



Course Syllabus

First Semester, Academic year 2024

- 1. Faculty of Agriculture at Kamphaeng Saen Department of Farm Mechanics**
- 2. Course code: 02027231 Course name: Principle of**
Credit: 3(2-3-6) Farmstead Irrigation
Pre: -
- 3. Instructor team:**
- | | |
|-----------------------------------|----------------------------------|
| Assoc.Prof. Pongsak Chontanasawat | E-mail: agrpoc@ku.ac.th |
| Assis. Prof. Vitawas Yomchinda | E-mail: vitawas@sut.ac.th |
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| Mr. Thawatchai Koedsuk | E-mail: thawatchai.koed@ku.ac.th |

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: +669-2782-2259.

5. Course objective

5.1 Students have knowledge and understanding of the relationship between plants, soil, water, and climate. They are familiar with various methods of irrigating plants and can choose appropriate irrigation methods and equipment that suit the plants and the conditions of the cultivation area.

5.2 Students are able to calculate the water requirements of plants, design and plan irrigation systems, determine the quantity of water and the timing for irrigation, and measure the efficiency of drip and sprinkler irrigation systems.

5.3 Students understand the principles of agricultural drainage systems and methods, and are capable of planning and selecting suitable drainage systems for farms based on the agricultural area's conditions.

6. Course Description

Importance of water to agriculture, agricultural water sources, water cycle and relationships among soil, water, plant and climate, water requirement, relevant factors to water management and water requirement, water schedule, surface irrigation, pipe irrigation, pump and pump system design, efficiency of irrigation, rain management and usage, yield responses to water drainage and design, an application of computer in farm water management.

7. Program Learning Outcomes: PLOs

PLOs	Knowledge	Specific skills	Attitude
PLO4: Be able to select plant watering system technology, agricultural greenhouse, and new technology correctly and appropriate to the type of plants, animals, and environment.	<ul style="list-style-type: none"> -Agricultural Irrigation and Drainage Systems -Principles of the Relationship Between Plants, Water, and Soil -Types of Plant Irrigation Systems - Principles of Design and Planning of Irrigation Systems for Plants - Agricultural Drainage 	<ul style="list-style-type: none"> - Take advantage of the relationship between plants, water, soil, and climate for appropriate plant irrigation. -Familiar with the equipment and components of various plant irrigation systems. -Able to install different types of plant irrigation systems in crop fields. 	<ul style="list-style-type: none"> -Be responsible and diligent in practice. -Punctuality. -Honesty. -Ability to work collaboratively with others. -Keep up-to-date with relevant academic news and information.
PLO6: Be able to choose information technology (IT) to operate tasks appropriately		<ul style="list-style-type: none"> -Have skills in using IT in agriculture. 	
PLO7: Be able to use Thai and English language on duty for listening, speaking, reading and writing appropriately.		<ul style="list-style-type: none"> - Use relevant technical terms correctly in both Thai and English - Write various reports that are assigned 	
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.		<ul style="list-style-type: none"> -Be a good leader and follower -Have problem-solving skills 	<ul style="list-style-type: none"> -Be responsible and disciplined in your work - Be diligent and patient - Be punctual - Be honest

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

Course Learning Outcomes: CLOs	Assessment Method	PLOs
CLO1: Able to explain the theories and principles of the water cycle, the relationships among soil, water, plants, and climate, and the methods of irrigation and drainage in crop fields.	<ol style="list-style-type: none"> 1. Written Examinations to assess learning outcomes through quizzes, mid-term exams, and final exams. 2. Laboratory Reports to document practical work. 	PLO4 PLO6 PLO7

CLO2: Able to calculate crop water requirements and schedule irrigation appropriately. CLO3: Able to select suitable irrigation methods and equipment to match the site conditions and crop types. CLO4: Able to plan and manage irrigation and drainage for crop fields so that both systems are appropriate for the specific field conditions.	3. Assessment of Student Skills and providing guidance during practical sessions. 4. Quizzes after completing each lesson to reinforce and assess understanding. 5. Individual and Group Reports to assess both personal and collaborative work. 6. Research and Presentations in class to evaluate independent learning and communication skills.	
CLO5: Students are responsible, moral, ethical, disciplined, punctual, honest, and responsible towards themselves and society.	7. Attend classes and be attentive to learning and practice and submit assigned work on time.	PLO8
CLO6: Have the skills to work with others as a good leader and member and can adapt to different situations appropriately.	8. Evaluate group work skills and provide advice on how to interact well in group work.	

9. Assessment of Learning Achievement

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 Quizzes:	15%
9.2.2 Mid-term Exam:	15%
9.2.3 Final Exam:	20%
9.2.4 Homework and Practical Work:	20%
9.2.5 Self-Study Report (Individual/Group Work):	20%
9.2.6 Regular Class Attendance and Behavior:	10%
Total	100%

Grading scale	>=80	75-79	70-74	65-69	60-64	55-59	50-54	<50
Grad	A	B+	B	C+	C	D+	D	F

10. Reading Materials (Supplementary Documents)

10.1 Viboon Boonyashorokul. 1986. Pumps and Water Pumping Systems. Department of Irrigation Engineering, Faculty of Engineering, Kasetsart University.

10.2 Sithiporn Sukkasem. 1993. Introduction to Agricultural Meteorology. Department of Soil Science and Conservation, Faculty of Agriculture, Chiang Mai University. Principles of Drip Irrigation.

10.3 Sontaree Yingchachawan. 1992. Hydrology in the soil-plant system. Department of Soil Science, Kasetsart University.

10.4 Viboon Boonyashorokul. 1986. Principal of Irrigation, Faculty of Engineering, Kasetsart University.

10.5 Montree Kamchuu. 1982. Department of Irrigation Engineering, Faculty of Engineering, Kasetsart University.

10.6A. Benami and A. Ofen. 1984. Irrigation Engineering. Faculty of Agricultural Engineering

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 of the Improvement of Teaching Methods and System

- ☐ There is no review because.....
- ☒ Review Process Based on Student Evaluation Results and Reassessment Results
 - ☐ No Adjustments or Improvements Made Because.....
 - ☒ Improvements to Address Time Constraints:
 - To address the feedback regarding the compressed learning schedule, the following improvements are being considered:
 - Adjusting Course Schedule: In future terms, the course may be structured to allow for a more balanced delivery of content, ensuring that lessons are not rushed.
 - Supplementary Learning Materials: Additional resources, such as online tutorials or recorded lessons, may be provided to help students review content at their own pace, especially for topics that were taught in a shortened time frame.
 - Extended Office Hours: To give students more time for individual clarification, extended office hours or online consultation sessions may be implemented.

13. Improvements in Teaching Based on Teaching Evaluation Results

- ☐ No Improvements Made.....
- ☒ Teaching Evaluation Results
 - The average score from the most recent teaching evaluation is 4.48. A total of 32 students out of 38 (84.21%) participated in the evaluation.
 - Key Feedback and Suggestions for Improvement:
 - Condensed Class Schedule: Students expressed concerns that the class schedule was too compressed, which impacted their ability to absorb the content thoroughly.
- ☐ No Improvements Made.....
- ☒ Planned Teaching Adjustments
 - Because last term was shortened by multiple public holidays, lecture times were compressed and the material had to be delivered rapidly. To prevent a repeat of that “rush-through” feeling, the instructor will implement the following improvements:
 - 1. Re-balanced Weekly Schedule
 - The lesson timetable has been redesigned so that each topic now has a realistic amount of class time.
 - Core concepts are distributed more evenly across the semester, reducing information overload in any single week.
 - 2. Make-up Sessions for Lost Holidays
 - When a class date falls on an official holiday, a make-up session will be scheduled in advance (e.g., an evening slot or weekend morning agreed upon with students).

- Make-up meetings will follow the same format as regular lectures—not merely slide uploads—so that students still receive full instruction and interaction.
- 3. Supplementary Learning Materials
 - Short video explainers, annotated slides, and practice quizzes will be uploaded to the LMS for any content that must still be condensed.
 - Students can revisit these materials at their own pace before mid-term and final assessments.
- 4. Early Notice & Student Input
 - A complete semester calendar—including tentative make-updates—will be shared on the first day of class.
 - Students will be invited to vote on preferred times for make-up sessions to maximize attendance.
- 5. Mid-course Pulse Checks
 - Two brief “temperature-check” surveys (weeks 4 and 9) will ask whether the pacing feels comfortable.
 - If students report that content still seems rushed, the instructor will adjust immediately (e.g., extend a lab period or shift minor topics to self-study).
 - These measures should keep coverage thorough while respecting the reduced teaching days, ensuring students no longer feel the course is “too condensed.”

14. Detailed Course Schedule Throughout the Semester (see Table 1)

Lecture: Tuesday, 3.00-5.00 pm. Laboratory: Wednesday, 2.30-5.30 pm. At PhulprasertPiya-anun Building, Farm mechanics department.

Reporter  _____

(Assoc.Prof.Pongsak Chontanaswat)

24 June, 2024

Table 1 Learning activity schedule for course 02027231 Principles of Farmstead Irrigation (First Semester, Academic Year 2024/25).

No.	Lecture	Lab	LLOs	L-level	Assessment	Teaching/ Learning method	Instructor	CLOs	PLOs
1 25, 26 June 2024	Course Overview, Learning and Teaching Methods Teaching Strategy Expected Outcomes	1. Soil Sampling and Determination of Soil Moisture Content 2. Determining Soil Moisture Content by Measuring Soil Water-Tension (Matric Suction)	-Able to collect soil samples and analyze the soil's moisture content. -Able to measure soil moisture using soil-water tension (matric suction) instruments.	K: U S: Pre A: Val	-Written Examination – assesses theoretical understanding of soil sampling and moisture-determination principles. -Practical Skill Assessment with on-the-Spot Guidance evaluates students' proficiency while they carry out soil sampling and use moisture-tension instruments; immediate coaching is provided during the exercise. -Laboratory Report – students submit a formal report documenting procedures, data, calculations, and interpretation of soil-moisture results.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO1 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
2 2, 3 July.	The relationship between soil, water, plants, and climate.	Measurement of water infiltration rate through the soil surface and within the soil.	-Able to utilize the relationship between soil, water, plants, and climate. -Able to use mathematical equations to determine the water consumption of plants.	K: Ap S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO1 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
3 9, 10 July.	Soil water and the infiltration of water from the soil surface.	Study and experimentation of open channel flow.	-Able to explain the types of soil water, surface water flow, and water infiltration within the soil." -Able to use the data from open channel flow rate measurements in designing irrigation systems for plants.	K: Ap S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO2 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8

4 16, 17 July.	Plant physiology and its relationship with water usage.	Measurement of water content in plant leaves using scientific equipment (Pressure Bomb).	<ul style="list-style-type: none"> - Able to utilize the relationship between plant physiological characteristics and their effect on water usage in plants. - Able to use of scientific instruments to measure water content in plant leaves. 	K: Ap S: Pre A: Val	<ul style="list-style-type: none"> -Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities. 	Lecture in Classroom / Laboratory Practice	Sunattha	CLO1 CLO2 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
5 23, 24 July.	Instruments and measurements in agricultural meteorology (Nakhon Pathom Meteorological Station).	Agricultural meteorology and plant water usage.	<ul style="list-style-type: none"> -Able to explain the relationship between climate conditions and the water requirements of plants. 	K: An S: Pre A: Val	<ul style="list-style-type: none"> -Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities. 	Lecture in Classroom / Laboratory Practice	Meteorological Station, KPS. / Tiwa.	CLO1 CLO2 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
6 30, 31 July.	Determination of plant water usage.	<ul style="list-style-type: none"> -Determining the water consumption of plants. -Determining the water consumption of plants through mathematical equations. 	<ul style="list-style-type: none"> -Able to calculate the water requirements of plants using mathematical equations. -Students are familiar with and understand the types of meteorological instruments. 	K: An S: Pre A: Val	<ul style="list-style-type: none"> -Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities. 	Lecture in Classroom / Laboratory Practice	Pongsak	CLO2 CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
7 6, 7 Aug.	Determining irrigation schedules for plants./ Irrigation water sources and the water required for plants.	"Flow of water through different types of weirs and measurement of the flow rate through weirs.	<ul style="list-style-type: none"> -Able to explain the characteristics of flow and measure the flow rate of water through different types of weirs. -Able to schedule irrigation for plants and plan water supply for crop cultivation. 	K: An S: Pre A: Val	<ul style="list-style-type: none"> -Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities. 	Lecture in Classroom / Laboratory Practice	Pongsak	CLO3 CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8

8 (10-18 Aug.) Midterm Examination									
9 20, 21 ส.ก	Surface irrigation for plants.	Surface irrigation and measurement of surface water flow rate (furrows and ditches).	- Able to select appropriate surface irrigation methods based on soil and plant conditions -Able to measure the surface water flow rate in crop fields.	K: An S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO3 CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
10 27, 28 Aug.	Planning plant irrigation and the amount of water required for plants.	Water pumps and the design of irrigation pump systems for agriculture.	-Able to plan water supply and irrigation for plants and can select appropriate drip and sprinkler irrigation equipment based on the type of plant and soil.	K: An S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO3 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
11 3, 4 Nov.	Sprinkler and drip irrigation for plants.	-Sprinkler and drip irrigation equipment. -Measurement of efficiency and uniformity of drip and sprinkler irrigation systems.	-Can appropriately select sprinkler and drip irrigation equipment for plants	K: An S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Vitawas	CLO3 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
12 10, 11 Nov.	Sprinkler and drip irrigation for plants.	-Sprinkler and drip irrigation equipment. -Measurement of efficiency and uniformity of drip and sprinkler irrigation systems.	-Can appropriately select sprinkler and drip irrigation equipment for plants. -Able to select the appropriate type of water pump based on the size and usage requirements for irrigating crop fields.	K: An S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Vitawas	CLO3 CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
13 17, 18 Nov.	Efficiency of plant irrigation systems.	An automatic control system for plant irrigation.	-Able to analyze the efficiency of plant irrigation systems.	K: An S: Pre A: Val	-Written examination (Essay examination)	Lecture in Classroom /	Pongsak	CLO3 CLO4 CLO5	PLO4 PLO6

			-Able to select appropriate automatic irrigation controllers for plants		-Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Laboratory Practice		CLO6	PLO7 PLO8
14 24, 25 Nov.	Irrigation system for crop production in greenhouses.	Irrigation system for greenhouse crop production.	-Able to select appropriate irrigation equipment for plants grown in greenhouses.	K: An S: Pre A: Val	-Written examination (Essay examination) -Assessment of students' practical skills with guidance provided during laboratory or fieldwork sessions. -Preparation of practical (or laboratory/fieldwork) reports. -Students are required to prepare reports based on the outcomes of their practical activities.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
15 1, 2 Oct.	Systems and planning of agricultural drainage.	Design of agricultural drainage systems.	-Able to explain the principles and methods of planning agricultural drainage for crop fields.	K: An S: Pre A: Val	-Oral examination. -Provide guidance during the practical session.	Lecture in Classroom / Laboratory Practice	Pongsak	CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
16 15, 16 Oct.	Presenting a research report.	Presenting a research study report.	-Have skill of presentation and answer the questions.	K: An S: Pre A: Val	-Presenting the research work conducted by students.	Presenting a research report.	Pongsak	CLO4 CLO5 CLO6	PLO4 PLO6 PLO7 PLO8
Final Examination									