SEMESTER – V				
Core Integral – II- Vermitechnology				
Code:18UMII52Hrs/ Week: 4Hrs/ Sem: 60Credit:4				

Vision

To educate the students by ensuring the production of healthy food in a healthy way, we want to contribute to live in a healthy world.

Mission:

To contribute to global ecological economic recovery, profitable and sustainable way to produce high quality organic products and a healthy and positive results in agriculture is to be achieved.

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO- 1	select from, use and interpret results of descriptive vermi technology methods effectively.	6	Ev
CO -2	demonstrate an understanding the scientific and technological benefits to the rural sector by equipping them with the latest technology and to create the model for the nation	6	Ev
CO- 3	gain knowledge about the various morphology of earthworms	1	An
CO -4	communicate the awareness of field sampling using vermi compost	5	Un
CO- 5	make appropriate awareness of parasites and predators in vermi composting	5	Un
CO- 6	understand the awareness among the present status and importance of composting methods and vermi composting	4	An
CO- 7	understand the waste reduction in vermi composting	4	Un
CO -8	explain the nutrient availability in the vermi compost	6	Ev

SEMESTER – V					
Core Integral – II- Vermitechnology					
Code:18UMII52Hrs/ Week: 4Hrs/ Sem: 60Credit:4					

Unit-I:

Earth worm classification – Morphology and Anatomy. Biology of *Lumbricus terrestris*.Vermicomposting - Definition, introduction and scope - The nature of earthworms-soil environment - basic environmental requirements.

Unit-II:

Vermicomposting materials and their classification. Physical, chemical and biological changes brought by earth worm in soil structure-carbon, nitrogen and phosphorous transformations

Unit-III:

Vermicomposting methods - Optimal conditions for Vermiculture - temperature, moisture, pH, soil type, organic matter. Nutrient availability in vermi Compost.

Unit-IV:

Vermicomposting in Homes, Maintenance of vermicomposting beds. Harvesting the worms. Earth worm predators, parasites and pathogens. - Vermi wash. Vermi culture for waste reduction.

Unit-V:

Composting - Vermicomposting - Required conditions - Advantages - Role of vermicompost in plant growth and other applications, Field sampling- passive methods.

Text Book:

Mary Violet Christy. A., 2014, Vermi Technology - MJP Publishers, Chennai.

Books for Reference:

- 1. Edwards, C.A. and Bohlen, P.J. 1996, *Ecology of earthworms*-3rd Edition, Chapman and hall.
- 2. Jsmail, S.A., 1970, Vermicology. The Biology of Earthworms. Orient Longman, London.
- 3. Lee, K.E., 1985. *Earthworms Their ecology and relationship with soil and land use*, Academic Press, Sydney.
- 4. Ranganathan L.S. 2006. *Vermibiotechnology from soil health to human health*. Agrobios India.
- 5. Gupta P.K. 2008. Vermicomposting for sustainable Agriculture. Agrobios. India.

SEMESTER – IV				
Allied – IV – Mushroom Technology				
Course Code: 21UMIA41Hrs/Week : 4Hrs/Sem : 60Credit : 3				

Objectives

1. To facilitate the students with wide knowledge about the mushroom technology.

2. To inculcate the deep knowledge on mushroom technology.

CO NO	Upon completion of this course, students	PSO	CL
	will be able to	addressed	
CO-1	explain about the detailed information of	4	Un
	edible and non – edible mushroom.		
CO-2	compare the cultivation of various types of	5	Un
	musmooms.		
CO-3	construct the mushroom house.	6	Cr
CO-4	compare different types of mushroom	7	An
	cultivation techniques and pure culture		
CO-5	explain about economics of mushroom	6	Un
	cultivation and their precaution.		
CO-6	interpret about the different modes of storage	5	Un
	of mushroom.		
CO-7	illustrate about the various nutrition content	4	Un
	present in mushroom.		
CO-8	make use of various types of foods prepared	6	Ар
	trom mushroom.		

SEMESTER – IV				
Allied – IV – Mushroom Technology				
Course Code: 21UMIA41Hrs/Week : 4Hrs/Sem: 60Credit : 3				

Unit – **I** : Mushroom morphology

Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate edible from poisonous mushrooms. Button, Oyster and King mushroom (*Ganoderma*)- General morphology, distinguishing characteristics, spore germination and life cycle. Historical account on mushroom cultivation.

Unit - II: Cultivation Technology

Infrastructure, spawn lab, equipments and substrates in mush- room cultivation: Casing; raw material used for casing, preparation of casing material; important sanitation during various stages of mushroom cultivation. Precautions in mushroom cultivation – area selection, spawn preparation, spawn run, harvesting, pest management.

Unit – III: Cultivation of mushrooms

Steps involved in cultivation - Button Mushroom, Oyster mushroom and King mushroom

(Ganoderma)

Unit –IV: Storage and nutrition

Short time storage, Long term storage, Drying, Storage in salt solutions. Nutrition – Proteins, Amino acids, Mineral elements; Carbohydrate, Vitamins, Crudefibre content.

Unit - V: Health benefits of Mushroom & Value added products

Health benefits of Mushroom: Antiviral value, antibacterial effect, antifungal effect, anti-tumour effect, hematological value cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.

Value added products - Mushroom - Soup, Pickles, Powders, Jams ,Cutlet, Omelette , Samosa , Curry, mushroom biscuits, mushroom ketchup, mushroom chips, mushroom candy.

Text Books:

- 1) Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R, *Oyster Mushrooms, Department of Plant Pathology,* Coimbatore: Tamil Nadu Agricultural University, 1991.
- 2) Nita Bahl, Hand book of Mushrooms, II Edition, Vol. I & Vol. II: 1988.

Books for Reference:

- 1. Biswas S., Datta M. and Ngachan S.V. Mushrooms: A Manual for Cultivation, PHI. 2012.
- 2. Zadrazil F. and Grabbe K. *Edible Mushroom, Biotechnology* Vol. 3, Berlin: Weinheim: Verlag Chemie, 1983.
- 3. Changs T. and Hayanes W.A. (Ed.) *Biology and Cultivation of Edible Mushrooms*. New York: Academic Press. 1978.
- 4. Tewari, Pankaj Kapoor, S.C., Mushroom cultivation, Delhi: Mittal Publications, 1988.

SEMESTER-III				
NME I - Food Microbiology				
Course Code:21UMIN31Hrs/Week:2Hrs/Sem:30Credit:2				

Objectives

To highlight student that microorganisms are importance of food, food hygiene, sanitation and food safety

CO. No	Upon completion of this course, students	PSO	CL
	Will be able to	addressed	
CO-1	To provide knowledge on the importance of	1,4	Un,An
	Food microbiology		
CO-2	Acquire brief knowledge on food microbes	1	Un
	And their importance.		
CO-3	Acquire knowledge on various types of	6	Со
	preservation.		
CO-4	Provide information about the principles of	1,6	Un
	preservation.		
CO-5	Acquire knowledge on contamination and	1,6	Un
	Spoilage problems		
CO-6	Provide interpretation of laboratory tests in the	2	Co
	Diagnosis of infectious diseases.		
CO-7	To understand the mode of transmission of food	6	Со
	Poisoning and food infections		
CO-8	Provide information about the quality control	1,2	Un
	Principles and importance.		

SEMESTER-III					
NME I-Food Microbiology					
Course Code: 21UMIN31Hrs/Week:2Hrs/Sem:30Credit:2					

Unit-I : Food as a substrate for microorganisms

Food as a substrate for microorganisms - factors affecting the growth of microorganism in food. Mold, yeast and bacteria- general characteristics & importance.

Unit-II: Principles of food preservation

Principles of food preservation – Methods of food preservation – asepsis, removal of microorganism anaerobic conditions, high temperature- low temperature, drying and food additives – Canning.

Unit–III: Contamination and spoilage

Contamination and spoilage of milk and milk products, meat and meat products, fish

and fish products, vegetables and fruits and canned food.

Unit-IV: Food Borne diseases

Food Borne diseases: Mode of Transmission –Food Poisoning –Food infection-Bacterial (*Staphylococcal*), Fungal (*Aspergillus*) and Viral infection (*Hepatitis*)

Unit-V: Quality Control

Food Laws and Regulations. Export Act- AGMARK -FPO, FAO-WHO-HACCP- Principles and Importance. intellectual property rights, Introduction to patents

Text Book:

- 1. Frazier, W.C and Westhoff, D.C *Food microbiology*, 4th edition, New Delhi. Tata Mac Graw Hill, 2008.
- 2. Adams, M.R and Moss M.O *Food Microbiology* New Age International (p) Limited Publishers. 1995

Books for Reference:

- 1. Banwart, G.J., Basic *Food Microbiology*, New Delhi. CBS Publishers and Distributors, 2nd Edition 1989.
- Robinson R.K *Dairy Microbiology*, London. Elsevier Applied science, 1990.

3. Edward Arnold, Hobbs BC Roberts D Food Poisoning and Food

Hygiene, London., 1993.

SEMESTER-III					
Skill Based Elective - Vermitechnology					
Course Code:21UMIS32Hrs/Week:2Hrs/Sem:30Credit:2					

Objectives

- 1. To get the thorough knowledge on making Vermicomposting and vermiculture.
- 2. To learn about species used in Vermicomposting and Culture techniques of earthworms
- 3. To study the Vermicomposting production
- 4. To encourage the self-employment practice and save the human being by the way of minimizing the use of chemical fertilizers.
- 5. To understand the interaction of earthworms with other organisms

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	Select from, use and interpret results of descriptive Vermitechnology methods	6	Ev
CO-2	Demonstrate an understanding the scientific and technological benefits to the rural sector by equipping them with the latest technology and to create the model for the nation	6	Ev
CO-3	gain knowledge earthworms about the various morphology	1	An
CO-4	Communicate the awareness of field sampling using Vermicomposting	5	Un
CO-5	Make appropriate awareness of parasites and predators	5	Un
CO-6	Understand the awareness among the present status and importance of composting methods and Vermicomposting	4	An
CO-7	Understand the waste reduction in Vermicomposting	4	Un
CO-8	Explain the nutrient availability in the Vermicomposting	6	Ev

SEMESTER-III				
Skill Based Elective –Vermitechnology				
Course Code:21UMIS32Hrs/Week:2Hrs/Sem:30Credit:2				

Unit-I: Earthworm classification

Morphology and Anatomy. Biology of *Lumbricus terrestris*. – Digestive system–Excretion – Reproduction and Life cycle – Earthworm as farmer's friend.

Unit-II: Vermicomposting materials and their classification

Vermicomposting materials and their classification. Physical, chemical and biological and environmental changes brought by earth worm in soil structure-carbon, nitrogen and phosphorous transformations.

Unit-III: Vermicomposting production

Requirements – Different methods of Vermicomposting – Heap method – Pot method and Tray method – changes during Vermicomposting. Collection and Preservation of earthworms.

Unit-IV: Vermicomposting in Homes

Vermicomposting in Homes, Maintenance of Vermicomposting beds. Earthworm predators,

Parasites and pathogens. - Economics of Vermicomposting and vermiwash production.

Vermiculture for waste reduction.

Unit-V: Vermicomposting advantages

Role of in plant growth and other applications, Earthworms as animal feed – Medicinal value of earthworm meal– Role of Earthworms in Solid Waste, and Sewage waste management. Earthworms as bioreactors.

Text Book:

Mary Violet Christy. A. Vermitechnology-Chennai: MJP Publishers, 2014.

Books forReference:

- Edwards, C.A. and Bohlen, P.J., *Ecology of earthworms*. Chapman and hall. 3rdEdition, 1996.
- 2. Ismail, S.A. Vermicology. The Biology of Earthworms. London. Orient Longman, 1970.
- Lee, K.E. Earthworms-Their ecology and relationship with soil and land use, Sydney. Academic Press, 1985.
- Ranganathan L.S. Vermibiotechnology from soil health to human health. India: Agrobios, 2006.
- 5. GuptaP.K. Vermicomposting for sustainable Agriculture. India. Agrobios.2008.

SEMESTER – IV					
Skill Based Elective - Practical in Medical Laboratory Technology					
Course Code:21UMIS41	Hrs/week : 2	Hrs/Sem : 30	Credit: 2		

Objectives:

The Medical Laboratory Technology graduates excel as innovative practitioners committed to excellence and a collaborative and healthy work environment. These graduates play a vital role in the provision of quality health care and in scholarship for the advancement of self, the profession and society.

CO NO.	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	understand the laboratory practices and know how to maintain the laboratory instruments	1,2	Un
CO-2	analyze and distinguish various types of blood groups	2,3,4	An
CO-3	evaluate the culture tests and understand the patho- logical diseases of humans	2,4	An
CO-4	analyze the physical, chemical and microscopic analysis of culture samples	2,3	An
CO-5	perform various techniques on isolation of micro- organisms for various sources	2	Ap
CO-6	understand the ESR and CRP tests for analysis	1,2	Un
CO-7	perform the qualitative tests for carbohydrates and proteins	2	Ар
CO-8	analyze and isolate the microbes from blood	3,4	An

SEMESTER – IV					
Skill Based Elective - Practical in Medical Laboratory Technology					
Course Code:21UMIS41	Hrs/week : 2	Hrs/Sem : 30	Credit: 2		

- 1. Separation of blood and serum
- 2. Collection and preservation of blood sample.
- 3. Estimation of glucose
- 4. Estimation of cholesterol
- 5. Identification of carbohydrates (Qualitative test)
- 6. Identification of proteins (Qualitative test)
- 7. Staining of blood smear
- 8. Examination of urine- physical, chemical, & microscopic
- 9. Urine analysis: Glucose, protein, urea, creatinine and billirubin.
- 10. Culture tests- urine, nasal, throat swab, stool & pus
- 11. Antimicrobial susceptibility testing
- 12. Pregnancy test
- 13. ESR
- 14. CRP- Demonstration.
- 15. Testing of malarial parasite.
- 16. Testing of stool samples for parasites (ova & cysts)
- 17. Isolation & identification of Mycobacteria- Demonstration
- 18. Cultivation & identification of protozoa
- 19. Identification of Escherichia coli from urine sample
- 20. Isolation of bacteria from blood.

Books for Reference:

- 1. Cappucino.J.G., and Sherman. N. *Microbiology a laboratory manual*. New York: BenjaminCummins. 1996.
- 2. Kannan.N. *A laboratory manual in general Microbiology*. Palani: Palani paramount publication, 1996.
- 3. Gunasekaran. P. *Laboratory manual in Microbiology*. New Delhi: A new age International Ltd., publishers, 1996.
- Sundaraj. T. *Microbiology A laboratory manual*. Chennai: Sundaraj.1st Edition Publication. 2005.
- 5. Jayaraman. J. Laboratory manual in Biochemistry. New Delhi: Wiley Eastern Ltd., 1985.
- 6. Plummer. D.T. *An introduction to Practical Biochemistry*. New Delhi: Tata McGraw Hill, 1998.
- 7.Benson. *Microbiological applications A Laboratory Manual in General Microbiology*.
 Mc.Graw Hill Higher Education. International Edition, 2002.
- 8. Renganathan. S., Gkul Shankar S., Ranjit.M.S, Pankajalakshmi.V., Sivramakrishnan.M., Selvakumar.B.N., and mohhamedaejaz. *Fungal Diseases and Diagnosis*. (Vol I): 2001.
- 9. Kanai Mukerjee L., *Medical Laboratory Technology A procedure manual for routine diagnosis tests-* Tata mc Graw Hill Publishing Co. Ltd., New Delhi: Vol III.2005
- 10.Rajan S., Selvi Christy R., *Experimental procedures in Life Sciences*. Chennai: Anjanaa Publishers, 2010.