



Course Outline Form

EVEN SEMESTER 2019

Dear Student: Course outlines are intended to provide students with an overall plan for a course to enable them to function efficiently and effectively in the course.

*Academic Programs
BSc Biotechnology
EMEA College
Kondotty*

Course Outline : **BTY6B13. PLANT BIOTECHNOLOGY** (2018-2019)

Name of the Stream	Science
Name of the Programme	BSc Biotechnology
Name of the Course	BTY6B13. PLANT BIOTECHNOLOGY
Nature of the Course	Core Course
Semester	Sixth
Lecturer(s)	Ruba Badharudheen
Name of the Coordinator	Ruba Badharudheen
Year	2018-2019
No of Credits	3
No of Contact Hours	4
Course Description	This course explores the use of biotechnology to both generate genetic variation in plants and to understand how factors at the cellular level contribute to the expression of genotypes and hence to phenotypic variation. There is an emphasis on the molecular mechanisms directing plant gene expression
Course Objectives	The objective of the course is to give students new knowledge and widening of the knowledge acquired in other course by handling of classical and modern plant biotechnology processes, including breeding of healthy plants, plants with improved characteristics and plants for biomolecule production.
Course Outcome	On completion of the course, students are able to understand: 1. Laboratory organization, culture media, callus culture, suspension culture, Assessment of growth and viability, Micropropagation, Somatic embryogenesis, synthetic seed. 2. Meristem culture, Somaclonal variations, haploid plants, androgenesis, gynogenesis, embryogenesis. 3. Protoplast culture, somatic hybridization, cybrids, germplasm conservation and cryopreservation. 4. Nuclear genome, chloroplast genome, mitochondrial genome, transposon, Chloroplast transformation, Agrobacterium mediated transformation. 5. Application of DNA technology, plant cell as biofactories for the production of Secondary metabolites.
Assessment Method	Assignments Homeworks Class Tests Unit Tests Practical Tests Term Exam Seminars Lab Experiments
Teaching Methods Used	

Textbook	<ol style="list-style-type: none"> 1. Herlaw, F. & David, L.D. (Eds.). 1998. Antibodies: A Laboratory Manual, Coldspring Harbor Laboratory. 2. Coligan, J.E. Kruisbeck, A.M. Margulies, D.H. Shevach, E.M. and W. Strober 1996. Current Practicals in Immunology, John Wiley & Sons Inc. 3. Dixon, R.A. & Genzales, R.A. (Eds.) 1994. Plant Cell Culture – A Practical Approach, IRL Press, Oxford. 4. Smith, R.H. 1992. Plant Tissue Culture Techniques and Experiments, Academic Press. 17 5. Edwin F. George (1993). Plant propagation by Tissue Culture, Part I. The Technology II Ed. Exegetics Ltd.
References	<ol style="list-style-type: none"> 1. Herlaw, F. & David, L.D. (Eds.). 1998. Antibodies: A Laboratory Manual, Coldspring Harbor Laboratory. 2. Coligan, J.E. Kruisbeck, A.M. Margulies, D.H. Shevach, E.M. and W. Strober 1996. Current Practicals in Immunology, John Wiley & Sons Inc. 3. Dixon, R.A. & Genzales, R.A. (Eds.) 1994. Plant Cell Culture – A Practical Approach, IRL Press, Oxford. 4. Smith, R.H. 1992. Plant Tissue Culture Techniques and Experiments, Academic Press. 17 5. Edwin F. George (1993). Plant propagation by Tissue Culture, Part I. The Technology II Ed. Exegetics Ltd. 6. Edwin F. George, 1993/1996. Plant Propagation by Tissue Culture, Part II In Practice II Ed. 7. Pierik, R.L.M. 1989. In vitro culture of higher plants. Martinus Nijhoff Publishers, Dordrecht, Netherlands. 8. M.Z. Abdin et al. (eds.). 2017. Plant Biotechnology: Principles and Applications, Springer Nature Singapore Pte Ltd. 9. Kamle, S., & Ali, S. (2013). Genetically modified crops: Detection strategies and biosafety issues. Gene, 522(2), 123–132. 10 Bhajmani & Razdan. Plant Tissue Culture, Theory and Practice. 11. Reinert & Bajaj. 1977. Plant Cell, Tissue and Organ Culture, Springer Verlag, Berlin. 12. S. Narayanaswamy, 1994. Plant Cell and Tissue Culture, Tata McGraw Hill Publishing Company Ltd., New Delhi.
Internet Resources	

Internal Exam Pattern

Items	Marks/20	Marks/15
Assignment	4	3
Test Paper(s)/Viva voce	8	6
Seminar/Presentation	4	3
Class Room Participation based on Attendance	4	3
Total	20	15

External Exam Pattern

Question Type	No of Question	Marks/Question	Total Marks
Short Questions(2-3 Sentences)	15	2	Ceiling 25
Paragraph / Problem Type	8	5	Ceiling 35
Essay Type	2 out of 4	10	20
Total			80
Time			2.5 hrs

Graduate Attributes	<p>Name of the Course: BTY6B13. PLANT BIOTECHNOLOGY</p> <p>Knowledge</p> <p>Academic and Intellectual Skills</p> <p>Self Learning</p> <p>Collaborative Learning</p> <p>Professional Skills</p> <p>Communication Skills</p> <p>Team Work and Leadership</p> <p>Decision Making</p> <p>Problem Solving Skills</p> <p>Research Skills</p> <p>Entrepreneur Aptitude</p> <p>Personal Skills</p> <p>Application Skills</p> <p>Attitude and Values</p> <p>Social Responsibility</p> <p>Ethical Commitment</p>
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Course Schedule

Basic techniques of plant tissue culture (Introduction, Definition)	
Medium preparation and sterilization	Week 2
inoculation, explant selection, growth regulators, subculture, conditions of culture room, etc.	Week 3
In vitro morphogenesis	Week 4
Organogenesis – Meristem culture	Week 5
Production of virus free plants embryogenesis and synthetic seeds,	Week 6
embryogenesis and synthetic seeds, significance studies on regeneration – single / multiple shoot, root formation	Week 7
somaclonal variation and its significance, transfer and establishment of whole plants into soil	Week 8
Different types of culture (Callus culture, studies on different types of callus formation, cell culture / suspension culture).	Week 9

Organ culture: (ovary, ovule, endosperm triploid production, embryoculture, induction of polyembryony, anther culture, in vitro production of haploids and its significance in crop improvement). first internal examination	Week 10
Tissue culture and Biotechnological applications in agriculture, horticulture, pharmacology, industry.	Week 11
Protoplast isolation and fusion,	Week 12
importance of hybrids and cybrids culture, importance and applications in crop improvement.	Week 13
Cryopreservation, germplasm storage, and establishment of gene banks, viability & potentiality test, gene sanctuaries second internal examination	Week 14
Genetic manipulations: Recombinant DNA technology	Week 15
production of transgenic plants, hairy root culture	Week 16
basic concepts, practical applications of genetic transformations. GMO crops and issues related to it.	Week 17
Biosafety, Bioethics and IPR in Plant biotechnology Modal examination	Week 18

Contact Details

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