Institute of Education and Research
Science Education
University of the Punjab, Lahore
Course Outline

Programme	BSSEd	**Course Code**	**SE-305**	**Credit Hours**	3
Course Title	**Botany I-Theory (Plants Diversity)**				

Course Introduction

The course is organised to provide a piece of adequate knowledge about different plant groups with their representatives along with their Taxonomy, Morphology and life cycle patterns. It is generally aim to familiarize students with the morphological and systematic knowledge of different plant groups, their evolution and their Economic importance.

Learning Outcomes

On the completion of the course, the students will:

- Familiarized with the morphological and systematic knowledge about different plant groups.
- Learn about the general characters, structure, life history, classification and economic importance of different plant groups.
- Qualify for basic to moderate-level jobs involving knowledge of plants and their environment.

	Course Content	**Assignments/Readings**
Week 1	**Unit-1: Viruses** 1.1 RNA and DNA	Test preparation/ Agrios, G.N. (2004). Plant Pathology
	1.2 RNA and DNA Types	Quiz
Week 2	1.3 RNA and DNA concerning tobacco	Figure drawing with labelling/ Agrios, G.N. (2004). Plant Pathology
	Unit-2: Bacteria and Cyanobacteria 2.1 Nostoc	Quiz/ Lee, E. R. (2007). Phycology
Week 3	2.2 Oscillatoria	Short written test/ Lee, E. R. (2007). Phycology
	Unit-3: Algae 3.1 Chlamydomonas	Test preparation/Lee, E. R. (2007). Phycology

Week 4	3.2 Spirogyra	Quiz/ Lee, E. R. (2007). Phycology
	3.3 Chara	Diagram labelling/ Lee, E. R. (2007). Phycology
Week 5	3.4 Pinnularia	Written Test preparation/ Lee, E. R. (2007). Phycology
	3.5 Ectocarpus	Oral Test / Lee, E. R. (2007). Phycology
Week 6	3.6 Polysiphonia	Long question preparation/ Lee, E. R. (2007). Phycology
	Unit-4: Fungi 4.1 Mucor and it's effect on corp production and industrial applications.	White Board Test/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
Week 7	4.2 Pencillium and it's effect on corp production and industrial applications.	Quiz/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
	4.3 Phyllactinia and it's effect on corp production and industrial applications.	Figure drawing with labelling/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
Week 8	4.4 Ustilago and it's effect on corp production and industrial applications.	Quiz/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
	Revision	
Week 9	4.5 Puccinia and it's effect on corp production and industrial applications.	MCQs/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
	4.6 Agaricus and it's effect on corp production and industrial applications.	Long question Test/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.

Week 10	**Unit-5: Lichens** 5.1 Physcia	Quiz/ Alexopoulos, C.J ., Mims, C.W. and Blackwell,
		M. (1996). Introductory Mycology.
	Unit-6: Bryophytes 6.1 Riccia	MCQs/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
Week 11	6.2 Anthoceros	Diagram labelling/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
	6.3 Funaria	Quiz/ Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology.
Week 12	**Unit-7: Pteridophytes** 7.1 Fossils and Fossilization	Quiz/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany
	7.2 Major groups and their Affinities	Quiz/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany
Week 13	7.3 Psilopsida(posilotum) , Lycopsida(Selaginella) , Sphenopsida(Equisetum) and Pteropsida(Marsilea).	Long question preparation/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany
	Unit-8: Gymnosperms 8.1 Cycas	MCQs/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany

Week 14	8.2 Pinus	Diagrams labelling/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany
	8.3 Ephedra	Quiz/ Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes,
		Gymnosperms and Paleobotany
Week 15	**Unit-9: Angiosperm** 9.1 Dicots	Short question answers Test/ Mauseth. J.D. (2003). Botany: An Introduction to Plant Biology
	9.2 Monocots	Short question answers Test/ Mauseth. J.D. (2003). Botany: An Introduction to Plant Biology
Week 16	Revision	
	Revision	

Textbooks and Reading Material

1. Agrios, G.N. (2004). Plant Pathology. (8th Ed.), Academic Press London.
2. Alexopoulos, C.J ., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology. (4th Ed.) John Wiley and Sons, UK.
3. Biswas, C, and Johri, B.M. (1999). The Gymnosperms. Narosa Publishing House. New Delhi and London.
4. Lee, E. R. (2007). Phycology. (4th Ed.) Cambridge University Press U.K.
5. Mauseth. J.D. (2003). Botany: An Introduction to Plant Biology. (3rd Ed.) Jones & Bartlett Pub.UK.
6. Prescott, L.M ., Harley, J.P. and Klein, A.D. (2004). Microbiology, (3rd Ed.) WM. C. Brown Publishers.
7. Sambamurty, A.V.S.S. (2005). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany. I.K. International Pvt. Ltd. New Delhi, Banglore, Mumbai. 573 pp.

Teaching Learning Strategies
1. Lecture Method 2. Inquiry Method 3. Demonstration Method 4. Project-making Method
Assignments: Types and Number with Calendar
1. Quiz 2. Presentation 3. Written Test 4. Class discussion

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

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Course Outline

BSSEd (4 Years) Science Education

Physics-II: SE-305A **WAVES AND OPTICS (3)**

WAVES AND OPTICS		(CR3)
Preq.	**FSc/A-Level (Physics) or equivalent**	

Objectives

To introduce the ideas of harmonic motion in depth, and concept of waves in physics with special attention on light waves.

Syllabus

Oscillations, simple and damped harmonic oscillations, Mass-spring system, Simple harmonic oscillator equation, Simple pendulum, Forced damped harmonic oscillations and Resonance. Waves, Transverse Standing Waves, Normal Modes, General Time Evolution of a Uniform String, Phase velocity, Group Velocity, Longitudinal Waves, Traveling waves, wave equation, Standing waves in a Finite Continuous Medium, Traveling waves in an infinite continuous medium, Electromagnetic waves. Doppler effect of sound waves. Optics, Propagation of Light and Image Formation: Huygens' Principle, Fermat's Principle, Laws of Reflection and Refraction, Refraction at a spherical surface, Thin Lenses, Newtonian Equation for a thin lens. Optical Instruments including simple magnifiers, Telescopes and microscopes, Chromatic and monochromatic aberrations, Spherical Aberrations. Superposition and Interference: Standing waves, Beats, Phase and group velocities, Two-beam and Multiple-beam interference, Michelson and Fabry-Perot interferometers, resolving power. Fraunhofer Diffraction: Diffraction from multiple slits, Diffraction grating, Dispersion. Polarization: Jones Matrices, Production of polarized light, description of polarization states, Dichroism, Brewster's law, Birefringence, Double refraction. Coherence and Holography: Temporal Coherence, Spatial Coherence, Holography.

Recommended Books

The Physics of Vibrations and Waves, by J. Pain, Wiley, (6th edition) (2005).

A student's guide to waves, D. Fleish, and L. Kinnaman, Cambridge, (2015). Vibrations and Waves, by P. French, CBS Publishers (2003).

Waves and Oscillations, by F. S. Crawford, Jr., Berkeley Physics Course, McGraw-Hill, (1968).

Physics Vol. I & II by Resnick, Halliday and Krane, 5th Edition, Wiley, (2002).

Introduction to Optics, by F. Pedrotti, L. S. Pedrotti and L. M. Pedrotti, Pearson, 3rd edition (2007).

Optics, by E. Hecht and A. Ganesan, Dorling Kindersley, 4th edition (2008).

Optics: Principles and Applications, by K. K Sharam, Academic Press, (2006).