



MAHATMA GANDHI COLLEGE

THIRUVANANTHAPURAM

POST GRADUATE DEPARTMENT OF BOTANY & RESEARCH CENTER

NOTICE

ADD-ON COURSE –TISSUE CULTURE

Dear students,

We are excited to announce the introduction of an Add-On course titled "Tissue Culture" for the academic year 2018-2019. This course aims to provide students with an in-depth understanding of tissue culture techniques and their practical applications.

Details of the Add-On Course:

Course Duration: 3 months

Start Date: 11/07/2018

End Date: 30/10/2018

Time: 0 hr

Venue: Room 55

Registration Details

Last Date for Registration: 30/06/2018

Seats are limited, and admission to the course will be on a first-come, first-served basis. Interested students are encouraged to register at the earliest to secure their spot.

For any queries or additional information, please contact the course coordinator, Head, Department of Botany at the department office between 10:00 AM to 4:00 PM on weekdays.

Warm regards,

Head, Department of Botany

**MAHATMA GANDHI COLLEGE
THIRUVANANTHAPURAM**

Re-accredited with B+ Grade by NAAC

**ADD ON COURSE
TISSUE CULTURE TECHNIQUES
COURSE STRUCTURE AND SYLLABUS**

BY

**POST GRADUATE DEPARTMENT &
RESEARCH CENTRE OF BOTANY**



(2018 onwards)

OBJECTIVES OF THE COURSE

- **Understanding the principles of tissue culture:** The course aims to provide a comprehensive understanding of the basic principles of tissue culture, including cell culture techniques, media preparation, aseptic techniques, and laboratory safety.
- **Practical skills development:** Participants are expected to gain hands-on experience in performing various tissue culture techniques, such as cell line establishment, subculturing, cryopreservation, and media optimization. They should also learn to identify and troubleshoot common issues that may arise during the tissue culture process.
- **Familiarity with equipment and instrumentation:** Participants will be exposed to the various laboratory equipment and instruments used in tissue culture, such as laminar flow hoods, CO₂ incubators, microscopes, centrifuges, and pipettes. They should gain proficiency in operating and maintaining these instruments.
- The candidate is trained on professional skill, professional knowledge and Employability skill related to jobs in Tissue culture.
- To create awareness about cell and tissue biology, through the cultivation of cells *in vitro*, students can observe and analyze various cellular processes, including cell growth, differentiation and cellular interactions.
- By studying tissue culture, students can develop proficiency in wide range of fundamental laboratory skills, including aseptic techniques, media preparation, cell isolation and culture maintenance.
- By studying tissue culture, students gain the knowledge and skills necessary to contribute to ongoing research projects and potentially pursue their research interests in the future.
- Studying tissue culture techniques enhances critical thinking and problem-solving abilities, which are valuable in scientific research and other fields.
- Students learn to formulate research questions, design appropriate controls, and select relevant assays to address specific scientific inquiries.

EXPECTED OUTCOMES OF THE COURSE

- **Competence in basic tissue culture techniques:** Participants should be able to independently perform routine tissue culture procedures, including cell line maintenance, passaging, and cryopreservation.
- **Ability to troubleshoot issues:** Students should be equipped with problem-solving skills to identify and address challenges that may arise during tissue culture, such as contamination, low cell viability, or growth issues.
- **Proficiency in experimental design and data analysis:** Participants should be able to design tissue culture experiments, collect and analyze data, and draw meaningful conclusions from their results.
- **Familiarity with specialized techniques:** Depending on the course content, students may have acquired knowledge and practical skills in specific tissue culture techniques, allowing them to pursue more specialized research areas.
- **Awareness of safety and ethical considerations:** Participants should have a clear understanding of safety protocols and ethical considerations associated with tissue culture research, ensuring responsible and compliant practices.
- **Enhanced career prospects:** Successful completion of the course and acquisition of tissue culture skills can enhance participants' employability in various fields such as biomedical research, pharmaceuticals, agriculture, and biotechnology.

COURSE STRUCTURE

DURATION : **30 Hrs**

ASSESSMENT & CERTIFICATION : The trainee will be tested for his skill, knowledge and attitude during the period of training and at the end of the training programme including practical examinations.

TISSUE CULTURE TECHNIQUES

SYLLABUS

MODULE I

(5 hrs)

Introduction to Plant Tissue Culture:

- Historical background and significance of plant tissue culture
- Applications of plant tissue culture in research and industry
- Applications of Plant Tissue Culture
- Ethical and Regulatory Issues in Plant Tissue Culture
- Biosafety regulations and ethical considerations in plant biotechnology

MODULE- II

(15hrs)

Plant Tissue Culture Laboratory:

- Aseptic techniques and sterile conditions in the laboratory
- Preparation of culture media and culture vessels
- Sterilization methods and equipment
- Maintenance of stock cultures and subculturing techniques

Culture Initiation and Establishment:

- Selection and preparation of suitable explants
- Surface sterilization of explants
- Inoculation techniques and explant establishment on culture media

Plant Growth Regulators:

- Introduction to plant growth regulators (hormones) and their role in tissue culture
- Types, functions, and applications of plant growth regulators (auxins, cytokinins, gibberellins, etc.)
- Manipulation of plant growth regulators for specific tissue culture purposes (shoot initiation, root induction, callus formation, etc.)

Callus Culture and Cell Suspension Culture:

- Callus induction and proliferation techniques
- Factors influencing callus growth and differentiation
- Cell suspension culture and its applications

MODULE- III

(10hrs)

Micropropagation:

Mass propagation of plants through tissue culture techniques

Techniques for shoot multiplication and rooting

Acclimatization and transfer of micropropagated plants to *ex vitro* conditions

➤ **Workshops and visit to an established Tissue culture lab**

MAHATMA GANDHI COLLEGE

POST GRADUATE DEPARTMENT AND RESEARCH CENTRE OF BOTANY

THIRUVNANTHAPURAM

ADD ON COURSE-2018-2019

LIST OF STUDENTS –TISSUE CULTURE TECHNIQUES

SL.NO	NAME OF STUDENT	CLASS/ SEMESTER
1	ASWATHY V	II PG
2	ATHIRA I S	II PG
3	GOURI KRISHNAN	II PG
4	ANNIE T U	I PG
5	ANU JOSE	I PG
6	ANUPAMA ARAVIND	I PG
7	ANAGHARAJASEKHARAN	III UG
8	ANEESH S	III UG
9	ANIEMOLAN	III UG
10	ASWANIANIL	III UG
11	GAYATHRIL	III UG
12	GAYATHRIDEVIGS	III UG
13	GOKULGA	III UG
14	GOPIKAPS	III UG
15	KARTHIKVIJAYAKUMAR	III UG
16	LEKSHMIP	III UG
17	MITHUNMNAIR	III UG
18	RESMIS	III UG
19	SABARICHANDRAN	III UG
20	SREEHARIMR	III UG
21	VEENAVIJAYAN	III UG
22	THEERTHAGR	II UG
23	VISHNUAS	II UG
24	VYSHAKRNAIR	II UG
25	ANANDHUKRISHNANRS	II UG
26	ANUMOLBINU	II UG
27	ARAVINDPS	II UG
28	ARIYANANTHASJ	II UG

29	ASWATHYK	IUG
30	FATHIMASS	IUG
31	GANGAMS	IUG
32	JEEVAMURUKESH	IUG
33	KRISHNAGS	IUG
34	PRIYANM	IUG
35	RESHMIKL	IUG
36	SUBINB	IUG
37	VAISHNAV.V.L	IUG
38	YADHUKRISHNANR.L	IUG
39	ABHIJITHKUMARAB	IUG
40	ABHIRAMIR.S	IUG
41	AMALGKRISHNAN	IUG
42	ANANDITAD	IUG
43	APARNA.B	IUG
44	APARNA.S.B	IUG
45	ARDRA J S	IUG
46	DHANAKRISHNA R R	IUG
47	NAVYA B S	IUG
48	LEKSHMI S S	IUG
49	MEGHA D	IUG
50	KAVYA T NAIR	IUG


HEAD OF THE DEPARTMENT


PRINCIPAL






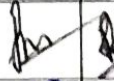
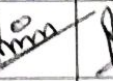
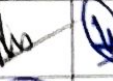










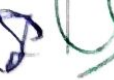

MAHATMA GANDHI COLLEGE, THIRUVNANTHAPURAM







POST GRADUATE DEPARTMENT AND RESEARCH CENTRE OF BOTANY

ADD ON COURSE – 2018-2019

ATTENDANCE OF STUDENTS - TISSUE CULTURE TECHNIQUES

SL.NO	NAME OF STUDENT	CLASS/ SEMESTER	11-7-18	16-7-18	27-7-18	9-8-18	18-8-18	11-9-18	26-9-18	29-9-18	06-10-18	13-10-18
			WED	MON	FRI	THU	SAT	TUE	WED	SET	SET	WED
1	ASWATHY V	II PG	X	X	X	γ	X	γ	X	X	X	γ
2	ATHIRA I S	II PG	X	X	Ab	γ	X	X	X	X	X	Ab
3	GOURI KRISHNAN	II PG	X	X	X	Ab	X	X	X	X	X	γ
4	ANNIE T U	I PG	X	X	X	X	Ab	X	X	X	Ab	X
5	ANU JOSE	I PG	Ab	X	X	γ	γ	X	X	X	γ	γ
6	ANUPAMA ARAVIND	I PG	X	X	γ	γ	X	X	X	X	X	γ
7	ANAGHA RAJASEKHARAN	III UG	X	X	X	γ	X	Ab	Ab	γ	X	γ
8	ANEESH S	III UG	X	X	γ	γ	γ	X	X	γ	γ	X
9	ANIEMOL A N	III UG	X	Ab	X	γ	X	X	X	X	γ	Ab
10	ASWANI ANIL	III UG	X	X	X	γ	γ	X	X	γ	γ	γ
11	GAYATHRI L	III UG	X	X	Ab	γ	X	X	X	Ab	γ	γ
12	GAYATHRI DEVI G S	III UG	X	X	X	Ab	γ	X	X	X	γ	γ
13	GOKUL G A	III UG	X	X	X	γ	Ab	X	X	γ	X	Ab
14	GOPIKA P S	III UG	X	X	X	γ	γ	X	Ab	X	X	γ
15	KARTHIK VIJAYAKUMAR	III UG	X	X	X	γ	X	X	X	X	X	γ
16	LEKSHMI P	III UG	Ab	X	X	γ	X	X	X	γ	Ab	γ
17	MITHUN M NAIR	III UG	X	X	X	γ	X	X	X	γ	X	γ
18	RESMI S	III UG	X	X	Ab	γ	X	Ab	X	X	X	γ
19	SABARICHANDRAN	III UG	X	X	X	γ	X	X	X	X	X	γ
20	SREEHARI M R	III UG	X	Ab	X	Ab	X	X	X	X	X	Ab
21	VEENA VIJAYAN	III UG	X	X	X	γ	Ab	X	γ	γ	γ	X
22	THEERTHA G R	II UG	X	X	X	γ	γ	Ab	Ab	γ	X	γ

23	VISHNU A S	II UG	x	x	x	+	+	x	x	+	+	x
24	VYSHAK R NAIR	II UG	x	x	x	+	+	x	x	+	+	x
25	ANANDHU KRISHNAN R S	II UG	x	x	x	+	+	x	x	+	+	x
26	ANUMOL BINU	II UG	+	x	Ab	+	+	x	x	+	+	Ab
27	ARAVIND PS	II UG	Ab	x	x	Ab	+	Ab	Ab	Ab	+	+
28	ARIYANANTHA S J	II UG	x	x	x	+	+	x	+	+	Ab	+
29	ASWATHY K	II UG	x	x	x	+	+	x	x	+	+	+
30	FATHIMA S S	II UG	x	x	x	+	Ab	x	+	+	+	+
31	GANGA M S	II UG	+	x	x	+	+	x	+	Ab	x	+
32	JEEVA MURUKESH	II UG	+	x	x	+	+	x	x	+	Ab	+
33	KRISHNA G S	II UG	+	x	x	+	+	x	+	x	+	Ab
34	PRIYAN M	II UG	+	x	x	x	+	x	+	x	x	x
35	RESHMI K L	II UG	x	Ab	x	Ab	+	x	+	x	x	x
36	SUBIN B	II UG	x	x	Ab	x	+	x	+	x	x	x
37	VAISHNAV. V. L	I UG	x	x	x	+	x	x	Ab	x	x	+
38	YADHU KRISHNAN R.L	I UG	x	x	x	+	x	Ab	x	x	Ab	+
39	ABHIJITH KUMAR A B	I UG	x	x	x	+	+	x	+	Ab	x	+
40	ABHIRAMI R.S	I UG	+	x	x	+	Ab	x	x	x	x	Ab
41	AMAL G KRISHNAN	I UG	Ab	x	x	+	+	x	x	+	+	x
42	ANANDITA D	I UG	x	x	x	Ab	+	x	+	x	Ab	+
43	APARNA.B	I UG	x	x	x	+	x	x	Ab	x	x	+
44	APARNA.S.B	I UG	x	x	x	+	x	x	x	x	+	+
45	ARDRA J S	I UG	x	x	Ab	+	x	x	x	Ab	+	+
46	DHANAKRISHNA R R	I UG	x	x	x	Ab	Ab	x	+	+	Ab	+
47	NAVYA B S	I UG	x	Ab	x	x	x	x	+	+	x	Ab
48	LEKSHMI S S	I UG	x	x	x	x	Ab	x	x	+	Ab	+
49	MEGHA D	I UG	x	x	x	Ab	x	Ab	+	+	x	+
50	KAVYA T NAIR	I UG	Ab	x	x	x	x	x	Ab.	Ab	Ab	Ab
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23	VISHNU A S	II UG	x	x	x															
24	VYSHAK R NAIR	II UG	x	x	x															
25	ANANDHU KRISHNAN R S	II UG	x	x	x															
26	ANUMOL BINU	II UG	ab	x	x															
27	ARAVIND PS	II UG	x	x	x															
28	ARIYANANTHA S J	II UG	x	x	x															
29	ASWATHY K	II UG	x	ab	x															
30	FATHIMA S S	II UG	x	x	ab															
31	GANGA M S	II UG	x	x	x															
32	JEEVA MURUKESH	II UG	x	x	x															
33	KRISHNA G S	II UG	x	x	x															
34	PRIYAN M	II UG	ab	x	x															
35	RESHMI K L	II UG	x	x	x															
36	SUBIN B	II UG	x	x	x															
37	VAISHNAV. V. L	I UG	x	ab	x															
38	YADHU KRISHNAN R.L	I UG	x	x	x															
39	ABHIJITH KUMAR A B	I UG	x	x	x															
40	ABHIRAMI R.S	I UG	x	x	x															
41	AMAL G KRISHNAN	I UG	x	x	x															
42	ANANDITA D	I UG	ab	x	x															
43	APARNA.B	I UG	x	ab	x															
44	APARNA.S.B	I UG	x	x	x															
45	ARDRA J S	I UG	x	x	x															
46	DHANAKRISHNA R R	I UG	x	x	x															
47	NAVYA B S	I UG	ab	x	x															
48	LEKSHMI S S	I UG	x	ab	ab															
49	MEGHA D	I UG	x	x	x															
50	KAVYA T NAIR	I UG	x	x	x															
SIGNATURE OF FACULTY ENGAGED THE CLASS																				
SIGNATURE OF HOD																				



MAHATMA GANDHI COLLEGE
THIRUVANANTHAPURAM

POST GRADUATE DEPARTMENT & RESEARCH CENTRE OF BOTANY

ADD ON COURSE- TISSUE CULTURE

QUESTION PAPER

2018-2019 Academic year

Duration: 1 hr

Marks: 30

PART A - (Answer all 5; 1 marks each = 5 marks)

1. In which year was the concept of plant tissue culture introduced?
2. Name an application of plant tissue culture in research.
3. What is the primary purpose of biosafety regulations in plant biotechnology?
4. Why is aseptic technique crucial in the tissue culture laboratory?
5. What is the role of plant growth regulators in tissue culture?

PART B - (Answer any 5; 2 marks each = 10 marks)

6. Briefly discuss the significance of plant tissue culture in modern biotechnology.
7. Elaborate on an ethical issue associated with plant tissue culture.
8. Describe the importance of maintaining sterile conditions in the plant tissue culture laboratory.
9. How is culture media preparation pivotal for the success of tissue culture?
10. Mention two sterilization methods commonly used in the tissue culture laboratory.
11. Explain the concept of subculturing techniques.
12. How does the type of explant influence tissue culture success?
13. What role do cytokinins play in tissue culture?

PART C - (Answer any 3; 5 marks each = 15 marks)

14. Provide a comprehensive overview of the historical background and significance of plant tissue culture.
15. Elaborate on the applications of plant tissue culture in the industry, with examples.
16. Discuss in detail the preparation of culture media and the factors influencing its composition.
17. Explain the various types of plant growth regulators and their roles in different stages of tissue culture.
18. Describe the entire process of callus culture, including induction, proliferation techniques, and factors affecting its growth.

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ADD ON COURSE - 2018-2019

MARK LIST OF STUDENTS – TISSUE CULTURE TECHNIQUES

SL.NO	NAME OF STUDENT	CLASS/ SEMESTER	MARK	SIGNATURE
1	ASWATHY V	II PG	22	<i>Aswathy</i>
2	ATHIRA I S	II PG	19	<i>Athira</i>
3	GOURI KRISHNAN	II PG	27	<i>Gouri</i>
4	ANNIE T U	I PG	25	<i>Annie</i>
5	ANU JOSE	I PG	21	<i>Anu</i>
6	ANUPAMA ARAVIND	I PG	17	<i>Anupama</i>
7	ANAGHA RAJASEKHARAN	III UG	18	<i>Anagha</i>
8	ANEESH S	III UG	24	<i>Aneesh</i>
9	ANIEMOL A N	III UG	26	<i>Aniemol</i>
10	ASWANI ANIL	III UG	24	<i>Aswani</i>
11	GAYATHRI L	III UG	08	<i>Gayathri</i>
12	GAYATHRI DEVI G S	III UG	16	<i>Gayathri Devi</i>
13	GOKUL G A	III UG	23	<i>Gokul</i>
14	GOPIKA P S	III UG	22	<i>Gopika</i>
15	KARTHIK VIJAYAKUMAR	III UG	24	<i>Karthik</i>
16	LEKSHMI P	III UG	26	<i>Lekshmi</i>
17	MITHUN M NAIR	III UG	19	<i>Mithun</i>
18	RESMI S	III UG	18	<i>Resmi</i>
19	SABARICHANDRAN	III UG	22	<i>Sabar</i>
20	SREEHARI M R	III UG	24	<i>Sreehari</i>
21	VEENA VIJAYAN	III UG	25	<i>Veena</i>
22	THEERTHA G R	II UG	26	<i>Theertha</i>
23	VISHNU A S	II UG	25	<i>Vishnu</i>
24	VYSHAK R NAIR	II UG	22	<i>Vyshak</i>
25	ANANDHU KRISHNAN R S	II UG	22	<i>Anandhu</i>
26	ANUMOL BINU	II UG	06	<i>Anumol</i>
27	ARAVIND PS	II UG	24	<i>Aravind</i>
28	ARIYANANTHA S J	II UG	24	<i>Ariyanantha</i>

29	ASWATHY K	II UG	19	<i>Aswathy</i>
30	FATHIMA S S	II UG	08	<i>Fathima</i>
31	GANGA M S	II UG	20	<i>Ganga</i>
32	JEEVA MURUKESH	II UG	21	<i>Jeeva</i>
33	KRISHNA G S	II UG	22	<i>Krishna</i>
34	PRIYAN M	II UG	23	<i>Priyan</i>
35	RESHMI K L	II UG	24	<i>Reshmi</i>
36	SUBIN B	II UG	25	<i>Subin</i>
37	VAISHNAV. V. L	I UG	22	<i>Vaishnavi</i>
38	YADHU KRISHNAN R.L	I UG	18	<i>Yadhu</i>
39	ABHIJITH KUMAR A B	I UG	07	<i>Abhijith</i>
40	ABHIRAMI R.S	I UG	21	<i>Abhirami</i>
41	AMAL G KRISHNAN	I UG	20	<i>Amal</i>
42	ANANDITA D	I UG	15	<i>Anandita</i>
43	APARNA.B	I UG	17	<i>Aparna</i>
44	APARNA.S.B	I UG	26	<i>Aparna</i>
45	ARDRA J S	I UG	08	<i>Ardra</i>
46	DHANAKRISHNA R R	I UG	25	<i>Dhanakrishna</i>
47	NAVYA B S	I UG	22	<i>Navya</i>
48	LEKSHMI S S	I UG	23	<i>Lekshmi</i>
49	MEGHA D	I UG	24	<i>Megha</i>
50	KAVYA T NAIR	I UG	22	<i>Kavya</i>


HEAD OF THE DEPARTMENT


PRINCIPAL



MAHATMA GANDHI COLLEGE

THIRUVANANTHAPURAM

Re-accredited with B+ Grade by NAAC

DEPARTMENT OF BOTANY

CERTIFICATE

This is to certify that of
..... has successfully completed Add on
Course in “ ” offered by
Department of Botany, Mahatma Gandhi College, TVPM during the
academic year


Head of the Department


Principal

Report on the Add-on Course – Tissue Culture Techniques

Academic Year: 2018-2019

In its quest to offer students a more enriched learning experience that transcends standard curriculum boundaries, the Department of Botany embarked on introducing an add-on course in tissue culture techniques. This initiative is not just about imparting academic knowledge; it's about nurturing a robust scientific temperament and fostering a heightened sense of societal responsibility among our learners. The course stands as a clear reflection of our dedication to holistic education. The course, structured over 30 hours, was meticulously designed to cater to both Undergraduate and Post Graduate students. Dr. Remya Krishnan, Assistant Professor from the Department of Botany at NSS College, Cherthala, was at the helm of this endeavor. Her expertise was complemented by the involvement of multiple faculty members, thereby ensuring students had access to a rich tapestry of knowledge and experience.

Classes kicked off on a Saturday, and to accommodate students' schedules, were scheduled either before or after regular college hours on subsequent working days. The inaugural lecture by Dr. Pradeesh S was an enlightening dive into the fascinating realm of tissue culture techniques. It quickly became evident that the students were intrigued, as they actively participated in discussions, showcasing their zeal for the topic. Following lectures took a deeper dive into the various aspects of tissue culture. Students were introduced to the essential terminologies, state-of-the-art techniques, and critical tools pivotal in tissue culture. Furthermore, the potential and importance of tissue culture in various fields were explored, broadening the horizon for students. To ensure a two-way flow of knowledge, the course was structured to be interactive. This design spurred students to ask questions, with many showing keen interest in adopting these techniques. Periodic review sessions offered a platform for recapitulation and clarification, ensuring a strong conceptual foundation.

At the course's conclusion, the students were bestowed with certificates, symbolizing their dedication and the acquisition of a new skill set. To encapsulate, the introduction of the add-on course in tissue culture techniques exemplifies the Department of Botany's ethos: a commitment to marrying theoretical insights with practical application for an all-rounded educational experience.