

GUJARAT UNIVERSITY

REVISED SYLLABUS

Post Graduate Diploma in Plant Tissue Culture

Effective from July 2022



1. There will be 2 Papers (Three Hour Duration) and two Practical (Six hour Duration) of One Hundred (70 External + 30 Internal) Marks each at Semester Examination.
2. The Field Excursion is highly essential for studying vegetation in its natural state. There shall be at least one field excursion in and outside Gujarat State. Tour report and submission of specimens will be given due weightage.
3. Candidate shall be required to submit at the time of practical examination at the end of each semester.
 - The laboratory Journal and diary of field work (Tour report) duly signed by the teachers concerned from time to time.
 - A set of Slides, Preparations or Materials illustrating the subject - matter as per syllabus for each semester.

Distribution of Marks

INTERNAL MARKS

Practical / Assignment, Seminar Field Work, Strategy Planning, Submission:

PGD BDM	Experiment	Total
Sem I	Paper 403 and 404	
Marks	30 + 30	60
Sem I	Paper 405 Viva-voce	
Marks	30	30
Sem II		
Marks	100	100

Theory:

Internal

Semester	Per Paper / Marks	Papers	Total
I	30	2 (401 and 402)	60

EXTERNAL MARKS

Semester	Theory / Project			Practical			Grand
	Internal	External	Total	Internal	External	Total	Total
I	30 X 2 = 60	70 X 2 = 140	200	30 X 2 = 60	70 X 2 = 140	200	400
II	100	200	300				300
	30	70	100				100
							800

Seminar:

- Topics will be allotted in the beginning of the each semester.
- On due date student has to present the seminar on allotted topic and submit compiled literature.
- Presentation would be evaluated.

Assignment / Submission:

- Student must Prepare / Collect specific literature / Herbarium / Material pertaining to the topics in Botany.
- Student may take up survey work in guidance of the department.
- Assignment / submission would be evaluated.

Project:

- One of the prime requirements of the programme is preparation of dissertation/project by the students on a topic/subject determined by a student and his guide. Based on the papers and topics studied, student must select a line of research; prepare a project proposal (comprising introduction, literature survey, problem, target, methodology, probable outcome and reference) and submit the dissertation.
- Project report would be evaluated. Entitlement of Diploma requires one to fulfill this condition invariably

COURSE STRUCTURE

Department Name: Applied Botany Centre, School of Sciences			Semester – I				
Course		Name of Course	No. of Hours per Week				Credit
No.	Type		Lectures	Others	Practical	Total	
PGD PTC 401	CORE	Plant Tissue Culture, methods and applications	3	2	-	5	5
PGD PTC 402	CORE	Plant Improvement and complementary techniques	3	2	-	5	5
PGD PTC 403	CORE	PRACTICAL – 1 based on Paper PGD PTC 401	-	2	3	5	5
PGD PTC 404	CORE	PRACTICAL – 2 based on Paper PGD PTC 402	-	2	3	5	5
TOTAL			06	08	06	20	20
			Semester – II				
Course		Name of Course	No. Of Hours per Week				Credit
No.	Type		Lectures	Others	Practical	Total	
PGD PTC 501	CORE	PROJECT	2	2	16	20	20
PGD PTC 502	ELECTIVE	ASSIGNMENT, DOCUMENTATION and REVIEW WRITING	-	10	-	10	10
TOTAL			2	12	16	30	30

CREDIT AND EVALUATION SYSTEM:

This Programme carries a **Total of 50 Credits**. Each of the above courses carries Four Credits (One Credit Equals 9 Hours Each).

Total Credits in each semester will be as under:

Number of courses in Semester-I x Credits for each course = 4x5 = 20 Credits

Number of courses in Semester-II Plus Credits for project Work = 20 Credits

Plus Credits For Assignment, Documentation and Review Writing in Semester-II = 10 Credits

Total Credits for Semester-II = 30 Credits

Giving **Total Credits for entire programme =50 Credits**

- Minimum of 75% Attendance in each semester (135 Hours out of 180 hours (45x4 courses) in each semester i.e. a minimum of 15 Credits in each semester) is a mandatory requirement to qualify for the Internal and University Exams in each semester. Students not satisfying this criterion will disqualify for the Internal as well as Semester End University Exams.
- Project Work carries 10 Credits equivalent to 90 Hours out of which a minimum of 1 Credit equivalent to 9 Hours must be spent for consultation with the Project Guide.
- Each course in this P.G. Diploma carries 100 marks for the purpose of evaluation out of which 30 marks are allotted for internal evaluation and 70 marks are allotted for semester end University examination known as external evaluation.
- The performance of a student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points.
- Evaluation for each course shall be done by a Continuous Internal Assessment (CIA) by the concerned course teacher as well as by an end semester examination and will be consolidated at the end of the course. Continuous Internal Assessment carries 30% weightage and Semester End University Exams carry 70% weightage.
- The components of Continuous Internal Evaluation of 30% weightage include:
 - 1) 20% for Internal Examination in each Semester and
 - 2) 10% for Attendance and class participation.
- Project work also carries 30% weightage of Evaluation by Project Guide and 70% weightage of Evaluation by External Examination Committee.
- External Evaluation of Projects will be conducted as follows:
 - 1) Project Contents, Quality of Research Work and Presentation: 140 Marks
 - 2) Power point presentation by the student: 40 Marks
 - 3) Viva-Voice: 20 Marks

Total: 200 Marks
- The passing minimum for CIA (Continues Internal Assessment) shall be 36 % i.e., 11 marks out of 30 marks, where the candidate is required to appear for the internal test at least once in each semester.

- Failed candidates in the Internal Assessment are permitted to improve their Internal Assessment marks in the subsequent semesters by appearing for Re-test only once.
- The passing minimum for University or External Examinations shall be 36% i.e. 25 marks out of 70 marks. A student not securing minimum standard of 36% in each course in external examination shall be declared as unsuccessful or fail.

GRADING SYSTEM:

Once the marks of the CIA (Continues Internal Assessment) and end semester University Examination for each of the courses are available, they will be added. The marks thus obtained in each course will then be graded as per details provided in the table below:

GRADING OF THE COURSES

Percentage / Marks	Grade Points	Grade	Description
Above 85	8.5 - 10.0	O+	Outstanding
70 - 84..99	7.0 - 8.49	O	Excellent
60 - 69.99	6.0 - 6.99	A	Very good
55 - 59.99	5.5 - 5.99	B+	Good
48 - 54.99	4.8 - 5.49	B	Fair
36 - 47.99	3.6 - 4.79	C	Average
Below 36	0.0	D (Dropped)	Dropped or Fail

GRADES FOR FINAL RESULT:

CGPA From - to	Letter Grade	Classification of Final Result
8.5 - 10	O+	First class with Distinction
7.0 - 84.99	O	
6.0- 6.99	A	First Class
5.5 - 5.99	B+	Higher Second Class
4.8 - 5.49	B	Second Class
3.6 - 4.79	C	Pass Class
Below 3.6 - 0.0	D	Dropped or Fail

EVALUATION & AWARD OF DIPLOMA

1. In order to be declared successful in examination and declared as **PASS** the following conditions should be fulfilled:

(A) Minimum of 36% marks (C Grade) should be obtained by a student in each course both in internal evaluation as well as external evaluation done at the end of a semester.

(B) A student not securing minimum standard of 36% in external examination shall be declared as unsuccessful or fail. Anyone not securing 36% in internal evaluation in any course shall not be permitted to appear in semester end University examination in a concerned course.

(C) Unless all the conditions laid down above are fulfilled a student shall not be declared **PASS** and shall not qualify to obtain the P.G. Diploma Certificate.

2. A student is eligible to continue his/her studies for the second semester inspite of his failing in the First Semester end University examination.

3. A student is required to complete project work before the external examination for the second semester. Any one not completing this requirement shall not be permitted to appear in the semester end University Examination of second semester.

4. The final Mark Sheet will include the credit points, marks obtained in each course in internal as well as external exams, the corresponding grades obtained in each course as well as overall Grade as per the Evaluation System described above.

Question Paper Pattern (for External Examination)

Theory:

Question	Unit			Marks
Q – 1	From Unit I			
	(a)	Or	(a)	07
	(b)	Or	(b)	07
Q – 2	From Unit II			
	(a)	Or	(a)	07
	(b)	Or	(b)	07
Q – 3	From Unit III			
	(a)	Or	(a)	07

Q – 4	(b) From Unit IV	Or	(b)	07
	(a)	Or	(a)	07
Q – 5*	(b) From Unit I to IV	Or	(b)	07

*Objective type questions like Multiple choice / match A & B / fill in the blank / True or false / give one word / expand abbreviations etc.

Alternatively Q.1. –Q.4 one from each unit for 14 marks may be asked but Q. 5 will be objective type only.

Practical:

Q – 1. Major experiment 20 Marks.

Q – 2. Minor experiment 14 Marks.

Q – 3. General experiment 10 Marks.

Q – 4. Comment 16 Marks.

Q – 5. Viva – voce and journal 10 Marks.

(Pattern may change slightly depending upon the practical topics.)

SYLLABUS

POST GRADUATION DIPLOMA IN PLANT TISSUE CULTURE

**PTC- 401 : PLANT TISSUE CULTURE – METHODS AND APPLICATIONS
(EXTERNAL 70+ INTERNAL 30=100 MARKS)**

Unit - 1.

- History , Major Milestones, Pioneer experiments
- Laboratory organization: equipments, facilities
- Nutrient media, Types of cultures, Aseptic conditions

Unit – 2.

- Callus – induction, transfer, subcultures, growth kinetics.
- Micropropagation – stages, advantages, applications.
- Somatic embryogenesis-induction, factors, comparison with zygotic embryogenesis, Synthetic seed- technique, advantages ,applications.

Unit – 3.

- Morphogenesis, organogenesis, role of PGRs.
- Acclimatization – need, process, packaging, exports
- Pathogen (Virus) indexing- significance, methods, advantages, applications.

Unit – 4.

- Plant tissue culture Industry in Gujarat, India
- Application, Advantages, Challenges and constraints of the industry
- Success stories- case study in Gujarat , India

PTC – 402 : PLANT IMPROVEMENT AND COMPLEMENTARY TECHNIQUES
(EXTERNAL 70+ INTERNAL 30=100 MARKS)

Unit - 1.

- Meristem culture – methods, advantages, applications
- Haploid production – Androgenesis, gynogenesis
- Somaclonal variations – causes, advantages and applications,

Unit – 2.

- Somatic hybridization – methods, advantages and applications
- Transgenic plants- gene transfer methods,
- Case studies, challenges and limitations of transgenic plants.

Unit – 3.

- Germplasm preservation – methods
- Challenges and limitations of germplasm conservation
- Cryopreservation- methods, cryoprotectants,

Unit – 4.

- Phytochemistry- primary and secondary metabolites
- Biotransformation and bioreactors
- Hairy root cultures - methods, applications

Paper – 403: Practical 1 Based on paper PGD PTC 401

Paper – 404: Practical 2 Based on paper PGD PTC 402

Paper – 501: Project

- Compilation under guidance with write – up including introduction, problem, aim, literature survey, methodology, outcome, discussion, bibliography and enclosures.

Paper – 502:

- ELECTIVE: ASSIGNMENT, DOCUMENTATION AND REVIEW WRITING

References-

1. Bhojwani, S.S. 1990. Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.
 2. Bhojwani, S.S. 1996. Plant Tissue Culture: Application and Limitations. Elsevier Science Publishers, New York, USA.
 3. Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue Culture. Kluwer Academic Publishers, the Netherlands.
 4. Shantharam, S. and Montgomery, J.F. 1999. Biotechnology, Biosafety and Biodiversity. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
 5. Glick, B.R. and Thomson, J. E. 1993. *Methods in Plant Molecular Biology and Biotechnology*. CRC Press, Boca Raton, Florida.
 6. A Text Book of Biotechnology, R. C. Dubey, S. Chand Publication
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