



## **DEPARTMENT OF BOTANY**

**UNIVERSITY OF CALICUT**

# **BRIDGE COURSE**

**30 November – 07 December 2021**

### **PREFACE**

The M.Sc. Applied Plant Science programme of the University of Calicut is of high demand in the field of life sciences in Kerala. The essential requirement for the admission to the programme is a Bachelor's Degree in Botany or Plant Science of the University of Calicut or an equivalent degree of any other university recognized by the University of Calicut. Students from various universities aspire to pursue M.Sc. Applied Plant Science Programme of this university. All universities may not have a syllabus equivalent to the course content of the UG Botany/plant science syllabi (of University of Calicut) and the enrolled students may feel difficulty in studying the advanced contents of the PG programme in Applied Plant Science. This bridge course is a pragmatic, proactive and progressive step in view of helping those students. This will upgrade the basic knowledge and understanding of the students in the subject.

### **OBJECTIVES**

1. To bridge the gap between the course contents of syllabi in UG Botany/Plant Science of the University of Calicut and other Indian Universities.
2. To impart minimum graduate level basic training in Botany for the students admitted to the PG programme and to strengthen the base of students in basic and fundamentals of Botany.
3. To leverage the learning skills of slow learners with different learning ability, academic standards and academic performance.
4. To bring back the slow learners who have fallen behind and failed to utilize the best of their ability

## **SCHEME FOR IMPLEMENTATION**

Students enrolled for the first semester of M.Sc. Applied Plant Science shall complete the modules prescribed in the syllabus and undergo an evaluation process before the commencement of the regular courses of the programme. The Bridge course will be conducted in the Department of Botany, University of Calicut through contact online/offline classes/laboratory training and by self study by the students. Slow learners if any will be given additional guidance and training. In case of failure in the course, such students shall have to complete the course with the guidance of the teachers within the period of the first semester.

## **EVALUATION**

Examinations of the Bridge Course (Theory and Internal) shall be conducted by the Department of Botany, University of Calicut, and the pattern of the question papers will be decided by the Department Council. Twenty percent (20%) will be internal marks for the course, that may include tests, presentation, assignment, *viva voce*, etc. There is no practical examination for the Bridge Course. Question paper setting, evaluation and declaration of results will be entrusted entirely internally to the Department. The Head of the Department shall issue the “Certificate of Qualifying the Bridge Course” to the successful candidates. There shall be no revaluation of theory or internal papers under any circumstances. All the records and documents pertaining to the course shall be maintained by the Department of Botany, University of Calicut.

## **PASSING STANDARDS AND AWARD OF GRADES**

For passing the Bridge Course a candidate must score a minimum of 40% marks in aggregate with a minimum of 40% in theory examination. “Grade” (from O to E) and CGPA will be awarded to the successful candidate as per the Credit Based Grading System.

## **FEES**

No fee will be charged from the students/as prescribed by the University of Calicut.

## **SYLLABUS**

### **Module 1 (6 hours)**

A general introduction about the Course Structure (M.Sc. Applied Plant Science), Credit and Mark distribution, and Scheme of theory and practical examinations. Career prospectus in the field of Plant Sciences.

Classroom procedures. laboratory ethics and safety measures; concept of biosafety; social responsibility.

Basic laboratory techniques: Microscopy – Principles and types of microscopes; micrometry; camera lucida; microphotography; photomicrography,

Killing and fixing fluids; common stains and staining techniques; mounting media.

Separation techniques: Types, principles and applications of centrifuges; chromatography; electrophoresis.

Buffers; pH and pH meter; Training on handling various minor equipments for practicals like micropipette, pH meter, water bath operation, making of stains for anatomy and microtechnique; hand sections, basic staining procedures and slide preparations; scientific drawing.

### **Module 2 (6 hours)**

Introduction to the basic structure of cell: Cells in the Kingdoms of life (Monera, Protista, Fungi, Plantae and Animalia), Difference between Prokaryotic and Eukaryotic cells.

General characters of algae, cyanobacteria, bacteria and viruses. An Overview of the Diversity and Classification of Fungi.

Cell reproduction and cell cycle: brief account of mitosis and meiosis.

Comparison of cellular junctions – plasmodesma in plants and gap & other junctions in animals.

Cell Biology Techniques: brief account on the various techniques used in Cytology to study cells.

Introduction to Molecular Biology: Genome in Prokaryotes and eukaryotes, it's replication, gene expression and gene regulation. Organellar genome.

Plant Tissues: Meristems – Classifications based on origin, position and functions; permanent tissues: simple, complex and secretory.

Development of primary plant body; structure of dicot and monocot embryo; primary structure of root, stem and leaf; secondary growth in dicot stem and root.

### **Module 3 (5 hours)**

Origin of life on earth; origin of prokaryotes and eukaryotes; Origin of Earth, Physical processes associated with Earth. Origin of prokaryotes and eukaryotes. Salient features and general pattern of evolution in different groups of plants – from algae to angiosperms. Geological time scale. Ecosystems and ecological interactions. Phylogeny: monophyly, polyphyly, paraphyly. Reproduction and life cycle in plant kingdom: Vegetative methods; asexual methods; sexual methods – isogamy, anisogamy, oogamy; types of life cycles: haplontic, diplontic, haplo-diplo biontic. Reproduction in flowering plants: Parts of flower: Bracts, bracteoles, axis, calyx, corolla, androecium, gynoecium; fruits and seeds.

Basic concepts of species; basic concepts of botanical nomenclature.

### **Module 4 (4 hours)**

Basic Physiology and Biochemistry: Properties of water; diffusion, DPD, osmotic pressure, water potential, osmotic potential, turgor pressure; ascend of sap; phloem transport; basics of photosynthesis. Molarity and molality, normal and percentage solutions and their dilutions.

Plant growth hormones.

Laws of thermodynamics; high energy molecules: ATP, NADPH, FADH and FMN.

Biomolecules: Carbohydrates, lipids, amino acids and proteins; secondary metabolites.

### **Module 5 (4 hours)**

Biostatistics: Collection of data, organization, presentation; measures of central tendency; measures of dispersion; Probability; experimental designs; basic statistical softwares.

Genetics: Chromosomes; genes; alleles; homozygous, heterozygous, hemizygous; traits; genotype and phenotype. Sex determination in plants. Macromolecules; basic structure of DNA and RNA.

## REFERENCES

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### **Time Schedule**

<b>Date and time</b>	<b>9.30- 10.45</b>	<b>11.15 -12.30</b>	<b>1.30 -2.45</b>	<b>3.15-4.30</b>
30-11-2021 Tuesday	Jos T. Puthur	M .Shamina	C.C. Harilal	K.P. Deepnalatha
01-12-2021 Wednesday	Santhosh Nampy	P. Sunojkumar	C. Pramod	A.K. Pradeep
02-12-2021 Thursday	John E. Thoppil	V.V. Radhakrishnan	P. Sunojkumar	A. Yusuf
06-12-2021 Monday	A.K. Pradeep	L. Resmi	Jos T. Puthur	C. Pramod
07-12-2021 Tuesday	A. Yusuf	John E. Thoppil	K.P. Deepnalatha	L. Resmi

## **REPORT**

Department of Botany, University of Calicut conducted bridge course for the newly joined PG students of Applied Plant Science. The main objective of the program was to bridge the gap between the course contents of syllabi in UG Botany/Plant Science of the University of Calicut and other Indian Universities and also to impart minimum graduate level basic training in Botany for the students admitted to the PG programme and to strengthen the base of students in basic and fundamentals of Botany. The faculty from the Department of Botany, University of Calicut served as resource persons for conducting the course and at the end of the course, an examination was conducted for the assessment of students. All the students participated in the evaluation. The percentage of scores obtained by the students are classified and tabulated below.

### **Summary of Evaluation**

<b>Sl. No.</b>	<b>Range of Marks</b>	<b>No. of students</b>
1	0-20	0
2	20-40	0
3	40-60	2
4	60-80	10
5	80-100	12

The Department Council held on 6 January 2022 discussed the result of evaluation of the Bridge course and decided to encourage advanced learners and to conduct remedial coaching for slow learners. Students who scored above 60% are categorized as advanced learners and those who scored below 60% as slow learners. Advanced learners were encouraged by providing additional reading and resource materials while, slow learners were supported by remedial classes. Remedial classes were engaged by the faculty after the regular classes as per the schedule given below.

### **Schedule for conducting remedial classes for slow learners**

<b>Day</b>	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>Teacher</b>	Dr. A. K. Pradeep	Dr. C. Pramod	Dr. Jos T. Puthur	Dr. Resmi L.	Dr. John E. Thoppil