

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	24UMBVAC1	Value Added Course- I	30	-	-	100	100
Course Title		BIOPRODUCTION OF ORGANIC FARMING					

SYLLABUS		
Unit	Contents	Hours
I	<b>Organic Farming:</b> Introduction, concepts, principles, need and types of organic farming. Conventional farming v/s organic farming. Environmental benefits of organic farming: sustainability- reduces non-renewable energy by decreasing agrochemical needs. Ecological services and biological control.	6
II	<b>Organic Farming for Urban Space:</b> Create a Sustainable Organic Garden (Backyard- Square Foot Gardening, Small Space Gardening, Mini Farming, Terrace gardening) Methods, benefits and applications of Composting and Vermicomposting	6
III	<b>Bacterial Biofertilizers:</b> Concept of Bio fertilizers, Scope and importance of bio fertilizers, Classification of biofertilizers. Structure, Characteristic features and production technology of bacterial biofertilizers - <i>Azospirillum</i> , <i>Azotobacter</i> , <i>Bacillus</i> , <i>*Pseudomonas*</i> and <i>Rhizobium</i> .	6
IV	<b>Mushroom Cultivation:</b> Introduction, Spawn preparation, - Isolation of pure culture; Nutrient media for pure culture, Cultivation of different types of mushroom – <i>*Milky Mushroom*</i> , <i>Oyster Mushroom</i> and <i>Button Mushroom</i> . Nutrient values of Mushroom.	6
V	<b>Spirulina Production:</b> Laboratory Cultivation – Small scale, Commercial Production –Mass cultivation- Tank construction, culture medium, strain selection, scaling up of the process. Importance of light and pH in <i>Spirulina</i> cultivation – harvesting, <i>*Drying and Packing*</i> .	6

\*-----\* Self Study

Text Book(s):
1. SubbaRao, N. S. Soil Microbiology. Soil Microorganisms and Plant Growth. (4 th Edition), Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi 2002.
2. Dubey, R. C. A Textbook of Biotechnology. S. Chand & Co., New Delhi.2008.
3. A.K. Sharma .Hand book of Organic Farming, 2006.
4. SubbaRao, N. S. Soil Microbiology. Soil Microorganisms and Plant Growth. (4 th Edition), Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. 2002
Reference Book(s):
1.N.S. Subbarao. Bio-fertilizers in Agriculture and Forestry (4 th Edition) Med tech publisher2017.
2. SujitChakrabarty . Organic Home Gardening Made Easy, 1 st Edition, 2018.
3.Singh and Purohit . Biofertilizer technology. Agrobios, India.2018.

**Web Resource(s):**

1. <https://environment.co/benefits-of-organic-farming-on-the-environment/>
2. <https://www.goodhousekeeping.com/home/gardening/a20706747/square-foot-gardening/>
3. <https://unacademy.com/content/neet-ug/study-material/biology/classification-of-biofertilizers/>

**Course Coordinator: Dr. M. Mohamed Mahroop Raja**

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
V	24UMBVAC2	Value Added Course- II	30	-	-	100	100
Course Title		DAIRY TECHNOLOGY					

SYLLABUS		
Unit	Contents	Hours
I	<b>Introduction to Milk:</b> Definition, Composition, properties, Secretion of milk in the udder and nutritive values. Importance factors affecting the milk yield and composition. Colostrums: characterization, *composition*, Bioactive components and benefits.	6
II	<b>Clean Milk Production:</b> Sources of microbes in milk – Clean milk Production – Bacteriological standard for raw milk – Methylene Blue Reduction Test– Detergents and Sanitizers – *Common adulterants* and Preservatives in milk.	6
III	<b>Milk Processing and Market:</b> Collection, Transportation of milk, Milk reception, Clarification, *Chilling*, Homogenization, Pasteurization, Sterilization, UHT processing, Packaging; Market milk – standardized – Toned – Double toned – flavoured milk.	6
IV	<b>Starter Cultures:</b> Definition, Characterisation, types, Preparation, Preservation, Biochemical activities and Application. Probiotics and *Prebiotics use of Lactobacilli *and their therapeutic and nutritional value.	6
V	<b>Fermented Dairy Products:</b> Health benefits of functional fermented dairy products: such as Dahi, Lassi, Yoghurt, Buttermilk, Acidophilus milk, Cheese, Kefir, Koumiss, *Yakult*, Fermented whey drinks, Dairy-based cereal foods and Soy-based yoghurt containing probiotics.	6

\*-----\* Self Study

Text Book(s):
<ol style="list-style-type: none"> <li>1. Adams, M.R, and Moss, M.O. Food Microbiology, 2nd Edition, Royal society of chemistry, 2000.</li> <li>2. Cassida, L.E., J.R. Industrial Microbiology, New Age International (P) Ltd, New Delhi, 2005.</li> <li>3. Dubey, R.C. A Textbook of Biotechnology (4th edition), S. Chand and Company Ltd, New Delhi, 2007.</li> </ol>
Reference Book(s):
<ol style="list-style-type: none"> <li>1. J.M. Jay, M.J. Loessner and D.A. Golden. Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India 2005.</li> <li>2. R.K. Robinson, Dairy Microbiology Handbook - The Microbiology of Milk and Milk Products. 3rd ed. Wiley-Interscience, New York 2002.</li> <li>3. G.W. Gould. New Methods of Food Preservation. Blackie Academic and Professional, London.</li> <li>4. J.M. Jay, M.J. Loessner and D.A. Golden. (2005). Modern Food Microbiology. 7th edition, CBS Publishers and Distributors, Delhi, India 1995.</li> </ol>

**Web Resource(s):**

1. <https://pravara.in/wp-content/themes/twentyseventeen/essentials/pdf/elearn/composition.pdf>
2. <http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=5014>
3. <https://www.fao.org/3/y3548e/y3548e06.htm>

**Course Coordinator: Dr. H. Vajiha Banu**

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	24PMBVAC1	Value Added Course- I	30	-	-	100	100
<b>Course Title</b>   <b>CLINICAL TRIALS AND PHARMACOVIGILANCE</b>							

SYLLABUS		
Unit	Contents	Hours
I	<b>Drug Discovery:</b> New drug discovery process- Phase-I, II, III, IV trials. Pre-clinical toxicology: General principles, Systemic toxicology, Carcinogenicity, Mutagenicity, Teratogenicity, Reproductive toxicity, Local toxicity and Genotoxicity	6
II	<b>Clinical Trial:</b> Basics terminology, Types of clinical trials and their examples. Clinical Trial Application in India. *Import & Export of Drugs in India*, Investigational New Drug application (IND), Abbreviated New Drug Application (ANDA). New Drug Application (NDA). Basic conceptual knowledge about ADME.	6
III	<b>Biological Standardization:</b> General Principles, Scope and Limitation of bio-assays and bioassay of some official drugs. Preclinical drug evaluation of its biological activity. Toxicity test in animals, requirements, ED50 and LD50 determination. Various guidelines for toxicity studies.	6
IV	<b>Regulatory Requirements:</b> Schedule Y, ICMR guidelines. Documents in clinical study Investigator Brochure (IB), Protocol & Amendment in Protocol, Case Report Form (CRF), *Informed Consent Form (ICF)*. Essential Documents in Clinical Trial Good Clinical Practice guidelines.	6
V	<b>Pharmacovigilance:</b> Introduction, Definition, Requirement needed, Objectives, Scope and Agencies concerned with Pharmacovigilance, Reporting ADRs, Changes to recommendations for use, Methods involved in Pharmacovigilance, Pharmacovigilance plans, Indian Scenario, Pharmacovigilance and *Pharmacogenetics*.	6

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Text Book(s):
1 S.P.Maity, R.N.Chatterjee and A.K.Das, Pharmacology, Seventh edition, Books and Allied (P)Ltd, Kolkata, 2017.
2 J.G.Collee, A.G.Fraser, B.P.Marmion and A.Simmons, Mackie & McCartney Practical Medical Microbiology, 14 <sup>th</sup> Edition, Longman Singapore publishers (pte) Ltd, 1996.
3 K.P.R Chowdary, A Textbook of Clinical Research and Pharmacovigilance, 1 <sup>st</sup> Edition Pharma Med Press, 2021.
4. G.P. Mohanta and P.K. Manna, Textbook of Pharmacovigilance: Concept and Practice, 2 <sup>nd</sup> Edition, Pharma Med Press, 2020.

**Reference Book(s):**

1. Eric T. Herfindel, Dick R. Gourley, Textbook of therapeutics Drug and Disease Management, 6<sup>th</sup> edition, Lippincott Williams and Wilkins, 1996.
2. Janet Woodcock, Frederick Ognibene and John Overbeke, Assuring Data Quality and Validity in Clinical Trials for Regulatory Decision Making, Wiley Publication, 2003.
3. S.K. Gupta, Post marketing Surveillance, Text book of Pharmacovigilance, 1<sup>st</sup> edition, Jaypee Brothers Medical Publishers (P) Ltd, 2011.

**Web Resource(s):**

1. <https://www.pharmdstudy.com/p/clinical-research-pharmd-notes-pdf.html?m=1>
2. <https://pharmdguru.com/category/clinical-research/page/2/>
3. <https://gpatindia.com/pharmacovigilance-notes-and-lectures/>
4. <https://pharmacyinfo.com/pharmacovigilance-theory/>

**Course Coordinator: Dr. N.Reehana**