

SCHOOL OF STUDIES IN BIOTECHNOLOGY

**Pt. Ravishankar Shukla University
Raipur-492 010**

Syllabus

M.Phil. in Biotechnology

**Session
2019-2020**

**BoS approved syllabus for M.Phil. in Biotechnology
(Academic session 2019-20)**

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M.Phil. Biotechnology

Scheme of Examination (2019-2020)

S.N.	Paper Code	Title of Theory/Practical Paper	Marks
i	01	Research Methodology	100
ii	02	Applied Biotechnology	100
iii	Lab Course	Based on Theory papers 1,2	100
Total Marks			300

iv	Seminar	Seminar based on theory	50
v	Dissertation	Seminar based on dissertation	50
		Dissertation Writing	75
		<i>Viva-voce</i>	25
Total Marks			200
Grand Total			500

Distribution of 100 marks of practical:

Time: 6 hrs

Total Marks: 100

Q1. Experiment(s) based on theory paper 1	30
Q2. Experiment(s) based on theory paper 2	30
Q3. <i>Viva voce</i>	20
Q4. Sessional	20

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M.Phil. Biotechnology

Paper 1 - Research Methodology

M.M. 100

Unit –I

1. Essential steps in research: Basic and applied research
2. Importance of literature collection: Different system of literature citation and components of research report
3. Research report presentation: Tables, figures, formatting and typing
4. Basic principles of experimental design: Experimental error and control

Unit –II

1. Introduction to general laboratory measure
2. Laboratory acquired infections
3. Radiation hazards and spillage disposal
4. Experimental animals: Ethics and biological models

Unit – III

1. Basics of Computer Application , Application of software,
2. MS office, Photoshop, Corel,
3. Internet use and its application in Biotechnology
4. Fundamentals of Bioinformatics
5. Biological databases and their uses in Biotechnology

Unit –IV

1. Sequencing methods: DNA and proteins
2. Radioisotopic techniques and its biological application
3. Biosensors: Development, Types Application of biosensor.

Unit – V

1. Measures of variability: Standard Deviation, standard error, coefficient of variation
2. Correlation and Regression
3. Test of significant: t-test, chi-square test and analysis of variance
4. Frequency distribution: Binomial and normal distribution

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Books:-

1. Diana Rain, Marni Ayers Barby (2006) Textbook on Q level Programming. 4th Edition.
2. Karl Schwartz (2006) Guide to Micro Soft. Marina Raod. 4th Edition.
3. C.S.V. Murthy (2003) Bioinformatics. First Edition, Himalaya Publishing House.
4. Dov Stekel (2005) Microarray bioinformatics. Cambridge University Press.
5. S.C. Rastogi, Namita Mendiratta, Parag Rastogi (2003) Bioinformatics: Concepts, Skills and Applications, CBS Publishers and Distributors, New Delhi.
6. Andreas D. Baxebanis. B.F. Francis Ouellette (2001). Bioinformatics: A practical Guide to the Analysis of genes and proteins. Wiley Interscience.
7. C. Subramanian (2004) A Text Book of Bioinformatics. Dominant Publishers and Distributors, New Delhi.
8. Anmesh K. Dutta (2004) Basic Biostatistics and Its Application. New Central Book Agency (P) Ltd. Kolkata.
9. P.K. Banerjee (2018) Introduction to Biostatistics. S. Chand & Company Ltd.
10. P.S.S. Sunder Rao and J. Richard (2012) Introduction to Biostatics and Research Methods, 5th edition.
11. Johathan Pevsnev (2015) Bioinformatics and Functional, 3rd edition.
12. M. Debnath (2011) Tools and Techniques in Biotechnology.
13. Rosner, B. (2000). Fundamentals of Biostatistics. Boston, MA: Duxbury Press.

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M.Phil. Biotechnology

Paper 2 – Applied Biotechnology

M. M. 100

Unit – I

1. Micro-propagation method for different plants (Banana, Sugarcane and Eucalyptus).
2. Metabolic engineering and industrial products: Secondary metabolites, edible vaccines/industrial enzymes
3. Anther culture, embryo and endosperm culture
4. Cryopreservation and DNA banking for germplasm conservation

Unit – II

1. Immunodiagnostic techniques: Agglutination techniques, Western blotting
2. Monoclonal antibodies: Preparation and application
3. Application of animal tissue culture.
4. Stem cell theory, Tissue engineering

Unit – III

1. Bioreactors : Structure, types and application
2. Microorganisms in Bioprocess engineering
3. Industrial products and Microbes with special reference to Alcohol, Acids, Antibiotics.
4. Food processing, Bioleaching and Biosensor

Unit – IV

1. Environmental biotechnology: Utilization of various microorganisms for pollution control
2. Pollution: Definition, effects, causes and control
3. Xenobiotics,
4. Bioremediation

Unit – V

1. Electrophoresis : Principle, Types and Applications
2. Principle and working of PCR
3. Applications of PCR in genetic finger printing of human and plant genomes

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Books:-

1. Thomas J Kindt, Barbara A. Osborne and Richard A. Goldsby (2007) Immunology 6th edition; W. H. Freeman.
2. J.Kuby (2006) Immunology. W.H. Freeman and Company, New York.
3. Razdan M K (2010) Introduction To Plant Tissue Culture, 2nd edition, Oxford & Ibh Publishing Co. Pvt Ltd
4. Michael L. Shuler, Fikret Kargi(2002) Bioprocess engineering: basic concepts; Prentice Hall.
5. Manoj, Kapil and Archana (2013) Environmental studies. I.K. International Publishing House Pvt. Ltd., New Delhi.
6. A.K. Chatterjee (2011) Introduction to Environmental Biotechnology. Prentice Hall of India Pvt. Ltd.
7. David Evans Reisner(2009) Bio-nanotechnology: global prospects; CRC Press.
8. U. Satyanarayana (2005) Biotechnology. Books and Allied (P) Ltd., Kolkata.
9. Hans-Joachim Jördening, Josef Winter (2005) Environmental biotechnology: concepts and applications; Wiley-VCH.
10. P. F. Stanbury A, Whitaker and S.J. Hall (1995) Principles of Fermentation technology, second Edition, Pub. Butterworth-Heinemann, An imprint of Elsevier.
11. Lewin Benjamin (2007) Gene IX; Jones And Bartlett Publishers.
12. John R. W. Masters (2000) Animal cell culture: a practical approach; Oxford University Press
13. Press L Y Kun (2003) Microbial Biotechnology: Principles and applications.
14. GL Hornyak, HF Tibbals, and J Dutta: Fundamentals of Nanotechnology, 2008
15. S Choudhuri, and DB Carlson (2008) Genomics: Fundamentals and applications, 1st edition,
16. Rita Khare (2013) Concepts in Nano Biotechnology.
17. Sharad Saxena (2011) Microbiology and Environmental Toxicology, Published by Manglam Publications.
18. Veena Kumari (2012) Food Microbiology
19. P.S.S. Sunder Rao and J. Richard (2012) Introduction to Biostatistics and Research Methods, 5th edition,
20. Johathan Pevsnev (2015) Bioinformatics and Functional, 3rd edition
21. M. Debnath (2011) Tools and Techniques in Biotechnology,

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List of Practical's for M. Phil Biotechnology

1. To study citric acid production, qualitative and quantitative estimation. (Industrial Biotechnology).
2. Fermentation of carbohydrate by fungal strain. (Industrial Biotechnology).
3. Fermentation of carbohydrate by bacterial strain. (Industrial Biotechnology).
4. Effect of antibiotic on bacterial strain (Gram positive). (Industrial Biotechnology).
5. To study the effect of xenobiotic on microbial fungal growth (*Aspergillus* species). (Environmental Biotechnology).
6. Plant Tissue Culture: Micropropagation
7. Plant Tissue Culture: Callus culture and organogenesis.
8. Extraction of DNA from plant leaves by CTAB methods.
9. Estimation of plant genomic DNA by Spectrophotometer methods.
10. Separation of plant genomic DNA by Agarose gel electrophoresis.
11. DNA amplification by PCR.
12. Genetic Engineering: Dot ELISA. (Kit based).
13. Genetic Engineering: Sandwich ELISA. (Kit based).
14. Genetic Engineering: Radial Immuno Diffusion. (Kit based).
15. Genetic Engineering: Agglutination. (Kit based).
16. To perform t-test for given data of samples of leaves.
17. To perform Chi-square test from given samples of leaves.
18. To calculate standard deviation from given data.
19. To study the data presentation in graphical from.
20. Research report presentation through tabulation of data.
21. Applications of internet.

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M.Phil. Biotechnology, 2019 - 2020

Dissertation Work

The dissertation work should be related to the field of Biotechnology. The dissertation work should include declaration by the candidate; certificate by the supervisor, acknowledgement, title and introduction along with the following points:

1. Introduction
2. Review of Literature
3. Materials and Methods
4. Results & Discussion
5. Summary
6. Bibliography

Last date of submission of dissertation work: As per M. Phil. Ordinance

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