SULTAN QABOOS UNIVERSITY
COURSE OUTLINE
PROGRAM: Soils, Water & Agricultural Engineering

1. Course Code	SWAE3201	
2. Course Title	Power Units	
3. Credits	3 CR, 12 CP, 8 ECTS	
4. Pre-requisite Course(s)	SWAE2001 or SWAE2002 or MEIE2129	
5. Co-requisite Course(s)	N/A	
6. Equivalent Course(s)	None	
7. Incompatible Course(s)	None	
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	

12. Course Description

Mechanization of agriculture is to make the farm work less arduous and to improve the quality of field operations, providing better soil environment for seed germination and plant growth. Modern tractors play an important role in achieving these goals. The agricultural tractor is basically a mobile machine for pulling other mobile machines. It is a major source of power for agricultural implements in a mechanized farm. This course deals with tractor as a main source of farm power and this power comes from internal combustion engines. So the course will cover details about internal combustion engine as source of tractor power, tractor-implement performance, power transmission, hydraulic control system and trouble shootings of IC engine and overall performance of tractor. The course will cover fundamental of other source of farm power like electric motor as a source of power for irrigation pump.

13. Teaching/Learning Strategies

14. Assessment Components and Weight [%]

☒ Quizzes 20%	☒ Practical 10%	☐ Other (specify):
☒ Homework assignments 10%	☐ Project	
☒ In-term examination(s) 20%	☒ Final examination 40%	

15. Grading Method

☒ A-F Scale ☐ Pass/Not passed

16. Textbook(s) and Supplemental Material

- Engine and Tractor Power by Carrol E. Goering, 1992 (3rd edition), American Society of Agricultural Engineering.

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. apply the knowledge and skills relevant to the specialization 2. communicate effectively and use information and communication technologies 3. critically analyze complex information and present it in simple clear manner	1. interpersonal communication skills and alignment with culture of international labour market to assist them in practical life and in living successfully 2. skills and motivation for independent learning and engagement in lifelong learning and research 3. work ethics and positive values, and intellectual independence and autonomy 4. 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.

#	Intended Student Learning Outcome /Course Learning Objective	Relevant Program Outcome(s)	Applicable Attribute(s)
1.	Give the student a fundamental knowledge of agricultural tractors and their power sources and outlets	An ability to apply knowledge of mathematics, science, and engineering	A1, A3
2.	Equip students with skills for selection, safe utilization and management of farm power and machinery sources	An ability to design and conduct experiments, as well as an ability to analyze and interpret data. - An understanding of professional and ethical responsibility - The knowledge of contemporary issues.	A1,A2,A3,B1, C
3.	Introduce students to the various tractor components, systems, and their mode of operation	An ability to apply knowledge of mathematics, science, and engineering	A1, A3
4.	Introduce students to internal combustion engines and their working principle	An ability to apply knowledge of mathematics, science, and engineering	A1,A3
5.	Introduce students to power transfer mechanisms in tractors from engine to the wheels and other outlets, such as, gear box, differential, and final drive	An ability to apply knowledge of mathematics, science, and engineering An ability to design and conduct experiments, as well as an ability to analyze and interpret data.	A1,A2,A3
6.	Introduce students to principles of weight transfer, traction, hitching and mechanics of the tractor chassis	An ability to apply knowledge of mathematics, science, and engineering An ability to design and conduct experiments, as well as an ability to analyze and interpret data. An ability to identify, formulate and solve engineering problem	A1,A2,A3
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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:

COURSE INFORMATION

Course Code	SWAE3201	**Course Title**	Power Units
Semester/ Year	Spring/2016	**Section(s)**	10
Day, Time, and Place	Sun. 10:11:50 (CMT/A01) and Thu. 10:00-11:50 (AGR/0069)		

Course Coordinator	Talal Al-Shikaili		
Office Location	Room # 234, CAMS 2nd floor	**Office Hours**	Mon. & Tue. 10:00-11:50
Office Tel. Ext.	1212	**Email**	talals@squ.edu.om

Tentative Schedule

Week	Lecture #	Topic/Material to be covered	Assessment
1	1	Sources of Farm Power, Origin and development of tractor	
2	2	Tractor component and IC engine terminology	
3	3	Tractor mechanics	Quiz 1
4	4	Torque power and efficiency of IC engine	
5	5	Working principles of 2-stroke and 4 stroke cycle engines	Assignmet 1
6	6	Fuel supply systems of SI engine	Quiz 2
7	7	Fuel supply systems of CI engine	
8	8	Ignition Systems of SI engine	Midterm Exam
9	9	Engine lubrication system	
10	10	Engine cooling systems and trouble shooting	Quiz 3
11	11	Power transmission systems of tractor	Assignment 2
12	12	Weight transfer, Traction, Hitching and mechanics of the tractor chassis	
13	13	Tractor implement matching and operation	Quiz 4
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APPENDIX A: INSTRUCTORS OF MULTIPLE SECTIONS

Section	Instructor	Day, Time, and Place	Office Location and Extension	Email	Office Hours

APPENDIX B: ADDITIONAL INFORMATION