



UNIVERSITI TEKNOLOGI MARA

AGR218: BASIC AGRICULTURAL ENGINEERING

Course Name (English)	BASIC AGRICULTURAL ENGINEERING APPROVED
Course Code	AGR218
MQF Credit	3
Course Description	This is an introductory course on farm mechanization. Student will explain the construction and operation of various engine system, operate farm tractor mounted with various implements and explain the importance of maintenance.
Teaching Methodologies	Lectures, Lab Work, Self-directed Learning
CLO	CLO1 Identify and used various tools in the farm workshop such as spanners, screwdrivers, torque wrench, feeler gauge, etc CLO2 Explain the construction and operation of various engine systems such as cooling, lubrication, transmission, fuel, electrical, etc and their maintenance. CLO3 Operation the farm tractor with various implements mounted to it. CLO4 Make decision in selecting and matching equipment to tractor.
Pre-Requisite Courses	No course recommendations
Topics	
1. The Farm Tractor 1.1) Introduction to farm tractor 1.2) The need for farm tractor 1.3) Types of tractor 1.4) Safety rules in using tractor	
2. Engine Construction 2.1) Heat engine, internal combustion engine, 4-stroke engine and 2-stroke engine 2.2) Comparison between petrol and diesel engine 2.3) Engine construction 2.4) Valve timing, valve lead, lag and overlap 2.5) Valve clearance	
3. Engine Lubrication 3.1) Basic functions of lubricants 3.2) Forced lubrication system	
4. Engine Cooling 4.1) The need for cooling 4.2) Air and water cooling	
5. Fuel Systems 5.1) Petrol fuel system 5.2) Diesel fuel system	
6. Electrical Systems 6.1) Engine cranking 6.2) Battery charging 6.3) Coil ignition 6.4) Maintenance of electrical system	
7. Power Transmission 7.1) The need for speed reduction and torque multiplication	
8. Power-take-off, Tractor hydraulics and Three-point linkages 8.1) Types of PTO 8.2) Tractor hydraulics and three point linkage 8.3) Operation of a basic hydraulic system 8.4) 4. Automatic draft control and position control	

9. Maintenance of Agricultural Machinery 9.1) Logbook 9.2) Maintenance schedule
10. Cultivation and Seedbed Preparation 10.1) Objective of tillage and cultivation 10.2) Disc plough, rotovator, harrow and ridgers
11. Irrigation 11.1) Type of irrigation
12. Crop Production Equipment 12.1) Objective and type of planters 12.2) General purpose of seed drill 12.3) Machineries for fertilizer application 12.4) Combine drill, spinning disc broadcaster and full width distributors; maintenance 12.5) Spraying equipment
13. Machine Capacity 13.1) Factors influence machine capacity 13.2) Methods of measure capacity
14. Machine Power Requirement 14.1) Methods of measuring power requirement

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment	Assessment Type	Assessment Description	% of Total Mark	CLO
	Lab Exercise	Laboratory Practical (Report)	20%	CLO1 , CLO2 , CLO3
	Quiz	Quiz 1	5%	CLO1 , CLO2
	Quiz	Quiz 2	5%	CLO2 , CLO3
	Test	Test 1	15%	CLO1 , CLO2
	Test	Test 2	15%	CLO2 , CLO3 , CLO4

Reading List	Reference Book Resources	<ul style="list-style-type: none"> • Culpin, C 1992, <i>Farm Machinery</i>, 9 Ed., Black Publishers Hunt, D.R. 1999 Farm Power M • Pulkrabek W.W 1997, <i>Engineering Fundamentals of the Internal Combustion Engine</i>, 1 Ed., Prentice Hall United State of America [ISBN: 0137444591] • Wendell Bowers 1975, <i>Fundamentals of Machine Operation (FMO) Machinery Management</i>, 1 Ed., John Deere Service Publications United State of America
Article/Paper List	This Course does not have any article/paper resources	
Other References	This Course does not have any other resources	