

# **BHAGWANT UNIVERSITY**

**Sikar Road, Ajmer**

**Rajasthan**



## **Syllabus**

**Institute of Life Science & Applied Sciences**

**M. Phil I Semester**

**Botany**

### Course Category

MBot : M.Phil in Botany

CCC: Compulsory Core Course

ECC: Elective Core Course

#### Contact Hours:

L: Lecture

T: Tutorial

P: Practical or Other

#### Marks Distribution :

IA: Internal Assessment (Test/Classroom Participation/Quiz/Presentation/Assignment etc.)

EoSE: End of Semester Examination

### **M. Phil (Botany)**

#### **(Course Structure)**

Subject code	Subject Name	Teaching hours			Marks		
		L	T	P	External	Internal	Total
01MBot101	<b>Research Methodology: Theory &amp; Techniques</b>	3	0	0	70	30	100
01MBot102	<b>Advanced Cytogenetics</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>70</b>	<b>30</b>	<b>100</b>
01MBot103	<b>MICROBIOLOGY AND INDUSTRIAL</b>	3	0	0	70	30	100

	<b>BIOTECHNOLOGY</b>						
<b>01MBot104</b>	<b>PLANT CELL, TISSUE AND ORGAN CULTURE</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>100</b>		<b>100</b>
<b>Total</b>		<b>12</b>	<b>0</b>	<b>0</b>	<b>280</b>	<b>120</b>	<b>400</b>

### Research Methodology Theory And Techniques

**Course/Paper: O1MBot101**

#### **Unit - 01**

Research - definition - importance and meaning of research - characteristics of research - types of research - steps in research - identification, selection and formulation of research problem – research questions - research design - formulation of hypothesis - review of literature

#### **Unit - 02**

Sampling techniques : sampling theory - types of sampling - steps in sampling - sampling and non-sampling error - sample size - advantages and limitations of sampling. Collection of data : primary data - meaning - data collection methods - secondary data - meaning - relevances, limitations and cautions.

#### **Unit - 03**

Statistics in research - measure of central tendency - dispersion - skewness and kurtosis in research. Hypothesis - fundamentals of hypothesis testing - standard error - point and interval estimates - important non-parametric tests : sign, run, kruskal - wallis tests and mann-whitney test.

## **Unit - 04**

Para metric tests : testing of significance - mean, proportion, variance and correlation - testing for significance of difference between means, proportions, variances and correlation co-efficient. Chi-square tests - anova - one-way and two-way.

## **Unit - 05**

Research report : types of reports - contents - styles of reporting - steps in drafting reports - editing the final draft - evaluating the final draft.

# **ADVANCED CYTOGENETICS**

01MBot102

## **Unit - 01**

Dynamics of cell division. Karyotype differentiation and evolution. chromosomal aberrations ( numerical and structural) Translocation Inversions. Duplication and deficiencies Their role in chromosome mapping

## **Unit – 02**

Evolutionary role of polyploidy and its uses: Aneuploids Alien chromosomes, gene substitution and addition and their probable role in crop improvement.

## **Unit – 03**

Cytogenetic nature of sex determination.

## **Unit – 04**

Structure and composition of chromatin & chromosomes including the details of the structure of centromere and telomeres.

## **Unit – 05**

Techniques and mechanism of banding in chromosomes.

## **MICROBIOLOGY AND INDUSTRIAL BIOTECHNOLOGY**

### **01MBot103**

#### **Unit – 01**

scope and application of microbes in :

- (a) Agriculture with reference to biological nitrogen fixation.
- (b) Food (sources of food and feed)
- (c) Pollution (degradation of pesticides and hydrocarbons in soils).

#### **Unit – 02**

Biococnversion of agricultural crop residues and garbage by microbes for the production of alcohol and biogas. Medical microbiology: Laboratory diagnosis of important human diseases antimicrobial drugs and their mechanism of action and drug resistance.

#### **Unit – 03**

Immunobiology \_preparation of antigens and antisera, characterization of antigen antibody reactions by immunodouble diffusion and general immunoelectrophoretic techniques and western blotting, characterization of antigenic sites by immunoelectron microscopy, strategies for the production of vaccienes and monoclonal antibodies.

#### **Unit – 04**

Microbiology of phylloplane and its applications in biological control of airborne insect pests and fungal pathogens. Microbiology of rhizosphere and its importance in controlling soil-borne plant pathogens. General considerations of microbial strain improvement for agriculture, medicine and industry.

### **Unit – 05**

General considerations for biotransformation and production of useful compounds through cell culture, factors affecting yield; immobilized cell systems and bioreactors.. Industrial production of:

- (a) Antibiotics
- (b) Acetic acid
- (c) Lactic acid
- (d) Citric acid
- (e) Common enzymes and
- (f) Microbial insecticides

## **PLANT CELL, TISSUE AND ORGAN CULTURE**

01MBot104

### **Unit – 01**

Techniques of organ, tissue, free cell and protoplast culture. Methods of preparation and sterilization of tissue and culture media. Aspects of nutrition of plant tissue and organ cultures.

### **Unit – 02**

In vitro culture and application of the following:

-Apical meristem

-Flower, fruit

-Anther and pollen, pathways of androgenesis

-Ovary, ovule, nucellus and endosperm

-Embryo and its significance in breeding

### **Unit – 03**

Protoplast culture, somatic hybridization and its application in crop improvement.  
Totipotency of free angiosperm cell and the significance of free cell culture

### **Unit – 04**

Growth, differentiation and organogenesis in plant tissue and organ culture.  
Somaclones and induced variations

### **Unit – 05**

Gene delivery systems and role of transgenes in crop improvement. Industrial  
production of secondary metabolites from callus