MASTER OF PHILOSOPHY IN BIOTECHNOLOGY (2 YEARS) (30 Cr Hr)

DEGREE PROGRAM STRUCTURE

Sr.	Categories	No. of courses	Credit Hours
1.	Compulsory Requirement	08	24
2.	Research Project / Seminar	02	06
	Total		**30**

- Total numbers of Credit hours 30
- Duration 2 years
- Semester duration 16-18 weeks
- Semesters 4
- Course Load per Semester maximum 12 Cr hr/ semester
- Number of courses per semester maximum 4-5

SCHEME OF STUDIES FOR MASTER OF PHILOSOPHY IN BIOTECHNOLOGY (2 YEAR)

YEAR ONE / SEMESTER FIRST

Course Code	Name of Subject	Credits
Biotech-511	Agriculture Biotechnology	3+0
Biotech-512	Advances in Microbiology	3+0
Biotech-513	Protein Chemistry	3+0
Biotech-514	Advances in Nutritional Biochemistry	3+0
Biotech-515	Oncology	3+0
Biotech-516	Health Biotechnology	3+0
Biotech-517	Techniques in Biotechnology	3+0

YEAR ONE / SEMESTER SECOND

Course Code	Name of Subject	Credits
Biotech-521	Gene Regulation and Expression	3+0
Biotech-522	Advances in Animal Biotechnology	3+0
Biotech-523	Advances in Immunology	3+0
Biotech-524	Pharmaceutical Biotechnology	3+0
Biotech-525	Molecular Genetics	3+0

4-5 courses per semester will be offered from the above subjects.

Biotech- M.Phil Thesis defense Seminar 0(0-0)

The student will deliver a seminar on the research topic allotted by the supervisor.

Biotech- M.Phil Thesis on the basis of Research Project 6(0-6)

MASTER OF PHILOSOPHY IN BIOTECHNOLOGY SEMESTER-1

Biotech-511 AGRICULTURE BIOTECHNOLOGY (3+0)

Course Contents:

Agricultural environment, productivity, Plant breeding, cell and tissue culture, plant transformation, methods of transformation in plants including competence, Electroporation, microinjection, particle gun. *Agrobacterium* biology: methods for assessing transformation, transgenic plants for herbicides, pests, fungal, bacterial and viral resistance, transgenic plants for nitrogen fixation, animal cell culturing, requirements of small and large-scale cell culture: Virus as a stable expression vector system.

Biotech-512 ADVANCES IN MICROBIOLOGY (3+0)

Course Contents:

Pathogenesis of Bacterial infection, Normal Flora, Antimicrobial Chemotherapy, Antibiotic resistance, Antimicrobial Susceptibility Testing, The Staphylococci, Streptococci and Enterococci, Enteric gram negative rods (Enterobacteriaceae), Mycobacteriology and Antimycobacterial Susceptibility Testing, Viruses, Antiviral Drugs, Acquired Immune deficiency syndrome (AIDS), Influenza virus, Hepatitis B and C, Epidemiologic and Infection Control Microbiology, Biohazards and Safety, Bioterrorism.

Biotech-513 PROTEIN CHEMISTRY (3+0)

Introduction of protein

Classification of proteins: (1) Based on shape (2) Based on chemical composition Based on solubility (4) Based on function

Amino acids; Classification, Isoelectric point of Amino Acids, one letter presentation

Protein Structure : Primary, Secondary, Tertiary and Quaternary Structure

Protein Properties: Isoelectric point of protein, Colloidal properties, Protein Protein precipitation, Protein sedimentation, Protein hydrolysis, Color reaction UV light absorption.

Protein Isolation and Purification

Disease related protein

Biotech-516 HEALTH BIOTECHNOLOGY (3+0)

Course Contents:

Introduction to Health biotechnology, Social acceptance of medical biotechnology, The molecular basis of disease, Molecular and genetic markers, Detection of mutations, Genetic testing and Prenatal diagnosis, Detection of infectious agents, Molecular Cytogenetics (FISH), ELISA, ARMS PCR, Monoclonal Antibodies, use of Monoclonal antibodies in therapy, Organ transplantation, transplant rejection, Applications of transgenic animals (animal models of diseases), Pharmacogenetics, Strategies of gene therapy, gene delivery vehicles, genetic disorders and gene therapy, Uses of stem cell technology

MASTER OF PHILOSOPHY IN BIOTECHNOLOGY SEMESTER-2

Biotech-521 GENE REGULATION AND EXPRESSION (3+0)

Course Contents:

Gene expression: regulation of gene expression in prokaryotes, the operon model Lac: an indelible operon, positive control of Lac operon by CAP and cyclic AMP. Regulation of gene expression and development in eukaryotes: cellular differentiation in higher eukaryotes: genetic control of development in Drosophilae, mechanism of regulation of transcription in eukaryotes: hormonal control of gene expression, genetic control of immune response: components of immune system; genetic control of cell division, oncogenes and proto-oncogenes

Biotech-523 ADVANCES IN IMMUNOLOGY (3+0)

Course Contents:

Immunology, Humeral and cell- mediated immunity, structure, types of Antigens and, structure, types of Antibodies**,** Genetic basis of antibodies production, Complement**,** Disorders of immune system**,** Infection, Immunodeficiency, Anaphylaxis and Allergy, Autoimmunity, Transplantation.

Biotech-524 PHARMACEUTICAL BIOTECHNOLOGY (3+0)

Biotech-525 MOLECULAR GENETICS (3+0)

Course Contents:

Introduction and history, Cell division, Mendal laws, inheritance and recombination, traits, Structural genomics, Organization and Structure of the Genomes, Structural Variation in the Genomes, Chromosome mapping, mutations and polymorphism, variations, molecular markers; types of molecular markers, Genetic disorders,Use of Molecular markers in Genetic disorders, pedigree analysis, DNA profiling,Genetic counseling and prenatal diagnosis.

Biotech- M.Phil Thesis Defense Seminar 00

The student will deliver a seminar on a topic allotted by the supervisor of the student on the allotted topic for research.

Biotech- M.Phil Thesis on the basis of Research Project 06(0-06)

The student will undertake experimental work on the topic of research allotted during the third semester and submit a thesis, which will be evaluated on the bases of experimental results obtained, quality of manuscript, oral presentation of research work and viva voce examination.