



GOVERNMENT COLLEGE KOTTAYAM

Accredited with 'A' grade by NAAC

Affiliated to Mahatma Gandhi University Kottayam

Guidelines & Syllabus for

Add on Course of the Department of Botany

PHYTO ENTREPRENEURSHIP

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General Guidelines

Programme Outcome

This programme is intended to provide theoretical and practical knowledge on basic aspects of various plant-based small-scale industries

Programme Specific Outcomes

On completion of this course, the student will be able to:

1. Familiarize with the theoretical and practical aspects of plant tissue culture.
2. Start small-scale or large-scale mushroom industries.

PROGRAMME STRUCTURE

Phyto entrepreneurship (BADP – Botany Add-on Diploma Programme)					
Course category	Courses	Course code	Course title	Instr. hrs	
				Th.	Pr.
Add -on	Course 1	BADPC01	Basics of plant tissue culture techniques	20	10
Add -on	Course 2	BADPC02	Mushroom cultivation: Theory and Practice	20	10
Duration				60 hrs	

Admission and Assessment Criteria

- The duration of the Botany Add-on Diploma Programme in Phyto entrepreneurship is one year.
- All students who completed the first four semesters of the undergraduate programme in B.Sc. Botany/ B.Sc. Zoology is eligible for admission to this add-on programme.
- The Diploma Completion Certificate may be awarded to those students who satisfy the following minimum requirement for each course.

Criterion	Minimum Requirement
Attendance	75%
Written examination	50% marks
Practical Examination	50% marks

Evaluation of each course is based on the total marks secured for the respective course which comprises the following components

Components	Marks
Attendance (>75%)	10
Assignment	10
Seminar	10
Written examination	40
Practical examination	30
Total	100

Grade Card will be issued to all students based on the cumulative percentage of total marks obtained for all two courses.

Total % of marks	Grade	Remarks
Above 90	A+	Outstanding
80-89	A	Excellent
70-79	B+	Very good
60-69	B	Good
50-59	C	Above average
40-49	D	Satisfactory
Below 40	E	Failed

A department-level grievance redress system will address the grievances of students if any, about the programme. Grade Card and Course Certificate are issued at college level, duly signed by the Head of the Institution.

Course 1

Course code: BADPC01

BASICS OF PLANT TISSUE CULTURE TECHNIQUES

(Theory - 20 hrs; Practical - 10hrs)

Objectives:

- To impart basic theoretical aspects of Plant tissue culture.
- To familiarize with the laboratory structure and equipment used in plant tissue culture.
- To provide hands-on training on micropropagation
- To impart basic knowledge on large-scale production of tissue culture banana plant lets.

Expected Course outcome:

At the end of the course the student will be able to:

- Conduct plant tissue culture in a laboratory
- Operate equipment used in tissue culture laboratory
- Prepare an estimate on large-scale production of tissue-cultured plantlets

Module 1: History of plant tissue culture, Concept of totipotency, types of cultures: shoot tip, axillary bud, and meristem culture; Anther culture, Suspension cultures, organogenesis, somatic embryogenesis. (4Hrs)

Module 2: Infrastructure of a tissue culture laboratory, Basic organization of tissue culture laboratory, Washing and Media Preparation Area, Inoculation area, Culture Area (4Hrs).

Module 3: Media preparation: Solid and liquid media - composition and preparation. Sterilization techniques. (3Hrs)

Module4: Stages of micropropagation- Explant - inoculation and incubation techniques, hardening, and transplantation. Packaging and transportation of tissue culture regenerated plantlets (6Hrs)

Module 5: Industrial scaling. Preparation of estimate/production plan for a given number of tissue-cultured banana plantlets. (3Hrs)

Practical (10 Hrs)

- Preparation of Solid and Liquid media from individual components.
- Preparation of media with different hormonal combinations
- Callus culture techniques
- Organogenesis
- Hardening and acclimatization

References

1. Plant Tissue Culture: Theory and Practice, a Revised Edition by S.S. Bhojwani and M.K. Razdan
Edition: Revised Edition, Publisher: Elsevier, North Holland ISBN: ISBN: 0-444-81623-2

2. Introduction to Plant Tissue Culture by M K Razdan, Second Edition Publishers: Oxford and IBH publishing Co Pvt.Ltd.

3. Plant Tissue Culture: An Introductory Text, By Bhojwani, Sant Saran, Dantu, Prem Kumar, Springer publishers,

SEMESTER VI

Course 2

Course code: BADPC02

MUSHROOM CULTIVATION: THEORY AND PRACTICE

(Theory - 20 hrs; Practical - 10hrs)

Objectives:

- Familiarize mushrooms as a good quality food.
- Demonstrate basic methods of mushroom cultivation.
- Develop basic skills in mushroom cultivation.
- Equip the student to the level of an entrepreneur in the Mushroom industry.

Expected Course outcome:

At the end of the course the student will be able to:

- Conduct small-scale or large-scale mushroom cultivation

Module 1: Introduction (5 hrs)

What are mushrooms? Importance of mushroom cultivation – nutritional and medicinal. Types of mushrooms – poisonous and edible. Major cultivated mushrooms – *Agaricus bisporus* (White button mushroom), *Pleurotus* (Oyster mushroom), *Volvariella volvacea* (Paddy straw mushroom), *Calocybe indica* (Milky Mushroom)

Module 2: Basic requirements for mushroom cultivation (3 hrs)

Mushroom house – basic components and provisions, climatic conditions, major equipment's.

Module 3: Spawn production (2 hrs)

Spawn and its importance. Major requirements and procedure of spawn production.

Module 4: Commercial production of mushroom (7 hrs)

Substrate for mushroom cultivation, preparation of the substrate, cultivation of mushrooms on paddy straw and sawdust. Harvesting, packaging, transporting, and marketing of mushrooms. Major pests and defects of mushrooms.

Module 6: Mushroom recipes (3 hrs)

Ingredients and preparation methods of – Mushroom masala, Mushroom soup, and Mushroom bajji. Mushroom curry, Chilli mushroom.

PRACTICALS (10 Hrs.)

1. Preparation of spawn
2. Sterilization and preparation of substrate for mushroom cultivation
3. Cultivation of Button mushroom and Oyster mushroom on paddy straw and saw dust.
4. Preparation of mushroom recipes mentioned in the syllabus

REFERENCES

1. Kaul T N, 2002. Biology and Conservation of Mushroom, Oxford and IBH Publishing Co.
2. Pandey R.K, S K Ghosh, 1996. A Hand Book on Mushroom Cultivation. Emkey Publications.