

**Sher-e-Bangla Agricultural University**  
**Class Routine for B. Sc. Ag. (Hons.), Level 2 Semester II (July-December/2023)**

➤ Number in parenthesis indicates theory class room: 7, 8 (3<sup>rd</sup> Floor), Central Laboratory-601

\* Elective course      Effective from 01.12.2024

Day	Section	8.00-9.00	9.05-10.00	10.05-11.00	11.05-12.00	12.05-1.00	1.00-2.00	2.05-3.00	3.05-4.00	4.05-5.00	Course Code/Dept
Sunday	I		A-AGRO-252 C-ABOT-258	B-ENTO-254 D-SOIL-256	AFES 259 (7)	ENTO 253 (7)			HORT 281 (Elective) (7)		AGRO 251, 252 Department of Agronomy
	II		ABOT 257 (7)	AGRO 251 (7)	E-AFES-260 G-ABOT-258	F-AGRO-252 H-ENTO-254			HORT 281 (Elective) (7)		
	III		ENTO 253 (8)	AFES 259 (8)	I- AFES 260 K- SOIL 256	J- ABOT 258 L- ENT0 254			SOIL 255 (8)		
	IV		AGRO 251 (601)	ABOT 257 (601)	SOIL 255 (8)	AFES 259 (8)			M- AFES-260 O- SOIL-256	N- ABOT-258 P- ENT0-254	
	V		Q- AFES-260 S- SOIL-256	R- ABOT-258 T- ENT0-254	ENTO 253 (601)	ABOT 257 (601)			AFES 259 (601)		
Monday	I		A- AFES-260 C- SOIL-256	B-ABOT-258 D-ENTO-254	SOIL 255 (7)	AFES 259 (7)			ABOT 257	HORT 281 (Elective) (7)	ENTO 253, 254 Department of Entomology
	II		ENTO 253 (7)	ABOT 257 (7)	E-SOIL-256 G-ENTO-254	F- AFES-260 H- ABOT-258					
	III		ABOT 257 (8)	AFES 259 (8)	I-ABOT-258 K- ENT0-254	J- AFES-260 L- AGRO-252					
	IV		M- AGRO-252 O- ABOT-258	N- ENT0-254 P- SOIL-256	ENTO 253 (8)	AGRO 251 (8)			HORT 281 (Elective) (8)		
	V		AFES 259 (601)	SOIL 255 (601)	AGRO 251 (601)	ENTO 253 (601)			Q- AGRO-252 S- ABOT-258	R- ENT0-254 T- SOIL-256	
Tuesday	I		ABOT 257 (7)	AGRO 251 (7)	A-SOIL-256 C-AFES-260	B-AGRO-252 D-ABOT-258					ABOT 257, 258 Department of Agricultural Botany
	II		AFES 259 (8)	ABOT 257 (8)	SOIL 255 (8)	ENTO 253 (8)					
	III		I-SOIL- 256 K- AGRO- 252	J- ENT0-254 L- AFES-260	AGRO 251 (7)	AFES 259 (7)					
	IV		SOIL 255 (601)	ENTO 253 (601)	M-ENTO-254 O-AGRO-252	N-SOIL-256 P-AFES-260					
	V		Q- SOIL-256 S- AFES-260	R- AGRO-252 T- ABOT-258	ENTO 253 (601)	ABOT 257 (601)			HORT 281 (Elective) (601)		
Wednesday	I		A- ABOT-258 C- ENT0-254	B- AFES- 260 D-AGRO-252	AFES 259 (7)	ENTO 253 (7)					AFES 259, 260 Department of Agroforestry and Environmental Science
	II		ENTO 253 (8)	AFES 259 (8)	AGRO 251 (8)	SOIL 255 (8)					
	III		SOIL 255 (7)	ABOT 257 (7)	I- AGRO-252 K- AFES-260	J- SOIL- 256 L- ABOT- 258					
	IV		M- SOIL-256 O- AFES-260	N- AGRO-252 P- ABOT-258	ABOT 257 (601)	AFES 259 (601)					
	V		ABOT 257 (601)	AGRO 251 (601)	Q-ENTO-254 S-AGRO-252	R-SOIL-256 T-AFES-260			HORT 281 (Elective) (601)		
Thursday	I		ABOT 257 (7)	ENTO 253 (7)	AGRO 251 (7)	SOIL 255 (7)					* HORT 281 Department of Horticulture
	II		E-ENTO-254 G-AGRO-252	F-SOIL-256 H-AFES-26	AFES 259 (8)	HORT 281 (Elective) (8)					
	III		ENTO 253 (8)	ABOT 257 (8)	I- ENT0- 254 K- ABOT- 258	J- AGRO-252 L- SOIL- 256					
	IV		M- ABOT-258 O- ENT0- 254	N- AFES- 260 P- AGRO-252	ENTO 253 (601)	ABOT 257 (601)					
	V		SOIL 255 (601)	AFES 259 (601)	Q-ABOT-258 S-ENTO- 254	R- AFES- 260 T- AGRO-252					

Examination Hour

Recess

Theory

Reg. No.

I 22010182 - 22010261  
II 22010262 - 22010341  
III 22010344 - 22010422  
IV 22010423 - 22010504  
V 22010508 - 22010562 & 21010158 - 19-09490 Re-add.

Practical

Reg. No.

Group A 22010182 - 22010201  
B 22010202 - 22010221  
C 22010223 - 22010241  
D 22010242 - 22010261

Reg. No.

E 22010262 - 22010281  
F 22010282 - 22010301  
G 22010302 - 22010322  
H 22010324 - 22010341

Reg. No.

I 22010344 - 22010361  
J 22010362 - 22010381  
K 22010382 - 22010402  
L 22010403 - 22010422

Reg. No.

M 22010423 - 22010442  
N 22010443 - 22010463  
O 22010464 - 22010483  
P 22010484 - 22010504

Reg. No.

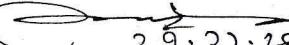
Q 22010508 - 22010523  
R 22010525 - 22010542  
S 22010543 - 22010562  
T 21010158 - 19-09490

Ref. No. SAU/FA-11/03/312

Dated: 27-11-2024

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29.12.28  
Prof. Dr. Mohammed Ali  
Dean  
Faculty of Agriculture

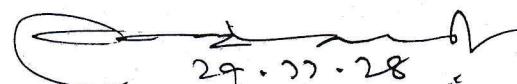
**Sher-e-Bangla Agricultural University**  
**Sher-e-Bangla Nagar, Dhaka 1207**

**Academic Calendar**

**Level 2, Semester II**  
**(July – December/2023)**

**(Class Room No. 7, 8 (3<sup>rd</sup> Floor), Central Laboratory-601**

<b>Class beginning</b>	<b>:</b>	<b>01.12.2024</b>
<b>Enrollment (Compulsory &amp; elective course )</b>	<b>:</b>	<b>08.12.2024 –09.12.2024</b>
<b>Late enrollment</b>	<b>:</b>	<b>10.12.2024</b>
<b>Winter Vacation</b>	<b>:</b>	<b>23.12.2024 – 26.12.2024</b>
<b>Tentative Mid Semester Exam.</b>	<b>:</b>	<b>19.01.2025 – 30.01.2025</b>
<b>1st Practical Examination</b>	<b>:</b>	<b>05.02.2025 – 18.02.2025</b> <b>(Exam. to be conducted following class routine)</b>
<b>Class end</b>	<b>:</b>	<b>25.02.2025</b>
<b>Recess period</b>	<b>:</b>	<b>26.02.2025 - 01.03.2025</b>
<b>Tentative Semester final (Theory) :</b>	<b>:</b>	<b>02.03.2025 - 20.03.2025</b>
<b>Shob-e-Quadr, Jamatul Wida &amp; Eid-ul-Fitr*</b>	<b>:</b>	<b>23.03.2025 – 03.04.2025</b>
<b>Tentative Semester final (Practical) :</b>	<b>:</b>	<b>08.04.2025 - 20.04.2025</b>
<b>Publication of results</b>	<b>:</b>	<b>04 (Four) weeks</b>



29.11.28

**Prof. Dr. Mohammed Ali**  
Dean  
Faculty of Agriculture, SAU.

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3. Controller of Examinations, SAU, Dhaka.
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5. Public Relations & Publications Office (for kind Publicity).
6. All Notice boards, SAU, Dhaka.
7. Office copy.

**LEVEL-2: SEMESTER-I**

Title of the Courses	Courses Code		Credit Hours	Total
	Theory	Practical	Theory + Practical	
<b>Compulsory Courses</b>				
Vegetable Production (T)	HORT 201	HORT	3+2	5
Vegetable Production (P)		202		
Cytology and Cytogenetics (T)	GEPB 203	GEPB	2+2	4
Cytology and Cytogenetics (P)		204		
Introduction to Plant Pathology and Microbiology (T)	PLPA 205	PLPA	2+2	4
Laboratory Techniques in Plant Pathology and Microbiology (P)		206		
Agricultural Extension and Rural Development (T)	AEIS 207	AEIS	2+1	3
Agricultural Extension and Rural Development (P)		208		
Intermediary Metabolism and Food Nutrition (T)	BIOS 209	BIOS	2+2	4
Intermediary Metabolism and Food Nutrition (P)		210		
<b>TOTAL</b>			<b>11+10</b>	<b>20</b>
<b>Elective Course</b>				
Sustainable Agriculture (T-E)	AGRO 231	-	2+0	2
<b>TOTAL</b>			<b>2+0</b>	<b>2</b>

**LEVEL-2: SEMESTER-II**

Title of the Courses	Courses Code		Credit Hours	Total
	Theory	Practical	Theory + Practical	
<b>Compulsory Courses</b>				
Seed Science & Technology (T)	AGRO 251	AGRO	2+2	4
Seed Science & Technology (P)		252		
Introductory Entomology (T)	ENTO 253	ENTO	3+2	5
Introductory Entomology (P)		254		
Soil Classification, Survey and Conservation (T)	SOIL 255	SOIL	2+2	4
Field and Laboratory Study of Soil (P)		256		
Plant Physiology (T)	ABOT 257	ABOT	3+2	5
Plant Physiology Practical (P)		258		
Agro-Forestry (T)	AFES 259	AFES	3+2	5
Agro-Forestry (P)		260		
<b>TOTAL</b>			<b>13+10</b>	<b>23</b>
<b>Elective Course</b>				
Nursery Management of Horticultural Crops (T-E)	HORT 281	-	2+0	2

<b>Course Code:</b> ABOT 257 <b>Course Title:</b> Plant Physiology (Theory)	<b>Credit Hours:</b> 03	<b>Level:</b> 2	<b>Semester:</b> II
<b>Rationale:</b> This course is designed to provide the knowledge of fundamental physiological principles and processes related to crop production and crop improvement.			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>Realize the importance and mechanisms of water and nutrients uptake and their cellular distribution</li> <li>Understand the processes of solar energy conversion into chemical energy and their metabolism</li> <li>Develop knowledge on physiological mechanisms of plant growth and development</li> <li>Gather knowledge about plant responses to stresses</li> </ul>			
Intended Learning Outcomes (ILOs) The students will be able to -	Course Content	Teaching-Learning Strategies	Assessment Strategies
<ul style="list-style-type: none"> <li>Elucidate the processes of water absorption in plants</li> <li>Describe the mechanisms of water movement in plants</li> </ul>	<b>Plant-water relations -</b> Properties and functions of water in plants; mechanism of and factors affecting water movement through the soil-plant-atmosphere continuum	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Explain the mechanism of nutrients uptake and their cellular distribution in plants</li> </ul>	<b>Mineral absorption -</b> Mechanism of mineral absorption and conduction in plants	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Describe the light harvest by pigment systems, carbon assimilation and their translocation in the plant body</li> <li>Illustrate the mechanism of photorespiration and way of its control</li> </ul>	<b>Photosynthesis -</b> Plant pigments and pigment-systems; light reactions; pathways of carbon assimilation and their significance; factors affecting rate of photosynthesis; photosynthetic efficiency and bio-productivity; concept, pathway and factors affecting photorespiration; key to improve crop productivity by controlling photorespiration	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Show the mechanism of energy generation from organic compounds</li> </ul>	<b>Respiration -</b> Respiratory pathways; factors affecting respiration; respiration of plant parts during storage, ripening, damage, and at low oxygen concentrations	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer

<ul style="list-style-type: none"> <li>Explain the function of plant growth regulators on growth, development and yield of crops</li> </ul>	<b>Plant growth regulators -</b> Concept and classification; physiological effects of natural and synthetic growth regulators on plants; application of growth regulators in agriculture	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Discuss the flowering behavior in plants in relation to variations of the environment</li> </ul>	<b>Physiology of flowering -</b> Floral initiation, anthesis, dehiscence of anther, stigma receptivity, pollen tube growth, fruit growth and development; photoperiodism and vernalization	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Show the process and metabolic changes in seed during germination</li> <li>Discuss seed dormancy of agricultural crops</li> </ul>	<b>Seed physiology -</b> Process of seed germination, metabolic and other changes during seed germination, seed dormancy and viability, factors affecting seed dormancy and germination; exposure to bud dormancy and related aspects	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Explain the response of plants to stress and the mechanism of stress tolerance</li> </ul>	<b>Stress physiology -</b> Concept and types; effects of stresses on plants; mode of stress tolerance	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Descriptive answer
<ul style="list-style-type: none"> <li>Describe the latest research findings and information of Plant Physiology</li> </ul>	Latest research findings and information regarding Plant Physiology	Assignment	Report

### Reference Books

1. A. Hemantaranjan, (Ed). 2003. Advances in Plant Physiology. Scientific Publishers, New Delhi.
2. F. Salisbury and C. Ross. 1978. Plant Physiology. Wads Worth Pub Co., Belmont.
3. L. Taiz and E. Zeiger. 2002. Plant Physiology. Sinauer Associates, Inc. Publishers, USA.
4. R.M. Devlin and F.H. Witham. 1983. Plant Physiology. 4<sup>th</sup>Edn. CBS Publisher and Distribution, Delhi.
5. S.N. Pandey and B.K. Sinha. 1990. Plant Physiology. Vikas Publishing House Pvt. Ltd., New Delhi.
6. V.K. Jain. 1999. Fundamentals of Plant Physiology. S. Chand and Company Ltd., India.

<b>Course Code:</b> ABOT 258 <b>Course Title:</b> Plant Physiology (Practical)	<b>Credit Hours:</b> 02	<b>Level:</b> 2	<b>Semester:</b> II
<b>Rationale:</b> This course is designed to provide knowledge on physiological processes of crop plants.			
<b>Course Objectives</b> <ul style="list-style-type: none"> <li>Gain practical knowledge on physiological processes in plants</li> <li>Demonstrate different physiological phenomena practically</li> <li>Acquire knowledge on growth analysis of crop plants</li> </ul>			
Intended Learning Outcomes (ILOs) The students will be able to -	Course Content	Teaching-Learning Strategies	Assessment Strategies
• Operate plant physiology related laboratory instruments efficiently	Handling and use of laboratory instruments related to plant physiology	Lecture Demonstration Discussion	Quiz/MCQ Short answer Identification Demonstration performance Viva voce Practical notebook
• Demonstrate basic plant physiological processes including osmosis, plasmolysis, transpiration and respiration	Demonstration of basic physiological processes that happen in plants	Lecture Demonstration Discussion Group work	Quiz/MCQ Short answer Identification Demonstration performance Viva voce Practical notebook
• Separate, estimate and analyze plant pigments	Quantitative estimation of pigments by chromatography and spectrophotometry	Lecture Demonstration Discussion Group work	Quiz/MCQ Short answer Identification Demonstration performance Viva voce Practical notebook
• Analyze different growth parameters of crop plants and their parts	Growth analysis of a crop	Lecture Demonstration Discussion Group work	Quiz/MCQ Short answer Identification Demonstration performance Viva voce Practical notebook

#### **Reference Books**

1. A.C. Datta and C. Subhash. 1994. Plant Physiology. New Age International Ltd., India.
2. A.C. Datta. 1975. Botany for Degree Students. 6<sup>th</sup>Edn. Oxford University Press, London.
3. A.C. Leopold and P.E. Kriedemann. 1983. Plant Growth and Development. 2<sup>nd</sup>Edn. McGraw-Hill, New York.
4. F.B. Salisbury and C.M. Ross. 1986. Plant Physiology. 3<sup>rd</sup>Edn. CBS Pub., Delhi.
5. L. Taiz and E. Zeiger. 1991. Plant Physiology. The Benjamin/Cummings Pub. Co. Inc., California.
6. P. Gupta and S. Kumar. 2001. Plant Physiology. East West Press, Delhi..
7. R.M. Devlin and F.H. Witham. 2000. Plant Physiology. 4<sup>th</sup>Edn. CBS Pub., Delhi.
8. S.N. Pandey and B.K. Sinha. Plant Physiology. 2<sup>nd</sup> Revised Edn. Vikas Pub., New Delhi.

<b>Course Code: AGRO 251</b> <b>Course Title : Seed Science and Technology (Theory)</b>	<b>Credit Hours:</b> <b>02</b>	<b>Level: 2</b>	<b>Semester: II</b>
<b>Rationale:</b> This course is designed to provide fundamental aspects of seed and technology, seed quality, seed production, seed processing & preservation and seed legislation			
<b>Course Objectives:</b>			
<ul style="list-style-type: none"> <li>• Provide basic concept on seed and seed technology</li> <li>• Acquire knowledge about seed quality</li> <li>• Learn about seed production and processing</li> <li>• Provide knowledge about seed legislation</li> </ul>			
Intended Learning Outcomes (ILOs) The students will be able to-	Course Content	Teaching-Learning Strategies	Assessment Strategies
<ul style="list-style-type: none"> <li>• Acquire knowledge about seed.</li> <li>• Learn about the aspect of seed technology.</li> <li>• Explain seed formation and development process.</li> </ul>	<b>Seed and seed technology-</b> Definition, importance, classification, structure, seed formation, seed development	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Explain and describe seed quality.</li> <li>• Explain quality determining parameters of seed.</li> </ul>	<b>Seed quality-</b> Importance, characteristics ,factors, seed sampling, determination of purity, moisture, dormancy, germination, viability, vigor.	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Describe seed treatment, its importance and seed treating chemicals</li> <li>• Acquire knowledge about the seed treating equipments and their functions</li> </ul>	<b>Seed treatment-</b> Concept, objectives, types and methods, seed treatment on storage, germination and seedling establishment, seed treating chemicals and equipments	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Determine of seed rate of crops.</li> <li>• Describe the factors of determining seed rate</li> </ul>	<b>Seed rate-</b> Definition, ,objectives, factors, seed rate determination	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Gain knowledge on principles of seed production.</li> <li>• Describe production technology of hybrid and composite seeds of cros.</li> <li>• Explain the demand and supply of seeds</li> </ul>	<b>Seed production-</b> Basic principles, seed production of major agronomic crops, hybrid seed production, seed ecology, seed dispersion, present status of seed production, demand and supply of seeds	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer

<ul style="list-style-type: none"> <li>• Discuss seed processing activities</li> <li>• State the storage procedure of seed.</li> <li>• Describe the factors affecting seed longevity and deterioration</li> </ul>	<b>Seed processing and seed storage-</b> Concept, principles, importance, types, factors safe storage conditions , seed longevity and deterioration	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Describe seed legislation and explain seed certification.</li> <li>• Discuss the role of National Seed Board and Seed Certification Agency</li> </ul>	<b>Seed legislation -</b> Definition, objectives. Seed quality class, seed certification procedure, role of national seed board and seed certification agency	Lecture Visual presentation Discussion Assignment	Quiz/MCQ Short answer Essay type answer Report
<ul style="list-style-type: none"> <li>• Attain latest research findings and information regarding seed science, seed technology and seed legislation.</li> </ul>	Latest research findings and information regarding seed science, seed technology and seed legislation.	Assignment	Report
<p><b><u>Reference Books:</u></b></p> <ol style="list-style-type: none"> <li>1. A. S.Barva. 2002. Seed Quality. CBS Publisher and Distributor, New Delhi. India.</li> <li>2. B. K Bala. 1997. Drying and Storage of Cereal Grains. Science Publishers, Inc. USA.</li> <li>3. L.O. Copeland. 2005. Principles of Seed Science and Technology (4<sup>th</sup> Ed.). Bargress Publishing Co. Minnesota, USA.</li> <li>4. N. P. Nema. 1985. Principles of Seed Certification and Testing. Selied Publishers Limited, New Delhi.</li> <li>5. R. L. Agrawal. 1995. Seed Technology. Oxford &amp; IBH Publishing Company Pvt. Limited New Delhi.</li> <li>6. Seed Certification Agency. 1976. Seed Certification Manual. Ministry of Agriculture, Govt. of the People's Republic of Bangladesh.</li> </ol>			

<b>Course Code: AGRO 252</b> <b>Course Title : Seed Science and Technology (Practical)</b>	<b>Credit Hours: 02</b>	<b>Level: 2</b>	<b>Semester: II</b>
<b>Rationale:</b> This course is designed to provide practical knowledge on seed, seed testing, seed production and processing			
<b>Course Objectives:</b> <ul style="list-style-type: none"> <li>• Provide practical knowledge on seed and seed testing</li> <li>• Acquaint with seed production and processing</li> </ul>			
<b>Intended Learning Outcomes (ILOs)</b> The students will be able to-	<b>Course Content</b>	<b>Teaching-Learning Strategies</b>	<b>Assessment Strategies</b>
• Identify and collect seeds & prepare seed album.	Identification & collection of seeds Preparation of seed album	Lecture Visual presentation Discussion Demonstration Laboratory work Assignment	Quiz/MCQ Short answer Identification Job Viva- voce Report Seed album Practical notebook Viva -voce
• Use and evaluate seed technological equipments.	Study on seed technological equipment.	Lecture Visual presentation Discussion Demonstration Laboratory work Assignment	Quiz/MCQ Short answer Identification Report Demonstration performance Practical notebook Viva- voce
• Describe and differentiate morphological parts of seed.	Study the structure of monocotyledonous and dicotyledonous seeds.	Lecture Visual presentation Discussion Demonstration Laboratory work Assignment	Quiz/MCQ Short answer Identification Job Report Demonstration performance Practical notebook Viva- voce

<ul style="list-style-type: none"> <li>• Practice seed sampling, testing and grading.</li> </ul>	<p>Technique of seed sampling. Testing of seed for purity, moisture, germination, viability and vigor.</p>	<p>Lecture Visual presentation Discussion Demonstration Laboratory work Assignment</p>	<p>Quiz/MCQ Short answer Identification Report Demonstration Performance Practical notebook Viva- voce</p>
<ul style="list-style-type: none"> <li>• Gather knowledge and calculate seed rate of different crops.</li> </ul>	<p>Calculation of seed rate of different crops: True seed and vegetative propagated seed.</p>	<p>Lecture Visual presentation Discussion Problem solving Assignment</p>	<p>Quiz/MCQ Short answer Job Calculation Report Viva- voce Practical notebook</p>
<ul style="list-style-type: none"> <li>• Cultivate quality seed</li> </ul>	<p>Production of seed crops in individual plots.</p>	<p>Lecture Visual presentation Discussion Demonstration Assignment Field work</p>	<p>Quiz/MCQ Short answer Report Demonstration Performance Practical notebook Viva -voce</p>
<ul style="list-style-type: none"> <li>• Acquire practical knowledge on the activities of GOs and NGOs related to seed production and processing.</li> </ul>	<p>Visit to a seed production farm and report preparation.</p>	<p>Lecture Visual presentation Discussion Farm visit Assignment</p>	<p>Quiz/MCQ Short answer Job Report Practical notebook Viva- voce</p>

**Reference Books:**

1. R.L. Agrawal, 1995. Seed Technology. Oxford & IBH Publishing Company Pvt. Limited New Delhi.
2. L.O. Copeland, 2005. Principles of Seed Science and Technology (4<sup>th</sup> Ed.). Bargress Publishing Co. Minnesota, USA.
3. N.P. Nema, 1985. Principles of Seed Certification and Testing. Selied Publishers Limited, New Delhi.
4. Seed Certification Agency. 1976. Seed Certification Manual. Ministry of Agriculture, Govt. of the People's Republic of Bangladesh.
5. USDA. 1961. Seeds. The Yearbook of Agriculture 1961. The United States Department of Agriculture, Washington, D.C.
6. International Seed Testing Association (IST A). 1976. International Rules for seed testing. Seed Science and Technology. Vol 4. P. 3-49.
7. M. N. Huda, 2001. Why quality seed. Dr. Richard Lowrynowicz, Team leader, Bangladesh German Seed Development Project, Dhaka, Bangladesh.
8. O.L. Justice, and L.N. Bass, 1978. Principles and Practices of Seed Storage. Agricultural Hand Book No. 506.
9. Seed Certification Agency. 1992. Proceedings of National seed Technology Seminar. MOA. Govt. of the Peoples Republic of Bangladesh.

## **Department of Agroforestry and Environmental Science**

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### **Course Layout**

<b>Sl. No.</b>	<b>Course Code and Course Title</b>	<b>Credit Hours</b>	<b>Level</b>	<b>Semester</b>
01	AFES 259: Agroforestry (Theory)	03	2	II
02	AFES 260: Agroforestry (Practical)	02	2	II
03	AFES 335: Issues of Environment and Conservation (Theory-Elective)	02	3	I
	Theory	03		
	Practical	02		
	Elective	02		
	<b>Total</b>	<b>07</b>		

<ul style="list-style-type: none"> <li>• Learn the suitable tree crop association.</li> <li>• Assess the effect of different MPTs.</li> <li>• Explain the role of nitrogen fixing trees in agroforestry systems.</li> <li>• Know the adaptability of different tree species in problem soils of Bangladesh.</li> </ul>	<p>species; desirable characteristics of agroforestry species; woody and non-woody species suitable for agroforestry systems; multipurpose trees(MPTs) and their benefits in agroforestry; nitrogen fixing trees; criteria of Agroforestry species; their compatibility and adaptability in different agro-ecological zones with special reference to salinity, drought, marshy and degraded lands of Bangladesh.</p>	<p>Visual presentation</p>	<p>answer</p>
<ul style="list-style-type: none"> <li>• Describe the various tree-crop interactions in agroforestry system.</li> <li>• Evaluate the interaction factors on which agroforestry production depends.</li> </ul>	<p><b>Tree-crop Interactions:</b> Concept and types of tree-crop interactions; various interactions (above and below ground) between trees and crops for light, temperature, air, water and nutrients.</p>	<p>Lecture Interactive discussion Visual presentation</p>	<p>Quiz/MCQ Short answer Essay type answer</p>
<ul style="list-style-type: none"> <li>• Know the homestead agroforestry.</li> <li>• Express the principles, planning and layout of homestead agroforestry.</li> <li>• Explain homestead microsites, their composition and productivity.</li> <li>• Describe the prospect and role of homestead agroforestry in Bangladesh.</li> </ul>	<p><b>Homestead Agroforestry:</b> Definition of homestead Agroforestry; types and structure of homestead based on ecological region of Bangladesh; principals, planning and layout of homestead agroforestry; homestead micro sites, their composition and productivity; role of owners in homestead utilization; planning of homestead agroforestry having one bigha land.</p>	<p>Lecture Interactive discussion Visual presentation</p>	<p>Quiz/MCQ Short answer Essay type answer</p>
<ul style="list-style-type: none"> <li>• Learn the various agroforestry system and practices commonly found in Bangladesh.</li> <li>• Elucidate agroforestry system management.</li> </ul>	<p><b>Agroforestry System Management:</b> Definition of Agroforestry systems and practices; various agroforestry practices commonly found in Bangladesh; regeneration techniques of agroforestry</p>	<p>Lecture Interactive discussion Visual presentation</p>	<p>Quiz/MCQ Short answer Essay type answer</p>

<ul style="list-style-type: none"> <li>• Describe regeneration of Agroforestry species and nursery management techniques.</li> </ul>	species and nursery management; management of trees and other components.		
<ul style="list-style-type: none"> <li>• Discuss the concept of social forestry.</li> <li>• Describe the problems and constraints of social forestry in Bangladesh.</li> <li>• Explain the role of social forestry in climate change.</li> <li>• Discuss the social forestry acts of Bangladesh.</li> <li>• Illustrate the concept of social forestry in different countries.</li> </ul>	<b>Social Forestry:</b> Concept, basic characteristics and objectives of social forestry; problems and constraints of social forestry practices; social forestry act; role of social forestry in climate change; social forestry in different countries.	Lecture Interactive discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
• Explain the latest research findings and information of Agroforestry.	Latest research findings and information regarding Agroforestry	Assignment	Report

### Reference Books:

1. Young. 1997. Agroforestry for Soil Management. CAB International, New York, and ICRAF, Nairobi, Kenya, ISBN: 0-85199-189-0.
2. L.E. Buck, J.P. Lassoie and E.C.M. Fernandes. 1999. Agroforestry in Sustainable Agricultural Systems. CRC Press LLC, New York, NY ISBN: 1-56670-294-1.
3. P.K.R. Nair, 1993. An Introduction to Agroforestry. Kluwer Academic Publishers, Dordrecht, Netherlands, ISBN: 0-7923-2134-0.
4. P. Huxley. 1999. Tropical Agroforestry. Blackwell Science, Oxford, UK, <http://www.blackwell-science.com> ISBN: 0-632-04047-5.
5. G. Schroth, G.A.B. da Fonseca, C.A. Harvey, C. Gascon, H.L. Vasconcelos, and A-M.N. Izac. 2004. Agroforestry and Biodiversity Conservation in Tropical Landscapes. Island Press, Washington, DC. ISBN: 1-55963-357-3.
6. A.P. Dwivedi. 1992. Agroforestry Principal and Practices. Oxford and IBH publishing co. pvt. Ltd., New Delhi.
7. A.P. Wojtkowski, (1998). The theory and practices of Agroforestry design. Oxford and IBH publishing co. pvt. Ltd., New Delhi.
8. M.K. Alam, and M. Mohiuddin. 1992. Some potential multipurpose trees for homestead in Bangladesh. BARC Winrock International.
9. A.A. Bhuiya. 1994. Forest Land Agroforestry: The North Bengal Experience. BARC Winrock International.
10. M.K. Chowdhury and B.S. TejMahat. 1993. Agroforestry farming system linkage in Bangladesh. BARC Winrock International.
11. E. Toquebiau 1990. Agroforestry concept. ICRAF, Nairobi.

<b>Course Code:</b> AFES 260	<b>Credit Hours:</b> 02	<b>Level:</b> 02	<b>Semester:</b> II
<b>Course Title:</b> Agroforestry <b>(Practical)</b>			
<b>Rationale:</b> This course is designed to provide practical knowledge in relation to the application of agroforestry practices in the field level.			
<b>Course Objectives:</b>			
<ul style="list-style-type: none"> <li>Identify different multipurpose trees and shrubs used in agroforestry</li> <li>Achieve some practical field experience</li> <li>Practice on some agroforestry management practices</li> </ul>			
<b>Intended Learning Outcomes (ILOs)</b>	<b>Course Content</b>	<b>Teaching-Learning Strategies</b>	<b>Assessment Strategies</b>
The students will be able to-			
<ul style="list-style-type: none"> <li>Identify different MPTs.</li> <li>Describe different MPTs.</li> </ul>	Identification of MPTs (multipurpose trees) and their importance in agroforestry	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>Learn the silvan feature of different MPTs.</li> <li>Represent the geographical distribution of Important MPTs.</li> </ul>	Study on silvan features of different MPTs	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>Learn the root management technique by field observation.</li> <li>Apply root pruning in the crop field.</li> </ul>	Study on root pruning of trees grown in agroforestry system	Lecture Discussion Demonstration Field visit	Quiz/MCQ Short answer Demonstration performance Identification Report Viva voce Practical notebook

<ul style="list-style-type: none"> <li>• Know the different shoot management techniques.</li> <li>• Apply pollarding, coppicing, lopping etc. in the crop field.</li> </ul>	Study on tree shoot management grown in crop field	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>• Demonstrate the nursery establishment techniques.</li> <li>• Establish nursery.</li> </ul>	Preparation of nursery for raising seedlings/saplings of different trees	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>• Practice various plantation techniques.</li> <li>• Learn the post plantation management</li> </ul>	Study of tree plantation techniques and after care.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>• Estimate the biomass of trees.</li> </ul>	Determination of biomass of trees and other components.	Lecture Discussion Demonstration Problem solving	Quiz/MCQ Short answer Demonstration performance Calculation Identification Viva voce Practical notebook
<ul style="list-style-type: none"> <li>• Gather practical knowledge about the bio-diversified areas of Bangladesh and preparation of report.</li> </ul>	Field visit to different bio-diversified area / natural resource of Bangladesh and preparation of reports individually.	Lecture Discussion Demonstration Field visit	Quiz/MCQ Short answer Demonstration performance Report Identification Viva voce Practical notebook

**Reference Books:**

1. L.E. Buck, J.P. Lassoie, and E.C.M. Fernandes. 1999. Agroforestry in Sustainable Agricultural Systems. CRC Press LLC, New York, NY ISBN: 1-56670-294-1.
2. A.P. Dwivedi. 1992. Agroforestry Principal and Practices. Oxford and IBH publishing co. pvt. Ltd., New Delhi.
3. P.K.R. Nair. 1993. An Introduction to Agroforestry. Kluwer Academic Publishers, Dordrecht, The Netherlands, ISBN: 0-7923-2134-0.
4. G. Schroth, G.A.B. da Fonseca, C.A. Harvey, C. Gascon, H.L. Vasconcelos, and A-M.N. Izac 2004. Agroforestry and Biodiversity Conservation in Tropical Landscapes. Island Press, Washington, DC. ISBN: 1-55963-357-3.
5. Young. 1997. Agroforestry for Soil Management. CAB International, New York, and ICRAF, Nairobi, Kenya, ISBN: 0-85199-189-0.
6. M.K. Alam, and M. Mohiuddin. 1992. Some potential multipurpose trees for homestead in Bangladesh. BARC Winrock International.
7. A.A. Bhuiya. 1994. Forest Land Agroforestry: The North Bengal Experience. BARC Winrock International.
8. M.K. Chowdhury. and B.S. TejMahat 1993. Agroforestry farming system linkage in Bangladesh. BARC Winrock International.
9. E. Toquebiau. 1990. Agroforestry concept. ICRAF, Nairobi.
10. A.P. Wojtkowski. 1998. The theory and practices of Agroforestry design. Oxford and IBH publishing co. pvt. Ltd., New Delhi.

## **Department of Entomology**

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### **Course Layout**

<b>Sl. No.</b>	<b>Course Code and Title</b>	<b>Credit Hours</b>	<b>Level</b>	<b>Semester</b>
1	ENTO 253: Introductory Entomology (Theory)	03	2	II
2	ENTO 254: Introductory Entomology (Practical)	02	2	II
3	ENTO 307: Systematic Entomology and Insect Ecology (Theory)	02	3	I
4	ENTO 308: Systematic Entomology and Insect Ecology (Practical)	02	3	I
5	ENTO 459: Pest Management and Economic Entomology (Theory)	03	4	II
6	ENTO 460: Pest Management and Economic Entomology (Practical)	02	4	II
7.	ENTO 333: Medical and Veterinary Entomology (Theory-Elective)	02	3	II
<b>Total</b>		Theory Practical Elective <b>Total</b>	08 06 02 <b>16</b>	

<b>Course Code:</b> ENTO 253 <b>Course Title:</b> Introductory Entomology(Theory)	<b>Credit Hours:</b> 03	<b>Level:</b> 2	<b>Semester:</b> II
<b>Rationale:</b> This course is designed to provide fundamental concept of insects and other related arthropods			
<b>Course Objectives</b>			
<ul style="list-style-type: none"> <li>• Acquire knowledge about concept and importance of insects and related arthropods in agriculture and other aspects</li> <li>• Know external morphology and different appendages of insects, their modifications and functions</li> <li>• Gain knowledge on embryonic development, moulting and metamorphosis of insects</li> <li>• Learn classification and identification of adult and immature insects and their economic importance</li> <li>• Understand different physiological systems and sense organs of insects and their functions</li> </ul>			
<b>Intended Learning Outcomes (ILOs)</b> The students will be able to	<b>Course Content</b>	<b>Teaching-Learning Strategies</b>	<b>Assessment Strategies</b>
<ul style="list-style-type: none"> <li>• Define entomology and insect</li> <li>• Describe importance of insects and other related arthropods in agriculture and other aspects</li> </ul>	<b>Introduction:</b> Concept of entomology and importance of insects and other related arthropods in agriculture and other aspects	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Describe general characteristics of Arthropoda and its classification</li> <li>• Describe characteristics of Class Arachnida and Insecta</li> <li>• Differentiate Arachnida and Insecta</li> </ul>	<b>Arthropoda:</b> General characteristics and classification, class: Arachnida and Insecta	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>• Describe external morphology of a typical insect</li> <li>• Describe different appendages of insect, their modifications with functions and adaptations</li> </ul>	<b>Insect Morphology:</b> External morphology of a typical insect, integument, antennae, legs, wings and mouthparts of insects	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type
<ul style="list-style-type: none"> <li>• Explain developmental process of insect embryo</li> <li>• Describe moulting and metamorphosis of insects</li> <li>• Describe different types of larvae and pupae</li> </ul>	<b>Embryology:</b> Development and formation of embryo in insects <b>Metamorphosis:</b> Moulting and metamorphosis, types of metamorphosis in insects, types of larvae and pupae	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer

<ul style="list-style-type: none"> <li>Classify orders of insects and other arthropods</li> <li>Describe importance of various insects and related arthropods in agriculture and other aspects</li> </ul>	<b>Systematic Entomology:</b> Identifying characters and economic importance of important orders of insects and other arthropods of agricultural importance	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>Describe anatomical features and physiological processes of different systems of insects</li> </ul>	<b>Insect Physiology:</b> Digestive system, digestion and absorption; excretory system, excretory organs and mechanism of excretion; circulatory system, circulatory organs and mechanism of circulation; respiratory system, respiratory organs, respiration in terrestrial, aquatic and endoparasitic insects; nervous system, neurons, types of nervous system; reproductive system of insect and types of reproduction, oogenesis and spermatogenesis of insects.	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>Describe endocrine glands and hormones of insects</li> <li>Explain role of hormones in physiological events of insect life</li> </ul>	<b>Endocrine Glands and Hormones:</b> Major endocrine glands and hormones in insect, hormonal control of moulting, metamorphosis and diapause	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>Describe various sensory organs of insects with functions</li> </ul>	<b>Sense Organs:</b> Mechanoreceptor, chemoreceptor, photoreceptor, auditory receptor, temperature and humidity receptors	Lecture Visual presentation Discussion	Quiz/MCQ Short answer Essay type answer
<ul style="list-style-type: none"> <li>Attain latest research findings and information regarding Introductory Entomology</li> </ul>	latest research findings and information regarding Embryology, Metamorphosis, Insect Physiology , Endocrine Glands and Hormones of insects	Assignment	Report

### **Reference Books**

1. A.D. Imms. 1965. A General Text Book of Entomology. The English Language Book Society, UK.
2. D.B. Tembare. 1984. A Text Book of Insect Morphology, Physiology and Endocrinology. S. Chand and Co. Ltd., Ramnagar, New Delhi.
3. J.B. Whitfield and A.H. Purcell. 2013. Daly and Doyen's Introduction to Insect Biology and Diversity. 3rd edition. Oxford University Press, New York.
4. N.F. Johnson and C.A. Triplehorn. 2004. Borror and DeLong's Introduction to the Study of Insects. 7<sup>th</sup>Edn. Cengage Learning.
5. Novak, V.J.A. 1966. Insect Hormones. Methuen and Co., London.
6. P.J. Gullan and P.S. Cranston. 2014. The Insects: An Outline of Entomology. 5th edition, John Wiley and Sons, Ltd, UK.
7. R.F. Chapman. 1982. The Insects: Structure and function. 3<sup>rd</sup> edition. The English Language Book Society and MacMillan India Ltd., Bangalore, India.
8. V.B. Wigglesworth. 1979. The Principles of Insect Physiology. English Language Book Society, England.
9. W.S. Romoser and J.G. Stoffolano. Jr. 1998. The Science of Entomology. 4th Edn. WCB McGraw-Hill Science, New York.

<b>Course Code:</b> ENTO 254 <b>Course Title:</b> Introductory Entomology (Practical)	<b>Credit Hours:</b> 02	<b>Level-2</b>	<b>Semester:</b> II
<b>Rationale:</b> This practical course is designed to develop skill on collection, preservation and identification of insects; their morphological and anatomical structures and functions			
<b>Course Objectives</b>			
<ul style="list-style-type: none"> <li>• Acquire skills for collecting, mounting and preserving insects for scientific study</li> <li>• Identify insects under major orders by sight</li> <li>• Learn anatomical modifications and physiological processes of major groups of insects</li> </ul>			
Intended Learning Outcomes (ILOs)	Course Content	Teaching-Learning Strategies	Assessment Strategies
The students will be able to			
• Collect, prepare and preserve insects	Methods of collection, preparation and preservation of insects	Lecture Visual presentation Discussion Demonstration Field visit Exercise	Quiz/MCQ Short answer Collection Demonstration performance Practical notebook Viva-voce
• Identify the insects and their relatives to its order of economic importance	Identification of different Orders of insects and other arthropods of economic importance in Bangladesh	Lecture Visual presentation Discussion Demonstration Field visit Collection and sorting Identification Preservation	Quiz/MCQ Short answer Identification Practical notebook Viva-voce
• Dissect and demonstrate external and internal anatomy of insects	Study on external and internal anatomy of grasshopper, bugs and Lepidopteran insects	Lecture Visual presentation Discussion Demonstration Dissection Drawing	Quiz/MCQ Short answer Dissection Demonstration performance Practical notebook Viva-voce
• Identify different appendages of insects and their structural modifications for functional adaptations.	Study of different types of antennae, mouthparts, legs and wings of insects	Lecture Visual presentation Discussion Demonstration Identification Drawing	Quiz/MCQ Short answer Demonstration performance Identification Practical notebook Viva-voce
• Prepare and demonstrate slides	Preparation of temporary and	Lecture Discussion	Quiz/MCQ Short answer

of insect appendages	permanent slides of antennae, legs, wings and mouthparts of insects	Demonstration Lab exercise	Demonstration performance Practical notebook Viva-voce
• Collect and identify immature stages of insect	Collection and identification of different types of larvae and pupae of insects	Lecture Discussion Demonstration Field visit Collection Exercise	Quiz/MCQ Short answer Demonstration performance Practical notebook Viva-voce

**Reference Books**

1. A. Prakash. 2001. Laboratory Manual of Entomology. New Age International Publishers, India.
2. G.T. Tonapi. 1994. Experimental Entomology: An Aid to Laboratory and Field Studies. CBS Publishers and Distributors.
3. M.M. Trigunayat. 2009. A Manual of Practical Entomology. 2<sup>nd</sup> edition. Scientific Publishers, Jodhpur, India.
4. N.F. Johnson and C.A. Triplehorn. 2004. Borror and DeLong's Introduction to the Study of Insects. 7<sup>th</sup> edition. Cengage Learning.
5. T.J. Gibb and C.Y. Oseto. 2006. Arthropod Collection and Identification: Field and Laboratory Techniques. 2<sup>nd</sup> Edn. Elsevier-Academic Press.

## Department of Horticulture

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### Course Layout

Sl. No	Course code & Course Title	Credit Hours	Level	Semester
1	HORT 151. Introduction to Floriculture & Landscaping (Theory)	02	1	II
2	HORT 152. Introduction to Floriculture & Landscaping (Practical)	02	1	II
3	HORT 201. Vegetable Production (Theory)	03	2	I
4	HORT 202. Vegetable Production (Practical)	02	2	I
5	HORT 281. Nursery Management of Horticultural Crops (Theory- Elective)	02	2	II
6	HORT 301. Vegetable Seed Production and Spices (Theory)	02	3	I
7	HORT 302. Vegetable Seed Production and Spices (Practical)	02	3	I
8	HORT 453. Fruit production & Orchard Management (Theory)	03	4	II
9	HORT 454. Fruit Production & Orchard Management (Practical)	02	4	II
	Theory	10		
	Practical	08		
	Elective	02		
	<b>Total</b>	<b>20</b>		

<b>Course Code : HORT 281</b> <b>Course Title:</b> <b>Nursery Management of Horticultural Crops (Theory-Elective)</b>	<b>Credit Hours: 02</b>	<b>Level: 2</b>	<b>Semester: II</b>
<b>Rationale:</b> This course is designed to provide introductory concepts about nursery management of horticultural crops			
<b>Course Educational objectives:</b>			
<ul style="list-style-type: none"> <li>• Conceptualize about nursery</li> <li>• Acquire knowledge on different nursery structures and establishment.</li> <li>• Acquaint the nursery seedling production techniques</li> <li>• Enrich understanding about asexual propagation of horticultural plants in a nursery</li> </ul>			
Intended Learning Outcomes (ILOs) The students will be able to –	Course Content	Teaching-learning Strategies	Assessment Strategies
Acquire introductory knowledge about nursery	<b>Introduction to nursery:</b> Definition, objectives, types, parts of commercial nursery.	Lecture Discussion	Quiz/MCQ Short answer Essay type answer
Discuss the different components of nursery	<b>Structures in nursery:</b> Green house, cold frame, lath house, net house, polytunnel, mist propagating unit, pots, polybag & frames for raising seedling in nursery, equipment's of nursery.	Lecture Discussion Visual presentation Field visit	Quiz/MCQ Short answer Essay type answer Report
Acquaint different seedling or sapling growing media theoretically	<b>Growing media for raising seedlings /saplings:</b> Types, component, preparation of growing media, compost.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer

Explain about nursery management	<b>Establishment &amp; management of nursery:</b> Site selection, steps, layout.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
Describe the procedure of raising seedling and their management theoretically	<b>Raising of seedlings and saplings:</b> Seedbed, nursery bed, soil management, soil treatment, characteristics of good seedling	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
Acquaint potting, depotting of saplings in nursery	<b>Uprooting and planting of seedling/sapling:</b> Selection of seedling/ sapling for planting, methods of planting, potting, depotting, repotting and aftercare.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
Discriminate the different propagation procedures of horticultural crops	<b>Propagation of horticultural crops:</b> Sexual & asexual propagation of horticultural crops with their merits & demerits.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
Perform organic fertilizer preparation for nursery management	<b>Preparation of organic fertilizers for nursery:</b> Water hyacinth, row cowdung, green leaves and inert materials, etc.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
Acquaint the mother plant management system in nursery	<b>Stock plant management:</b> Selection, raising and management.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer

Illustrate the production and marketing procedure of nursery plant	Collection, production management and marketing of nursery plant	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
• Obtain latest research findings and information regarding nursery management of horticultural crops	Latest research findings and information regarding nursery management, growing media for raising seedlings /saplings, organic fertilizers for nursery and stock plant management	Assignment	Report

**Reference Books:**

1. G. E. Welbaum. 2015. Vegetable Production and Practices. CABI Publication.
2. M. M. Hussain.1995. Seed Production and Storage Technology (in Bangla). Meer Imtaiz Hussain, Dhaka.
3. K. K. De.1992. An Introduction to Plant Tissue Culture. New Central Book Agency, Calcutta, India.
4. T. K. Bose, S.K. Mitra and Sadu, 1990, Propagation of Tropical and Subtropical Horticultural crops. Naya prokash, Calcutta- India.
5. R. A. T. George. 1980. Technical Guidelines for Vegetable Seeds Technology. Food & Agriculture Organization of the United Nations, Rome.
6. P. D. Hebblethwite. 1980. Seed production. Butlerworths, London.
7. M. N. Islam. 1990. "Bij Shanrakhan prajukti" (in Bangla) Misses Jahura Islam, 47/A, Ram Babu Road. Mymensingh.

## **Department of Soil Science**

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### **Course Layout**

<b>Sl. No.</b>	<b>Course Code and Title</b>	<b>Credit Hours</b>	<b>Level</b>	<b>Semester</b>
1	SOIL 105: Introductory Soil Science (Theory)	02	1	I
2	SOIL 106: Elementary Soil Experiments (Practical)	02	1	I
3	SOIL 255: Soil Classification, Survey and Conservation (Theory)	02	2	II
4	SOIL 256: Field and Laboratory Study of Soil (Practical)	02	2	II
5	SOIL 303: Soil Physics and Soil Chemistry (Theory)	02	3	II
6	SOIL 304: Physical and Chemical Analysis of Soils (Practical)	02	3	II
7	SOIL 403: Soil Fertility and Soil Microbiology (Theory)	03	4	I
8	SOIL 404: Experiments on Plant Nutrition and Soil Microbiology (Practical)	02	4	I
9	SOIL 481: Soil Pollution and Environmental Degradation (Theory- Elective)	02	4	I
		Theory	09	
		Practical	08	
		Elective	02	
		<b>Total</b>	<b>19</b>	

<b>Course Code:</b> SOIL 255 <b>Course Title:</b> Soil Classification, Survey and Conservation (Theory)	<b>Credit Hours:</b> 02	<b>Level:</b> 2	<b>Semester:</b> II
<b>Rationale:</b> The course is designed to provide applied knowledge on survey, classification and conservation of soil in relation to agriculture.			
<b>Course Objectives:</b> The course will help the students to- <ul style="list-style-type: none"> <li>• Acquire knowledge on soil classification, soil taxonomy, soil formation, and geology and geomorphology of Bangladesh soils.</li> <li>• Enrich knowledge on soil survey, land evaluation and soil mapping.</li> <li>• Gather knowledge on soil organic matter, soils of Bangladesh, problem soils of Bangladesh &amp; soil erosion and conservation.</li> </ul>			
<b>Intended Learning Outcomes (ILOs)</b> The students will be able to-	<b>Course Content</b>	<b>Teaching-learning Strategies</b>	<b>Assessment Strategies</b>
• Describe concept and objectives of soil classification. • Evaluate different systems of soil classification.	<b>Soil Classification-</b> concept, objectives and different systems of soil classification.	Lecture Discussion Visual presentation Assignment	Quiz/MCQ Short answer Essay type answer Report
• Illustrate different diagnostic horizons in a soil profile. • Differentiate between different horizons in a soil profile. • Explain the categories of taxonomy classification • Describe different soil orders of the world and identify the equivalent soils in Bangladesh	<b>Soil Taxonomy-</b> diagnostic horizons, soil moisture and temperature regimes; categories and nomenclature; Soil Orders and their equivalent soils in Bangladesh.	Lecture Discussion Visual presentation Field visit Report writing	Quiz/MCQ Short answer Essay type answer Report
• Explain the concept and use of soil survey in agriculture. • Describe different types of soil survey and prepare soil maps	<b>Soil survey-</b> concept, importance and types, soil mapping.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
• Evaluate land by using different land criteria and land evaluation methods • Describe different land types and land capability classification of Bangladesh soils	<b>Land Evaluation-</b> objectives, criteria and methods. Land types and land capability classification of Bangladesh soils.	Lecture Discussion Visual presentation Assignment	Quiz/MCQ Short answer Essay type answer Report
• Discuss the concept and branches of geology. • Describe the geological formation and formation time of	<b>Geology-</b> concept and branches, Geological Time Scale. Geology and Geomorphology of	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer

Bangladesh soils. • Differentiate between geology and geomorphology of Bangladesh	Bangladesh.		
• Describe the general soil types of Bangladesh, their formation, geological make up, agricultural and socioeconomic constraints • Discuss the criteria of AEZ classification in Bangladesh • Explain the 30 AEZs of Bangladesh, their location, extent, present land use, crop productivity, ecological hazard and socioeconomic constraints	<b>Soils of Bangladesh-</b> General Soil Types. Agro Ecological Zones (AEZ)- concept and criteria. Different agro-ecological zones- Location, extent, present land use and crop productivity constraints.	Lecture Discussion Visual presentation Field visit Assignment	Quiz/MCQ Short answer Essay type answer Report presentation
• Describe the different problem soils of Bangladesh, their location, cause of formation, their extent and management practices • Apply appropriate reclamation measures for amelioration of problem soils for successful crop production	<b>Problem soils-</b> Acid Sulphate, Strongly acidic soil, Saline, Alkali, Peat, Hill soils, Char land, Organic matter and nutrient depleted soils. Calcareous and Degraded rice soils: characteristics, location, extent and management.	Lecture Discussion Visual presentation Field visit	Quiz/MCQ Short answer Essay type answer Report
• Elucidate the concept, types, causes of soil erosion, universal soil loss equation and control measures of soil erosion • Explain different types of erosion and their impact on crop production	<b>Soil erosion-</b> Concept, types and factors affecting soil erosion. Universal Soil Loss Equation, control of soil erosion.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
• Describe the concept, importance and methods of soil conservation • Apply suitable conservation measures to reduce soil erosion	<b>Soil Conservation-</b> concept, importance and methods.	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer
• Describe the sources and composition of soil organic matter and its effects on physico-chemical and biological properties of soil	<b>Soil organic matter-</b> sources, composition and effects on soil properties. Organic matter decomposition	Lecture Discussion Visual presentation	Quiz/MCQ Short answer Essay type answer

<ul style="list-style-type: none"> <li>Differentiate between decomposition of organic matter in aerobic and anaerobic conditions of soil</li> <li>Explain humus formation, C:N ratio and their importance in soil fertility and productivity</li> </ul>	in aerobic and anaerobic soils. Formation and characteristics of humus. C: N ratio.		
<ul style="list-style-type: none"> <li>Explain the latest research findings and information of Soil Classification, Survey and Conservation</li> </ul>	Latest research findings and information regarding Soil Classification, Survey and Conservation	Assignment	Report

**Reference Books:**

1. N. C. Brady and R. R. Weil. 2014. The Nature and Properties of Soils. 14<sup>th</sup>Edn. Macmillan Pub. Co., New York.
2. H. Brammer. 2000. Agro ecological Aspects of Agricultural Research in Bangladesh. University Press Ltd., Dhaka.
3. H. Brammer. 1996. The Geography of the Soils of Bangladesh. University Press Ltd. Dhaka.
4. FAO. 1988. Agro ecological Regions of Bangladesh, Report No.2, UNDP-FAO, Rome.
5. M. M. Hassan. 1999. Soils of Bangladesh: Their genesis, classification and use potential.
6. M. S. Hussain. 1992. Soil Classification with special reference to the soils of Bangladesh.
7. M. Idris. 1987. Erosion Hazard Areas in Bangladesh. Report on Soil Conservation, SRDI, Dhaka.
8. Soil Survey Staff. 1951. Soil Survey Manual, USDA No. 18, US Govt. Printing Office, Washington, D.C.
9. Soil Survey Staff. 1978. Soil Taxonomy-A basic System of Soil Classification. Agricultural Handbook No. 456, Soil Conservation Service, USDA.

<b>Course Code : SOIL 256</b> <b>Course Title : Field and Laboratory Study of Soil (Practical)</b>	<b>Credit Hours: 02</b>	<b>Level: 2</b>	<b>Semester: II</b>
<b>Rationale:</b> The course is designed to provide applied knowledge on physical and chemical properties of soils, soil profile study, soil survey and mapping, study of Agro ecological zone and problem soils of Bangladesh.			
<b>Course Objectives:</b> The objectives of this course are to- <ul style="list-style-type: none"> <li>• Gather practical knowledge on soil texture, structure, soil color, soil profile, soil map, soil survey and Agro ecological Zones study of Bangladesh soils.</li> <li>• Know the analysis of soil organic carbon, soil pH, electrical conductivity and their application.</li> <li>• Study of Agro ecological Zones of Bangladesh.</li> <li>• Study of problem soils of Bangladesh and their amelioration for successful crop production and other use.</li> </ul>			
<b>Intended Learning Outcomes (ILOs)</b> The student will be able to-	<b>Course Content</b>	<b>Teaching-learning Strategies</b>	<b>Assessment Strategies</b>
• Assess soil texture in the field by finger feel method	Assessment of soil texture by finger feels method.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook
• Examine and identify spheroidal, platelike, prismlike and blocklike structures of soil in the field	Identification and examination of soil structure.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook
• Study a soil profile in the field. • Demonstrate, separate and describe the horizons of a soil profile	In-situ study of soil profile.	Lecture Discussion Demonstration Field visit and pit open	MCQ Short answer Demonstration performance Viva-voce Practical notebook Report
• Determine the actual strength of the secondary standard substance and its use in the determination of organic carbon of soil. • Explain the criteria of secondary standard substances	Standardization of approximately normal ferrous sulphate solution with the help of normal potassium dichromate solution.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook

<ul style="list-style-type: none"> <li>Determine organic carbon and organic matter of soil</li> <li>Evaluate the values of SOM content for making plan to maintain soil fertility</li> </ul>	Determination of soil organic carbon by wet oxidation method.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>Explain the causes, use and significance of soil color</li> <li>Determine different colors of soil using Munsell's color chart</li> </ul>	Determination of soil color by Munsell's color chart.	Lecture Discussion Demonstration Field visit	Quiz/MCQ Short answer Demonstration Performance Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>Explain the methodology of pH determination</li> <li>Determine soil pH by colorimetric method using a pH kit</li> </ul>	Determination of soil pH by colorimetric method using a pH kit.	Lecture Discussion Demonstration	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>Prepare and study of a soil map.</li> <li>Explain and use of soil map in agriculture</li> </ul>	Preparation and study of soil map.	Lecture Discussion Demonstration of map	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>Survey the soils of selected area and prepare soil survey report</li> </ul>	Preparation of soil survey report.	Lecture Discussion Demonstration Field visit and survey	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook Survey report
<ul style="list-style-type: none"> <li>Determine electrical conductivity of soil by using an EC meter</li> <li>Evaluate EC values for reclamation and crop selection</li> </ul>	Determination of electrical conductivity of soil.	Lecture Discussion Demonstration Problem solving	Quiz/MCQ Short answer Demonstration performance Calculation Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>Elucidate the effect of sodium on crop production</li> <li>Determine the level of sodium in soil</li> </ul>	Determination of sodium in salt affected soil	Lecture Discussion Demonstration Problem solving	Quiz/MCQ Short answer Demonstration performance Calculation Viva-voce Practical notebook

<ul style="list-style-type: none"> <li>• Illuminate the effect of calcium on crop production</li> <li>• Determine the level of sodium in soil</li> </ul>	Determination of calcium in different soil	Lecture Discussion Demonstration Problem solving	Quiz/MCQ Short answer Demonstration performance Calculation Viva-voce Practical notebook
<ul style="list-style-type: none"> <li>• Describe the area, location, extent, agricultural productivity, present land use and agricultural and socio-economic constraints of different Agroecological Zones of Bangladesh.</li> <li>• Identify location, extent of different AEZ of Bangladesh</li> </ul>	Study of AEZ map.	Lecture Discussion Demonstration Field visit	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook Report
<ul style="list-style-type: none"> <li>• Describe the causes of differences in soil profiles of different Agroecological Zones of Bangladesh</li> <li>• Identify and describe the soil horizons in different soil profiles of different Agroecological Zones of Bangladesh</li> </ul>	Field trip for soil profile study in different AEZs of Bangladesh.	Lecture Discussion Demonstration Presentation Field visit and pit open	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook Report
<ul style="list-style-type: none"> <li>• Evaluate and explain the problem soils of Bangladesh at different places of the country and their extent</li> <li>• Explain the causes of development of different problem soils and their probable reclamation processes</li> </ul>	Study of problem soils in the field.	Lecture Discussion Demonstration Presentation Field visit	Quiz/MCQ Short answer Demonstration performance Viva-voce Practical notebook Report

**Reference Books:**

1. N. C. Brady and R R. Weily. 2014. The Nature and Properties of Soils. 14thEdn. Macmillan Pub. Co., New York.
2. A. L. Sparks, A. L. Page, P. A. Helmke. 1996. Methods of Soil Analysis. Patr-3., Amer. Soc. Agron. Inc., Wisconsin, USA.
3. R. L. Donahue, R. W. Miller and J .C. Shickluna. 1992. Soils : An Introduction to Soils and Plant Growth. Prentice Hall of Ind. Pvt. Ltd., New Delhi.
4. Munsell Soil Colour Charts. 1988. U. S. Dept. of Agriculture Handbook 18- Soil Survey Manual.
5. H. Brammer. 2000. Agro ecological Aspects of Agricultural Research in Bangladesh. University Press Ltd., Dhaka.
6. H. Brammer. 1996. The Geography of the Soils of Bangladesh. University Press Ltd. Dhaka.
7. FAO. 1988. Agro ecological Regions of Bangladesh, Report No.2, UNDP-FAO, Rome.
8. M. M. Hassan. 1999. Soils of Bangladesh: Their genesis, classification and use potential.