

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR

IV YEAR II SEMESTER COURSE STRUCTURE

CODE	SUBJECT	T	P	C
07A82302	Animal Cell Science and Technology	4+1*	-	4
	ELECTIVE –III	4+1*	-	4
07A82303	Food Science and Technology			
07A82304	Molecular Modeling and Drug Design			
07A82305	Bio Process Economics and Plant Design			
07A82306	Biopharmaceutical Technology			
07A82307	Phytochemicals and Herbal Medicine			
07A82308	Bioprocess Optimization			
	ELECTIVE –IV	4+1*	-	4
07A82391	Industry Oriented Mini project	-	-	2
07A82392	Seminar	-	-	2
07A82393	Project Work	-	-	10
07A82394	Comprehensive Viva	-	-	2
	TOTAL	15	-	28

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

T	P	C
4+1*	0	4

(07A82302) ANIMAL CELL SCIENCE AND TECHNOLOGY

Unit I:

Structure and Organization of animal cell; Equipments and materials for animal cell culture technology; Primary and established cell line cultures; Introduction to the balanced salt solutions and simple growth medium,

Unit II:

Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium. Role of carbon dioxide. Role of serum and supplements; Serum & protein free defined media and their application.

Unit III:

Measurement of viability and cytotoxicity; Biology and characterization of the cultured cells, measuring parameters of growth;

Unit IV:

Basic techniques of mammalian cell culture in vitro; disaggregation of tissue and primary culture, maintenance of cell culture; cell separation.

Unit V:

Cell synchronization; Cell cloning and micromanipulation; Cell transformation; Application of animal cell culture; Scaling-up of animal cell culture.

Unit VI:

Stem cell cultures, embryonic stem cells and their applications; Cell culture based vaccines, Somatic cell genetics.

Unit VII:

Organ and histotypic cultures; Measurement of cell death; Apoptosis;

Unit VIII:

Three dimensional culture and tissue engineering.

TEXT BOOKS:

1. Culture of Animal Cells, (3rd Edition), F1. Ian Froshney. Wiley-Liss.
2. Animal Cell Culture – Practical Approach, Ed. John R.W. Masters, OXFORD.

REFERENCES

1. Cell Culture Lab Fax. Eds. M. Butler & M. Dawson, Bios Scientific Publications Ltd., Oxford.
2. Animal Cell Culture Techniques. Ed. Martin Clynes, Springer.
3. Methods in Cell Biology, Vol. 57, Animal Cell Culture Methods. Ed. Jenni P. Mather and David Barnes. Academic Press.
4. Cell Growth and Division: A Practical Approach. Ed. R. Basega, IRL Press.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

T	P	C
4+1*	0	4

**(07A82303) FOOD SCIENCE & TECHNOLOGY
(Elective-III)**

UNIT -1 INTRODUCTION TO FOOD SCIENCE & TECHNOLOGY

Fundamentals and Aims of food science and technology. Interdisciplinary approach, Nutritive value of foods, Food as a source of energy, Food Health and disease.

UNIT -2 FOOD CHEMISTRY

Food chemistry-definition and importance, water in food, water activity and shelf life of food. Carbohydrates- functional properties of sugars and polysaccharides in foods. Lipids: use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical and chemical properties, distribution, amount and functions of proteins in foods, functional properties, effect of processing.-Losses of vitamins and minerals due to processing.

UNIT -3 FOOD MICROBIOLOGY

Microbial growth pattern, Types of micro-organism normally associated with food-mold, yeast, and bacteria. Micro-organisms in natural food products. Contaminants of foods-stuffs, Fisheries, milk and meat during handling and processing. Biochemical changes caused by micro-organisms, deterioration of various types of food product. Food poisoning and microbial toxins, standards for different foods. Food borne intoxicants and mycotoxins.

UNIT -4 FOOD Preservation

Principles of food preservation: Physical ,chemical ,and biological methods of preservations. Bioprocessing of meat, Fisheries, vegetables, diary products. Irradiated foods.

UNIT -5 Food Biotechnology

Biotechnology in relation to food industry, Enzymes in foods and food industry, Nature and type of starters,Role of starters in Fermented foods, Fermentation of Milk products-Fermented soy and peanut milk, Fruit and cereal based beverages, Non beverage plant products. Mycoprotein production.

UNIT -6 FOOD Additives and ANALYSIS

Sampling techniques and theory and practice of chemical and physical methods of food analysis for determination of food composition; Pigments in food, food flavours, food additives and toxicants. Natural sweeteners and artificial sweeteners and their role in controlling diseases and deficiencies, Nutraceuticals, and Functional Foods

UNIT -7 FOOD PROCESSING

Basic principles, unit operations, and equipment involved in the commercially important food processing methods and unit operations; materials and containers used in food packaging.

UNIT -8 FOOD QUALITY ASSURANCE

Objectives, importance and functions of quality control. Methods of quality, assessment of food materials-fruits, vegetables, cereals, dairy products, meat, poultry. Food regulations, grades and standards, Concept of Codex Alimentarius/HACCP/USFDA/ISO 9000 series etc. Food laws and standards.

- 1 Jay J.M. 1986. Modern Food Microbiology. 3rd Edn. VNR, New York.
- 2 Food processing and Preservation PHI private ltd,New Delhi
- 3 Food Microbiology fourth edition William C.Frazier, Tata Mc Graw Hill
- 4 Food Microbiology 2nd Edition, Michael P.Doyle ,ASM press
- 5 Fennema, O.R. Ed. 1976. Principles of Food Science: Part-I Food Chemistry. Marcel Dekker, New York.
- 6 Meyer, L.H. 1973. Food Chemistry. East-West Press Pvt. Ltd., New Delhi.
- 7 Charalambous, G. and Inglett, G. 1981. The Quality of Foods and Beverages. (2 vol. set). Academic Press, New York.
- 8 Krammer, A. and Twigg, B.A. 1970. Quality Control for the Food Industry. 3rd Edn. AVI, Westport.
- 9 Ranganna, S. 1986. Handbook of Analysis and Quality Control for Fruits and Vegetable Products. Tata McGraw Hill, New Delhi.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

T	P	C
4+1*	0	4

**(07A82306) BIOPHARMACEUTICAL TECHNOLOGY
Elective-IV**

UNIT I: INTRODUCTION TO PHARMACEUTICALS

History & Definition of Drugs. Sources of Drugs - Plant, Animals, Microbes and Minerals. Different dosage forms. Routes of drug administration.

UNIT II: PHARMACODYNAMICS

Physico-Chemical Principles, Pharmacodynamics- Mechanism of drug action, drug receptors, and Physiological receptors: structural and functional families.

UNIT III: PHARMACOKINETICS

Pharmacokinetics- Drug absorption, factors that affect the absorption of drugs, Distribution of drugs, Biotransformation of drugs, Bioavailability of drugs.

UNIT IV: DRUG MANUFACTURING PROCESSES I

Good manufacturing practices, manufacturing facilities, sources of Biopharmaceuticals,

UNIT V: DRUG MANUFACTURING PROCESSES II

Production & analysis of Biopharmaceuticals.

UNIT VI: PRODUCTION OF BIOPHARMACEUTICALS

Production of Therapeutic Proteins, Hormones, Cytokines - Interferons, Interleukins I & II, Tumor Necrosis Factor (TNF); Nucleic acids.

UNIT VII: APPLICATIONS OF BIOPHARMACEUTICALS

Role of Biopharmaceuticals in treatment of various health disorders

UNIT VIII: DRUG DELIVERY SYSTEMS, BIOMATERIALS AND THEIR APPLICATIONS

Controlled and sustained delivery of drugs. Biomaterial for the sustained drug delivery. Liposome mediated drug delivery. Drug delivery methods for therapeutic proteins.

Reference:

1. Biopharmaceuticals: Biochemistry & Biotechnology, Gary Walsh (1998), John Wiley & Sons Ltd.
2. Remington's Pharmaceutical sciences, (Mark Publications & Company eston PA) year 1980.
3. Theory & Practice of Industrial Pharmacy, (3rd ed.) Leon Lachman, Lea & Febiger (1986)

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

T	P	C
0	0	2

(07A82391) INDUSTRY ORIENTED MINI PROJECT

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

**T P C
0 0 2**

(07A82392) SEMINAR

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

T	P	C
0	0	10

(07A82393) PROJECT WORK

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech BT II-Sem

**T P C
0 0 2**

(07A82394) COMPREHENSIVE VIVA