



### STUDENTS FEEDBACK ON CURRICULUM

This questionnaire is to collect information relating to your satisfaction towards curriculum for creating conducive atmosphere for teaching and learning. The information provided by you will be kept confidential and will be used as important feedback for quality improvement of the program of studies/institution.

Academic Year	2015-16
Branch	BIO TECHNOLOGY
Name of the Student	RAJEEV ROSHAN B
USN	15G12BTO20

Rate the curriculum/syllabus on the following Points

SL NO	Statements	Excellent	Very good	Good	Average	Below Average
		5	4	3	2	1
1	How do you rate the syllabus of the courses that you have studied in relation to the competencies expected out of the course?		✓			
2	How do you rate the allocation of the credits to the courses?	✓				
3	Relevance for implementation in projects	✓				
4	How do you rate the electives offered in relation to the technological advancements?		✓			
5	How do rate the evaluation scheme designed for each of the course?	✓				
6	How do you rate the percentage of courses having LAB components?	✓				
7	Curriculum is sufficient to make you analyze the engineering problems and its suitable solution		✓			

Suggestions: Hands on session on cell culture technique  
are required

Rajeev B.  
Signature

B

Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road  
Bangalore-560 057



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This questionnaire is to collect information relating to your satisfaction towards curriculum for creating conducive atmosphere for teaching and learning. The information provided by you will be kept confidential and will be used as important feedback for quality improvement of the program of studies/institution.

Academic Year	2015-2016
Branch	Bio-technology
Name of the Student	Prateek N
USN	13G09BTO60

Rate the curriculum/syllabus on the following Points

SL NO	Statements	Excellent	Very good	Good	Average	Below Average
		5	4	3	2	1
1	How do you rate the syllabus of the courses that you have studied in relation to the competencies expected out of the course?	✓				
2	How do you rate the allocation of the credits to the courses?		✓			
3	Relevance for implementation in projects	✓				
4	How do you rate the electives offered in relation to the technological advancements?		✓			
5	How do rate the evaluation scheme designed for each of the course?	✓				
6	How do you rate the percentage of courses having LAB components?	✓				
7	Curriculum is sufficient to make you analyze the engineering problems and its suitable solution	✓				

Suggestions:

Request advanced Technology Studies

Prateek N  
Signature

B

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Bangalore-560 057





### STUDENTS FEEDBACK ON CURRICULUM

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Academic Year	2015 - 2016
Branch	BIOTECHNOLOGY
Name of the Student	SWATHI . B . M
USN	15G12B7027

Rate the curriculum/syllabus on the following Points

SL NO	Statements	Excellent	Very good	Good	Average	Below Average
		5	4	3	2	1
1	How do you rate the syllabus of the courses that you have studied in relation to the competencies expected out of the course?	✓				
2	How do you rate the allocation of the credits to the courses?	✓				
3	Relevance for implementation in projects	✓				
4	How do you rate the electives offered in relation to the technological advancements?		✓			
5	How do rate the evaluation scheme designed for each of the course?	✓				
6	How do you rate the percentage of courses having LAB components?	✓				
7	Curriculum is sufficient to make you analyze the engineering problems and its suitable solution		✓			

Suggestions: practical session on plant cell culture  
are required to improve a skills.

Swathi  
Signature

B

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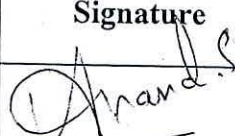




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## Department of Biotechnology

### CIRCULAR

Date: 23/05/2016

This is to inform that there will be a meeting of Academic committee members for analyzing curriculum syllabus of academic year 2016-17. The meeting is scheduled on 24/05/2016 at 11.30 am in HOD's chamber.

Sl No.	Faculty Name	Designation	Signature
1	Dr. Ananda S	HOD, Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
4	Prof. Soumya C	Assistant Professor	
5	Prof. Shobha G	Assistant Professor	

  
HOD  
Head of the Department  
Dept. of Bio-Technology  
Sapthagiri College of Engineering  
No. 57/1, Chikkasandra  
Hesaraghatta Main Road  
Bangalore -57

  
Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road  
Bangalore-560057



Date: 24/05/2016






### MINUTES OF MEETING

With reference to circular dated on 23/05/2016, the academic committee member assembled in HODs chamber for addressing the following agenda.

#### Agenda:

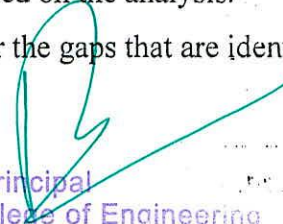
- Reviewing department curriculum syllabus of Academic Year 2016-17
- Reviewing the feedback analysis of various stake holders of the academic year 2015-16
- Identifying the gaps in the syllabus
- Action to be taken for the identified gaps.

During the meeting the following members were present

Sl No.	Faculty Name	Designation	Signature
1	Dr. Ananda S	HOD, Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
4	Prof. Soumya C	Assistant Professor	
5	Prof. Shobha G	Assistant Professor	

The following points were discussed in the meeting

1. The committee members reviewed the analysis of department curriculum syllabus.
2. The committee members discussed about the feedback of department curriculum syllabus.
3. The members identified the gaps based on the analysis.
4. The following actions were taken for the gaps that are identified.

  
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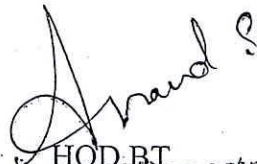
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## Department of Biotechnology

SL.NO	SEM	Course Title	Identified Gap
1	V Sem VII Sem	Somatic Embryogenesis	Lack of practical implementation

### Action Taken:

Based on the feedback obtained from Students, Faculties and Alumni and analysis of syllabus by department academic committee members, it was decided to conduct certification course on Somatic Embryogenesis to overcome the gaps identified in the curriculum/syllabus.



HOD, BT  
Head of the Department  
Dept. of Bio-Technology  
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## Department of Biotechnology

Date: 30/05/2016

To

IQAC Coordinator

Sapthagiri College of Engineering

Bengaluru-560 057

Respected sir/madam,

Subject: Requisition for conduction of certification course and approval from Governing Council.

With respect to the Academic committee members meeting was held for analyzing department curriculum/syllabus for the academic year 2016-17. The committee members identified few gaps after analyzing the syllabus and feedback from the stakeholders. To bridge the gaps identified in the curriculum, the committee members decided to conduct a certification course on Somatic Embryogenesis from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 for the academic year 2016-17. So, I request you to forward and get the approval from the governing council for the same.

Thanking You,

Enclosure: Budget proposal

*Forwarded to the BSC  
approval and satisfaction  
Saur*

*RG*  
Principal

Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road  
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*Anand S*  
HOD

Head of the Department  
Dept. of Bio-Technology  
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## Department of Biotechnology

Date: 30/05/2016

To

IQAC Coordinator

Sapthagiri College of Engineering

Bengaluru-560 057

Respected sir

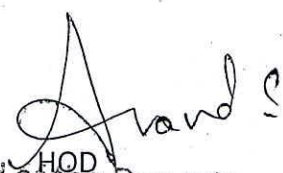
Subject: Budget proposal for conduction of certification of certification program on “Somatic embryogenesis”


The Budget Proposal for conduction a certificate program on Somatic Embryogenesis from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 is hereby enclosed for your kind consideration and approval.

The details of the recurring budget are given as follows:

Recurring Amount:

Sl. No.	Description	Quantity	Amount in Rs.
1	Bouquet	1	200
2	Certificates	Students	1500
3	Others		2000
Total			3700

  
HOD  
Head of the Department  
Dept. of Bio-Technology  
Sapthagiri College of Engineering  
No. 57/1, Chikkasandra  
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Principal  
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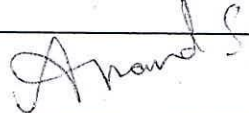




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## Department of Biotechnology

06-07-2016

### CIRCULAR

This is to inform that the following Curriculum Board members are requested to attend the meeting on 07/07/2016 at 11.30 AM in the HODs chamber to decide the syllabus and the lesson plan for the certification program on “Somatic embryogenesis”

Sl No.	Faculty Name	Designation	Signature
1	Dr. Ananda S	HOD, Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
4	Prof. Soumya C	Assistant Professor	
5	Prof. Shobha G	Assistant Professor	

  
Head of **HOD** Department  
Dept. of Bio - Technology  
Sapthagiri College of Engineering  
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**Principal**

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## Department of Biotechnology

Date: 06-07-2016

To,

Mr. Rohith Raj

Managing Partner

Chlorbios Pvt. Ltd.

Yalahanka

Bangalore - 560057.

Respected Sir,

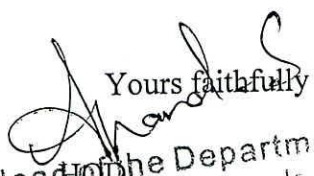
Subject: Invitation as a "Guest Speaker" in certification program and to attend meeting to discuss about the certification program

Department of Biotechnology have planned to conduct a certification program titled "Somatic embryogenesis" for 5<sup>th</sup> and 7<sup>th</sup> semester students from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016. In this connection, we are privileged to invite you as a guest speaker on the above mentioned topic.

Thanking you for your kind acceptance to our request on phone. We request you to attend the meeting to discuss about the conduction of certification course on 07/07/2016 at 11.30AM. We look forward to welcome you at SCE.

Thanking you

  
Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road,  
Bangalore-560 057

  
Yours faithfully  
Head of the Department  
Dept. of Bio-Technology  
Sapthagiri College of Engineering  
No. 57/1, Chikkasandra  
Hesaraghatta Main Road  
Bangalore - 57



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## Department of Biotechnology

### Minutes of Meeting

A meeting was conducted on 07-Jul-2016 in BT HoD's Chamber to discuss and approve the following syllabus and schedule of the one week Certification Course for 5<sup>th</sup> & 7<sup>th</sup> semester BT Students.

- **Course Title :** Somatic embryogenesis
- **Resource Personnel:** Mr.Rohith Raj, CEO Chlorbios Pvt.Ltd.Yalahanka Bangalore.
- **Course Duration & Date:** One week from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016

Syllabus and Schedule of the certification program :

Date	Time	Topics
18-7-2016	8:30 AM - 10:15 AM	Importance of Plant Tissue Culture and progress in Technology
	10:30 AM – 12:30 AM	Culturing and Sub-Culturing of tissues
	1:30PM – 4.30pm	Hands on preparation of media for plant cell culture & explant preparation and inoculation
19-7-2016	8:30 AM - 10:15 AM	Monitoring and control of cell culture
	10:30 AM – 12:30 AM	Cell metabolism and its control in culture media
	1:30PM – 4.30pm	Hands on session on monitoring cell culture
20-7-2016	8:30 AM - 10:15 AM	Mass propagation of plants through somatic embryogenesis
	10:30 AM – 12:30 AM	Employing liquid medium in shake flasks/bioreactors
	1:30PM – 4.30pm	Hands on shake flask studies/Bioreactors
21-7-2016	8:30 AM - 10:15 AM	Physico-chemical parameters affecting somatic embryogenesis in shake flasks/bioreactors
	10:30 AM – 12:30 AM	Analysis and monitoring of biomass growth
	1:30PM – 4.30pm	Hands on session on checking Physio-chemical parameters affecting somatic embryogenesis
22-7-2016	8:30 AM - 10:15 AM	Polymorphisms
	10:30 AM – 12:30 AM	Types of Polymorphism Analysis and monitoring of biomass growth
	1:30PM – 4.30pm	Hands on session on RFLP/ RAPD Techniques

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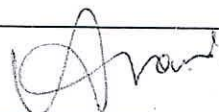





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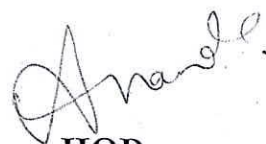
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23-7-2016	8:30 AM - 10:15 AM	Genetic stability of Plant
	10:30 AM – 12:30 AM	Analysis of genetic stability of plants regenerated via somatic embryogenesis through RAPD technique
	1:30PM – 4.30pm	Hands on session on analysis of genetic stability using RAPD Techniques

The following Curriculum board members were present in the meeting and the syllabus and lesson plan for the certification program has been decided.

Sl No.	Faculty Name	Designation	Signature
1	Dr.Ananda S	HOD,Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
4	Prof. Soumya C	Assistant Professor	
5	Prof. Shobha G	Assistant Professor	
6	Mr.Rohith Raj	Guest Speaker	



**HOD**  
Head of the Department  
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## Department of Biotechnology

8/07/2016

### NOTICE

As a part of programming skill development Department of Information Science and Engineering is conducting Five days Certification Course on “**SOMATIC EMBRYOGENESIS**” from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016. All the 5<sup>th</sup> & 7<sup>th</sup> sem BT students must attend the course compulsorily.

**Signature of HOD**

Head of the Department

Dept. of Bio-Technology

Sapthagiri College of Engineering

No. 57/1, Chikkasandra

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## Department of Biotechnology

### Certification Program on “Somatic embryogenesis”

#### Academic year 2016-17

#### Students Enrollment

Sl.No.	USN	Student Name
1	1SG13BT001	AAYUSHI MISHRA
2	1SG13BT003	AJAY KUMAR YADAV
3	1SG13BT004	AKASH.R
4	1SG13BT005	ASHWINI N
5	1SG13BT006	BHARGAVI DUBEY J
6	1SG13BT007	CHETAN S
7	1SG13BT008	DEEPTI
8	1SG13BT009	DIVYA B K
9	1SG13BT010	DIVYA C
10	1SG13BT011	DIVYASHREE A N
11	1SG13BT012	GOWTHAMI K V
12	1SG13BT013	JAIKRARTHIK J
13	1SG13BT014	KRUTIKA SHETTY
14	1SG13BT015	LAVANYA.S
15	1SG13BT016	LIJIN K LITSON
16	1SG13BT017	MADHURI BHAT S
17	1SG13BT018	MOHAN KUMAR N
18	1SG13BT019	MUZZAMMIL AHMED
19	1SG13BT020	SPOORTHY N
20	1SG13BT022	PAREEKSHITH J
21	1SG13BT023	PAVITHRA VENI
22	1SG13BT024	POOJA SINGH
23	1SG13BT025	L PRAVEEN KUMAR
24	1SG13BT026	PREETHI M
25	1SG13BT027	DISHA R
26	1SG13BT028	RAKSHA P A
27	1SG13BT029	RAKSHITHA H S
28	1SG13BT030	S D SIRI

  
Principal

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## Department of Biotechnology

29	1SG13BT031	SAGAR S
30	1SG13BT032	SHARON NAINA RAVISHANKAR
31	1SG13BT033	SHIVANGI DUBEY
32	1SG13BT034	SHIVARAJ V
33	1SG13BT035	SOORYA SESHADRI
34	1SG13BT036	SOUNDARYASRI S
35	1SG13BT037	SUBHASH KUMAR SHARMA
36	1SG13BT038	SUPRIYA MORE
37	1SG13BT039	VARSHA PRAKASH
38	1SG13BT040	VIJITHA T P
39	1SG13BT041	YASHASHWINI S
40	1SG13BT042	AKSHAY KUMAR YADAV
41	1SG13BT043	KUSUMA.B.M
42	1SG13BT044	LAVANYA M N
43	1SG13BT045	RUCHITHA N KUMAR
44	1SG13BT047	SHIVANI
45	1SG12BT022	SAYEED AHMED KHAN
46	1SG14BT001	A.RITISH
47	1SG14BT002	AASTHA KAMBOJ
48	1SG14BT003	AKSHATHA. J
49	1SG14BT004	AMEERKHAN
50	1SG14BT007	ANITHA.M
51	1SG14BT009	ARUN D K
52	1SG14BT010	ASHA PRANAVI.M
53	1SG14BT012	AYANA E K
54	1SG14BT013	CHANDANA.P
55	1SG14BT015	DHEESHA.B.S
56	1SG14BT016	HARISH.G
57	1SG14BT017	HINDUSHREE.J
58	1SG14BT018	K A VINAY
59	1SG14BT021	MANISH KUMAR. M
60	1SG14BT022	MEERAN HUSSAIN
61	1SG14BT023	MEGHANA M
62	1SG14BT024	MEGHANA.M

  
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63	1SG14BT025	MOHIT KUMAR SINGH
64	1SG14BT026	NAVEEN .S
65	1SG14BT027	NIRANJANA.S
66	1SG14BT031	SHRIPRABHA R UPADHYAYA
67	1SG14BT032	SHWETHA H
68	1SG14BT033	SIDHARTH.M.V
69	1SG14BT034	SINDHU K
70	1SG14BT035	SNEHA
71	1SG14BT036	SNEHA.P.R
72	1SG14BT037	SONALI S.KAMATH
73	1SG14BT039	VANI VISWANATHAN
74	1SG14BT041	VEENA G V
75	1SG14BT042	VIBHA M
76	1SG14BT043	VIDYA G V
77	1SG14BT044	VIKERAMAN S
78	1SG14BT045	YAMINI S ACHARYA
79	1SG14BT046	YESHWANTHJ
80	1SG12BT022	SAYEED AHMED KHAN
81	1SG13BT042	AKSHAY KUMAR
82	1SG13BT047	SHIVANI

Principal  
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Ananda S  
Head of ~~HOD~~ Department  
Dept. of Bio-Technology  
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## Department of Biotechnology

### Certification Course on "Somatic Embryogenesis"

#### Attendance

Sl No.	USN	Student Name	18/7/16		19/7/16		20/7/16		21/7/16		22/7/16		23/7/16	
			MS	AS	MS	AS	MS	AS	MS	AS	MS	AS	MS	AS
1	1SG13BT001	AAYUSHI MISHRA	P	P	P	P	P	P	P	P	P	P	P	P
2	1SG13BT003	AJAY KUMAR YADAV	P	P	P	P	P	P	P	P	P	P	P	P
3	1SG13BT004	AKASH.R	P	P	P	P	P	P	P	P	P	P	P	P
4	1SG13BT005	ASHWINI N	P	P	P	P	P	P	P	P	P	P	P	P
5	1SG13BT006	BHARGAVI DUBEY J	P	P	P	P	P	P	P	P	P	P	P	P
6	1SG13BT007	CHETAN S	P	P	P	P	P	P	P	P	P	P	P	P
7	1SG13BT008	DEEPTI	P	P	P	P	P	P	P	P	P	P	P	P
8	1SG13BT009	DIVYA B K	P	P	P	P	P	P	P	P	P	P	P	P
9	1SG13BT010	DIVYA C	P	P	P	P	P	P	P	P	P	P	P	P
10	1SG13BT011	DIVYASHREE A N	P	P	P	P	P	P	P	P	P	P	P	P
11	1SG13BT012	GOWTHAMI K V	P	P	P	P	P	P	P	P	P	P	P	P
12	1SG13BT013	JAIKRARTHIK J	P	P	P	P	P	P	P	P	P	P	P	P
13	1SG13BT014	KRUTIKA SHETTY	P	P	P	P	P	P	P	P	P	P	P	P
14	1SG13BT015	LAVANYA.S	P	P	P	P	P	P	P	P	P	P	P	P
15	1SG13BT016	LIJIN K LITSON	P	P	P	P	P	P	P	P	P	P	P	P
16	1SG13BT017	MADHURI BHAT S	P	P	P	P	P	P	P	P	P	P	P	P
17	1SG13BT018	MOHAN KUMAR N	P	P	P	P	P	P	P	P	P	P	P	P
18	1SG13BT019	MUZZAMMIL AHMED	P	P	P	P	P	P	P	P	P	P	P	P
19	1SG13BT020	SPOORTHY N	P	P	P	P	P	P	P	P	P	P	P	P
20	1SG13BT022	PAREEKSHITH J	P	P	P	P	P	P	P	P	P	P	P	P
21	1SG13BT023	PAVITHRA VENI	P	P	P	P	P	P	P	P	P	P	P	P
22	1SG13BT024	POOJA SINGH	P	P	P	P	P	P	P	P	P	P	P	P
23	1SG13BT025	L PRAVEEN KUMAR	P	P	P	P	P	P	P	P	P	P	P	P
24	1SG13BT026	PREETHI M	P	P	P	P	P	P	P	P	P	P	P	P
25	1SG13BT027	DISHA R	P	P	P	P	P	P	P	P	P	P	P	P
26	1SG13BT028	RAKSHA P A	P	P	P	P	P	P	P	P	P	P	P	P
27	1SG13BT029	RAKSHITHA H S	P	P	P	P	P	P	P	P	P	P	P	P

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## Department of Biotechnology

28	1SG13BT030	S D SIRI	P	P	P	P	P	P	P	P	P	P	P	P
29	1SG13BT031	SAGAR S	P	P	P	P	P	P	P	P	P	P	P	P
30	1SG13BT032	SHARON NAINA RAVISHANKAR	P	P	P	P	P	P	P	P	P	P	P	P
31	1SG13BT033	SHIVANGI DUBEY	P	P	P	P	P	P	P	P	P	P	P	P
32	1SG13BT034	SHIVARAJ V	P	P	P	P	P	P	P	P	P	P	P	P
33	1SG13BT035	SOORYA SESHADRI	P	P	P	P	P	P	P	P	P	P	P	P
34	1SG13BT036	SOUNDARYASRI S	P	P	P	P	P	P	P	P	P	P	P	P
35	1SG13BT037	SUBHASH KUMAR SHARMA	P	P	P	P	P	P	P	P	P	P	P	P
36	1SG13BT038	SUPRIYA MORE	P	P	P	P	P	P	P	P	P	P	P	P
37	1SG13BT039	VARSHA PRAKASH	P	P	P	P	P	P	P	P	P	P	P	P
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40	1SG13BT042	AKSHAY KUMAR YADAV	P	P	P	P	P	P	P	P	P	P	P	P
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46	1SG14BT001	A.RITISH	P	P	P	P	P	P	P	P	P	P	P	P
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## Department of Biotechnology

59	ISG14BT021	MANISH KUMAR. M	P	P	P	P	P	P	P	P	P	P	P	P
60	ISG14BT022	MEERAN HUSSAIN	P	P	P	P	P	P	P	P	P	P	P	P
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63	ISG14BT025	MOHIT KUMAR SINGH	P	P	P	P	P	P	P	P	P	P	P	P
64	ISG14BT026	NAVEEN .S	P	P	P	P	P	P	P	P	P	P	P	P
65	ISG14BT027	NIRANJANA.S	P	P	P	P	P	P	P	P	P	P	P	P
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73	ISG14BT039	VANI VISWANATHAN	P	P	P	P	P	P	P	P	P	P	P	P
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78	ISG14BT045	YAMINI S ACHARYA	P	P	P	P	P	P	P	P	P	P	P	P
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80	ISG12BT022	SAYEED AHMED KHAN	A	A	P	P	P	P	P	P	P	P	P	P
81	ISG13BT042	AKSHAY KUMAR	P	P	P	P	P	P	P	P	P	P	P	P
82	ISG13BT047	SHIVANI	P	P	P	P	P	P	P	P	P	P	P	P

*Anand S*

HOD

Head of the Department

Dept. of Bio -Technology

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ghatta

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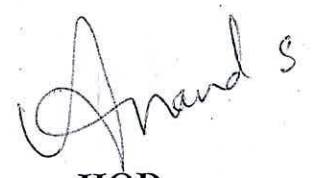
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## Department of Biotechnology

### One week Certification Course on “Somatic Embryogenesis”

#### Test Time Table

Sl. No.	DATE	DAY	TIMINGS
1	23/7/2016	Saturday	3:45 pm - 4:45 pm

  
**HOD**  
Head of the Department  
Dept. of Bio-Technology  
Sapthagiri College of Engineering  
No. 57/1, Chikkasandra  
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Bangalore-57

  
**Principal**  
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Bangalore-57



### CERTIFICATE COURSE PROGRAMME ON SOMATIC EMBRYOGENESIS

#### QUESTION PAPER

**Duration: 1hr**

**Maximum marks: 25**

**Note:** Question number 1-15 (1M each)

Question number 16-20 (2M each)

1. Plant tissue culture technique is a redefined method of \_\_\_\_\_  
a) Hybridization b) Vegetative Propagation c) Asexual Reproduction d) Selection
2. Polyethylene glycol is  
a) Fusogenic chemical b) Electrofusion stimulant c) Callus stimulant d) Differentiation stimulant
3. Somatic hybridization is achieved through  
a) Grafting b) Protoplast fusion c) Conjugation d) Recombinant DNA technology
4. The enzymes required to obtain wall-free / naked protoplasts are  
a) Cellulase and Proteinase b) Cellulase and Pectinase c) Cellulase and amylase d) Amylase and Pectinase
5. The first transgenic crop was  
a) Pea b) Tobacco c) Flax d) Cotton
6. A(n) \_\_\_\_\_ is an excised piece of leaf or stem tissue used in micropropagation.  
a) microshoot b) medium c) explant d) scion
7. Protoplasts can be produced from suspension cultures, callus tissues or intact tissues by enzymatic treatment with  
a) cellulolytic enzymes b) pectolytic enzymes c) both cellulolytic and pectolytic enzymes d) proteolytic enzymes
8. Which of the following is considered as the disadvantage of conventional plant tissue culture for clonal propagation?

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- a) Multiplication of sexually derived sterile hybrids b) Less multiplication of disease free plants c) Storage and transportation of propagates d) Both (b) and (c)

**9. What is meant by 'Organ culture'?**

- a) Maintenance alive of a whole organ, after removal from the organism by partial immersion in a nutrient fluid  
b) Introduction of a new organ in an animal body with a view to create genetic mutation in the progenies of that animal  
c) Cultivation of organs in a laboratory through the synthesis of tissues  
d) The aspects of culture in community which are mainly dedicated by the need of a specified organ of the human body

**10. Which method of plant propagation involves the use of girdling?**

- a) Grafting b) Cuttings c) Layering d) Micropropagation

**11. Which of the following is used in the culture of regenerating protoplasts, single cells or very dilute cell suspensions?**

- a) Nurse medium b) Nurse or feeder culture c) Both (a) and (b) d) None of these

**Organogenesis is**

- a) formation of callus tissue b) formation of root and shoots on callus tissue c) both (a) and (b) d) genesis of organs

**12. In a callus culture**

- a) increasing level of cytokinin to a callus induces shoot formation and increasing level of auxin promote root formation  
b) increasing level of auxin to a callus induces shoot formation and increasing level of cytokinin promote root formation  
c) auxins and cytokinins are not required  
d) only auxin is required for root and shoot formation

**13. Protoplast are the cells devoid of**

- a) cell membrane b) cell wall c) both cell wall and cell membrane d) none of these



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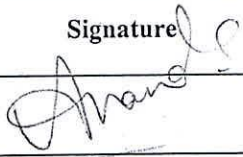

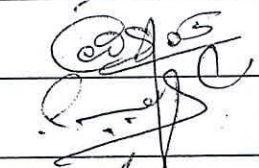
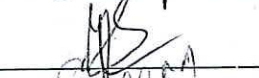
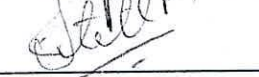

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14. Which breeding method uses a chemical to strip the cell wall of plant cells of two sexually incompatible species?
  - a) Mass selection b) Protoplast fusion c) Transformation d) Transpiration
15. The phenomenon of the reversion of mature cells to the meristematic state leading to the formation of callus is known as
  - a) Redifferentiation b) Dedifferentiation c) either (a) or (b) d) none of these
16. What are the different types of media used in plant tissue culture?
17. Write a MS media composition for Plant Tissue culture?
18. What are Plant Growth Hormones? Give Examples
19. What are the Functions of Auxins and Gibberellins?
20. Write the any two applications of synthetic seeds.

Approved by Academic Committee members and Guest speaker

Sl No.	Faculty Name	Designation	Signature
1	Dr. Ananda S	HOD, Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
4	Prof. Soumya C	Assistant Professor	
5	Prof. Shobha G	Assistant Professor	
6	Mr. Rohith Raj	Guest Speaker	

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## Department of Biotechnology

### Certification Course on “SOMATIC EMBRYOGENESIS”

#### Solutions for the Questions

Duration: 1hr

Maximum marks: 25

1.	Answer 1:	Option B
2.	Answer 2:	Option B
3.	Answer 3:	Option D
4.	Answer 4:	Option C
5.	Answer 5:	Option A
6.	Answer 6:	Option D
7.	Answer 7:	Option B
8.	Answer 8:	Option D
9.	Answer 9:	Option B
10.	Answer10:	Option A
11.	Answer 11:	Option B
12.	Answer12:	Option D
13.	Answer13:	Option B
14.	Answer 14:	Option C
15.	Answer15:	Option B

  
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16. White's medium: This is one of the earliest plant tissue culture media developed for root culture. MS medium: Murashige and Skoog (MS) originally formulated a medium to induce organogenesis, and regeneration of plants in cultured tissues. These days, MS medium is widely used for many types of culture systems. B5 medium: Developed by Gamborg, B5 medium was originally designed for cell suspension and callus cultures. At present with certain modifications, this medium is used for protoplast culture. N6 medium: Chu formulated this medium and it is used for cereal anther culture, besides other tissue cultures.
17. Major salts (macronutrients)/ 1L, Ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) 1,650 mg/l, Calcium chloride ( $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$ ) 440 mg/l, Magnesium sulfate ( $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ ) 370 mg/l, Monopotassium phosphate ( $\text{KH}_2\text{PO}_4$ ) 170 mg/l, Potassium nitrate ( $\text{KNO}_3$ ) 1,900 mg/l. These are major salts present in MS media. Minor salts (micronutrients)/ 1L, Boric acid ( $\text{H}_3\text{BO}_3$ ) 6.2 mg/l, Cobalt chloride ( $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ ) 0.025 mg/l, Ferrous sulfate ( $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ ) 27.8 mg/l, Manganese(II) sulfate ( $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$ ) 22.3 mg/l, Potassium iodide (KI) 0.83 mg/l, Sodium molybdate ( $\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$ ) 0.25 mg/l, zinc ( $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$ ) 8.6 mg/l, Ethylenediaminetetraacetic acid ferric sodium (NaFe-EDTA) constituting 5 ml/l of a stock solution containing 5.57 g  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  and 7.45 g Na2-EDTA per litre of water. Copper ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ) 0.025 mg/vitamins and organics/ 1L.
18. Plant hormones (also known as phytohormones) are signal molecules produced within plants, that occur in extremely low concentrations. Plant hormones control all aspects of growth and development, from embryogenesis, the regulation of organ size, pathogen defense,<sup>[2][3]</sup> stress tolerance<sup>[4][5]</sup> and through to reproductive development. Example Auxins and Gibberellins



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19. Auxins are compounds that positively influence cell enlargement, bud formation and root initiation.

In seedlings and adults, GAs strongly promotes cell elongation. GAs also promote the transition between vegetative and reproductive growth and are also required for pollen function during fertilization

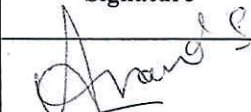





20.1) Propagation of hybrid plants is very easy through artificial seeds.

2) Genetically modified crops and endangered species of plants can be propagated through artificial seed technology.

3) Germplasm of elite lines and endangered species can be preserved with artificial seed technology

4) Cereals crops, fruits, vegetables and medicinal plants can be studied anywhere in the world using Artificial (synthetic) seeds.

**Scheme and Solutions approved by Academic Committee members and Guest speaker**

Sl No.	Faculty Name	Designation	Signature
1	Dr.Ananda S	HOD,Professor	
2	Dr. Rohit K C	Associate Professor	
3	Prof. Prashanth Kumar H P	Assistant Professor	
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5	Prof. Shobha G	Assistant Professor	
6.	Mr.Rohith Raj	Guest Speaker	

  
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### Certification Course on “Somatic Embryogenesis”

#### Participant Feedback

1. How was the overall organization of the Certification Course?  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
2. How appropriate were the facilities provided?  
a) Poor b) Satisfactory ☒ c) Good d) Excellent
3. Opportunity to ask questions for clarification and interaction with presenters  
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a) Poor b) Satisfactory c) Good ☒ d) Excellent
5. Topic and contents of the Certification Course  
a) Poor b) Satisfactory ☒ c) Good d) Excellent
6. How do you rate the Certification Course compared to other workshops that you have attended?  
a) Poor b) Satisfactory ☒ c) Good d) Excellent
7. Generally how was your overall experience during the Certification Course  
a) Poor b) Satisfactory ☒ c) Good d) Excellent
8. Any Suggestions:

More Theoretical Explanation is required for  
particular topic

Student Name: Disha.R.

Student Signature: 

  
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8. Any Suggestions:

Student Name: Lavanya S

Student Signature: 

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8. Any Suggestions:

Harish G  
Student Name:

Harish G  
Student Signature:

Principal

Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road  
Bangalore-560057

### Certification Course on “Somatic Embryogenesis”

#### Participant Feedback

1. How was the overall organization of the Certification Course?  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
2. How appropriate were the facilities provided?  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
3. Opportunity to ask questions for clarification and interaction with presenters  
a) Poor b) Satisfactory c) ☒ Good d) Excellent
4. Effectiveness of the Hands-on Sessions  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
5. Topic and contents of the Certification Course  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
6. How do you rate the Certification Course compared to other workshops that you have attended?  
a) Poor b) Satisfactory c) ☒ Good d) Excellent
7. Generally how was your overall experience during the Certification Course  
a) Poor b) Satisfactory c) Good ☒ d) Excellent
8. Any Suggestions:

Student Name: Vinay. R. A

Student Signature: 

  
Principal

Sapthagiri College of Engineering  
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Bangalore-560 057



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(Affiliated to Visvesvaraya Technological University, Belagavi & Approved by AICTE, New Delhi)

#14/5, Chikkasandra, Hesaraghatta Main Road, Bengaluru – 560057

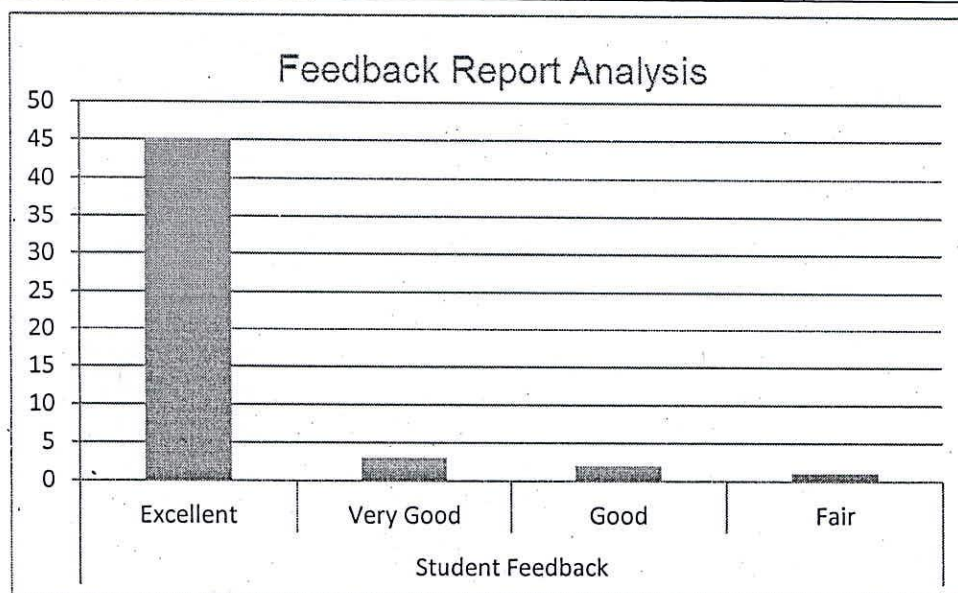
Phone: 080-28372800/1/2 www.sapthagiri.edu.in Fax: 080-28372797

## Department of Biotechnology

### FEEDBACK ANALYSIS

Certification Programme: “Somatic embryogenesis”

No. of students participated	Student Feedback			
	Excellent	Very Good	Good	Fair
51	45	3	2	1



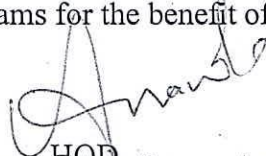
#### Action Report:

88 % of students were completely happy with the certification program and 6 % of students felt it was a good program and remaining 4 % students were satisfied with the program.

#### Action Taken:

The Feedback report which was collected from the students were sent to the principal and he would take necessary actions based on the comments and conduct more programs for the benefit of students.

  
Program Coordinator

  
HOD  
Head of the Department  
Dept. of Bio -Technology  
Sapthagiri College of Engineering  
No. 57/1, Chikkasandra  
Hesaraghatta Main Road  
Bangalore -57

  
Principal

Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road  
Bangalore-560057



**CERTIFICATE COURSE  
ON  
SOMATIC EMBRYOGENESIS**



**This is to certify that**

Mr./Ms.. ..... HINDUSHREE.J .....

Of V<sup>th</sup> semester Biotechnology has successfully completed Somatic Embryogenesis organized by Department of Biotechnology, Sapthagiri College of Engineering, Bengaluru-57 and CHLORBIOS PVT LTD, Bengaluru-560106 from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 .

Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road.  
Bangalore-560 057

  
Chief Coordinator  
PTC course

  
Head  
Department of BT

  
Managing Director  
CHLORBIOS PVT LTD

  
Principal  
SCE





**CERTIFICATE COURSE  
ON  
SOMATIC EMBRYOGENESIS**



**This is to certify that**

Mr./Ms.. ..... NIRANJANA S .....

Of V<sup>th</sup> semester Biotechnology has successfully completed Somatic Embryogenesis organized by Department of Biotechnology, Sapthagiri College of Engineering, Bengaluru-57 and CHLORBIOS PVT LTD, Bengaluru-560106 from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 .

Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road,  
Bangalore-560 057

  
Chief Coordinator  
PTC course

  
Head  
Department of BT

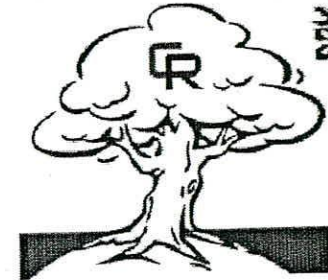
  
Managing Director  
CHLORBIOS PVT LTD

  
Principal  
SCE





**CERTIFICATE COURSE  
ON  
SOMATIC EMBRYOGENESIS**



**This is to certify that**


Mr./Ms.. ..... SINDHU.K .....

Of V<sup>th</sup> semester Biotechnology has successfully completed Somatic Embryogenesis organized by Department of Biotechnology, Sapthagiri College of Engineering, Bengaluru-57 and CHLORBIOS PVT LTD, Bengaluru-560106 from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 .

Principal  
Sapthagiri College of Engineering  
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Chief Coordinator  
PTC course

  
Head  
Department of BT

  
Managing Director  
CHLORBIOS PVT LTD

  
Principal  
SCE





**CERTIFICATE COURSE  
ON  
SOMATIC EMBRYOGENESIS**



**This is to certify that**

**Mr./Ms.. .....**

**Of V<sup>th</sup> semester Biotechnology has successfully completed Somatic  
Embryogenesis organized by Department of Biotechnology,  
Sapthagiri College of Engineering, Bengaluru-57 and CHLORBIOS PVT  
LTD, Bengaluru-560106 from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016 .**

Principal  
Sapthagiri College of Engineering  
Chikkasandra, Hesaraghatta Road,  
Bangalore-560 057

**Chief Coordinator  
PTC course**

**Head  
Department of BT**

**Managing Director  
CHLORBIOS PVT LTD**

**Principal  
SCE**



### Certificate Course – Somatic Embryogenesis

#### Post Event Report

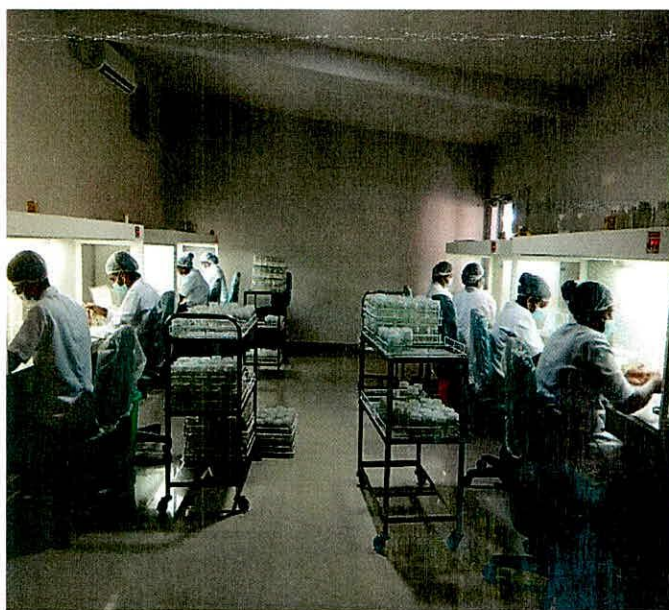
Department of BT conducted Certificate Course on Somatic Embryogenesis from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016


**Objective of the Course:** The one week course made the students to be familiar with the major concepts in plant tissue culture which is a main platform for their career. Certificate Course became the vital step to improve the knowledge of students.

**Resource Person:** Mr. Rohith Raj, Managing Partner, Chlorbios Pvt. Ltd. Yalahanka Bangalore

**Duration of the course:** One week from 18<sup>th</sup> July 2016 to 23<sup>rd</sup> July 2016

Student participant in certification program



  
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## Department of Biotechnology

Dates	Report
18-7-2016	Speaker delivered a talk on Importance of Plant Tissue Culture and progress in Technology, Culturing and Sub-Culturing of tissues, Hands on preparation of media for plant cell culture & explant preparation and inoculation
19-7-2016	Speakers delivered a talk on Monitoring and control of cell culture, Cell metabolism and its control in culture media, Hands on session on monitoring cell culture
20-7-2016	Speakers delivered a talk on Mass propagation of plants through somatic embryogenesis, employing liquid medium in shake flasks/bioreactors, Hands on shake flask studies/Bioreactors
21-7-2016	Speakers delivered a talk on Physico-chemical parameters affecting somatic embryogenesis in shake flasks/bioreactors, Analysis and monitoring of biomass growth, Hands on session on checking Physio-chemical parameters affecting somatic embryogenesis.
22-7-2016	Speakers delivered a talk on Polymorphisms, Types of Polymorphism, Hands on session on RFLP/ RAPD Techniques
23-7-2016	Speakers delivered a talk on Genetic stability of Plant, Analysis of genetic stability of plants regenerated via somatic embryogenesis through RAPD technique, Hands on session on analysis of genetic stability using RAPD Techniques.

Conclusion: These programs prepare students to complete a specific task or allow them proficiency in one of the particular aspect of their field. Students are able to learn about somatic embryogenesis. Certificate programs to helps the students study to round out their education for their own personal fulfillment and interest for professional advancement or personal interest.

**Principal**

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Bangalore-560 057

**HOD**  
Head of the Department  
Dept. of Bio-Technology  
Sapthagiri College of Engineering  
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