DEPARTMENT OF BIOTECHNOLOGY

VALUE ADDED COURSE

Semester	Course Code	Course Title	Hours
III	22UBTVAC1	ECONOMIC BIOTECHNOLOGY	30

Course Outcomes

At the end of the course, students will be able to:

CO.1. Ensure students to gain knowledge about the importance of transgenic animals

CO.2. Analyze the importance of transgenic plants as bioreactors

CO.3. Give adequate knowledge on mushroom cultivation and value addition to train the students for self employment

CO.4. Understand the steps involved in cultivation of mushroom and its value addition

CO.5. Discuss the importance of Biofertilizer and organic manure

Unit: I Transgenic Animals **6 Hours**

Importance of Transgenic Animals- Milk as medium for protein production ; Transgenic sheep -Wool production ; Transgenic Pig – Organ farms ; Transgenic fish – Growth hormone production.

Unit: II Transgenic plants **6 Hours**

Plantibodies- Production of Secretory IgA; Vaccines- Production of edible vaccine; Production of Therapeutic proteins ; Production of Industrial enzymes in plants. Field Visit to any Pharmaceutical industry.

Unit: III Microbial production of foods and Beverages **6 Hours**

Fermented foods – Advantages- Production of Cheese, Yoghurt, Bread, sweeteners and Falvour Enhancers. Alcoholic Beverages – General Aspects – production of Beer and Wine.

Unit: IV Mushroom Cultivation and Value Addition **6 Hours**

Preparation of inoculums, Spawn production, preparation of bed, inoculation, growth conditions and harvest **.** Types of foods prepared from mushroom - soup, cutlet, omelette, samosa, pickles, curry.

Unit: V Bio fertilizers as Organic Manure **6 Hours**

Classifications; Management of green manures and its importance; Blue Green algae as Biofertilizers**;** Farm manures- Cow dung, Poultry wastes, production of vermicompost and commercialization of organic manures #Panchakavyam#.

Text Books:

1. U. Satyanarayana., Biotechnology, Books and Allied P.Ltd, Kolkata. (2015).
2. A. Kumar., Verms and Vermitechnology, APH Publishing Corporation, New Delhi, (2005).
3. M.M.Ranga, “Animal Biotechnology”, Student Edition- Jodhpur. 2003

Semester	Course Code	Course Title	Hours
V	22UBTVAC2	VERMICOMPOSTING TECHNOLOGY	30

Course Outcomes

At the end of the course, students will be able to:

CO.1. Ensure the students to understand the value of solid waste management system.

CO.2. Understand the significance of solid waste management to our environment.

CO.3. Provide sufficient solid waste expertise and value addition to prepare students for self-employment.

CO.4. Examine the significance of vermicomposting and organic manure.

CO.5. Comprehend and demonstrate the role of earthworms and microorganisms in solid waste degradation.

Unit I: **6 Hours**

Waste Definition, Solid Waste, Classification and Sources of Solid waste, Types of solid waste, Causes and Effects of solid waste pollution.

Unit II: **6 Hours**

Physical and Chemical composition of solid waste, Waste Generation, Storage, Collection, Transfer and Transport Processing and Recovery, Disposal.

Unit III: **6 Hours**

Waste Management, Waste Minimization, Treatment of Solid Waste (Land filling, Incineration, Recycling, Plasma Gasification and Vermicomposting).

Unit IV: **6 Hours**

Earthworm, Life Cycle, Internal and External Features of earthworm, Classification of Earthworm. Role of enzymes and Microbes in Vermicomposting.

Unit V: **6 Hours**

Composting, Types of Composting, Methods of vermicomposting (aerobic and anaerobic), Process of Vermicomposting and Advantages of Vermicomposting.

Text Books:

1. A. Kumar, Verms and Vermitechnology, APH Publishing Corporation, New Delhi, (2005).
2. G. Tchobanoglous., H. Theisen., and S.A. Vigil., Integrated solid waste management: McGraw Hill, New York (2007).

Semester	Course Code	Course Title	Hours
III	22PBTVAC1	CLINICAL RESEARCH AND PHARMACOVIGILANCE	30

Course Outcomes

At the end of the course, students will be able to:

CO.1.Provide the students an opportunity to learn drug development process especially the phases of clinical trials.

CO.2.Discuss the guidelines, regulations and ethics in clinical research

CO.3.Imparts knowledge and develop skills on Pharmcovigilance, regulatory activities and Guidelines.

CO.4.Understand the concept of different methodologies in pharmacovigilance

CO.5.Ensure students to gain knowledge about the importance of Regulatory guideline and Laws in pharmacovigilance

UNIT-1: Introduction to Clinical Research. 6 Hours

An overview of Clinical Research – Different types of Clinical Research – Terminologies and Definitions in Clinical Research – Clinical Trial Phases – Drug development and Launch.

UNIT-II: Guidelines, Regulations and Ethics in Clinical Research. 6 Hours

Guidelines for Good Clinical Practice – ICMR guidelines for Biomedical research on Human subjects – Drug and Cosmetic act – FDA – Schedule-Y – Ethics committee and their regulations

UNIT-III: Introduction to Pharmacovigilance (PV) 6 Hours

Overview of Pharmacovigilance – Standard terms and terminologies in Pharmacovigilance – Adverse Drug Reactions (ADR) – Diagnosis and managements of ADRs– Global and Indian Pharmacovigilance system.

UNIT-IV: Methodologies in Pharmacovigilance 6 Hours

Pre- marketing and Post-marketing methodologies in Pharmacovigilance – Sources and Documentations of Individual Case Safety Reports (ICSR's) — Medical information system – Special cases in Pharmacovigilance.

UNIT-V: Good Pharmacovigilance Practices (GPP) 6 Hours

Monitoring process- Good Manufacturing Practices - Individual Case safety reports - Regulatory guideline and Laws in PV – SOP's in PV – PV auditing and Inspection – Regulatory aspects in PV. Field Visit to any Pharmaceutical industry.

Text Books:

1. C. Livingstone., Handbook of clinical research. Julia Lloyd and Ann Raven Ed.. 2009
2. G.D. Ignazio., D. Giovanna and Haynes., Principles of Clinical Research edited by. 2008.
3. International Conference on Harmonization of Technical requirements for registration of Pharmaceuticals for human use. ICH Harmonized Tripartite Guideline. Guideline for Good Clinical Practice.E6; May 1996.