



SIDDHARTH UNIVERSITY

Kapilvastu. Siddharth Nagar (UP)- 272202

Proposed Course for Pre-Ph.D

Course Title: Instrumentation Techniques in Plant Science & Identification, Quantification of Bio molecules.

Course Code: BODC701

Credit Units: 3

Level: Pre-Ph.D.

Credit Distribution of the course		
Lecture (L)	Tutorial (T)	Practical (P)
03	-	-

Course Objectives: To provide knowledge about Principles and Application of various instruments and techniques used in Plant Sciences.

Pre-requisites: Post Graduation or 4 years Graduate with Research

Course Contents/Syllabus:

Descriptors/Topics	Weightage (%)	
Unit I: Principles and Application of Instruments	35%	
Microscopes: phase contrast, differential image control, fluorescence, confocal, scanning and transmission electron microscopes. Spectrophotometer: UV-Visible, Mass Spectrophotometer, ICP-MS (Inductively coupled plasma mass spectrophotometer), AAS (Atomic Absorption Spectroscopy) and fluorescence spectrophotometers.		
Unit II: Techniques in Plant Sciences.	35%	
Tissue culture techniques: Media preparation, sterilization, in vitro regeneration. Microbial culture techniques: Sterilization, culture media, types of cultures- batch and continuous, culture preservation.		
Unit III: Identification & quantification of Biomolecules	30%	
Genomics: Isolation of genomic and plasmid DNA, Gel Electrophoresis, PCR, Genome sequencing.		

Chromatography		
Centrifugation		
Bioinformatics: Basic concepts and applications.		

Course Outcomes: After Pre-Ph.D. course students will be skilled at handling various types of instruments used in research work and will be knowledgeable in technique of biosciences.

Pedagogy for Course Delivery:

The course will be delivered in the form of lectures and discussions.

Assessment/ Examination Scheme:

Evaluation scheme and mode will be as per the guidelines notified by the Siddharth University, Kapilvastu, Siddharth Nagar

Textbooks/ References Books:

1. J.M. Miller, 2005, Chromatography - Concepts and Contrasts. John Wiley & Sons, New Jersey, USA.
2. R.L. Grab and E. F. Barry, 2004, Modern Practice of Gas Chromatography fourth edition). John Wiley & Sons, New Jersey, USA.
3. W.J. Ough and I.W. Wainer, 1995, High Performance Liquid Chromatography- Fundamental Principles and Practices. Blackie Academic & Professional, Glasgow,5 Scotland.
4. B.D. Hames (ed.) 2002, Gel Electrophoresis of Protein- A Practical Approach. Oxford University Press Inc., New York, USA.
5. K. Wilson and J. Walker (ed.), 2010, Principles and Techniques of Biochemistry and Molecular Biology. 7th edition. Cambridge University Press.
6. F.S. Parker, 1983, Applications of Infrared, Raman and Resonance Raman Spectroscopy in Biochemistry. Plenum Press, New York, USA.
7. J.B. Harborne, 1998, Phytochemical Methods-A Guide to Modern Techniques of Plant Analysis. Chapman & Hall, London, U.K.
8. S. Sadasivam and A. Manickam, 2005, Biochemical Methods. New Age International Private Ltd., New Delhi.
9. D. Heard (ed.) 2006, Analytical Techniques for Atmospheric Measurements. Blackwell Publishing Ltd., UK.
10. G.K. Agrawal, R. Rakwal, (Ed.) 2008, Plant Proteomics- Technologies, Strategies and Application. John Wiley & Sons, New York, USA.
11. M. Radojević and V.N. Bashkin, 1999, Practical Environmental Analysis. Royal Society of Chemistry, Cambridge, UK.
12. American Public Health Association (APHA), 1998, Standard Methods for the Examination of Water and Wastewater 19th edition. Washington, D.C

<u>Record Matrix</u>	
<u>To be Filled By Institution</u>	
Date of Introduction of course:	March 2025 (Proposed)
Date of Last Revision:	Not applicable
Version*:	1st
Percentage of revision:	Not applicable (New Course)



SIDDHARTH UNIVERSITY
Kapilvastu. Siddharth Nagar (UP)- 272202

Proposed Course for Pre-Ph.D (Botany)

Course Title: Advances in Ecology.

Course Code: BODC702

Credit Units: 3

Level: Pre-Ph.D

Credit Distribution of the course		
Lecture (L)	Tutorial (T)	Practical (P)
03	-	-

Course Objectives: To provide an understanding of current research frontiers in ecological science and to develop ability for analyzing and interpreting ecological data.

Pre-requisites: Post Graduation or 4 years Graduate with Research

Course Contents/Syllabus:

Descriptors/Topics	Weightage (%)
Unit I: Biodiversity Assessment and Impacts	30 %
Assessment of biodiversity, Degradation and loss of biodiversity, Conservation and management of biodiversity.	
Unit II: Principals of ecology and species concept	35%
Population, community, Invasion, Immigration, Emigration, River continuum concept, eutrophy and concept of nutrient limitation, River ecosystem and resilience. Concept and strategies of ecological restoration, Ecology of disturbed ecosystems, Degradation and restoration of natural ecosystems.	
Unit III: Pollution abatement and Management	35%
Spatial and temporal trends of soil contaminants, Risk assessment, Current remediation approaches. Emerging water pollutants, Water quality characterization and monitoring, Innovative management strategies. Global warming impacts on various ecosystems, Mitigation measures on global	

warming, Mechanism of toxicity of air pollution in plants. Bioremediation: Bioremediation of heavy metal toxicity in environment.	
--	--

Course Outcomes: The students will be able to design & conduct ecological research projects and interpret complex ecological data.

Pedagogy for Course Delivery:

The course will be delivered in the form of lectures and discussions.

Assessment/ Examination Scheme:

Evaluation scheme and mode will be as per the guidelines notified by the Siddharth University, Kapilvastu, Siddharth Nagar

Textbooks/ References Books:

1. E. P. Odum, Fundamentals of Ecology, Nataraj Publisher.
2. P. D. Sharma, Ecology and Environment, Rastogi Publication.
3. M. C. Dash, Fundamentals of Ecology, Tata McGraw Hill.
4. Kormondy Edward J. Concept of Ecology, Fourth Edition, PHI Learning.
5. K. C. Agrawal, Fundamentals of Environmental Biology, Nidhi Publisher.
6. R. S. Shukla & P.S. Chandel, A Textbook of Plant Ecology: Including Ethnobotany and Soil Science, S. Chand Publisher.
7. K.S. Rao, Practical Ecology, Anmol Publication Pvt. Ltd.
8. S. S. Dara, A Textbook of Environmental Chemistry and Pollution Control, 2004
9. J. P. Sharma, Comprehensive Environmental Studies (For Undergraduate Students) Laxmi Publication (P) Ltd
10. D. K. Asthana & Meera Asthana, Environment: Problems and Solutions, S. Chand Publication •
11. E. D. Enger & B. E. Smith, Environmental Science – A study of Inter relationships, 5th edition, W C B publication.
12. Oke, T. R., Mills, G., Christen, A., & Voogt, J. A. Urban climates. Cambridge University Press.
13. Landsberg, H. E. The urban climate. Academic press.
14. Baklanov, A., Sue, G., Alexander, M., & Athanassiadou, M. (Eds.). Meteorological and air quality models for urban areas (Vol. 140). Berlin, Heidelberg: Springer.
15. Sustainable Air Pollution Management` R Chandrappa and U C Kulshrestha. Springer ISBN_978-3-319-21595-2, e ISBN_978-3-319-21596-9.

16. The Common-Sense Approach to Hazardous Materials, Fire, Frank. L., Fire Engineering, Penn Well Corp.

<u>Record Matrix</u>	
<u>To be Filled By Institution</u>	
Date of Introduction of course:	March 2025 (Proposed)
Date of Last Revision:	Not applicable
Version*:	1st
Percentage of revision:	Not applicable (New Course)