

SULTAN QABOOS UNIVERSITY COURSE OUTLINE PROGRAM: Agricultural Engineering

1.	Course Code	SWAE4203			
2.	Course Title	Principles of Machinery			
3.	Credits	3 CR, 12 CP, 6 ECTS			
4.	Pre-requisite Course(s)	SWAE3201+ CR*			
5.	Co-requisite Course(s)	N/A			
6.	Equivalent Course(s)	N/A			
7.	Incompatible Course(s)	N/A			
8.	Course Category	University Requirement	University Elective		
		College Requirement	College Elective		
		Department Requirement	Department Elective		
		Specialization Requirement	Specialization Elective		
		Other (specify):			
9.	Course Owner	College: CAMS	Department: SWAE		
10.	Course Type	Lecture	Lecture/Lab		
		Lecture/Seminar	Lecture/Studio		
		Lecture/Tutorial	Lecture/Lab/Tutorial or Seminar		
		Tutorial	Laboratory (Practical)		
		Field or Work Placement	Studio		
		Seminar	Internship		
		Workshop	Project		
11.	Language of Instruction	English			
10	C				

12. Course Description

This course focuses on exploring the functional systems and operational behavior of agricultural machinery. It will mainly cover the functional aspects of agricultural machinery, the power sources, the power transmission systems used and how the systems interact with the operational conditions. The machinery and equipment used for production operations such as tillage, harvesting, materials handling will be taken for discussion. The economics and management of farm machinery will also be covered in this course.

The objectives of this course are:

- 1. Mainly to introduce students the theory, functional and operational aspects of agricultural machinery equipment.
- 2. Introduce students about the design aspects of machinery starting from the fundamentals.
- 3. Introduce students the machinery use management and economics.

4. Practical sessions associated with the course are designed for students to engage and see by themselves at the machinery yard of the Agricultural Experimentation Station (AES) of SQU.

The course will enable students to learn fundamentals, thoery and hands-on practice.

13. Teaching/Learning Strategies

The students those who successfully complete this course will be capable of making good decisions on operational managements of agricultural machinery use. Students will be able to improve capabilities by continuous engagement in lecture sessions, quizzes, assignments, field and laboratory work.

There are weekly assessments on the progress, thus students will have to have continuous engagement. There are 4 quizzes, 4 assignments and 8 field lab reports in addition to the mid-semester and final exams. Continuous class participation is essential as course objectives are achieved weekly basis.

Students who studies this course will be able to improve their understanding on

1. Various functional systems and operational behavior of agricultural machinery and equipment (a, b, c, j, k)

2. How the engineering fundamentals and theory applied to operations of agricultural machinery and equipment under field conditions, (b, c, d, i)

3. How the economics and management functions integrate in the application of agricultural machinery to farming activities (f, h).

14. Assessment Components and Weight [%]					
Quizzes 10%	Practical 20%	Other (specify):			
Homework assignments 10%	Project				
\square In-term examination(s) 20%	Final examination 40%				
15. Grading Method					
A-F Scale Pass/Not passed					
16. Textbook(s) and Supplemental Material					
Class presentation materials; soft copies of presentations, lecture notes, Excel data sheets will be provided in advance.					

Text Book:

Liljedahl, J.P. Turnquist, D. Smith, and M. Hoki. 1989. Tractors and Their Power Units. Van Nostrand Reinhold. New York

17.	17. Matching Course Objectives with Program Outcomes and SQU Graduate Attributes					
	SQU Graduate Attributes					
A.	SQU graduates should be able to:	B.	SQU graduates possess	C.	SQU graduates should	
1. 2. 3.	apply the knowledge and skills relevant to the specialization communicate effectively and use information and communication technologies critically analyze complex information and present it in simple clear manner	 1. 2. 3. 4. 	interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully skills and motivation for independent learning and engagement in lifelong learning and research work ethics and positive values, and intellectual independence and autonomy teamwork skills and display potential leadership qualities		relish good citizenship qualities, be conscious of their national identity and be socially responsible, engage in community affairs and be mindful of contemporary issues.	
			leadership qualities			

#	Intended Student Learning Outcome	Relevant Program Outcome(s)	Applicable
	/Course Learning Objective		Attribute(s)
	Understand various functional systems and	a. An ability to apply knowledge of	ABET (a, b,
1.	operational behavior of agricultural machinery and	mathematics, science, and engineering.	C, J, K) SOLI A1 A3
	Understand and interprit how the engineering	b. An ability to design and conduct	ABET (b. c.
	fundamentals and theory applied to operations of	experiments, as well as an ability to analyze	d, i)
2.	agricultural machinery and equipment under field	and interpret data.	SQU A1, A2,
	conditions		A3
	Understand how the economics and management	c. An ability to design a system, component.	ABET (f. h)
3.	functions integrate in the application of agricultural	or process to meet desired needs.	SQU A1, A3
	machinery to farming activities.	-	
4.		d. An ability to function on multi-	
		disciplinary teams.	
5.		e. An ability to identify, formulate and solve	
		engineering problems.	
6.		f. An understanding of professional and ethical responsibility.	
7.		g. An ability to communicate effectively.	
		h. The broad education necessary to	
8.		understand the impact of engineering	
		solutions in a global and societal context.	

9.	i. A recognition of the need for, and an	
	ability to engage in life-long learning.	
10.	j. The knowledge of contemporary issues.	
	k. An ability to use the techniques, skills,	
11.	and modern engineering tools necessary for	
	engineering practice	
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16. Student Responsibilities

It is the student's responsibility to know and comply with all University Academic Regulations relevant to participation in this course. These regulations specifically include attendance requirement and students` academic code of conduct.

For attendance, it is the student's responsibility to be punctual and to attend all classes.

Students are expected to perform their work with honesty and avoid any academic misconduct, which is defined as the use of any dishonest or deceitful means to gain some academic advantage or benefit. This can take many forms, including but not limited to, the following: copying, plagiarism, collusion and forging documents. For full details, please refer to the Undergraduate Academic Regulations and to the Student Academic Misconduct Policy.

Additionally, this course requires that you:

Students should be aware of and abide by all University Regulations

1. Attendance: Class attendance is mandatory according to the University regulations.

2. No make-up exams will be given without a written medical excuse or prior permission from the instructor.

3. Students are responsible for all materials covered in the class whether presented orally during lectures or assigned from the text.

4. No class assignment of any student will be graded once the same assignment is corrected and returned to the class.

Assignment and Lab report submissions: within one week

Examinations: Class examinations will cover class material, homework assignments, and assigned readings.

COURSE INFORMATION					
Course Code SWAE4203 Course Title Principles of Machinery					
Semester/Year Fall Section(s) 10/11					
Day, Time, and PlaceAs in master timetable. Lab will be AGR0016 and Agricultural Experimentation Station (A of SQU.					
Course Coordinator Dr. Hemanatha Jayasuriya					
Office Location	Room 232	Office Hours	As mentioned in the timetable		
Office Tel. Ext. 1223 Email hemjay@squ.edu.om					

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Tentative Schedule					
Week	Lecture #	Topic/Material to be covered	Assessment		
1	1	Functional analysis of agricultural machinery, basic processes and process	Lab #1		
		diagrams			
		Lab #1 Introduction to agricultural machinery and their functional behaviors			
2	2.1	Power sources and arrangements for operations of agricultural machinery	Assignment #1		
3	2.2	Power sources and arrangements for operations of agricultural machinery	Quiz #1		
4	3.1	Power transmission systems			
5	3.2	Power transmission systems	Assignment #2		
		Lab #2 Power transmission systems	Lab #2		
6	4	Hitching and mechanics for the tractor stability	Quiz #2		
		Lab #3 Tillage machinery; hitching and operations	Lab #3		
7	5.1	Traction and field operations			
8	5.2	Traction and field operations	Mid-semester exam		
9	6.1	Tillage machinery	Design project ctd.		
10	6.2	Tillage machinery	Assignment #3		
11	7	Crop planting machinery	Quiz #3		
		Lab #4 Planting machinery	Lab #4		
12	8	Chemical and fertilizer application machinery	Lab #5		
		Lab #5Application of chemicals and fertilizers			
13	9	Grain harvesting machinery	Assignment #4		
		Lab #6 Harvesting Machinery	Lab #6		
14	10	Conveying of agricultural materials	Quiz #4		
		Lab #7 Material handling and conveying	Lab #7		
15	11	Machinery management and economics	Lab #8		
		Lab #8 Machinery management			
16			Final Exam		
17					

APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS							
Section	Instructor	Day, Time, and Place	Office Location and Extension	Email	Office Hours		

APPENDIX B: ADDITIONAL INFORMATION