

**CURRICULA LAY-OUT FOR B. Sc. Ag. (Hons.) DEGREE**

Level	S-1 (July-December)		S-2 (January-June)	
	Course (T,P)	Cr.hrs (T+P)	Course (T,P)	Cr.hrs (T+P)
<b>Level-1</b>	Agron 101,102	2+2	Agron 121,122	2+2
	SoilSc 101,102	2+2	Hort 121, 122	2+2
	FMech 101,102	2+2	Biochem 121,122	2+2
	Chem 101,102	3+2	AgStat 121,122	3+2
	AgEcon 101	3+0	RSoc 121	2+0
	<b>Optional (one):</b>		<b>Elective (any one):</b>	2+2
	English 101 (2+0)		AHusb 121,122 (2+2)	
	----- (2+0)		CompSc 121,122 (2+2)	
	<b>Total (Excluding optional)</b>	<b>12+8</b>	----- (2+2)	
			<b>Optional (one):</b>	
		English 101 (2+0)		
		----- (2+0)		
		<b>Total (Excluding optional)</b>	<b>13+10</b>	
<b>Level-2</b>	Agron 201, 202	2+2	Entom 221,222	3+2
	SoilSc 201, 202	3+2	PPath 221, 222	3+2
	Hort 201, 202	2+2	GPB 221, 222	2+2
	CBot 201, 202	3+2	AgExt 221, 222	3+2
	Biochem 201, 202	3+2	AgChem 221,222	2+2
	<b>Total</b>	<b>13+10</b>	<b>Total</b>	<b>13+10</b>
<b>LEVEL-3</b>	Hort 301, 302	3+2	Agron 321, 322	3+2
	GPB 301, 302	3+2	SoilSc 321, 322	3+2
	AgExt 301, 302	2+2	Entom 321, 322	3+2
	AgChem 301, 302	3+2	PPath 321, 322	3+2
	AgroF 301, 302	3+2	CBot 321, 322	2+2
	<b>Total</b>	<b>14+10</b>	<b>Total</b>	<b>14+10</b>
<b>Level-4</b>	Entom 401, 402	3+2	Agron 421, 422	3+2
	PPath 401, 402	3+2	SoilSc 421, 422	3+2
	CBot 401, 402	3+2	Hort 421, 422	3+2
	AgExt 401, 402	3+2	GPB 421, 422	3+2
	<b>Elective (any one):</b>	2+2	<b>Elective (any one):</b>	2+2
	Biotech 401,402(2+2)		Biotech 401, 402 (2+2)	
	EnvSc 401, 402 (2+2)		EnvSc 401,402 (2+2)	
	---- 401,402/etc(2+2)		----- 401, 402/etc (2+2)	
<b>Total</b>	<b>14+10</b>	<b>Total</b>	<b>14+10</b>	

Agron (12+10) = 22	PPath (9+6) = 15	AgChem (5+4) = 9
SoilSc (11+8) = 19	CBot (8+6) = 14	Biochem (5+4) = 9
Hort (10+8) = 18	GPB (8+6) = 14	AgroF (3+2) = 5
Entom (9+6) = 15	AgExt (8+6) = 14	Others (19+12) = 31
Total credit hrs (Theor. +Prac)		: 107+78 = 185
Total no. of courses (Theor.+Prac)		: 41+39 = 80

\* Modified from the originally submitted one, and approved in the 141<sup>st</sup> Academic Council meeting held on 17<sup>th</sup> and 24<sup>th</sup> January, 2002 and approved by the syndicate in its 252<sup>nd</sup> meeting held on 23.3.2002.

**Summary information on types of courses and credit requirement for B.Sc.Ag. (Hons) degree in the semester (cf. course lay-out)**

Types of courses		Credits	Levels & semesters the credits to be earned from
(I)	Compulsory	173	All 4 levels (S-1, S-2)
(II)	Elective	12	Level – 1 (S-2) & Level – 4 (S-1, S-2)
(III)	Optional	4	Level – 1 (S-1, S-2)
Total earned credit requirement (Excluding optional) = 185			

**Types of courses–compulsory/elective/optional to be offered by different departments at different levels (year) and semesters for B.Sc.Ag. (Hons) degree in the semester system from July 2002**

Sl.	Course No. and Title	Credit	Contact hrs/wk	Available at	
				Level	Semester
1.	Department of Agronomy				
	<b><u>Compulsory:</u></b>				
	Agron 101: Fundamentals of Agronomy-Theory	2 cr	2hrs	L-1	S-1
	Agron 102: Introductory Agronomic Practices	2 cr	3 hrs	"	"
	Agron 121: Seed Science and Technology-Theory	2 cr	2 hrs	L-1	S-2
	Agron 122: Seed Science & Technology-Practical	2 cr	3 hrs	"	"
	Agron 201: Weed Science-Theory	2 cr	2 hrs	L-2	S-1
	Agron 202: Practical Weed Science-Practical	2 cr	3 hrs	"	"
	Agron 321 : Crop Husbandry-Theory	3 cr	3 hrs	L-3	S-2
	Agron 322 : Crop Husbandry-Practical	2 cr	3 hrs	"	"
	Agron 421 : Crop Production & Farm Management-Theory	3 cr	3 hrs	L-4	S-2
	Agron 422 : Crop Production & Farm Management-Practical	2 cr	3 hrs	"	"
	<b><u>Elective:</u></b>				
	Agron 401: Introductory Cropping System	2 cr	2hrs	L-4	S-1
	Agron 402: Practical Introductory Cropping System	2 cr	3 hrs	"	"
	Agron 423: Forage Crops and Pasture Management	2 cr	2 hrs	L-4	S-2
	Agron 424: Practical Forage and Pasture Crops	2 cr	3 hrs	"	"
2.	Department of Soil Science				
	<b><u>Compulsory:</u></b>				
	Soil Sc 101: Introductory Soil Science-Theory	2 cr	2 hrs	L-1	S-1
	Soil Sc 102: Soil Science-Practical – 1	2 cr	3 hrs	"	"
	Soil Sc 201: Soil Survey, Classification & Conservation- Theory	3 cr	3 hrs	L-2	S-1
	Soil Sc 202: Soil Science-Practical – 2	2 cr	3 hrs	"	"
	Soil Sc 321 : Soil Physics & Soil Chemistry- Theory	3 cr	3 hrs	L-3	S-2
	Soil Sc 322: Soil Science- Practical – 3	2 cr	3 hrs	"	"
	Soil Sc 421: Soil Microbiology & Soil Fertility-Theory	3 cr	3 hrs	L-4	S-2
	Soil Sc 422: Soil Science-Practical – 4	2 cr	3 hrs	"	"
	<b><u>Elective:</u></b>	-	-	-	-
	Soil Sc 401: Soil Biology-Theory	2 cr	2 hrs	L-4	S-1
	Soil Sc 402: Soil Pollution-Theory	2 cr	2 hrs	L-4	S-1
3.	Department of Entomology				
	<b><u>Compulsory:</u></b>				
	Entom 221: Fundamentals of Entomology-Theory	3 cr	3 hrs	L-2	S-2
	Entom 222: Fundamentals of Entomology-Practical	2 cr	3 hrs	"	"
	Entom 321: Insect Ecology & Pest Management-Theory	3 cr	3 hrs	L-3	S-2
	Entom 322: Insect Ecology & Pest Management-Practical	2 cr	3 hrs	"	"
	Entom 401: Economic Entomology-Theory	3 cr	3 hrs	L-4	S-1
	Entom 402: Economic Entomology-Practical	2 cr	3 hrs	"	"
	<b><u>Elective:</u></b> Not available				
4.	Department of Horticulture				
	<b><u>Compulsory:</u></b>				
	Hort 121: Fundamental of Horticulture-Theory	2 cr	2 hrs	L-1	S-2
	Hort 122: Fundamental of Horticulture-Practical	2 cr	3 hrs	"	"
	Hort 201: Ornamental Horticulture & Plantation Crops-Theory	2 cr	2 hrs	L-2	S-1
	Hort 202: Ornamental Horticulture & Plantation Crops-Practical	2 cr	3 hrs	"	"
	Hort 301: Vegetables & Spice Crops-Theory	3 cr	3 hrs	L-3	S-1
	Hort 302: Vegetables & Spice Crops-Practical	2 cr	3 hrs	"	"
	Hort 421: Pomology-Theory	3 cr	3 hrs	L-4	S-2
	Hort 422: Pomology-Practical	2 cr	3 hrs	"	"
	<b><u>Elective:</u></b>				
	Hort. 401: Post harvest management of Hort Crops-Theory	2 cr	2 hrs	L-4	S-1
	Hort. 402: Postharvest Management of Horticulture Crops-Practical	2 cr	3 hrs	"	"
	Hort. 403: Commercial Horticulture-Theory	2 cr	2 hrs	L-4	S-2
	Hort. 404: Commercial Horticulture-Practical	2 cr	3 hrs	"	"
5.	Department of Plant Pathology				

Sl.	Course No. and Title	Credit	Contact hrs/wk	Available at	
				Level	Semester
	<b>Compulsory:</b>				
	PPath 221: Fundamentals of Plant Pathology-Theory	3 cr	3 hrs	L-2	S-2
	PPath 222: Plant Pathology-Practical 1	2 cr	3 hrs	"	"
	PPath 321: Principles of Plant Pathology & Diseases of Field Crops-Theory	3 cr	3 hrs	L-3	S-2
	PPath 322: Plant Pathology-Practical 2	2 cr	3 hrs	"	"
	PPath 401 : Diseases of fruits, Vegetables, Cash Crops, Agro-forest trees and Seed Pathology-Theory	3 cr	3 hrs	L-4	S-1
	PPath 402: Plant Pathology-Practical 3	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	PPath 404: Plant Disease Management-Practical	2 cr	3 hrs	L-4	S-1
	PPath 422: Plant Disease Clinic-Practical	2 cr	3 hrs	L-4	S-2
<b>6.</b>	<b>Department of Crop Botany</b>				
	<b>Compulsory:</b>				
	CBot 201: Plant Morphology, Embriology and Taxonomy & Embryology-Theory	3 cr	3 hrs	L-2	S-1
	CBot 202: Plant Morphology, Embriology and Taxonomy & Embryology-Practical	2 cr	3 hrs	"	"
	CBot 321: Plant Physiology & Ecology (I)-Theory	2 cr	2 hrs	L-3	S-2
	CBot 322 Plant Physiology & Ecology (I)- Practical	2 cr	3 hrs	"	"
	CBot 401: Plant Physiology and Ecology (II)-Theory	3 cr	3 hrs	L-4	S-1
	CBot 402: Plant Physiology and Ecology (II)- Practical	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	<b>CBot 421: Crop Physiology-Theory</b>	2 cr	2 hrs	L-4	S-2
	<b>CBot 422: Crop Physiology-Practical</b>	2 cr	3 hrs	"	"
	<b>CBot 423: Plant Biodiversity &amp; Conservation-Theory</b>	2 cr	2 hrs	L-4	S-2
	<b>CBot 424 : Plant Biodiversity &amp; Conservation-Practical</b>	2 cr	3 hrs	"	"
<b>7.</b>	<b>Department of Genetics &amp; Plant Breeding</b>				
	<b>Compulsory:</b>				
	GPB 221: Cytology-Theory	2 cr	2 hrs	L-2	S-2
	GPB 222: Cytology-Practical	2 cr	3 hrs	"	"
	GPB 301: Genetics and Cytogenetics-Theory	3 cr	3 hrs	L-3	S-1
	GPB 302: Genetics-Practical	2 cr	3 hrs	"	"
	GPB 421: Plant Breeding-Theory	3 cr	3 hrs	L-4	S-2
	GPB 422: Plant Breeding-Practical	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	GPB 401: Biotechnology and Genetic Engineering-Theory	2 cr	2 hrs	L-4	S-1
	GPB 402: Biotechnology and Genetic Engineering-Practical	2 cr	3 hrs	"	"
	GPB 423: Special Plant Breeding – Theory	2 cr	2 hrs	L-4	S-2
	GPB 424: Special Plant Breeding – Practical	2 cr	3 hrs	"	"
<b>8.</b>	<b>Department of Agricultural Extension Education</b>				
	<b>Compulsory:</b>				
	<b>AgExt 221: Fundamentals of Extension, Leadership and Motivatio Theory</b>	3 cr	3 hrs	L-2	S-2
	<b>AgExt 222: Extension Teaching Methods and Aids-Practical</b>	2 cr	3 hrs	"	"
	<b>AgExt 301: Extension Communication and Group Approaches-Theory</b>	2 cr	2 hrs	L-3	S-1
	<b>AgExt 302: Data Collection, Processing and Report Writing-Practical</b>	2 cr	3 hrs	"	"
	<b>AgExt 401: Extension Organization Management-Theory</b>	3 cr	3 hrs	L-4	S-1
	<b>AgExt 402: Extension Programme Planning and Outreach Programme-Practical</b>	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	<b>AgExt 403: Extension for Sustainable Agricultural Development–Theory</b>	2 cr	2 hrs	L-4	S-1
	<b>AgExt 404: Extension for Sustainable Agricultural Development–Practical</b>	2 cr	3 hrs	"	"
	<b>AgExt 421: Community Participation-Theory</b>	2 cr	2 hrs	L-4	S-2
	<b>AgExt 422: Community Participation – Practical</b>	2 cr	3 hrs	"	"

Sl.	Course No. and Title	Credit	Contact hrs/wk	Available at	
				Level	Semester
<b>9.</b>	<b>Department of Agricultural Chemistry</b>				
	Compulsory:				
	<b>AgChem 221: Nuclear and Agro-industrial Chemistry – Theory</b>	2 cr	2 hrs	L-2	S-2
	<b>AgChem 222: Nuclear and Agro-industrial Chemistry- Practical</b>	2 cr	3 hrs	"	"
	<b>AgChem 301: Plant Nutrition, Pesticide and Environmental Chemistry –Theory</b>	3 cr	3 hrs	L-3	S-1
	<b>AgChem 302: Plant Nutrition, Pesticide and Environmental Chemistry – Practical</b>	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	AgChem 401: Bioenergy – Principles & Practices – Theory	2 cr	2 hrs	L-4	S-1
	AgChem 402: Bioenergy – Principles and Practices – Practical	2 cr	3 hrs	"	"
	AgChem 421: Micro nutrients in agriculture –Theory	2 cr	2 hrs	L-4	S-2
	AgChem 422: Micro nutrients in Agriculture- Practical	2 cr	3 hrs	"	"
<b>10.</b>	<b>Department of Biochemistry</b>				
	Compulsory:				
	<b>Biochem 121: Chemistry of Biomolecules-Theory</b>	2 cr	2 hrs	L-1	S-2
	<b>Biochem 122: Chemistry of Biomolecules-Practical</b>	2 cr	3 hrs	"	"
	<b>Biochem 201: Metabolism and Human Nutrition-Theory</b>	3 cr	3 hrs	L-2	S-1
	<b>Biochem 202: Metabolism and Human Nutrition-Practical</b>	2 cr	3 hrs	"	"
	<b>Elective:</b>				
	Biochem 401: Fundamentals of Molecular Biochemistry & Biotechnology-Theory	2 cr	2 hrs	L-4	S-1
	Biochem 402: Fundamentals of Plant Biochemistry-Practical	2 cr	3 hrs	"	"
<b>11.</b>	<b>Department of Chemistry</b>				
	Compulsory:				
	<b>Chem 101: Chemistry – Theory</b>	3 cr	3 hrs	L-1	S-1
	Chem 102: Chemistry – Practical	2 cr	3 hrs	"	"
<b>12.</b>	<b>Department of Agroforestry</b>				
	Compulsory:				
	<b>AgroF 301: Principles of Agroforestry – Theory</b>	3 cr	3 hrs	L-3	S-1
	<b>AgroF 302: Principles of Agroforestry – Practical</b>	2 cr	3 hrs	"	"
	<b>Elective: Not available</b>	-	-	-	-
<b>13.</b>	<b>Department of Language</b>				
	Optional:				
	Lang 101: English Language	2 cr	2 hrs	L-1	S-1,2
<b>14.</b>	<b>Department of Agricultural Economics</b>				
	Compulsory:				
	<b>AgEcon 101: Agricultural Economics</b>	3 cr	3 hrs	L-1	S-1
<b>15.</b>	<b>Department of Rural Sociology</b>				
	Compulsory:				
	<b>RSoc 121: Rural Sociology</b>	2 cr	2 hrs	L-1	S-2
<b>16.</b>	<b>Department Agricultural Statistics</b>				
	Compulsory:				
	<b>AgStat 121: Agricultural Statistics- Theory</b>	3 cr	3 hrs	L-1	S-2
	AgStat 122: Agricultural Statistics – Practical	2 cr	3 hrs	"	"
<b>17.</b>	<b>Department of Farm Power &amp; Machinery</b>				
	Compulsory:				
	<b>FMech 101: Farm Mechanics – Theory</b>	2 cr	2 hrs	L-1	S-1
	<b>FMech 102: Farm Mechanics – Practical</b>	2 cr	3 hrs	"	"
<b>18.</b>	<b>Department of Animal Science</b>				
	Elective:				
	<b>AS 121: Animal Science – Theory</b>	2 cr	2 hrs	L-1	S-2
	<b>AS 122: Animal Science – Practical</b>	2 cr	3 hrs	"	"
<b>19.</b>	<b>Department of Biotechnology</b>				
	Elective:				
	Biotech 401: Theory (cf. GPB: 401)	2 cr	2 hrs	L-4	S-1,2
	Biotech 402: Practical (cf. GPB: 402)	2 cr	3 hrs	"	"

Sl.	Course No. and Title	Credit	Contact hrs/wk	Available at	
				Level	Semester
<b>20.</b>	<b>Department of Environmental Science</b>				
	<b>Elective:</b>				
	EnvSc 401: Theory (Not available)	2 cr	2 hrs	L-4	S-1, 2
	EnvSc 402 : Practical (Not available)	2 cr	3 hrs	"	"
<b>21.</b>	<b>Department of Computer Science &amp; Mathematics</b>				
	<b>Elective:</b>				
	CompSc 121: Theory (Not available)	2 cr	2 hrs	L-1	S-2
	CompSc 122: Practical (Not available)	2 cr	3 hrs	"	"

### SYLLABUS FOR B.SC. AG. (Hons.) DEGREE

#### DEPARTMENT OF AGRONOMY

#### Types of courses available for B.Sc.Ag. (Hons.) degree in the semester system

Course No. and Title	Credit	Contact hrs/wk	Available at	
			Level	Semester
<b>Compulsory:</b>				
AGRON 111: Fundamentals of Agronomy-Theory	2 cr	2hrs	L-1	S-1
AGRON 112: Introductory Agronomic Practices-P	2 cr	3 hrs	"	"
AGRON 121: Seed Science and Technology-Theory	2 cr	2 hrs	L-1	S-2
AGRON 122: Seed Science & Technology-Practical	2 cr	3 hrs	"	"
AGRON 211: Weed Science-Theory	2 cr	2 hrs	L-2	S-1
AGRON 212: Weed Science-Practical	2 cr	3 hrs	"	"
AGRON 321 : Crop Husbandry-Theory	3 cr	3 hrs	L-3	S-2
AGRON 322 : Crop Husbandry-Practical	2 cr	3 hrs	"	"
AGRON 421 : Crop Production & Farm Management-T	3 cr	3 hrs	L-4	S-2
AGRON 422 : Crop Production & Farm Management-Practical	2 cr	3 hrs	"	"
<b>Elective:</b>				
AGRON 411: Introductory Cropping Systems—Theory	2 cr	2hrs	L-4	S-1
AGRON 412: Introductory Cropping Systems-Practical	2 cr	3 hrs	"	"
AGRON 423: Forage Crops and Pasture Management-T	2 cr	2 hrs	L-4	S-2
AGRON 424: Forage Crops and Pasture Crops- Practical	2 cr	3 hrs	"	"

#### Level-1, Semester-1

#### **AGRON 111: Fundamentals of Agronomy-Theory, 2 Credits, 2 hrs/wk**

**An Introduction to Agronomy:** Concept, importance, scope and basic principles. Evolution of modern crop agriculture.

**Agrometeorology:** Concept, Weather and climate elements. Cropping seasons of Bangladesh and their characteristics. Rainfall and temperature pattern in Bangladesh and their influence on crop distribution.

**Crops and Cropping:** Agronomic classification of crops. Concept of cropping patterns, Crop rotation, and mono and multiple cropping.

**Crop Geography:** Distribution of crops in relation to climate and soil in world perspective. Agroecological zones of Bangladesh – their characteristics and crop suitability.

**Tillage:** Concept, objectives and types of tillage. Advantages and disadvantages of different types of tillage. Effect of tillage on soil characteristics and nutrient availability. Determinants of time, depth and number of ploughing. Characteristics of ideal tillth.

**Crop Nutrition:** Essential elements, their sources and forms of absorption. Function, deficiency symptoms and toxic effects of nutrient elements in crop plants. Manures and fertilizers: definition, characteristics, classification and nutrient contents. Preparation and preservation of manures. Methods of application of manures and fertilizers; their advantages and disadvantages. Soil fertility and productivity. Maintenance of soil productivity through agronomic manipulation.

**Planting Practices:** Concept, types of planting materials. Planting methods, depth and density and their determinants. Field conditions for sowing.

**Intercultural Practices:** Mulching, thinning, weeding, gap filling, earthing up – their concepts and objectives.

**Irrigation and Drainage:** Concept, methods; advantages and disadvantages.

AGRON 112: Introductory Agronomic Practices, 2 Credits, 3 hrs/wk

1. Study of different farm implements- (a) identification, (b) practicing of different operations and (c) determination of their efficiency.
2. Identification of soil by finger feel method.
3. Identification of manures, fertilizers and studying their physical characteristics.
4. Computation of manures and fertilizers for different crops.
5. Preparation of compost.
6. Preservation of farm yard manure.
7. Raising a crop and studying its different growth phases.
8. Practicing weeding, thinning, mulching and earthing up.
9. Study on effect of plant nutrients – N,P,K on root and shoot growth and yield of a cereal crop in pot culture.
10. Study of different meteorological instruments.
11. Study of climatic pattern of Bangladesh.

### **Text and Reference Books**

Das, P.C. 1997. Manures and Fertilizers. Kalyani Publishers. Ludhiana, New Delhi, Calcutta, 130p.  
 De, G.C. 1995. Fundamentals of Agronomy. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, Calcutta. 429p.  
 Mavi, H.S. 1974. Introduction to Agro-meteorology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.  
 Morachan, Y.B. 1993. Crop Production and Management. 2<sup>nd</sup> Edition (Reprint). Oxford & IBH Publishing Co., Pvt. Ltd. New Delhi, Bombay, Calcutta. 294p.  
 Simpson, K. 1986. Fertilizers and Manures. Longman Groups Limited, Hongkong.  
 Singh, S.S. 1996. Principles and Practices of Agronomy. 3<sup>rd</sup> Edition (Reprint). Kalyani Publishers. New Delhi.

### **Level-1, Semester-2**

#### **AGRON 121: Seed Science and Technology-Theory, 2 Credits, 2 hrs/wk**

**Introduction to Seed:** Definition, importance, classification and structure, formation and development of seed.

**Seed Quality:** Attributes of quality seed. Importance of quality seed in crop production. Factors affecting seed quality during production and processing.

**Seed Germination and Vigour:** Definition and process of germination. Conditions necessary for germination. Concept of seed viability and vigour. Significance of seed vigour in crop production.

**Seed Dormancy:** Definition, kinds and causes. Importance of dormancy in crop production. Means of breaking seed dormancy.

**Seed Rate:** Concept, planting value of seed. Factors affecting seed rate.

**Seed Crop Cultivation:** Basic principles, methods of cultivation and harvesting of seed crop. Processing and grading of seed.

**Principles of Seed Storage:** Environmental factors affecting seed in storage. Types of storage facilities for seed. Safe conditions for seed storage. Factors affecting seed longevity deterioration. The processes involved in seed deterioration.

**Seed Treatment:** Objectives and procedures. Seed treating chemicals.

**Seed Testing:** Definition and objectives. Seed sampling. Testing of seeds for moisture, purity, germination, viability and vigour.

**Quality Control of Seed:** Definition and objectives. Seed certification procedure. Role of National Seed Board, Seed Certification Agency in the quality control of seed. Present status of production and supply of seed in Bangladesh.

#### **AGRON 122: Seed Science and Technology-Practical, 2 Credits, 3 hrs/wk**

1. Identification of seed and preparation of seed album.
2. Study of structures of monocotyledonous and dicotyledonous seeds.
3. Techniques of seed sampling
4. Moisture test of seed
5. Purity test of seed
6. Germination test of seed
7. Viability test of seed
8. Vigour test of seed
9. Calculation of seed rate of crops.
10. Practicing seed grading.
11. Practicing seed treatment
12. Growing seed crop in students' individual plots/pots.

### **Text and Reference Books**

- McDonald, M.B. and Copeland, L. O. 1997. Seed Production: Principles and Practices. Chapman & Hall, New York.
- Copeland, L.O. and McDonald, M.B. 1995. Seed Science and Technology. 3<sup>rd</sup> Edition. Chapman & Hall, New York.
- Basra, A.S. (ed.). 1995. Seed Quality: Basic Mechanisms and Agricultural Implications. Food Product Press, New York.
- Hampton, J.G. and Tekrony, D.M. (eds.). 1995. Handbook of Vigour Test Methods. 3<sup>rd</sup> Edition. International Seed Testing Association, Zurich, Switzerland.
- ISTA. 1999. International Rules for Seed Testing. 1999. Supplement to Seed Science and Technology. Vol. 27, pp. 27-32.
- Bewley, J.D. and Black, M. 1994. Seed Physiology of Development and Germination. 2<sup>nd</sup> edition. Springer-Verlag, London

## DEPARTMENT OF SOIL SCIENCE

### Types of courses available for B.Sc.Ag. (Hons.) degree in the semester system

Course No. and Titles	Credit	Contact hrs/wk	Available at	
			Level	Semester
<b>Compulsory:</b>				
SS 111: Introductory Soil Science-Theory	2 cr	2 hrs	L-1	S-1
SS 112: Introductory Soil Science-Practical	2 cr	3 hrs	"	"
SS 211: Soil Survey, Classification & Conservation-Theory	3 cr	3 hrs	L-2	S-1
SS 212: Soil Survey, Classification & Conservation- Practical	2 cr	3 hrs	"	"
SS 321 : Soil Physics & Soil Chemistry- Theory	3 cr	3 hrs	L-3	S-2
SS 322: Soil Physics & Soil Chemistry – Practical	2 cr	3 hrs	"	"
SS 421: Soil Microbiology & Soil Fertility-Theory	3 cr	3 hrs	L-4	S-2
SS 422: Soil Microbiology & Soil Fertility - Practical-4	2 cr	3 hrs	"	"
<b>Elective:</b>	-	-	-	-
SS 411: Soil Biology-Theory	2 cr	2 hrs	L-4	S-1
SS 412: Soil Biology –Practical	2 cr	2 hrs	"	"
SS 423: Soil Pollution –Theory	2 cr	2 hrs	L-4	S-2
SS 424: Soil Pollution-Practical	2 cr	2 hrs	"	"

### Level-1, Semester-1

#### SS 111: Introductory Soil Science- Theory, 2 Credits, 2 hrs/wk

##### **Soil genesis**

Concept of soil, major components of soil  
 Rocks and minerals - classification and properties  
 Weathering – physical and chemical weathering  
 Soil forming factors – climate, biosphere, parent material, relief and time  
 Soil forming processes – laterization, podzolization and calcification Soil profile

##### **Soil physical properties**

Soil particles - classification and properties  
 Soil texture – classification and importance  
 Soil structure – genesis, classification and importance  
 Soil density - particle density and bulk density  
 Soil porosity – factors and importance of soil porosity  
 Soil air – composition and importance  
 Soil colour – causes and importance  
 Soil water – Classification and importance  
 Soil temperature – factors and importance of soil temperature

##### **Soil pH**

Concept of soil pH  
 Grouping of soils according to pH values

##### **Plant nutrients**

Criteria for essentiality, available forms, macro and micronutrients, and functions  
 Soil fertility and soil productivity  
 Manure and fertilizer - kinds and composition.

##### **Soil organisms**

Classification of soil organisms  
 Bacteria, fungi and algae – classification and functions

Earthworms - habitats and functions

**SS 112: Introductory Soil Science - Practical-1, 2 Credits, 2 hrs/wk**

1. Precautions to be taken while working in the laboratory
2. Collection and preparation of soil samples
4. Identification of different rocks and minerals
5. Determination of particle density of soil by volumetric flask method
6. Determination of bulk density of soil by core sampler method
7. Estimation of soil porosity
8. Identification of different fertilizers
9. Techniques of sterilization
10. Motility test of bacteria by hanging drop method
11. Identification of bacteria by Gram staining method

**Text and Reference Books**

Alexander, M. 1977. Introduction to Soil Microbiology. John Wiley & Sons Inc., New York.  
 Baver, L.D., Gardner, W.H. and Gardner, W.R. 1972. Soil Physics, 4<sup>th</sup> edition. John Wiley & Sons. Inc., New York.  
 Biswas, T.D. and Mukherjee, S.K. 1991. Textbook of Soil Science. Tata McGraw-Hill Pub. Comp. Ltd., New Delhi.  
 Brady N.C. 1999. The Nature and Properties of Soils. Varun Exports, India.  
 Kohnke, H. 1968. Soil Physics. McGraw Hill Book Comp., New York.  
 Miller, R.W. and Donahue, R.L. 1990. Soils-An Introduction to Soils and Plant Growth. Prentice Hall Inc., USA.  
 Seeley, H.W. and Van Demark, J.J. 1975. Microbes in Action. A Laboratory Manual of Microbiology. D.B. Taraporavala Sons Co. Pvt. Ltd., India.  
 Subba Rao, N.S. 1987. Advances in Agricultural Microbiology. Oxford and IBH Pub. Co., New Delhi.  
 Tamhane, R.U., Motiramani, D.P., Bali, Y.P. and Donahue, R.L. 1970. Soils-Their Chemistry and Fertility in Tropical Asia. Prentice Hall of India Pvt. Ltd., New Delhi.  
 Thomson, L.M. and Troeh, F.R. 1978. Soils and Soil Fertility. McGraw Hill, New York.

**DEPARTMENT OF HORTICULTURE**

**Types of courses available for B.Sc.Ag. (Hons.) degree in the semester system**

Course No. and Title	Credit	Contact hrs/wk	Available at	
			Level	Semester
<b>Compulsory:</b>				
HORT 121: Fundamentals of Horticulture-Theory	2 cr	2 hrs	L-1	S-2
HORT 122: Fundamentals of Horticulture- Practical	2 cr	3 hrs	"	"
HORT 211: Ornamental Horticulture & Plantation Crops-Theory	2 cr	2 hrs	L-2	S-1
HORT 212: Ornamental Horticulture & Plantation Crops- Practical	2 cr	3 hrs	"	"
HORT 311: Vegetables & Spice Crops- Theory	3 cr	3 hrs	L-3	S-1
HORT 312: Vegetables & Spice Crops- Practical	2 cr	3 hrs	"	"
HORT 421: Pomology- Theory	3 cr	3 hrs	L-4	S-2
HORT 422: Pomology- Practical	2 cr	3 hrs	"	"
<b>Elective:</b>				
HORT 411: Postharvest management of Horticultural Crops-Theory	2 cr	2 hrs	L-4	S-1
HORT 412: Postharvest Management of Horticultural Crops-Practical	2 cr	3 hrs	"	"
HORT 423: Commercial Horticulture- Theory	2 cr	2 hrs	L-4	S-2
HORT 424: Commercial Horticulture- Practical	2 cr	3 hrs	"	"

**Level- 1, Semester-2**

**HORT 121: Fundamentals of Horticulture- Theory, 2 Credits, 2 hrs/wk**

- 1. Introduction to horticulture:** Definition, history, branches, importance and scope of horticulture.
- 2. Principles and practices in horticulture:** Planting methods and raising of seedlings, soil and land preparation, plant spacing, manure and fertilizer application, irrigation and drainage, intercultural operations.
- 3. Nursery management:** Definition, types, objectives, establishment and management of nursery and its structures, calendar of nursery activities.
- 4. Propagation of horticultural crops:** Definition, importance, methods and techniques, advantages and disadvantages, use of growth regulators in propagation.



**5. Training and pruning:** Concept, objectives, principles, types, methods and their effects on plant structure and bearing.

**6. Harvesting and handling of horticultural crops:** Harvesting, sorting, grading, packaging, transportation and marketing of horticultural crops.

#### **HORT 122: Fundamentals of Horticulture- Practical, 2 Credits, 3 hrs/wk**

1. Layout of a nursery.
2. Identification and use of nursery equipments.
3. Methods of planting horticultural crops.
4. Preparation of seedbed and nursery bed.
5. Practices on potting, depotting and repotting.
6. Propagation practices of different horticultural crops.
7. Pruning and training of important horticultural crops.
8. Practicing different methods of application of manure and fertilizer.
9. Practices on different intercultural operations.
10. Harvesting methods of horticultural crops.

#### **Text and Reference Books**

Adams, C.R., K.M. Bamford and M.P. Early. 1993. Principles of Horticulture (2nd ed.). Linacre House, Jordan Hill, Oxford.

Bose, T.K., S.K. Mitra and M.K. Sadhu. 1986. Propagation of Tropical and Sub-tropical Horticultural Crops. Naya Prokosh, Calcutta.

Chadha, K.L. 2001. Hand Book of Horticulture. ICAR, New Delhi.

Hartmann, H.T., D.E. Kester and F.T. Davies Jr. 1990. Plant Propagation: Principle and Practices. Prentice-Hall, International editions.

Mondal, M.F. 2000. Nursery and Plant Propagation (in Bangla). Mrs. Afia Mondal, BAU Campus, Mymensingh.

Prasad, S. and U. Kumar, U. 1999. Principles of Horticulture. Agro Botanica, New Delhi.

Randhawa, G.S. and A. Mukhopadhyay. 1994. Floriculture in India. Allied Publishers Limited, New Delhi.

Rao, K.M. 1995. Text Book of Horticulture. Macmillan India Limited.

Sadhu, M.K. 1996. Plant Propagation. New Ag. Int. Ltd., Publishers, New Delhi.

### **DEPARTMENT OF BIOCHEMISTRY**

#### **Types of courses available for B.Sc.Ag. (Hons.) degree in the semester system**

Course No. and Title	Credit	Contact hrs/wk	Available at	
			Level	Semester
<b>Compulsory:</b>				
BCHEM 121: Chemistry of Biomolecules-Theory	2 cr	2 hrs	L-1	S-2
BCHEM 122: Chemistry of Biomolecules-Practical	2 cr	3 hrs	"	"
BCHEM 211: Metabolism and Human Nutrition-Theory	3 cr	3 hrs	L-2	S-1
BCHEM 212: Metabolism and Human Nutrition-Practical	2 cr	3 hrs	"	"
<b>Elective:</b>				
BCHEM 411: Fundamentals of Molecular Biochemistry and Biotechnology- Theory	2 cr	2 hrs	L-4	S-1
BCHEM 412: Fundamentals of Molecular Biochemistry and Biotechnology-Practical	2 cr	3 hrs	"	"

#### **Level-1, Semester-2**

#### **BCHEM 121: Chemistry of Biomolecules-Theory, 2Credits, 2 hrs/wk**

#### **Important organic constituents of plants and animals:**

**Carbohydrates** : Occurrence, definition, classification, physical and chemical properties. Chemistry of monosaccharides and disaccharides. Composition and chemical linkages of polysaccharides with special reference to starch, cellulose and cell-wall polysaccharides.

**Proteins:** Definition, classification, physical and chemical properties. Amino acid composition of peptides and proteins. Hydrolysis of proteins, Reactions of amino acids. Amino acids as ampholytes. Isoelectric point. Protein structure. Plant proteins - leaf, seed and cereal proteins.

**Lipids** :Definition, classification, chemical and physical properties. Fatty acid composition of fats. Chemical reactions of fatty acids. Edible oils and their characteristic fatty acid composition. characterization of fats. Oils and waxes. Phospholipids with special reference to lecithin and cephalin. Phospholipids and glycolipids as membrane components.

**Nucleic acids**: Occurrence, composition, classification and structural features. Chemical and physical properties. Important functions of nucleic acids.

**Enzymes**: Definition, classification and chemical nature of enzymes. Concept of coenzymes and prosthetic groups. Mode of action of enzymes. Factors affecting enzymatic reaction. Enzyme specificity and inhibition with special reference to plant proteolytic enzymes. Concept of active centre. Principle of enzyme assay.

**Vitamins**: Classification and biochemical functions.

**Plant Hormones**: Classification and biochemical functions.

### **BCHEM 122: Chemistry of Biomolecules- Practical, 2 Credits, 3 hrs/wk**

Preparation of buffer solutions and determination of pH.

Determination of pKa value.

Colour tests of carbohydrates.

Colour tests of proteins.

Preparation of esters and solubility tests for fats.

Preparation of starch and detection of amylase activity,

Determination of vitamin C

Proximate analysis: Moisture, fat, protein, crude fibre and ash.

#### **Text and Reference Books**

Principle of Biochemistry, Albert L. Lehninger 2<sup>nd</sup> Edition. Kalyani Publishers. Ludhiana, New Delhi, 1994.

Biochemistry, Lubert Stryer, Published by S.K. Jain for CBS Publishers and Distributors, 485 Jain Bhawan, Bhola Nath Nagar, Delhi, India, 1986.

Harper's Review of Biochemistry. David W. Martin, Jr. Peter A. Mayes, Victor W. Rodwell and Davy' K. Granner. 20<sup>th</sup> Edition, 1983. Lange Medical Publication. Drawer L. Los, Altos, California, USA, 1983.

Outlines of Biochemistry, Eric E. Conn, Paul K. Stumpf, George Bruening and Roy, H. Doi. John Wiley and Sons, New York, 1995 ( 5<sup>th</sup> edition).

Text Book of Biochemistry. Edward S. West, Wilber R. Todd, Howard S. Mason and John T. Van Bruggan. 4<sup>th</sup> Edition, 1966. The Macmillan Company. Collier-Macmillan Ltd. London, 1966.

An introduction to practical Biochemistry. Davit T. Plummer. Tata McGraw-Hill Publishing Company Limited, New Delhi, 1995.

Biochemistry Laboratory Manual. F. M. Strong. WM.C. Brown Company Publishers, USA, 1965.

Biochemistry Laboratory Technioques. Sterling Chaykin. Wiley Eastern Private Limited, New Delhi, 1970.

Biochemical Calculations. How to Solve Mathematical Problem in General Biochemistry. Irwin H. Segel. John Wiley and Sons, Inc. New York, 1968.

Experimental Biochemistry. A Laboratory Manual. Gerald Litwack. John Liley and Sons. Inc, New York, 1960.

Official Methods of Analysis. Association of Official Analytical Chemists (AOAC), Washington D.C., 1990.

## **DEPARTMENT OF CHEMISTRY**

### **Level-1, Semester-I**

#### **CHEM 111 : Chemistry- Theory, 3 Credits, 3 hrs/wk**

Chemical equilibrium : Law of mass action and its application in homogenous and heterogenous reactions.

Electrochemistry : Ionic equilibrium, Ostwald's dilution law, common ion effect, electrolytic dissociation and conductance theories of strong electrolyte, pH, buffer solution and its preparation, solubility and solubility product, principles of precipitation.

Colligative properties of dilute solutions.

Colloids : Preparation and properties.

Methods of quantitative analysis : Principle of different type of volumetric analysis, Theories of acid-base indicator and their selection, Principles of gravimetric analysis, washing and ignition technique of the precipitates, Different redox reactions, iodometry and iodimetry.

Colorimetric analysis: Lambert's and Beer's laws and their applications.

Chemical bonding : Formation and cleavage of covalent bond; Mechanism of addition, substitution and elimination reactions.

Aromatic and heterocyclic compounds, carboxylic acids.

Natural Products : Chemistry of alkaloids, Terpenoids and purines.

Stereochemistry : Stereoisomerism of organic compounds.

**CHEM 112: Chemistry- Practical, 2 Credits, 3 hrs/wk**

1. Preparation of primary and secondary standard solution of the following compounds.  $\text{Na}_2\text{CO}_3$ ,  $\text{H}_2\text{SO}_4$ ,  $\text{H}_2\text{C}_2\text{O}_4$  and  $\text{KMnO}_4$  etc.
2. Acid-base titration, Redox titration, Potentiometric titration, Precipitation titration, and Complexometric titration.
3. Identification of Organic compounds and their functional groups. Oxalic, Citric, Tartaric, Formic, Acetic and Maleic acids, Urea, Aldehydes and Ketones etc. preparation of derivatives. Determination of boiling and melting points.

**Text and Reference Books**

1. A text book of physical chemistry – Lewis & Glasstone
2. Physical Chemistry–Daniel & Alberty.
3. Principle of Physical Chemistry–Haque & Nawab.
4.  $\text{Principles of Physical Chemistry}$  -  $\text{K. L. Kapoor}$
5.  $\text{Physical Chemistry}$  -  $\text{P. W. Atkins}$
6.  $\text{Physical Chemistry}$  -  $\text{C. V. Srinivasan}$
7.  $\text{Physical Chemistry}$  -  $\text{R. C. Weast}$
8.  $\text{Physical Chemistry}$  -  $\text{C. V. Srinivasan}$
9. A source book of atomic energy–Glasstone
10. Organic Chemistry– A Jabbar & Mafizuddin Ahmed
11. Organic Chemistry- Morrison & Boyd
12. Organic Chemistry (Volume 1 and 2)- I.L. Finar
13.  $\text{Organic Chemistry}$  -  $\text{R. C. Weast}$
14. Carbohydrate Chemistry- Davidson
15.  $\text{Carbohydrate Chemistry}$  -  $\text{N. R. V. Rao}$

**DEPARTMENT OF ENVIRONMENTAL SCIENCE**

**Level-1, Semester-2 (Elective)**

**ENVSC 121: Introductory Environmental Science-Theory 2 Credit**

**Introduction:** Concept, scope and importance of environmental science. Environment — components and classification. Important environmental factors influencing the natural vegetation, crop, livestock, poultry fisheries and human ecosystems.

**Geography:** Location of a place on the earth's surface — latitude, longitude. Sun-earth geometry. Distribution of flora and fauna in different geographical positions.

**Climatology:** Introduction to climatology and micrometeorology, global climate change and its consequences, Global warming — Concept, local and global emission, impact on various habitats.

**Terrestrial environment:** Components of plain, hill, homestead and farm environment and agro-ecosystem. Impact of human activities on the degradation of terrestrial environment, crop-waste management.

**Aquatic environment:** Coastal and marine environments and importance of their maintenance. Impact of agricultural and industrial activities on water quality, aquatic flora and fauna.

**Animal ecology & environment:** Effect of climate on adaptation and acclimatization of animals. Environmental requirements for farm animals and poultry, animal waste management practices.

**Bangladesh environment:** Environment of Bangladesh, its degradation and management. Agricultural practices for environmental sustainability.

**Text Books/References:**

- Adrens, C. D. 1982. Meteorology Today – An Introduction to Weather, Climate and the Environment. West Publishing CO., St Paul, Minnesota 55165.
- Arya, S. P. 1988. Introduction to Micrometeorology. Academic Press, INC.
- Botkin, D. B. and Keller, E. A. 1997. Environmental Science – Earth as a Living Planet. Second Edition. John & Wiley Sons, Inc. New York.
- Chiras, D. D. 1985. Environmental Science – A Framework for Decision Making. The Benjamin/Cummings Publishing Company, Inc. 655p.
- Critchfield, H. J. 1979. General Climatology. *Third Edition*. Prentice-Hall of India, Private Limited, New Delhi.
- Greenwood, N. J. and Edwards, J. M. B. 1979. Human Environments and Natural Systems. Duxbury Press (Wadsworth Publishing Company, Inc.). 548p.
- Kaufman, P. B. and LaCroix, J. D. 1979. Plants, People & Environment. Macmillan Publishing Co., Inc. 542p.
- Khuda, Z. R. M. 2001. Environmental Degradation – Challenges of the 21st Century. *Environmental Survey and Research Unit, Dhaka, Bangladesh*.

- Koeppe, E. C. and De Long, C. G. Weather and Climate. 1958. McGraw-Hill Book Company, Inc. New York.
- Miller, Jr., G. T. 1985. Living in the Environment – An Introduction to Environmental Science. Fourth Edition. Wadsworth Publishing Company. 561p.
- Minami, K., Mosier, A. and Sass, R. 1994. CH<sub>4</sub> and N<sub>2</sub>O – Global Emissions and Controls from Rice Fields and Other Agricultural and Industrial Sources. NIAES Series 2. Yokendo Publishers, Tokyo.
- Odum, E.P. 1971. Fundamentals of Ecology. Saunders, Philadel.
- Oke, T. R. 1987. Boundary Layer Climate, Second Edition. Routledge, University Press, Cambridge.
- ReVelle, P. and ReVelle, C. 1981. The Environment – Issues and Choices for Society. Willard Grant Press, New York, 762p. (Edited).
- Rosenberg, J. R., Blad, B. L. and Shashi, B. V. 1983. Microclimate – The Biological Environment. John Wiley & Sons.
- Turk, A.; Turk, J.; Wittes, J. T. and Wittes, R. E. 1978. Environmental Science. Second Edition. W. B. Saunders Company.

### **ENVSC 122: Introductory Environmental Science-Practical 2 Credit**

1. Study of Agro-ecosystem.
2. Study of Forest-ecosystem.
3. Study of Aquatic-ecosystem.
4. Study of Animal-ecosystem.
5. Identification and use of different micrometeorological instruments/sensors.
6. Study of species diversity (Flora & Fauna) indices in terrestrial and aquatic habitat.

#### **Text Books/References:**

- Arya, S. P. 1988. Introduction to Micrometeorology. Academic Press, INC.
- Rosenberg, J. R., Blad, B. L. and Shashi, B. V. 1983. Microclimate – The Biological Environment. John Wiley & Sons.
- Botkin, D. B. and Keller, E. A. 1998. Environmental Science – Earth as a Living Planet. Second Edition. John & Wiley Sons, Inc. New York.
- Deshmukh, I. 1986. Ecology and Tropical Biology. Blackwell, Oxford.
- Dimond, J. and Case, T.J. 1980. Community Ecology. (Edited). Harper & Row, New York.
- Etherington, J.R. 1973. Environment and Plant Ecology, John Wiley and Sons, New York.
- Harper, J.L. 1977. Population Biology of Plants. Acad. Press, New York.
- Odum, E.P. 1971. Fundamentals of Ecology. Saunders, Philadel.
- Sukla, R.S. and Chandel, P.S. 1985. Plant Ecology. S. Chand and Company Ltd. Ram Nagar, New Delhi-110055.
- Turk, A.; Turk, J.; Wittes, J. T. and Wittes, R. E. 1978. Environmental Science. Second Edition. W. B. Saunders Company.

## **DEPARTMENT OF BIOTECHNOLOGY**

### **Level-1, Semester-2 (Elective)**

#### **BTECH 121: Basic Biotechnology-Theory Credit hrs: 2, Contact hours: 2**

- 1. Introduction:** Concept, importance, scope, limitations and branches of biotechnology.
- 2. Basic requirements:** Media composition, aseptic manipulation and *in vitro* microenvironment.
- 3. Cell and Tissue Culture Techniques:**
  - Nodal culture, meristem culture and embryo culture.
  - Protoplast isolation, culture, and somatic hybridization.
  - Haploid production through anther, pollen, ovary and ovule culture.
  - *In vitro* somaclonal and gametoclonal variations, ployploidization.
  - Plant regeneration from callus and cell suspension cultures through somatic embryogenesis.
  - Animal and fish cell technology, embryo transfer technology (ETT), multiple ovulation embryo transfer (MOET).
  - *In vitro* production of secondary metabolites.
- 4. DNA Structure:** Modern concept of gene, Watson and Crick model of DNA.
- 5. Genetic Engineering:** Vectors, restriction endonuclease, ligase, cDNA. Methods of genetic engineering. Promoter, marker and reporter genes.

#### **Text Books/References**

- Alberts, B., D. Bray, J. Lewis, M. Raff, K. Roberts and J. D. Watson. 1989. Molecular Biology of the Cell. 2<sup>nd</sup> Edition. Garland Pub. Inc., New York.

Brown, T. A. 1998. Recombinant DNA. Academic Press, London.  
 Dixon, R. A. 1987. Plant Cell Culture. IRL Press, Washington D.C.  
 Gamburg, O. L. and G. S. Phillips. 1995. *Plant Cell Tissue and Organ Culture. Fundamental Methods*, Narosa Pub. House, New Delhi.  
 Naryanaswamy, S. 1994. Plant Cell and Tissue Culture, Tata McGraw-Hill Pub., New Delhi.  
 Old, R. W. and S. B. Primrose. 1989. Principles of Gene Manipulation. Blackwell Sci Pub., London.  
 Primrose, S. B. 1987. *Modern Biotechnology. Blackwell Sci. Pub., London.*  
 Purohit, S. S, and S. K. Mathur. 1996. Biotechnology. Agro's Botanical Pub., India.  
 Razdan, M. K. 2000. An Introduction to Plant Tissue Culture. Oxford & IBH Pub. Co., Pvt. Ltd., New Delhi.  
 Spier, R. B. and J. B. Griffiths. 1990. Animal Cell Biotechnology, Academic Press, London.  
 Watson, J. D. 1992. Recombinant DNA, USA.

**BTECH 122: Basic Biotechnology-Practical Credit hrs: 2, Contact hours: 2**

1. Design, equipments and requirements of a biotechnology laboratory.
2. Media preparation, aseptic manipulation, explants preparation.
3. Node, meristem, embryo, pollen, anther, ovule, protoplast, cell and callus culture.
4. Isolation of genomic DNA from plant and animal tissues; isolation of plasmid DNA.
5. DNA, RNA and protein electrophoresis.
6. Digestion, ligation, competent cell preparation, transformation in *Escherichia coli*.

**Text Books/References**

Alberts, B., D. Bray, J. Lewis, M. Raff, K. Roberts and J. D. Watson. 1989. Molecular Biology of the Cell. 2<sup>nd</sup> Edition. Garland Pub., Inc., New York.  
 Brown, T. A. 2002. Gene Cloning and DNA Analysis. 4<sup>th</sup> Edition. Blackwell Pub., London.  
 Butler, M. 1991. Mammalian Cell Biotechnology-A Practical Approach, IRL Pub., Oxford.  
 Glover, D. M., and B. D. Hames. 1995. DNA Cloning-1 Core Techniques: A Practical Approach. Oxford University Press, UK.  
 Sambrook, J., E. F. Fritsch and T. Maniatis. 1999. Molecular Cloning. Cold Spring Harbor Press, USA.  
 Gamburg, O. L. and G. S. Phillips. 1995. Plant Cell Tissue and Organ Culture. Fundamental Methods, Narosa Pub. House, New Delhi.  
 Jane, K. S. and H. Alexander. 1982. Genetics engineering. Principles and methods Plenum Press, New York.  
 Raymond, L. R. and C. T. Robert. 1983. Recombinant DNA Techniques. An Introduction. The Benjamin Cumming Pub., Co., London.

**DEPARTMENT OF LANGUAGE**

**Level- 1, Semester-1 (Optional)**

**LAN 101: English Language, 2 Credits, 2 hrs/wk**

1. Textual study and comprehension of a few selective BBC talks.
2. Socio-linguistic rules to perform language function in English.
3. Basic grammatical structures:
  - i) Types and constructional forms of sentences; Sequence of tense; Voice; Verbs, verb patterns and verb modifiers; Syntax including transformation and combination of sentence and framing of WH-questions.
  - ii) Nouns, determiners and adjectives; Adverbials; Prepositional phrases; Headword, Infinitive phrases; Participle phrases; Apositives.
  - iii) Mechanics -- Punctuation, Quotation marks, Capitalization, Numbers, Abbreviation, Italics, Spelling (including most common mistakes).
4. Principles and methods of composition:
 

Precis, Abstract or Summary, Paragraphs, Letters, Short Essays and Reports.

**Text and Reference Books**

Close, R.A. 1988. The English We Use (24<sup>th</sup> Indian Edition). Longman, Calcutta.  
 Leech, G. and Svartvik, J. 1996. A communicative grammar in English (2<sup>nd</sup> Edition.). Longman, London and NY.  
 Hornby, A.S. 1998. Guide to Patterns and Usage in English (2<sup>nd</sup> Editio.). Oxford University Press, Delhi.  
 Pyle, K.A. and Munoz, M.A. 1992. Chiffs TOEFL Preparation Guide (62 Revised Edition) BPB Publications,  
 Chowdhury, M.Y.A. and Hossain, M.M. 2002. Advanced Learner's Degree General English. Advanced Publications, Banglabazar, Dhaka.

- Hornby, A.S. 1996. Oxford Advanced Learner's Dictionary of Current English (Ed. J. Crowler, 5<sup>th</sup> Edition) Oxford University Press, London.
- Begum, J. 1988. A Text Book of Modern Functional English. Globe Library (Pvt.) Ltd. Dhaka.
- Berkoff, N.A. 1975. Agriculture (English Studies Series: 10. Oxford University Press, London.
- McArthur, T. 1978. A Rapid Course in English for Students of Economics (Ed. R. Mackin). Oxford University Press, London.

## DEPARTMENT OF AGRICULTURAL ECONOMICS

### Level-1, Semester-1

#### AE 113: Agricultural Economics, 3 Credits, 3 hrs/wk

**Introduction:** Concepts of economics and agricultural economics, scope of agricultural economics, relation of agricultural economics with other social sciences.

**Theory of consumer behaviour:** Marshallian utility analysis, indifference curve analysis, derivation of demand and elasticity of demand.

**Theory of Production:** Factors of production, law of diminishing returns, stages of production and optimum input use.

**Theory of firm:** Cost and revenue concepts, equilibrium of firm, markets and their characteristics, price determination under different market conditions.

**Population Theory:** Malthusian theory, Optimum theory of population and comparison and acceptance of the two theories.

**National Income:** Concepts and measurement of national income, difficulties of measuring national income in Bangladesh.

**International trade:** Concept of international trade, classical theory of international trade and gains from international trade.

**Money and Banking:** Definition and functions of money, value of money, inflation, functions of central, commercial and specialized banks.

**Economy of Bangladesh Agriculture:** Role of agriculture in the economic development of Bangladesh, problems of agricultural development in Bangladesh, characteristics and marketing of agricultural products, farm power issues, farmer's role as a decision maker, agricultural credit and its sources, role of cooperative and non-government organizations in the agricultural development of Bangladesh, Farm size, tenure and productivity in Bangladesh and land reforms in Bangladesh.

#### Text and Reference Books

- Ahuja, H.L. 2001: Advanced Economic Theory, S. Chand & Company LTD, Pub. Ram Nagar, New Delhi.
- Bishop, C.E. and Toussaint W.D. 1958: An Introduction to Agricultural Economic Analysis., John Wiley and Sons, New York.
- Chokrobari, Monotos. 1984: Micro Economics, Padma Pub. Dhaka.
- Dewett, K.K. 2001: Modern Economic Theory, S. Chand & Company LTD. Pub. Ram Nagar, New Delhi.
- Dey, Monoranjan. 1982: Krishi Arthonity, Bisho Paricoy Pub. Dhaka.
- Dutta, S.C. 1987: Krishi Arthonity Swarup, Puthighar pub., Dhaka.
- Hill, B. 1990: An Introduction to Economics for Students of Agriculture, Pergamon Press, London.
- Mandal, M.A.S. 2000: Changing Rural Economy of Bangladesh, BEA Pub. Dhaka.
- Mian, M.S. 2001: Economics and Agricultural Development-Bangladesh Perspective, Universal Pub. Dhaka.
- Mukharji, Smpath. 1988: Samokalin Arthobiddha, New Central Book Agency, Calautta.
- Rahman, A. 1988: Adhunik Arthonity. Puthighar Pub. Dhaka.
- Ritson, C. 1977: Agricultural Economics: Principles and Policy, Granada Pub. London.
- Samuelson. P.A. 1995: Economics. 15<sup>th</sup> Edition, McGraw Hill New York.
- Sikder, J.I. 1995: Krishi Arthonity, Confidence Pub. Dhaka.
- Uddin Taj. and Masduzzaman, M. 1997: Krishi Arthonity, Bangladesh Technical Education Board Pub., Dhaka.
- Vaish, M.C. 1977: Macroeconomic Theory, Vikas Pub. New Delhi.

## DEPARTMENT OF RURAL SOCIOLOGY

### Level-1, Semester-2

#### RS 121: Rural Sociology, Theory, 2 Credits, 2 hrs/wk

- Introduction:** Definition of Sociology and Rural Sociology, Origin and Development of Rural Sociology; Scope of Rural Sociology –Importance of Rural Sociology –Role of the Rural Sociologists in Agricultural Development.

- 2) **Rural Livelihood and Sustainability:** Definition of Livelihood and Changing Socio-Economic activities, Institutional Arrangement, Integrated Farming System: Agriculture, Rice-Fish Culture, Poultry and Livestock.
- 3) **Culture:** Rural Culture or Peasant Culture, Elements, Characteristics and Functions of Culture, How we interpret Culture, Cultural Complexities and Diversities, Cultural Changes.
- 4) **Social Differentiation and Stratification:** Definition, Types and Function of Stratification, Basis and Nature of Stratification in Bangladesh, Rural Class and Power Structure.
- 5) **Social Change:** Nature and Factors of Social Change, Social Mobility, Evolution and Progress, Causes of Social Change, Adaptability and Rural Life.
- 6) **Family:** Concept, Types and Function of Family, Family and Agriculture in Bangladesh.
- 7) **Population and Environment:** Concept of Population and Development. Health, Illness and Population. Rural Population and Quality of Life, Population Resources and Environment.

#### **Text and Reference Books**

- Browne-An Introduction to Sociology, 2<sup>nd</sup> edition, Polity Press, Cambridge, 1998.  
 E. M. Rogers et al. Social Change in Rural Societies: An introduction to Rural Sociology, Prentice-Hill, London, 1988.  
 Giddens- Sociology, 3<sup>rd</sup> edition, Polity Press, London, 1998.  
 J. B. Chitamber- Introductory Rural Sociology, Wily Eastern Ltd., 1973.  
 Atiq Rahman, et al., Environment and Development in Bangladesh, UPL, Dhaka, 1994.  
 Hess, Markson & Stein-Sociology, 3<sup>rd</sup> edition, Macmillan Pub, New York, 1988.  
 Jansen- Rural Bangladesh: Competition for Scarce Resources, UPL, 1987.  
 Rahman-Rethinking Rural Poverty: Bangladesh as a Case Study, 1995.  
 Schaefer-Sociology, McGraw-Hill Book Company, New York, 1988.

### **DEPARTMENT OF AGRICULTURAL STATISTICS**

#### **Level-1, Semester-2**

#### **STAT 121: Agricultural Statistics-Theory, 3 Credits, 3 hrs/wk**

Definition, scope and limitations of Agricultural Statistics. Different types of variables. Frequency distribution: construction and graphical representation. Measures of location and variation and shape characteristics of curves.

Random experiment, outcome, sample space events, mutually exclusive, equally likely, independent and dependent events. Mathematical and statistical definitions of probability, compound and conditional probability. Additive and multiplicative laws of probability. Random variable, probability distribution. Probability function, Binomial, Poisson and Normal distributions.

Simple correlation and regression: Scatter diagram, the Pearson's correlation coefficient with its properties, least squares method for fitting regression line. Properties of regression coefficient.

Population and sample. Hypothesis, null and alternative hypotheses, type I error, type II level of significance. Basic steps for testing hypothesis. Statistical tests: a population mean is equal to a specified value, equality of two population means (independent and correlated), significance of correlation and regression coefficients, independence of attributes.

Experimental design: Basic concepts and principles. Completely randomized, randomized blocked Latin square design.

#### **STAT 122: Agricultural Statistics-Practical, 2 Credits, 3 hrs/wk**

Frequency tables and their graphical representation. Measures of location and variation. Measures of skewness and kurtosis. Pearson's correlation coefficient. Fitting linear regression to observed data by the method of least squares.

Statistical tests: A population mean is equal to a specified value, equality of two population means (for both independent & correlated samples), a population is equal to a specified value, equality of two population proportions, independence of attributes, significance of correlation and regression coefficients.

Analysis of variance for completely randomized, randomized block and Latin square designs. Multiple comparison (using 't' and 2sd).

#### **Text and Reference Books**

- Ali, M.A. (1969). Theory of Statistics, Vol. 1 & 2, Dhaka Book Mart, 38 Bangladesh, Dhaka

Goulden, G.H. (1952). *Methods of Statistical Analysis*, John Wiley, New York.  
 Gupta, S.C. & V.K. Kapoor (1982). *Fundamentals of Mathematical Statistics*, S. Chand and Company Ltd.  
 Kapur, J.N. & H. Sexena (1976). *Mathematical Statistics*, S. Chand & Company Ltd., Ramnagar, New Delhi.  
 Shil, R.N. and S.C. Debnath (1992). *An Introduction to the Theory of Statistics*, Minati Shil and Amita Debnath,  
 Snedecor, G.W. *Statistical Methods*, Iowa State University Press.  
 Steel, R.G.D. and J.H. Torrie (1960). *Principles and Procedures of Statistics*, McGraw-Hill Inc., New York.  
 Yule, G.U. & M.G. Kendall (1965). *An Introduction to the Theory of Statistics*, Charles Griffin, London.  
 Ahmed, A.R. et.al (2001). *Parsankhyan: Tattwa-o-proyog*, Second Edition, Shamsunnahar and associates, North  
 Seota, Manikgonj, Dhaka.  
 Khan, M.Z.A. and S.C. Debnath (1987). *Prathamik Parisankyan*, Printed by City Press, Mymensingh.

## **DEPARTMENT OF FARM POWER & MACHINERY**

### **Level-1, Semester-1**

#### **FPM 111: Farm Mechanics- Theory, 2 Credits, 2 hrs/wk**

Farm mechanization, Sources of farm power and their status.

Definition of engine and their classification, major component of engine, engine terminology, engine systems, maintenance of engine.

Introduction to farm machinery: Tillage, crop planting and plant protection machinery, repair and maintenance of farm machinery.

Importance of drying and classification of dryers.

Irrigation and its importance in Bangladesh. Methods of irrigation, irrigation efficiency. Classification of pumps and introduction to pumps commonly used in Bangladesh.

Introduction to common building materials: brick, sand, cement and timber. Estimation of simple building structures.

#### **FPM 112: Farm Mechanics- Practical, 2 Credits, 3 hrs/wk**

Inspection and study of engine parts and systems, agricultural machines, centrifugal pumps. Other need-based Farm mechanical practical/sessional/operational works complementary to the theoretical topics.

#### **Text and Reference Book**

A.M. Michael & T.P. Ojha. *Principles of Agricultural Engineering (Vol. I & II)*. Jain Brothers (New Delhi) 1978  
 Donnel Hunt. *Farm Power and Machinery Management*. Iowa State University Press, Iowa, 1983.  
 S.C. Jain and C.R. RAI. *Tractor Engine Maintenance and Repair*. Tata McGraw Hill Publishing Company Limited, New Delhi. 1980.  
 V.E. Hansen, O.W. Israelsen & G.E. Stringham. *Irrigation Principles & Practice*. John Wiley & Sons. 1993.  
 Aziz, M.A, 1967: *A Text Book of Estimating and Costing* Zohri Pub., Dhaka.  
 Aziz, M.A. 1990: *A Text Book of Engineering Materials*. Book Center, Dhaka.

## **DEPARTMENT OF ANIMAL SCIENCE**

### **Level- 1, Semester- 2 (Elective)**

#### **AS 121: Animal Science –Theory, 2 Credits, 2 hrs/wk**

Introduction: Concept, terminology, importance and production system of livestock in Bangladesh.

Classification and characteristics of different types of breeds of livestock: cattle, buffalo, sheep, goat and poultry.

Draught Animals: Importance, prospect, development and constraints of draught animal in Bangladesh. Breeds of draught animals: cattle and buffalo. Selection of draught animals.

Livestock feeds and feeding systems: Composition of plant and animal body. Principal feeds and their classification according to their feeding values. Essential feed nutrients and their function in animal body. Feeding value of common concentrates, fodder, forages, crop residues, and agro-industrial by-products. Definition of: Feed



digestibility, Metabolizable energy, Ration, Total digestible nutrients (TDN), Digestible protein (DP), principles and preparation of hay and silage. Requisites of good quality ration for livestock.

Feeding system: Scavenging, tethering, cut and carry method, intensive, extensive, semi-intensive system.

Housing of Livestock: Principle of housing for livestock.

Barnyard manure: Handling, conservation and disposal of manure.

### **AS 122: Animal Science-Practical, 2 Credits, 3 hrs/wk**

1. Judging of draft cattle.
2. Objectives and procedures of Grooming, Washing, Marking, Bedding and Clothing.
3. Identification of different breeds of cattle, buffalo and poultry.
4. Identification of different types of feeds and preparation of feed mixtures.
5. Demonstration of routine work of a livestock farm.
6. Demonstration of different types of houses for livestock and poultry.

### **Text and Reference Books**

Banerjee, G.C. 1982. A text book of animal husbandry. 5<sup>th</sup> ed., Oxford and IBH Pub. Co., New Delhi.  
Cole, H.H. 1962. Introduction to Livestock Production. W.H. Freeman and Co. San Francisco.  
Miller, W.C. and Robertson, D.S. 1959. Practical Animal Husbandry. 7<sup>th</sup> ed. Ohver and Boyd, London.  
Upadhyay, R.C. 1990. Draught Animal: Efficiencies Limiting Factors. Sunil Pub., Mathura.  
Gillespie, J.R. 1983. Modern Livestock and Poultry Production, 2<sup>nd</sup> Ed. Delmar Publishers Inc. U.S.A.  
Hossain, M.M. and Akhter, S. 1999. Practical Animal Science, Department of Animal Science, Bangladesh Agricultural University, Mymensingh, Bangladesh.