

Course Syllabus First Semester, Academic Year 2024

Course name: Farm Engines I

1. Faculty of Agriculture at Kamphaeng Saen Department of Farm Mechanics

2. Course code: 02027221 Credit: 3(2-3-6) *Pre:* -

3. Instructor team:

L.			
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4. Providing students with access to and advice outside of class hours:

Working days During official hours, except during teaching periods or when on official business outside of the premises. In case of emergency, students can contact us via Line group or Mobile phone.

5. Course Objectives

- 5.1 All students know about mechanical tools, engines, components and functions of engines.
- 5.2 All students understand the operation and important systems of 2-stroke, 4-stroke, gasoline and diesel engines in agriculture.
- 5.3 All students can disassemble, assemble and modify agricultural engines as demonstrated by the instructor.

6. Course Description

Engine components and their functions, gasoline engine, diesel engine, practical operation and usage of farm engine.

7. Program Learning Outcomes: PLOs (8PLOs for the revised curriculum year 2022)

PLOs	Knowledge	Specific skills	Attitude
PLO3: Be able to select	Principles of	-Disassemble and assemble	- Taking care of the safety of
agricultural machinery correctly	operation and use	components, functions,	everyone
and appropriately with the	of agricultural	operations, adjustment, use and	- Being responsible and
objectives and goals of the	power engines	maintenance of agricultural	diligent in practice
desired results in a	correctly,	power engines correctly and	- Following up on news and
comprehensive manner	appropriately and	safely.	academic information
	comprehensively	-Select the power source and	- Having a passion profession
		adjust the agricultural engine.	and the institution
PLO6: Be able to choose		-Have skills in using IT in	- Value and love to seek
information technology (IT) to		agriculture.	knowledge in IT
operate tasks appropriately			
PLO7: Be able to use Thai and		- Use relevant technical terms	
English language on duty for		correctly in both Thai and	
listening, speaking, reading and		English	

writing appropriately.	- Write various r assigned	eports that are
PLO8: Display a willingness to be responsible, disciplined, diligent, patient, and honest, human relations in working with others, be a good leader and follower and have a relationship with the organization.	-Be a good leade -Have problem-s	er and follower solving skills - Be responsible and disciplined in your work - Be diligent and patient - Be punctual - Be honest

8. Course Learning Outcomes: CLOs and Method of Learning Assessment

Course Learning Outcomes: CLOs	Method of Learning Assessment	PLOs
CLO1: Explain the function of the main components of the engine.	1. Pass all chapter lectures and/or homework assignments by using appropriate language (PLO7) and information	PLO3 PLO6
CLO2: Explain the operational principle of diesel, gasoline, 2-stroke and 4-stroke engines.	 technology (IT) (PLO6). 2. Submit assigned assignments on time and completely by using appropriate language (PLO7) and information technology (IT) (PLO6). 	PLO7
CLO3: Select and use fastening devices and tools correctly and safely.	 Evaluate student skills and provide advice during the operation. Conduct an operation test when each operation is 	PLO3 PLO6 PLO7
CLO4: Be able to disassemble, assemble, adjust, and maintain engines.	completed, and all students must pass the test with a score of at least 60% (<i>if they fail, they must retake the test until</i> <i>they pass at least 60%</i>).	
CLO5: Students are responsible, moral, ethical, disciplined, punctual, honest, and responsible for themselves and society (PLO8)	5. Attend classes, be attentive to learning and laboratory, and submit assigned work on time.	PLO8
CLO6: Have skills in working with others as a good leader and member and can adapt to various situations appropriately.	6. Evaluate group working skills and provide advice on how to interact well in group work.	

9. Academic achievement measurement:

9.1 Students must attend both lectures and practical classes for at least 80 percent of the total class time.

9.2 Assessment criteria and academic achievement measurement

9.2.1 Lecture Section	1. Single cylinder gasoline engine test					
	2. Single cylinder diesel engine test	10%				
	3. Multi-cylinder engine test	15%				
9.2.2 Laboratory Section	1. Practical skills test of single cylinder gasoline engine	10%				
	2. Practical skills test of single cylinder diesel engine	10%				
	3. Practical skills test of multi-cylinder engine	10%				
	(students must pass the test with a score of at least 60%, if they					
	fail, they must retake the test until they pass at least 60%).					
9.2.3 Research/Laboratory	1. End-of-Chapter Study Notes	10%				
Report and lecture note	2. Laboratory Report	10%				
9.2.4 Interest in learning, determination to perform, responsibility and teamwork.						

Total

Score level	>80	75-79	70-74	65-69	60-64	55-59	50-54	<50
Grade	Α	B+	В	C+	С	D+	D	F

<u>100%</u>

10. Documents to read:

10.1 Borpit Tangwongkit and Ratana Tangwongkit. 2010. Agricultural equipment and machinery.2nd ed. Kasetsart University Press. Bangkok. 190 pages. (e-book from <u>www.mebmarket.com</u>)



1.02 Books, research reports, articles, and other relevant and up-to-date documents as assigned.

11. Evaluation of teaching results:

From the student's questionnaire, students must evaluate their teaching results at www.kps.ku.ac.th (go to Students, Teaching System) with the university's teaching evaluation form before the mid-term and final exams.

12. Review to improve teaching methods and teaching systems:

□ No review because students

Reviewed by reviewing Student evaluation results and examination results

□ Not revised.....

☑ Revised to be consistent with The results of student evaluation and the results of the review include, There should be a method for students to evaluate teaching in the system more, as only 14 out of 33 students (42.42%) evaluated in the system, with no suggestions for improving teaching methods and the teaching system. Therefore, suggestions for consideration for improvement are unknown.

13. Teaching improvement from teaching evaluation results:

- \square No teaching evaluation
- ✓ Teaching evaluation, the average score of the previous evaluation was 4.69 (from 14 out of 33 students (42.42%) who participated in the evaluation system, with no suggestions for improving teaching.

□ No improvement,

 \square Improvements as follows How to have students evaluate teaching in the system

more to get suggestions for improving teaching in this semester

14. Schedule of activities related to teaching and learning (see Table 1)

Signature.....

(Assoc.Prof. Pongsak Chontanasawat)

18 June 2024

No Lesson LLOs L-Level **Teaching/Learning method** Assessment Instructor **CLOs PLOs** Lesson 1: Safety 1.1 Students are aware of safety in - Clarify and agree on details of learning Pongsak K: Ap CLO1 PLO5 1. Lecture: S: Manipulation CLO3 PLO6 in Technical technical work. outcomes (LLOs and CLOs), teaching - End of class study notes Ratana CLO5 PLO7 A: Responding Work methods, assessment and measurement of - End of chapter lecture Thawatchai CLO6 PLO8 learning outcomes via Course Syllabus which exam is uploaded on Edu-Farm. (includes Chapters 1, 2, - All teaching materials will be uploaded on and 3) Edu-farm platform -Laboratory: -Lectures, slides, video clips, Q&A, and - Evaluate students' 2.1 Students use tools in engine Lesson 2: Shop end-of-class notes practical skills using mechanics correctly and safely. Tools Chapter 1: Safety in Technical Work Marking Schemes and 2.2 Students use fastening correctly. and Chapter 2 Tools and Fastening Equipment" provide guidance during Fastenin -Laboratory: by dividing students into groups the practice gs - Submit laboratory to perform 3 operations in rotation until all 3 report of Chapters 1 and operations are completed, with all students being able to perform themself, including: 2 on Edu-Farm before 1) Know the safety symbols and be able to the next lesson perform mechanical work safely without - The content is included accidents. in the laboratory test of 2) Know and use mechanical tools correctly. chapters 1, 2 and 3, 3) Know and use equipment used to hold parts which students must of mechanical work correctly. score more than 60% (students must pass the test with a score of at least 60%, if they fail, they must retake the test until they pass at least 60%). Lesson 3: Single Chapter 3 There are 4 sessions (2nd-5th CLO2 PLO5 3.1. Able to explain the operational 2 Ratana CLO4 principle of a 4-stroke engine. PLO6 Cvlinder session) Lecture: Thawatchai CLO5 PLO7 3.2 Able to explain the operational Gasoline - Lecture, slide media, video clips, questions - End of class study notes CLO6 PLO8 principle of a 2-stroke engine. Engine and notes at the end of the class - End of chapter lecture 3.1 Operational 3.3. Able to explain the function of the Chapter 3 Single cylinder gasoline engine exam important components of a single-Principle of 4-3.1 Operational principle of 4-stroke and 2-(includes Chapters 1, 2, Stroke and 2cylinder gasoline engine. stroke engines and 3) 3.4. Able to disassemble important parts 3.2 Parts and functions of single cylinder Stroke Engines -Laboratory: 3.2 Parts and of a single-cylinder gasoline engine gasoline engines - Evaluate students' 3.3 Fuel system of single cylinder gasoline Functions of practical skills using Marking Schemes and Single Cylinder engine Gasoline 3.4 Ignition system of single cylinder gasoline provide guidance during

Table 1: Schedule of activities related to teaching and learning of 02027221 subject, 1st semester, 2024 academic year

3	Engines Lesson 3: Single Cylinder Gasoline Engine 3.3 Fuel system of a single cylinder gasoline engine Lesson 3: Single Cylinder Gasoline Engine 3.4 Ignition system of a single cylinder gasoline engine Lesson 3: Single Cylinder Gasoline Engine 3.5 Lubrication system of a single cylinder gasoline engine 3.6 Cooling system of a single cylinder gasoline engine	 3.5. Able to explain the fuel system of a single cylinder gasoline engine. 3.6. Able to explain the important components of a single cylinder gasoline engine fuel system. 3.7. Able to disassemble important parts of a single cylinder gasoline engine fuel system. 3.8. Able to explain the functions and operating principles of the ignition system of a single cylinder gasoline engine. 3.9. Able to explain the important components of the ignition system of a single cylinder gasoline engine. 3.10. Able to disassemble important parts of the ignition system of a single cylinder gasoline engine. 3.11 Able to explain the functions and operating principles of the lubrication system and cooling system of a single cylinder gasoline engine. 3.12 Able to explain the important components of the lubrication system and cooling system of a single cylinder gasoline engine. 3.13 Able to disassemble important parts of the lubrication system of a single cylinder gasoline engine. 3.14 Able to assemble various parts of the engine that have been disassembled to study the various systems to create a complete single cylinder gasoline engine. 3.15 Able to tuning a single cylinder gasoline engine. 		engine 3.5 Lubrication system of single cylinder gasoline engine 3.6 Cooling system of single cylinder gasoline engine -Laboratory: by dividing students into small groups of 2-3 people and giving each group a set of mechanical tools and a single cylinder gasoline engine which are used to laboratory practice about the content of a single cylinder gasoline engine by disassembling important parts of the system to study on the functions, operations and adjustments, which include: -Parts and functions -Principles of a 4-stroke engine -Fuel system -Iubrication system -Cooling system When all systems have been studied, students assemble the parts of a single- cylinder gasoline engine that have been removed to study the various systems to create a complete single-cylinder gasoline engine. All students must work together and help each other until they understand and can disassemble and assemble the engine. All students who achieve the learning outcome assessment must pass the practical test of at least 60% and can start the engine adjustment/tuning of a single-cylinder gasoline engine before passing.	the practice - Submit laboratory report of Chapters 3 (4 times) on Edu-Farm before the next lesson - The content is included in the laboratory test of chapters 1, 2 and 3, which students must score more than 60% - Test of engine starting and adjusting/tuning a single cylinder gasoline engine (students must pass the test with a score of at least 60%, if they fail, they must retake the test until they pass at least 60%).			
6	-1st lecture	gasoline engine. e exam (Chapter 1-3)		-1st practical exam Single cylinder gasoline engine -	must get at least 60%			
7	Lesson 4: Single- cylinder	4.1. Able to explain the operational principle of a single cylinder diesel	K: Ap S:	Chapter 4 There are 3 sessions (7th-9th session)	Lecture:	Sombat Nonthawat	CLO2 CLO4	PLO5 PLO6

	diesel engine	engine.	Manipulation	- Lecture, slides, video clips, Q&A and end of	- End of class study notes	Thawatchai	CLO5	PLO7
	4.1 Operational	4.2. Able to explain the function of the	A:	class notes	- End of chapter lecture		CLO6	PLO8
	principle, parts	important components of a single	Responding	Chapter 4: Single-cylinder diesel engine	exam			
	and important	cylinder diesel engine.		4.1 Operational principle, important parts and	(includes Chapters 4)			
	systems of	4.3. Students can disassemble important		systems of single cylinder diesel engines	-Laboratory:			
	single-cylinder	parts of a single cylinder		4.2 Fuel system of single cylinder diesel	- Evaluate students'			
	diesel engine			engines	practical skills using			
8	Lesson 4: Single-	4.4 Able to explain the operational		4.3 Lubrication system of single cylinder	Marking Schemes and			
	cylinder diesel	principles of the fuel system of a single		diesel engines	provide guidance during			
	engine	cylinder diesel engine.		4.4 Cooling system of single cylinder diesel	the practice			
	4.2 Fuel system of	4.5. Able to explain the functions of the		engines	- Submit laboratory			
	single-cylinder	important components of the fuel		- Operation: Divide students into small groups	report of Chapters 4 (3			
	diesel engine	system of a single cylinder diesel		of 5-6 people and provide each group with a	times) on Edu-Farm			
		engine.		set of shop tools and a single-cylinder diesel	before the next lesson			
		4.6 Able to disassemble important fuel		engine which are used to laboratory practice	- The content is included			
		system components of a single		about the content of a single cylinder diesel	in the laboratory test of			
		cylinder diesel engine.		engine by disassembling important parts of the	chapters 4, which			
9	Lesson 4: Single-	4.7. Able to explain the working		system to study on the functions, operations	students must score more			
	cylinder diesel	principles of the lubrication system		and adjustments, which include:	than 60%			
	engine	and cooling system of a single cylinder		-Parts and Functions	- Able to set Valve			
	4.3 Lubrication of	diesel engine.		-Diesel Engine Operation Principles	Clearance			
	single-cylinder	4.8. Able to explain the functions of the		-Fuel System	- Able to disassemble			
	diesel engine	important components of the		-Lubrication System	diesel fuel injector			
	4.4 Cooling	lubrication system and cooling system		-Cooling System	(students must pass the			
	system of	of a single cylinder diesel engine.		when all systems have been studied,	test with a score of at			
	single-cylinder	4.9 Able to disassemble important		students assemble the parts of a single-	least 60%, if they fail,			
	diesel engine	lubrication and cooling system		cylinder diesel engine that have been removed	they must retake the test			
		components of single cylinder diesel		to study the systems to create a complete	600%			
		engines.		All students must work together and	00%).			
		4.10 Able to assemble disassembled		halp each other until they understand and can				
		sustame to greate a complete single		disassemble and assemble the engine All				
		systems to create a complete single		students must pass the practical exam at least				
		4 11 Able to be tuning a single cylinder		60% and the exam to set the Valve Clearance				
		diesel engine		and disassemble the diesel fuel injector				
		dieser engine.		Therefore, they will pass the learning outcome				
				assessment.				
10	- 2	nd lecture exam (Chapter 4)	- 2	nd practical exam Single cylinder diesel engine mus	t get not less than 60%.	I	1	
11	Lesson 5: Multi-	5.1 Able to explain the operational	K: Ap	Chapter 5 has 4 sessions (11th-14th session)		Vithawas	CLO2	PLO2
	cylinder	principle of multi-cylinder engine.	S: _	- Lecture, slides, video clips, Q&A and end	บรรยาย	Chuti	CLO4	PLO6
	Engine	5.2 Students can disassemble important	Manipulation	of class notes	- บันทึกการเรียนท้ายชั่วโมงเรียบ	Thawatchai	CLO5	PLO7
	5.1 Working	parts of multi-cylinder engine.	A:	Chapter 5: multi-cylinder engines	-สอบกาลบุรรยายท้ายบุษาที่ 5		CLO6	PLO8
	Principle of		Responding	5.1 Operational principle of multi-cylinder	-10 TH HI TI TO LON IOT MM γ			

12 13 14	Multi-cylinder Engine Lesson 5: Multi- Cylinder Engines 5.2 Important Parts and Functions of a Multi-Cylinder Engines Lesson 5: Multi- Cylinder Engines 5.3 Starting and Electrical Systems of a Multi-Cylinder Engines Lesson 5: Multi- Cylinder Engines 5.4 Fuel System of Multi- Cylinder Engine 5.5 Lubrication System of Multi-Cylinder Engine 5.6 Cooling System of Multi-Cylinder Engine	 5.3 Able to explain the functions of important components of a multicylinder engine. 5.4 Able to disassemble important parts of a multi-cylinder engine. 5.5 Able to explain the functions and principles of the starting system and electrical system of a multi-cylinder engine. 5.6 Able to disassemble important parts of the starting system and electrical system of a multi-cylinder engine. 5.7 Able to explain the functions and principles of the fuel, lubrication and cooling systems of multi-cylinder engines. 5.8 Abke to disassemble important parts of the fuel, lubrication and cooling systems of multi-cylinder engines. 5.9 Able to assemble disassembled engine parts to study various systems to create a complete multi-cylinder engine. 5.10 Able to tune multi-cylinder engines. 	engine 5.2 Important parts and functions of multi- cylinder engine 5.3 Starting system and electrical system of multi-cylinder engine 5.4 Fuel system of multi-cylinder engine 5.5 Lubrication system of multi-cylinder engine 5.6 Cooling system of multi-cylinder engine •Operation: Divide students into small group of 8-10 people and provide each group with a set of shop tools and a multi-cylinder engine which are used to laboratory practice about th content of a multi-cylinder engine by disassembling important parts of the system to study on the functions, operations and Use it to learn the operation from start to finish on the content of a multi-cylinder engine by disassembling important parts of the various systems. •Parts and Functions •Operation Principle of Multi-Cylinder Engine -Fuel System •Ignition System •Lubrication System •Cooling System When all systems have been studied, students assemble the parts of Multi-Cylinder Engine that have been removed to study the systems to create a complete Multi-Cylinder Engine. All students must work together and help each other until they understand and can disassemble and assemble the engine. All students must pass the practical exam at least 60%. Therefore, they will pass the learning	ปฏิบัติการ -ประเมินทักษะการปฏิบัติงานนิสิต โดยใช้ Marking Schemes และแนะนำในระหว่างการ ปฏิบัติการ -ส่งรายงานผลการปฏิบัติการทุกครั้ง (รวม 4 ครั้ง) บน Edu-Farm ก่อนการเรียนครั้งต่อไป - สอยปฏิบัติการ (แล็ปกริ้ง) บทที่ 5 โดยนิสิตต้องสอบให้ได้ไม่น้อยกว่า 60%
15	- 3rd le	cture exam (Chapter 5)	outcome assessment 3rd practical exam, multi-cylinder engine, must get r	ot less than 60%.
15	- 51010	court chum (Chupter c)	ora practical chain, mani-cynnact engine, must get i	VV AND VARMAL UV / VI