PERIYAR UNIVERSITY

PERIYAR PALKALAI NAGAR

SALEM – 636011

DEGREE OF MASTER OF PHILOSOPHY

CHOICE BASED CREDIT SYSTEM

SYLLABUS FOR

M.PHIL. BIOTECHNOLOGY

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to Periyar University from 2017-2018 onwards)

REGULATIONS

FULL - TIME

1. ELIGIBILITY

Candidates who have qualified for post graduate degree (any biological science) this University or any other University recognized by the Syndicate as equivalent thereto shall be eligible to register for the Degree of Master of Philosophy (M.Phil.) in their respective subject.

Candidates who have qualified their postgraduate degree on or after 1st January 1991 shall be required to have obtained a minimum of 55% of marks in their respective postgraduate degrees to become eligible to register for the Degree of Master of Philosophy (M.Phil.)

In this case of teachers (or) others registering for part-time registration, the minimum percentage of marks for registration is 50%. For the candidates belonging to SC/ST community, and those who have qualified for the Master's degree before 01.01.1991 the minimum eligibility marks shall be 50 % in their Master's Degree.

2. DURATION

The duration of the M. Phil. Course shall extend over a period of one year from the commencement of the course.

3. COURSE OF STUDY

The course of study for the degree shall consist of (a) Part-I comprising three written papers according to the syllabus prescribed from time to time; and (b) Part –II Dissertation

Part-I shall consist of Paper-I in Research Methodology and Paper-II is an advanced paper in the main subject. There shall also be a third paper which shall be the background paper relating to the proposed dissertation conducted internally by the College.

Part-II Dissertation

The exact title of the Dissertation shall intimated within one month after the completion of the written examination. Candidates shall submit the Dissertation to the University through the Supervisor and Head of the Department at the end of the year from the commencement of the course which shall be valued by internal examiner (supervisor) and one external examiner appointed by the University from a panel of four names sent by the Supervisor through the Head of Department /Principal at the time of submitting the dissertation. Submission or resubmission of the Dissertation will be allowed twice a year.

4. RESTRICTION IN NUMBER OF CHANCES

No candidate shall be permitted to reappear for the written examination in any paper on more than two occasions or to resubmit a dissertation more than once. Candidate

shall have to qualify for the degree passing all the written papers and dissertation within a period of three years from the date of commencement of the course.

5. CONFERMENT OF DEGREE

No candidate shall be eligible for conferment of the M.Phil. Degree unless he/she is declared to have passed both the parts of the examination as per the Regulations.

6. QUALIFICATIONS FOR PERSONS CONDUCTING THE M.PHIL. COURSE.

No teacher shall be recognized as a Supervisor unless he possesses a Ph.D degree or two years of PG teaching experience after qualifying for M.Phil. Degree.

Only the postgraduate departments of affiliated colleges will be recognized for conducting the M.Phil. course; provided however, the syndicate shall have the power to decide any other institutions of higher learning/research within the University area for conducting the M.Phil. Course on merits.

PART-TIME

7. ELIGIBILITY

i) Teacher candidates working in the University Departments.

ii) Teacher candidates working in the affiliated colleges and whose qualifications the University approved by this University.

iii) Teachers candidates working in Polytechnics approved by the Director of Technical Education or in Higher Secondary Schools and High Schools approved by State Board or Central Board of Secondary Education or Educational Institutions of IAF (within Periyar University area) who possess a Master's Degree. For the Master's Degree qualified prior to 01.01.1991, no minimum of 55% of the marks is prescribed, provided that for the candidates belonging to SC/ST community a concession of 5% marks will be given in the minimum eligibility marks prescribed.

8. DURATION

The course of study shall extend over a period of two years from the commencement of the course. The examinations for Part-I shall be taken at the end of the first year and Part – II Dissertation at the end of the second year.

9. The Regulations governing the full-time M.Phil course with regard to course of study, scheme of examinations passing minimum, etc and qualifications of guide conducting the M.Phil course shall apply to part-time candidates also.

10. Restriction in Number of Chances

No candidate shall be permitted to reappear for the written examination in any paper on more than two occasions or to resubmit a Dissertation more than once. Candidates shall have to qualify for the degree passing all the written papers and Dissertation more than once. Candidates shall have to qualify for the degree passing all the written papers and dissertation within a period of four years from the date of commencement of the course.

COURSE OF STUDY AND SCHEME OF EXAMINATION

Part	Course	Name of the Course	Credit	University Examination		Total Marks
				Internal (25%)	External (75%)	
I SEMESTER						
I	Paper I	Research Methodology	4	25	75	100
I	Paper II	Applied Biotechnology	4	25	75	100
I	Paper III	Guide Paper	4	25	75	100
II	Paper IV	Dissertation and Viva - Voce	12 (8+4)			200
		Evaluation	-	50	100	
		Viva	-	25	25	
		Total	**24**			**500**

Mark Distribution

Theory Examination:

Total marks	:	100
Internal assessment (IA	:	25 marks
University external (UE)	:	75 marks

Distribution of Marks for IA

Attendance	:	5 marks
Assignment	:	5 marks
Seminar	:	5 marks
Test	:	10 marks

QUESTION PAPER PATTERN FOR UE

Max. Marks: 75 Time : 3 Hours

Section – A (5x5 = 25 marks)

Answer All the Questions

(Internal choice- One Question from each unit)

Section – B (5x10 = 50 marks)

Answer All the Questions

(Internal choice - One Question from each unit)

M.PHIL. BIOTECHNOLOGY
PART - I
PAPER I - RESEARCH METHODOLOGY

UNIT I

Research methods: Basic and applied research, Steps in research, Selection of research problem, Research/Experimental design, Literature collection, Literature citation, Research report: components, Format of thesis and dissertation, Manuscript/research article, Review monographs, Bibliography and Reference, Significance of research.

Statistical methods – Data collection – Data presentation – Diagrams and Graphs. Data analysis – Measures of central tendencies, Standard deviation, Correlation, Regression and ANOVA. Statistical Software – SPSS.

UNIT II

Microscopy – Principles and applications of Light, fluorescent, Phase contrast, dark field, SEM, TEM and Confocal Microscopes. Principles of sedimentation Centrifugation techniques Density gradient centrifugation & Ultra centrifugation. Electrophoresis – Principles and applications of AGE, PAGE, 2D PAGE, PFGE, Isoelectric focusing. Blotting techniques.

UNIT III

Chromatography – Principles and applications of GLC, HPLC, Ion exchange and affinity chromatography. Molecular methods – Principles and applications of PCR, RFLP, RAPD, Nucleic acid labeling. DNA sequencing methods and Micro arrays. Immunological techniques- ELISA, IFT and FACS.

UNIT IV

Biochemical methods: Laws of absorption Principles and applications of UV Visible Spectrophotometer, AAS, NMR, ESR Spectroscopy, MALDI, FTIR. X Ray diffraction. Radioisotope techniques Principles and applications of radio isotopes, Autoradiography and Liquid scintillation spectrometry.

UNIT V

Biological Databases- uses –Sequence databases-Nucleic acid ,Proteins-Structural databases- PDB, CATH. Specialized databases – KEGG,OMIM, Sequence analysis – Local Alignment , Global alignment- BLAST, Multiple sequence alignment-ClustalW, Phylogenetic analysis, Secondary structure prediction – GOR, Chau-Fasman method, restriction site analysis, molecular visualization tool-Rasmol.

REFERENCE BOOKS

1. Wilson,K. & Walker,J. (2003). Practical Biochemistry, 5th Edition, Cambridge University Press.
2. Palanivelu, P (2001). Analytical Biochemistry and Separation techniques, Tulsi Book Centre, Madurai.
3. Gurumani, N. (2006). Research Methodology for Biological sciences, MJP publishers, Chennai.
4. David Mount. (2001). Bioinformatics. Sequence and Genome analysis, Cold Spring Harbor Laboratory Press.
5. Prakash, M & C.K. Arora. (1999). Laboratory instrumentation, Anmol Publications pvt Ltd.
6. Khan & Khanum. Fundamentals of Biostatistics, Ukaaz Publications.
7. Sambrook, Fritsch and Maniatis. (1989). Molecular Cloning- A laboratory manual, Cold Spring Harbor Laboratory Press.
8. John Webster , (2004). Bioinstrumentation, John weily & sons.
9. Mark Schena. (2002). Microarray analysis, 1st Edition, John Wiley & Sons Ltd.
10. Prescott LM, Harley JP and Klein DA. (2005). Microbiology, 6th Edition, McGraw Hill.
11. Upadhyay.A., Upadhyay & Nath (2006). Biological Chemistry, 2nd Edition, Himalaya Publishing House.

M.PHIL. BIOTECHNOLOGY
PART - I
PAPER II - APPLIED BIOTECHNOLOGY

UNIT I : Plant Biotechnology

Genetic engineering of Herbicide resistant plants, Insect resistance, Viral resistance – Stress tolerant plants, flower pigmentation,- modification of nutritional content,

Delayed fruit ripening, Artificial seeds, Terminator seed technology, Nif gene transfer. Intellectual Property Rights.

UNIT II : Animal Biotechnology

Transgenic animals (Cattle, Mice), super ovulation, Embryo transfer, IVF, Preservation Methods. Production of recombinant products – Growth hormones, Human interferons. Dairy Biotechnology, Seri technology. Stem cell therapy. Ethical issues of animal Biotechnology.

UNIT III: Bioprocess technology

Fermentation-Types, Fermentor - Types, Strain improvement, Media formulation Upstream & Down stream processing. Production of industrially important enzymes, antibiotics, organic acids, Vitamins & aminoacids.SCP. Role of GMOs in Biodegradation. Bioleaching

UNIT IV: Immunotechnology

Immunoglobulin genes – functions & phylogenetic analysis. Isolation, characterization, purification and production of lymphocytes. Role of Immuno Supperssors and Modulators. Molecular Immunodiagnostic methods. Specificity of T-cell receptors. Role of Biotechnology in Vaccine production. Monoclonal antibodies.

UNIT V: Nanobiotechnology:

Nanoparticles - Metals. Biological networks. Bionano Particles - nanostarch, nanoparticulate, nanocomposites,nanobiosensors. Dentrimers as nanoparticulates. Nanotechnology in Molecular diagnosis. Nanotechnology in drug Discovery & Delivery. Applications of nanomaterials in medicine. Ethical considerations of Nanobiotechnology.

REFERENCE BOOKS

1. Hammond J, McGarvey P andYusibov V. (2000). Plant Biotechnology, Springer verlag.
2. Paul Christou and Harry Klee. (2004). Hand Book of Plant Biotechnology, Vol I& II. John Wiley & Sons. Ltd.
3. Chawla HS. (1998). Biotechnology in crop improvement, International Book Distributing Company.
4. Nigel Jenkins. Animal Cell Biotechnology: Methods and protocols, Humana Press.
5. John,R, Masters W. (2000). Animal Cell Culture- Practical approach, 3rd Edition, Oxford University Press.
6. Satyanarayana U. 2005. Biotechnology, Books and Allied (p) Ltd.
7. Peter F. Stanbury. Principles of Fermentation Technology, Butterworth-Heinemann, Elsevier Science Ltd.
8. Alexender N Glazer & Hiroshi Nikaido WH. (1995). Microbial Biotechnology, Freeman and Company.
9. Rajasekara Pandian M and Senthilkumar B. (2007). Immunology and Immunotechnology, Panima Publishing Corporation, New Delhi.
10. Kuby J. (1997). Immunology, 3rd Edition, WH Freeman & Co. New York.
11. Christof M.Niemayer,Chad A.Mirkin. (2004). Nanobiotechnology: concepts, applications and perspectives, Wiley VCH publishers.