

JIWAJI UNIVERSITY
GWALIOR (M.P.)

SYLLABUS

FOR

M.Phil. (BOTANY)

SEMESTER SYSTEM

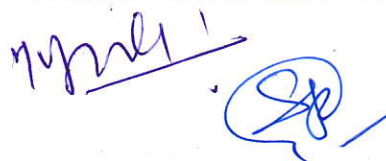
SESSION

2020 – 2021

Jiwaji University, Gwalior, M.Phil. in Botany, Semester System: 2020-21

Table I: Course Structure of M.Phil. in Botany as per the ordinance no 13 published in the Gazette of India on July 05, 2016. M.Phil. programme shall be of two (2) consecutive semesters/ one year.

First Semester: The credits of the M.Phil. course work (24 credits) will be as under-	Second Semester: Upon satisfactory completion of course work, the M.Phil. scholars shall be required to undertake research work (dissertation/thesis) in the second semester (24 credits). Along with some seminars and presentations as prescribed below-
(i) Research Methodology (4 credits) (ii) Computer applications (4 credits) (iii) One of the following optional Advance subjects in the relevant field (4 credits) a. Agroecology b. Microbial Biotechnology c. Environmental waste: Utilization and Green Scenario d. Ethnobotany-Techniques and Pharmacognosy. (iv) Review of published research in the relevant field (4 credits) (v) Synopsis submission (4 credits) (vi) Comprehensive Viva-Voce (4 credits) Note: Dissertation topic to be allotted and synopsis submission in the first semester and to be submitted for evaluation in II Semester.	(i) Seminar (4 credits) (ii) Term paper/ Assignment (4 credits) (iii) Final Dissertation/ Project presentation (12 credits) (iv) Comprehensive Viva-Voce (4 credits)
The examination and evaluation scheme for M.Phil. course work shall be according to the examination and evaluation scheme of the University as applicable to the other programmes of the UTDs. Each paper will be of 100 marks in each semester. The marks thus obtained in each paper will be converted into grades as per the scheme of the examination.	

JIWAJI UNIVERSITY, GWALIOR
CBCS Scheme of Examination
M.Phil. (Botany) First Semester December- 2020

Course Code MPHB-	Course Name	Total Marks	Min pass Marks	Credit C(i)	End Semester Examination Marks			Internal Assessment Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA $S(1) = \frac{\sum C(i).G(i)}{\sum C(i)}$
					Max	Min	Obtaine d	Max	Min	Obtained				
101	Research Methodology	100	55	4	60	33		40	22					
102	Computer applications	100	55	4	60	33		40	22					
103	Advance topic in Botany One of the following optional Advance subjects in the relevant field a. Agroecology b. Microbial Biotechnology c. Environmental waste: Utilization and Green Scenario d. Ethnobotany-Techniques and Pharmacognosy.	100	55	4	60	33		40	22					
104	Review of published research in the relevant field	100	55	4	x	x		100	55					
105	Synopsis submission	100	55	4	x	x		100	55					
106	Comprehensive viva-voce	100	55	4	x	x		100	55					
	$\sum_{i=0}^6 C(i)$			24										

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JIWAJI UNIVERSITY, GWALIOR
CBCS Scheme of Examination
M.Phil. (Botany) Second Semester June- 2021

Course Code	Course Name	Total Marks	Min pass Marks	Credit C(i)	Marks			Total Obtained Marks	Grade Points G(i)	Letter grade	SGPA S(2) = $\frac{\sum C(i) \cdot G(i)}{\sum C(i)}$
					Max	Min	Obtained				
201	Seminar	100	55	4	100	55					
202	Term paper/ Assignment	100	55	4	100	55					
203	Final Dissertation/Project Presentation	-	-	12	-	Pass/Fail					
204	Comprehensive viva-voce	100	55	4	100	55					
	$\sum_{i=0}^6 C(i)$			24							

Sem. I		Sem. II		CGPA = $\frac{\sum SC(i) \cdot S(i)}{\sum SC(i)}$	Result
SC(1)	S(1)	SC(2)	S(2)		
24		24			

$SC(i) = \sum C(i)$, $SGPA = S(j)$, $j = j^{th}$ Semester; $SGPA =$ Semester Grade Point Average. $CGPA =$ Cumulative Grade Point Average

NB : A student has to acquire minimum 55% marks. In end semester examination minimum 33 out of 60 and in internal assessment minimum 22 out of 40. The sum of both should be 55 or more. Grades will be decided by the marks obtained out of 100 on a 7.0 point scale.

The student will be promoted to the next semester after passing courses equivalent to 12 valid credits.

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Description of grade letter and grade points:

Letter Grade	Grade Points	Description	Range of Marks (%)
O	10	Outstanding	90-100
A+	9	Excellent	80-89
A	8	Very good	70-79
B+	7	Good	60-69
B	6	Above Average	50-59
C	5	Average	40-49
P	4	Pass	35-39
F	0	Fail	0-34
Ab	0	Absent	Absent

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Compulsory –I

MPHB:101- RESEARCH METHODOLOGY (Botany)

1. Introduction to Research Design

Nature and objectives of research, Methods of research: Historical, descriptive and experimental, research process, research approaches, criteria for good research, meaning of research design, need of research design, features of good designs, different research designs and basic principles of experimental designs, design of experiments.

2. Data collection and Analysis

Types of data, methods and techniques of data collection, primary and secondary data, meta analysis, historical methods, content analysis, devices used in data collection, pilot study and present of tools, choice of data collection method.

3. Data processing and Analysis

Measures of Central Tendency, Measures of Dispersion, Measures of dispersion, Measures of Central Tendency Vs Measures of Dispersion, Normal Distribution, Measures of Skewness and Interpretation, Correlation and Regression: Types and applications.

4. Test of Significance

Significance of difference in means: Standard deviation and standard error, Z-test, 't' test and Chi-square test: purpose and use, Analysis of variance.

5. Paper writing and report generation

Basic concept of paper/thesis writing and report generation, writing Research Abstract, Introduction, Review of Literature, Results, Conclusion, Concepts of Bibliography and References, Significance of Report Writing, Types of Research Reports, Methods of presentation of Reports, Formats of publication in Research Journals.

Reference Books:

1. Research Methodology: Methods and Techniques-C.R. Kothari, New Age Publisher.
2. Research Methodology: R. N. Trivedi and D.P. Shukla, College Book Depot, Jaipur.
3. Research Methodology: Research Methodology: D. Chakraborty, Lotus Press.
4. Research Methodology for Life Sciences: N. Arumugam, Saras Publication.
5. Random Data Analysis and Measurements Procedures: Bendat and Piersol, Willey Interscience.
6. Research Methodology: Bin Taylor, G. Sinha, N. T. Ghoshal, Prentice Hall of India Pvt. Ltd.
7. Methods in Biostatistics: B. K. Mahajan, Jaypee Brothers Medical Publishers, New Delhi India.
8. Research Design: J. W. Creswell, SAGE Publications, INC.
9. Principles of Biostatistics: Marcello Pagano, CRC Press, Taylor and Francis

Latest additions of the Books*

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Compulsory –II

MPHB : 102 - Computer Applications and Bioinformatics (Botany)

1. Computer Fundamentals

Computer Basics and Terminology, Input and Output devices, Computer memory, Computer generation and Classification, Types of software, Operating System, Their Types, Basics terms related to Windows OS, Computer Networks, LAN, MAN, WAN. Research Polishing Tool-MS Word, Creating, editing and saving a word document, Use of Auto text, Table related operations, graphics.

2. Introduction to Spreadsheets and Presentation

Introduction to Excel, Use of Spreadsheet in Research, Data Storing, Various Data Types, Use of Formula and Functions, Calculate, Manipulate and Analysis of Data, Preparing charts.

MS Power Point, Features and Functions, Creating presentation, Animation, Customizing presentation.

3. Introduction to Internet and Computer Applications

Introduction to Internet, WWW, Searching on Internet, Literature survey, Website, Search Engines, Anti-Plagiarism software, Viruses and its Types, Protection from Viruses, Introduction of computers in Research: Literature Search using various Search Engines, Writing References, Software for Reference arrangement, Statistical Packages: Sigma plot.

4. Bioinformatics

Applications of Bioinformatics in Life Sciences, Biological Databases: Primary, Secondary and Composite Database, Sequences Database: Nucleic acid (EMBL and GenBank), Protein Database (PIR and SWISS-PROT), Structure Database: Protein Data Bank.

Sequence Analysis: Biological Motivation of Sequence Analysis, Homology, Base Pair, Alignment, Local, Global and Tool for Base pair Alignment: BLAST and FASTA, Multiple Sequence Alignment Methods.

5. Phylogenetic Analysis, Protein Structure Prediction, Drug Designing

Phylogenetic Analysis: Methods, character based and distance based method, tree evaluation, Protein Structure Prediction, homology modeling, threading, ab-initio methods, Expression Sequence Tags (EST) and its Applications, Microarray Database and its Applications

Reference Books*:

1. An Introduction to Computational Biochemistry: C. Stan and T. Sal.
2. Introduction to Bioinformatics: A theoretical and Practical Approach: S.A. Krawetz and D. D. Womble.
3. Bioinformatics, Genes, Proteins and Computers: C. A. Orengo, B. T. Jopnes, J. M. Thornton.
4. Instant Notes on Bioinformatics: D.R. Westhead, J. M. Perish, R. M. Toyman.
5. Essential Bioinformatics: Jin Xiong.
6. An introduction to Bioinformatics Algorithms: N. C. Jones, P. Pebzner.
7. Bioinformatics: Sequence and Genome Analysis: D. W. Mount.
8. Statistical Methods in Bioinformatics: An Introduction: S. Misener, S. A. Krawetz.
9. Bioinformatics: Database and Algorithms: N. Gautham.
10. Bioinformatics Technology: Yi-Ping Phoebe Chen.
11. Data Mining: Multimedia, Soft Computing and Bioinformatics: S. Mitra, T. Acharya.

One advance subject in the relevant field (Elective papers):

MPHB 103 (a): AGROECOLOGY

UNIT I

Concept of agroecosystem
Plantation crops+spices crops.
Horticulture crops+forage crops.
Land utilization.

UNIT II

Agroclimatic zones of India.
Agriculture legislation.
Agriculture marketing storage.

UNIT III

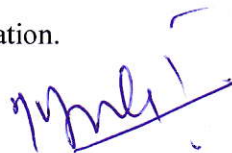
Structural components of Agroecosystem
Functional components of Agroecosystem
Weed control
Common diseases of cereals.

UNIT IV

Phytoallelopathy in crops.
Biofertilizers and thrie role in cropland ecosystem.
Farm management.
Soil fertility.

UNIT V

Cropping pattern
Water management in crop production
Insects and pests of cropland.
Nematodes of cropland.
Agriculture extension education.



MPHB 103(b): MICROBIAL BIOTECHNOLOGY

UNIT I

Biotechnical applications of Microorganisms; Value added products of microbial origin; Screening of useful strains: Strain improvement through random mutation, Role of genetic engineering in strain improvement.

UNIT II

Brief history of fermentation. Fermentation- general concepts, Applications of fermentation. Component parts of a fermentation process. Types of fermentations- Aerobic and anaerobic fermentation, Submerged and solid state fermentation; Factors affecting submerged and solid state fermentation

UNIT III

Industrial fermentation : Primary and secondary metabolites. Industrial Production: Typical Fermentation processes for the industrial production of Wine, Beer, Streptomycin, Riboflavin, Gibberellins. Microbial Enzymes - Enzyme immobilization, Microbial Insecticides. Production of SCP - Spirulina and yeast.

UNIT IV

Microorganisms in Bioprocess engineering: Industrial products and Microbes with special reference to alcohol, organic acids and antibiotics, Food processing, bioleaching and biosensors.

UNIT V

Intellectual Property Rights (IPR), Patents, Trademarks, Copyrights. Introduction to Patenting of Microbiological materials and GMO, implication of patenting, current issues. patenting of genes and DNA sequences.

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MPHB 103(c): Environmental Waste : Utilization and Green Scenario

Unit I : Environmental Waste :

Definition, Sources & Classification of Waste.
International Treaties & Convention for Environmental Waste
World wide/ Indian scenario of different types of waste.
Government notifications; 3 R concept in our Home and in our Country
3 D concept in our Home, in our City and in our Country

Unit II : Hazardous Waste (HW):

Sources and Classification of HW
Storage and Collection of HW
Compatibility and Flammability of hazardous chemicals
Problems in Developing Countries
E waste & Future challenges.

Unit III : Non Hazardous Waste (NHW):

Sources and Types of NHW
Collection & Segregation NHW
Sustainable Management of NHW
Integrated solid waste management

Unit IV : Mirror Waste :

Aqua Waste - Industrial & Domestic Contaminants
Agriculture waste & Utilization
Fly ash management
Indian case studies on Environmental improvement
EA & EIA for environmental waste

Unit V : Green Concept :

Clean India Green India Concep
Biodiversity & Green Belt Development
Green people; Green Organization & Green Technology
Ecotechnology; Mushroom Cultivation Bioremediation:
Concept of sustainable development
Corporate environmental ethics.

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MPHB 103(d): Ethnobotany- Techniques and Pharmacognosy.

UNIT I

Ethnobotany & its interdisciplinary approach

- Important tribal communities of the world and India: Life style & ethnobotanical aspects
- Wild plants in Indian folk life: faith, taboos, totems, sacred groves etc.
- Plants used by tribals in scarcity, emergency and supplementary food. Ethnoveterinary medicinal plants.
- History and principles of Ayurveda, Homeopathy, Unani, Siddha, systems of medicine, Tridosha theory of Ayurveda.

UNIT II

- **Distillation:** Introduction; Batch and continuous distillation, separation of azeotropes, plate columns and packed columns.
- **Absorption:** Introduction, Equipments – packed columns spray columns, bubble columns, packed bubble columns, mechanically agitated contractors.
- **Evaporation:** Introduction; Equipments short tube (standard) evaporator, forced circulation evaporator, falling film evaporators, climbing film (upward flow) evaporators, wiped (agitated) film evaporators.
- **Filtration:** Introduction, Filter media and filter aids, Equipment- Plate and frame filter press, itch filter, rotary drum filter, sparkler filter, candle filter, bag filter, centrifuge.

UNIT III

- **Drying:** Introduction; free moisture, bound moisture, drying curve, equipments – tray drier, rotary dryer, flash dryer and spray dryer.
- **Extraction:** Introduction; selection of solvents, Equipments – spray column, packed column rotating disc column, mixer settler.
- **Crystallization:** Introduction; Solubility, super-saturation, nucleation, crystal growth, Equipment – tank crystallizer, agitated crystallizer, evaporator crystallizer, draft tube crystallizer.

UNIT IV

- History and scope of Pharmacognosy to various systems of medicine.
- Classification of Chemical constituents, properties and biological sources of following: Tanins, Glycosides, Saponins, Latex and Terpenoides

UNIT V

- Alkaloids: Occurrence, Classification, isolation, properties, structure and uses
Occurrence, Classification and properties of phenolic compounds.

