Sher-e-Bangla Agricultural University
Dhaka, Bangladesh

Course Layout

Department of Agricultural Engineering
Faculty of Agriculture
Course Title: Farm Mechanization
Course Code: AGEN 225 (Theory) / AGEN 226 (Practical)

Farm Mechanization, AGEN 225 (Theory)
Credit Hour: 2, Level 2 Semester 1
Bachelor of Science in Agricultural Economics (Honors) / B.Sc. Ag. Econ. (Hons.)

Rationale:

This course is designed to develop students knowledge on important technologies used in the field of Agricultural Engineering for mechanized and modern Agricultural operations.

Course Learning Outcomes:

- Acquire knowledge about modem farm technologies and machineries.
- Enrich knowledge about the current status, needs and opportunities of mechanized farming.
- Develop knowledge on crop water requirement and efficient irrigation technologies.
- Become familiar with farm structure design and construction materials for farm structure.

Assessment and Grading Procedures:

Attendance	: 10
Two Quizzes	: 10
Two Class Tests	: 30
Final (Quiz and Written)	: 20+30

Numerical Grade	Letter Grade	Grade Point	Numerical Grade	Letter Grade	Grade Point
80% or above	A+	4.00	55 to < 60%	B-	2.75
75 to < 80%	A	3.75	50 to < 55%	C+	2.50
70 to < 75%	A-	3.50	45 to < 50%	C	2.25
65 to < 70%	B+	3.25	40 to < 45%	D	2.00
60 to < 65%	B	3.00	Less than 40%	F	0.00

Intended Learning Outcomes (ILOs) The students will be able to-	**Course Content**	**Teaching-Learning Strategies**	**Assessment Strategies**
• Categorize and criticize the level of Mechanization of Bangladesh.	**Farm Mechanization:** Introduction to farm mechanization, benefits and drawbacks of farm mechanization, factors influencing mechanization, mechanization and poverty alleviation, mechanization and national economy, prospects of farm mechanization in Bangladesh.	Lecture Visual presentation Discussion	QUIZ/MCQ Short answer Essay type answer
• Illustrate the type of engine and their working principles. •Compare between two and four stroke engine • Differentiate between petrol and diesel engines. • Describe about RM of engines.	**Farm Power:** Definition, classification of engines, engine parts, two and four stroke engines, petrol and diesel engines and their working principle and different internal systems in tractors and power tiller engines, repairs and maintenance of engines, estimation of power, energy and efficiencies of engines.	Lecture Visual presentation Discussion Assignment	Quiz/MCQ Short answer Essay type answer Report
• Classify the type of tillage implements and machineries. • Describe tillage implements, sprayers and harvesters and their uses. • Explain the uses of solar energy. • Estimate the power, energy and efficiencies of agricultural machineries.	**Farm Machinery:** Introduction to farm machinery, tillage machinery, crop planting and plant protection machinery. Harvesting and threshing machinery: their operation, performance and maintenance, calculation of soil – implementation relation forces and estimation of power energy and efficiencies of machines. Current status and future prospects of farm machinery business in Bangladesh.	Lecture Visual presentation Discussion Assignment	Quiz/MCQ Short answer Essay type answer Report
•Estimating the machinery operating cost •Determine the time of replacement the machines.	**Farm machinery management:** Minimizing power and machinery requirements, Annual operating cost of farm machinery, depreciation and machine life, machine safety. Different cost parameters; break even analysis, determination of annual cost.	Lecture Visual presentation Discussion Assignment	Quiz/MCQ Short answer Essay type answer Report

• Describe the methods of irrigation. • Estimate the irrigation requirements. • Compare various irrigation technologies. •Estimate the power requirement of pumping and cost of power. • Illustrate about RM of irrigation pumps.	**Irrigation and Drainage:** Importance and scope of irrigation, Irrigation development in Bangladesh, methods of irrigation and water requirement of crops, irrigation pumps and wells; their classification, uses, maintenance and troubleshooting, Drainage and its importance in agriculture in Bangladesh, Few constructional estimation.	Lecture Visual presentation Interactive discussion Assignment	Quiz/MCQ Short answer Essay type answer Report
•Know about the latest technologies in modern agricultural sectors	**Promising new technologies in Agriculture:** Introduction with modern farm technologies like computer and electronics in agriculture, precision farming, protected farming, intercropping, drones and robots, developments of modern (Need Based) machineries.	Lecture Visual presentation Discussion Assignment	Quiz/MCQ Short answer Essay type answer Report

Book Reference:

1. *R. A. Kepner, Roy Bainer and E. L. Barger. Principles of Farm Machinery.3rd Edition 1987, CBS Publishers & Distributors, New Delhi 110032. India.*
2. *A. M. Michael. Irrigation: Theory and Practice, Reprint Edition 1997, Vikas publishing house Pvt. Ltd. New Delhi, India.*
3. *S. K. Garg, Irrigation Engineering and Hydraulic Structures, 7th Edition, New Delhi: Khanna Publishers.*
4. *Donnell Hunt, David Wilson. Fancy Power and Machinery Management, Eleventh Edition, Iowa State University press, Ames, Iowa 50014, USA.*
5. *A.M. Michael, S.D. Khepar, and S.K. Sondhi. Water Wells and Pumps, 2nd Edition Published by Tata McGraw — Hill, India.*

Farm Mechanization, AGEN 226 (Practical)
Credit Hour: 1, Level 2 Semester 1
Bachelor of Science in Agricultural Economics (Honors) / B.Sc. Ag. Econ. (Hons.)

Rationale:

This course is designed to provide students the practical experience of using available machinery or to provide a closer overview of important technologies used in the domain of Agricultural Engineering for mechanized and modern Agricultural operations.

Course Learning Outcomes:

- Acquire knowledge on selection of best suited machine or engine and to do proper management and maintenance in practical situations.
- Enrich skill on the technique and methods of determining the exact irrigation requirement.
- Acquire the post harvest care, losses and crop processing technologies.

Assessment and Grading Procedures:

Attendance	: 10
First Practical Exam	: 45
Final Practical Exam	: 45

[45 Mark Distribution: Practical Note Book-05, Identification-05, Job/Expt.-05, Written-15, Viva-voce-15]

Intended Learning Outcomes (ILOs) The students will be able to-	**Course Content**	**Teaching-Learning Strategies**	**Assessment Strategies**
• Identify and use common hand tools.	Common hand tools	Lecture Discussion Demonstration Group work	Quiz Short answer Identification Demonstration performance Viva-voce Practical note book
• Explain the functions of different parts of engines • Use farm equipment's.	Different parts of IC engines.	Lecture Discussion Demonstration Group work	Quiz Short answer Identification Viva-voce Practical note book Demonstration performance
• Explain the different engine systems of tractor and power tiller.	Different engine systems of a tractor and a power tiller	Lecture Discussion Visual presentation	Quiz Short answer Viva-voce Practical note book

•Illustrate the technique of starting different types of engine.	Starting different types of internal combustion engine.	Lecture Discussion Demonstration Group work	Demonstration performance
• Explain and indentify the farm implements, machineries and dryers. •Describe the suitability of machines in various types of agricultural operations.	Different farm implements and pre & post harvest machinery. Components of seed drill machine, Rice Transplanted Reaper, Sprayer and Harvester.	Lecture Discussion Visual presentation	Quiz Short answer Identification Viva-voce Practical note book
• Explain and identify the functional components of power tiller and tractor.	Functional components of a power tiller and Tractor	Lecture Discussion Visual presentation	Quiz Short answer Identification Viva-voce Practical note book
• Operate and determine the capacity of centrifugal pump	Experiment on determination of centrifugal pump capacity.	Lecture Demonstration Group work	Demonstration performance
• Operate the power tiller and tractor.	Field operation of power tiller and tractor with different farm implements and measurement of their field performances.	Lecture Demonstration Group work	Demonstration performance
• Explain and identify the irrigation pumps suitable for the field.	Different irrigation water pump or lift.		
• Justify the field of farm machinery available for agricultural operations. • Observe modern agricultural machineries using in agricultural field.	Visit to ideal agricultural engineering farms, research institutes (BARI, BRRI and BADC) and farm machinery manufacturing industries.	Visiting the related organization	Report

Book References:

1. *J. M. Shippen, C. R. Ellin and C. H. Clover. Basic Farm Machinery, 3rd Edition, 1980, Published by Pergamon Press Oxford, UK*
2. *A. M. Michael. Irrigation: Theory and Practice, Reprint Edition, 1997, Vikas publishing house PA. Ltd. New Delhi. India.*
3. *"খামার যন্ত্রপাতি ম্যানুয়াল", 1988. Published by Department of Agricultural Extension, Ministry of Agriculture, Bangladesh*
4. *Study Guide, Lecture sheets and leaflets.*
5. *www.youtube.com/TheAutoPartsShop*