Hrs/Semester:30**	**Credit:2**

UNIT I: Botanical description, distribution, cultivation, harvesting and economic and nutritional valuesof cereals:rice, wheat, maize.

UNIT II: Botanical description, distribution, cultivation, harvesting and economic and nutritional values of legumes:soyabean ,blackgram, green gram and bengalgram. Vegetables: stem– potato, garlic, herbage– cabbage, cauliflower, fruit-tomato, brinjal.

UNIT III: Botanical description, distribution, cultivation, harvesting and economic and nutritional valuesof fruits: tropical fruits – banana and papaya.

UNIT IV: Botanicaldescription, distribution, cultivation, harvesting and economic and nutritional values of spices and condiments: roots – asafoetida, stem – ginger, bark –cinnamon, leaf – curry leaves, flower bud – clove, fruit – capsicum, coriander and blackpepper.

UNIT V: Beverages: botanical description, distribution, cultivation, harvesting and economic and nutritional values ofteaand wine preparation from fruits. Oil extraction techniques

– lemon grass oil and cinnamon oil.

Textbook:

1. PandeyB.P.EconomicBotany. New Delhi: S. Chand. 1999.

Books forReference:

1. ChrispeelsM.JandSandavaD.*Plants,FoodandPeople*.SanFancisco: W.H.Preeman& Co.,1977.
2. KoccharS.L.*Economic BotanyoftheTropics*. India:MacMillanLtd. Fourthedition, 2012.
3. SammbamurtyA.V.S.S and SubrahmanyamN.S.*AtextbookofModernEconomicBotany*.India: CBSpublishers and Distributors.2008.
4. SharmaO.P.*HillsEconomicBotany*. NewDelhi:Tata Mc Graw Hill.Co.Ltd., 1996.
5. SunidhiMiglani.*TextBookofEconomicBotany*.Delhi: ABSBooks. 2016.
6. SwaminathanMandKocharS.L.*PlantsandSociety*.Macmillan Education., 1989.
7. WickensG.E.*Economic Botany.PrinciplesandPractices*. New York:
8. Springer, Kluer Academic Publishers, 2004.

SEMESTER IV			
Core IV	**Taxonomy of Angiosperms and Economic Botany**		
Course Code: 21UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Objectives:

- To recall and outline the system of classification and scientific contribution done by naturalist/ taxonomist
- To gain the art of plant collection, identification and prepare herbaria to secure plant repository for type species.
- To describe the diagnostic features of different plants in technical terms to infer the evolutionary significances and to assign the hierarchical rank of plant species.

Course Outcomes:

CO. No.	Upon completion of this programme, students will be able to	PSO addressed	CL
CO-1	describe the general principles of classification and outline the systems of classification	1	Cr
CO-2	apply binomial nomenclature for species naming	4	Un
CO-3	learn floristic features in technical term and provide an illustrious explanation on floral components of the flower.	6	Ap
CO-4	familiarise and evaluate the economic importance of angiosperms	6	Ev
CO-5	attain field experience and preparation of herbaria for digital database	6	An
CO-6	develop skill in plant identification.	6	Ap
CO-7	gain the art of plant collection and protection	8	Cr
CO-8	compare and contrast the diagnostic features of different families of angiosperms prescribed in the syllabus	1	An

SEMESTER IV			
Core IV	**Taxonomy of Angiosperms and Economic Botany**		
Course Code: 21UBOC41	**Hrs/week: 4**	**Hrs/Semester: 60**	**Credit: 4**

Unit I: Taxonomy: definition and scope. Contribution of Mathew and Santappa. Modification of root and stem. Leaf: venation, leaf apices, leaf margins, leaf arrangements. Stipules: types and modification. Inflorescence: types of inflorescence (simple, compound and special). Flower: terms used in description of calyx, corolla, androecium and gynoecium.

Unit II: Floral formula: symbols employed in floral formula. Floral diagram: important features and sequential drawing of floral diagrams. Systems of classification: natural (Bentham and Hooker) and phylogenetic (Engler and Prantl's system). Botanical nomenclature: vernacular names, binomial. Principles of ICBN.

Unit III: Vegetative, floral characters and economic importance of Annonaceae, Rutaceae, Caesalpiniaceae, Myrtaceae, Cucurbitaceae.

Unit IV: Vegetative, floral characters and economic importance of Rubiaceae, Sapotaceae, Apocynaceae, Asclepiadaceae and Acanthaceae.

Unit V: Vegetative, floral characters and economic importance of Lamiaceae, Amaranthaceae, Euphorbiaceae, Orchidaceae, Arecaceae and Poaceae.

Text Books:

1. Pandey B.P. *Taxonomy of Angiosperms*. New Delhi: S.Chand & Company Ltd., 2005.
2. Shukla P. and Misra S.P. *An introduction to Taxonomy of angiosperms*. New Delhi: Vikas Pub. House Ltd., 1997.
3. Vashista P.C. *Taxonomy of Angiosperms*. New Delhi: Vikas Publications, 1985.

Books for Reference:

1. Gurcharan Singh. *Plant Systematics.* New Delhi: Oxford &IBH Publishing Co. PVT. Ltd., 2004.

2. Naik V.N. *Taxonomy of Angiosperms*. New Delhi: R. Chand & Co., 1984.
3. Rendle. *The classification of flowering plants vol. II & I.* Sahibabad U.P.: VikasPublishing House Pvt. Ltd., 1979.
4. Sharma O.P. *Plant Taxonomy*. New Delhi: Tata MC Graw – Hill publishing CompanyLtd., 1996.
5. Singh V. and Jain. *Taxonomy of Angiosperms*. New York: Rastogi publications, 1997.
6. Pandey B.P. *Economic Botany*. New Delhi: S.Chand & Company Ltd.,1999

Practical Hrs per Week: 2

- Dissect and display the floral parts of the typical members of the families prescribed inthe syllabus.
- Survey of locally available plant species belonging to the families prescribed in thesyllabus and preparation of digital herbarium.
- Field trip: submission of 2 herbarium sheets and 10 photographs.
- Study of various modifications and record of economically important products from themembers of the families prescribed in the syllabus.

Submission: Record note book/ Herbarium / Field note book

Taxonomic manuals for Reference:

1. Ashok Bendre and Ashok Kumar. *Text Book of Practical Botany II*. Meerut: RastogiPublications, 2008.
2. Gamble J.S. *Flora of Presidency of madras, Volume I to III.* London: Adlard and SonLtd., 1997.
3. Henry A.N., Chitra, V. and Balakrishnan N.P. *Flora of Tamil Nadu, India, Volume III.* Coimbatore: Botanical Survey of India, Southern circle, 1989.
4. Henry A.N., Kumari G.R. and Chitra V. *Flora of Tamil Nadu, India, Volume II.* Coimbatore: Botanical Survey of India, 1987.
5. Mathew K.M. *The flora of Tamil Nadu, Carnatic. Volume I to III.* Tiruchirapalli: Rapinet herbarium, St. Joseph's College, 1981 to 1984.

SEMESTER - IV			
Skill Based Elective	**Organic Farming and Biofertilizer**		
Course Code: 21UBOS41	**Hrs/Week 2**	**Hrs/Semester 30**	**Credits: 2**

Objectives

- To create knowledge on organic farming practices.
- To sensitizes the values and needs of organic farming.
- To develop organic farming management skills.

Course Outcomes:

CO. No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand overall perspective on organic farming.	7	Un
CO-2	realize the advantages of traditional organic farming over modern system of farming	4 & 7	An
CO-3	identify and formulate mechanical and biological managements of insects/pests/ weeds.	8	An
CO-4	prioritize good water management system, fertilizer choices and application	7	Un
CO-5	recognize the importance of composting and bio fertilizers over chemical fertilizers for soil sustainability	7	Ev
CO-6	understand and implement crop protection techniques of fruits and vegetables	4 & 6	Un
CO-7	know the process of food certification and to assess the socioeconomic benefit of organically grown foods	6	Ap
CO-8	enhance self employability and improve their economy	6	Ap

SEMESTER - IV			
Skill Based Elective	**Organic Farming and Biofertilizer**		
Course code: 21UBOS41	**Hrs/Week 2**	**Hrs/Semester 30**	**Credits: 2**

UNIT I: Introduction: need of organic farming, benefits of organic farming. Organicfertilizers: introduction, need of organic fertilizer, benefits of organic fertilizer.

UNIT II: Preparation of organic fertilizer: Animal waste (bone meal, blood meal, FYM and vermicompost), Plant based fertilizer (seaweed liquid fertilizer, greenmanure and biocompost). Panchakavya.

UNIT III: Organic pesticide: introduction, types and uses. Insecticides: Neem leaf,Onion and Garlic spray, *Chrysanthemum* flower tea.

UNIT IV: Organic weedicides: vinagreen and DIY safe organic weed killer. organicfungicide: organic homemade natural fungicides

UNIT V: Preparation of organic growing structure. Growing medium for plants: coirpeat and vermiculite. Growth hormone from kitchen waste. Guidelines for organic farming certification.

Text Books

1. Arun K Sharma. *Hand book of organic farming*. Jodhpur: Agrobios (India) Publisher,2005.
2. Chandrasekaran B., Annadurai K. and Somasundaram E. *Text book of agronomy*. NewDelhi: New Age International (P) Ltd. Publishers, 2010.

Books for Reference:

1. Fred C. Blank. *Essential aspects of agricultural crop production*. Jodhpur:Agrobios (India) Publisher, 2006.
2. Palaniappan S.P. and Annadurai. *Organic farming-Theory and Practice.* New Delhi:Scientific Publishers Journals Dept., 2010.
3. Sharma J.P. *Organic crop production (Principles and practices Vol-I: Principles andGeneral Aspects)*. New Delhi: KP publisher, 2017.
4. Balasubramanian R., Balakrishnan K. and Sivasubramanian K. *Principles and practicesof organic farming.* New Delhi*:* Satish Serial Publishing House, 2017.

SEMESTER IV			
Skill Based Elective II - Herbal health care products			
Code: 15UBOS41	**Hrs/week: 2**	**Hrs/semester: 30**	**Credit: 2**

Objective:

To give the students hands on training on preparation of herbal heath care products for day to day life.

Unit I: Hair care: Botanicals for hair care (*Cocos nucifera, Eclipta alba, Acacia concinna, Phyllanthus emblica and Hibiscus rosa-sinensis* -morphology of the useful part, common name, family and uses) - Preparation of hair oil.

Unit II: Skin care: Plants used for skin care (*Phaseolus radiates, Cicer arietinum, Curcuma aromatica, Curcuma zedoaria, Trigonella-foenum graecum, Citrus lemon, Acorus calamus* and *Rosa indica* - morphology of the useful part, common name, family and uses) -Preparation of bathing powder.

Unit III: Dental care: Herbs used for dental care (*Azadirachta indica, Syzygium aromaticum, Eucalyptus globulus, Mentha piperita, Psidum gujava* and *Allium sativum* - morphology of the useful part, common name, family and uses) - Preparation of tooth powder.

Unit IV: Eve care: Plants used for eve care (*Aegle marmelos, Achyranthus aspera, Saraca asoca, Asparagus racemosus* and *Boerhaavia diffusa*- morphology of the useful part, common name, family and uses) - Preparation of uterine decoction.

Unit V: Pulmonary care: Plants used for pulmonary care (*Zingiber officinalae, Piper nigrum, Piper longum, Cinnamomum zeylanicum, Abies spectapilis, Maranta arundinacea, Elettaria cardamomum* and *Saccharum officinarum* - morphology of the useful part, common name, family and uses))- Preparation of powder and pain balm.

Books for Reference:

1. John Jothi Prakash, E. 2001. Medicinal and Aromatic Plants, JPR Publications, Vallioor.

2. John Jothi Prakash, E., K. Venkataraman, 2001. The science of Medicinal Botany, JPR Publications, Vallioor.

3. Kokate C.F., A. P. Purohit and S.R. Gokhale, 2004. Pharmacognosy. Nirali Prakashan.

4. Moshrafuddin Ahmed. 2010. Medicinal Plants. MJP Publishers, Chennai.

5. Wallis, T. E. 2000. Test book of Pharmacognosy. CBS Publishers.

Practical

- Preparation of hair oil
- Preparation of bathing powder.
- Preparation of tooth powder
- Preparation of uterine decoction
- Preparation of powder for cough
- Preparation of pain balm

SEMESTER V			
Skill Based Elective – Horticulture			
Code: 15UBOS51	**Hrs/week: 4**	**Hrs/semester: 60**	**Credits: 3**

Objectives:

- To provide knowledge and skills in horticultural techniques.
- To make the students acquire basic skill in gardening.

Unit I: Horticulture and its importance. Division of Horticulture. Garden implements. Training, pruning, transplantation and irrigation.

Unit II : Methods of propagation - seedage; cutting –stem, leaf and root cutting, layering – simple, compound and air layering.

Unit III: Grafting – tongue, cleft and approach grafting, budding – 'T'- budding, chip and patch budding, Vegetative propagules – bulbs, tubers, corms and rhizomes.

Unit IV: Gardening – landscaping, formal and informal gardens. Components of garden –hedges, edges, flowerbeds, arches, rockery, pergola, lawn, water garden topiary and hanging basket.

Unit V Kitchen garden –selection of site, lay out and choice of plants. Indoor gardening. Floriculture - cut flowers, flower arrangement Bonsai and terrarium.

Text Books:

1. Kumar, N.1988. Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
2. Manibhusan Rao, K.1991. Text book of horticulture, Mac Millan, India.

Books for Reference:

1. Hartmann and Kester, 1989. Plant propagation. Prentice- Hall of India Pvt.Ltd, New Delhi.
2. Randhawa, G.S.1986. Floriculture in India. Allied Publishers Pvt. Ltd. New Delhi.
3. Sadhu, M.K. 1989. Plant Propagation. Wiley Easten Ltd. New Delhi.

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code: 18UBOSS1	**Credits: 2**

Vision:

- To create knowledge on organic farming and practices.

Mission:

- Sensitizes the values and needs of organic farming.
- To develop organic farming management skills.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	to understand overall perspective on organic farming.	7	Un
CO-2	to realize the advantages of traditional organic farming over modern system of organic farming	4, 7	An
CO-3	to identify and formulate mechanical and biological managements of insects/pests/ weeds.	8	An
CO-4	to prioritize good water management system, fertilizer choices and application	7	Un
CO-5	to recognize the importance of composting and bio fertilizers over chemical fertilizers.	7	Ev
CO-6	to understand and implement crop protection methods of fruits and vegetables	4, 6	Un
CO-7	to follow the certification of their produce	6	Ap
CO-8	to enhance self employability and improve their economy	6	Ap

SEMESTER - III	
Self Study (Optional)	**Organic Farming**
Code:18UBOSS1	**Credits: 2**

Unit I	Organic farming-Introduction, Concept, Need of organic farming, Development of organic farming, Scope and status of organic farming in India.
Unit II	Types of organic farming- Pure organic farming, Integrated organic farming and mixed organic farming; Soil management
Unit III	Organic plant protection- Mechanical, Biological pesticides, Bio control agents, Weed management.
Unit IV	Organic plant nutrient management- soil tillage, Crop rotation, Inter cropping: Water management, Green manuring , Composting- methods, Bio fertilizers, Concentrated organic manures.
Unit V	Organic crop protection and organic certification- Organic crop methods of rice, coconut, vegetables and fruits; life stock components and management in organic farming; Organic farming and socio economic impact, guidelines for organic farming certification.

Books for Reference:

1. Arun K Sharma (2005) Hand book of organic farming.
2. Chandrasekaran B, Annadurai K and Somasundaram E., Text book of agronomy.
3. Fred C. Blank, (2006) Essential aspects of agricultural crop production.

Semester V	
Self Study (Compulsory)	**Economic Botany**
Code: 18UBOSS3	**Credit: 2**

Vision

- To understand the utilization of crop plants as food and their commercial application

Mission

- To study the cultivation practices and uses of crop plants as food
- To know the commercial value of plants resources

Course Outcome

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	acquire knowledge of useful plants	3	Re
CO-2	describe the distribution, cultural practices and processing of harvested products for commercial purpose of cereals	1	Un
CO-3	know the nutrient potential of legumes	3	Ap
CO-4	discuss the types, production, keeping quality and marketing of tropical and temperate fruits	3	Ev
CO-5	evaluate the medicinal and confectionery value of spices and condiments	3	Ev
CO-6	understand the chemical composition of plant products and their application both as food and medicine	5	Un
CO-7	explain the use of beverages and their production	6	Un
CO-8	Learn about extraction of oil from oil crops	6	Cr

Semester V	
Self Study (Compulsory)	**Economic Botany**
18UBOSS3	**Credit: 2**

Unit I : Botanical description, distribution, cultivation, production, harvesting and marketing of Cereals and millets - Rice, Wheat, Maize, Oat, Pearl millet, Italian millet, Finger millet

Unit II : Botanical description, distribution, cultivation, production, harvesting and marketing of Legumes: Soyabean, black gram, green gram and Bengal gram
Vegetables: Stem – Potato, garlic, Herbage – Cabbage, Cauliflower, Fruit - Tomato, Brinjal

Unit III : Botanical description, distribution, cultivation, production, harvesting and marketing of Fruits: Tropical fruits – Mango, banana, guava and papaya, Temperate fruits – Apple and grape

Unit IV : Botanical description, distribution, cultivation, production, harvesting and marketing of Spices and Condiments: Roots – asafoetida, stem – ginger, bark – cinnamon, leaf – curry leaves, flower bud –clove, fruit – capsicum, coriander and black pepper.

Unit V : Bevarages - botanical description, distribution, cultivation, production, harvesting, processing and marketing of tea; wine preparation from fruits; Oil –groundnut, coconut and Eucalyptus oil, extraction techniques of oil

Books for Reference:

1. Chrispeels M.J. and Sandava. D. 1977. *Plants, Food and People*. San Fancisco.W.H. Preeman &Co.
2. Kocchar S L. 1998. *Economic Botany of the Tropics. II Edn.* Mac Millan India Ltd.
3. Pandey B. P. 1999. *Economic Botany*, S. CHAND
4. Sammbamurty A.V.S.S., Subrahmanyam N.S. 2008. *A text book of Modern Economic Botany* CBS publisher
5. Sharma O. P. 1996. *Hills Economic Botany*, Tata McGraw Hill. Co. Ltd. New Delhi
6. Sunidhi Miglani, 2016. *Text Book of Economic Botany*, ABS Books. Delhi
7. Swaminathan M and Kochar S. L. 1989. *Plants and Society*, Macmillar Publisher. Ltd.
8. Wickens G E 2004. *Economic Botany. Principles and Practices*, Springer, Kluer Publishers. Dordecht The Netherlands.

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Vision:

- To provide knowledge on significance of medicinal plants and their medicinal potency.

Mission

- To understand the characterization , production and standardization of crude drugs
- To deal with methods for sustainable production of crude drugs and their therapeutic value.

Course Outcome:

CO.No.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	define and identify the more valuable medicinal plants based on their pharmaceutically active compounds	3	Ap
CO-2	formulate medicinal product and apply the knowledge for proper storage and distribution	8	Ap
CO-3	assess and evaluate the purity of herbal medicine.	7	Ev
CO-4	elaborate the cultural practices of important medicinal plants.	6	Re
CO-5	assess the trade opportunities of medicinal plants.	6	Ap
CO-6	define, classify and explain the importance of herbal medicine.	6	Re
CO-7	identify the crude drugs by morphological, organoleptic and histological characters.	6	Un
CO-8	know and expain the important phytoconstituents of therapeutic value.	6	Un

SEMESTER V			
Core Integral II	**Pharmacognosy**		
Code:18UBOI52	**Hrs/week:4**	**Hrs/semester: 60**	**Credit: 4**

Unit I : Definition, scope and applications of herbal medicine. Classification (morphological. therapeutic, chemical. taxonomical and chemotaxonomic classifications) and identification of drugs

Unit II : Drug adulteration. Methods of drug evaluation (morphological, micoroscopic, physical, chemical and biological).

Unit III : Botanical name, family, useful part, chemical constituents, adulterants anduses of the following drug.

Glycosides – Senna, Aloe,
Digitalis, Liquorice Terpenoids
– Coriander, Fennel, Lemon,
CinnamomAlkaloids – Datura,
Opium, Vinca, Pepper
Lipids - Castor, Neem, Sesame oil.

Unit IV Methods of collection, process and storage of medicinal plants; purification of raw drugs; factors causing drug contamination, methods of storage of drugs

Unit V Extraction methods and medicinal uses of *Eucalyptus*, Castor and Lemongrass oil. Conservation of medicinal plants – *in-situ* and *ex-situ* methods

Text book:

Roseline. A. 2011. *Pharmacognosy*, MJP Publishers, Chennai.

Books for Reference

1. Anonymous. 1978. *The Ayurvedic Formulary of India.* Govt. of India, New Delhi
2. Anonymous. 1989. *Formulary of Siddha Medicine.* The Indian Medical Practitioners'Co-operative Pharmacy and Stores Ltd., Chennai
3. Anonymous. 1999. *The Ayurvedic Pharmacopoeia of India. Vol. I (1 & 2).* Ministry ofHealth and Family Welfare, Govt. India, New Delhi.
4. Chauhan, M.G. and A.P.G. Pillai. 2005. Microscopic Profile of Powdered Drugs Used inIndian Systems of Medicine. *Institute of Ayurvedic Medicinal Plant Sciences*, Jamnagar.
5. Daljithsimha, K. 1974. *Unani Dravyaguna Darshana*. Ayurvedic and Tibbi Academy,Lucknow
6. Kumar, N.C. 1993. *An Introduction to Medicinal Botany and Pharmacognosy*. EmkayPublications, Delhi.

7. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. 2004. *A Text book of Pharmacognosy*.Nirali Prakashan, Pune.
8. Murugesh, N. 2002 *A Concise Text Book of Pharmacognosy*. Sathya Publishers, Madurai.