



Course Syllabus Secondary Semester, Academic Year 2024

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

2. Course code: 02027362

Course name: Computer Programming
for Agriculture I

Credit: 2(1-3-4)

Pre: 02027262

3. Instructor team:

Mr. Pavit Tangwongkit

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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:

1. Students know the architecture of microcontroller boards.
2. Students know the steps of program development, principles of writing computer programming languages for microcontroller boards.
3. Students can sequence the steps of processing, checking and fixing errors in the program.
4. Students can write a program to command the microcontroller board to read values from the sensor and control the actuator.

6. Course Description

Principles of computer programming, program structure and algorithm flowchart, type of variable and data, computer programming and database structure analysis using high level language, microcontroller architecture, register and special register, data memory and program memory, input/output port, timer and counter circuit, microcontroller instruction set and microcontroller programming and applications using high level language in agricultural mechatronics.

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

PLOs	Knowledge	Specific skills	Generic skills	Attitude
PLO5: Be able to examine an electrical circuit, electronic circuit, and mechatronics principles to control an agricultural work properly	-architecture of microcontroller boards -steps and sequence of program development for microcontroller boards.	-applications using high level language in agricultural mechatronics.	- Can use technical terms (English) - Have skills in working with others	- Taking care of yourself and others' safety - Punctuality - Keeping up with relevant academic news and information

PLO6: Be able to choose information technology (IT) to operate tasks appropriately		-Have skills in using IT in agriculture.		- Value and love to seek knowledge in IT
PLO7: Be able to use Thai and English language on duty for listening, speaking, reading and writing appropriately.		- 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.		-Be a good leader and follower -Have problem-solving skills	-Be responsible and disciplined in your work - Be diligent and patient - Be punctual - Be honest	-Love the profession and the institution that you study - Have good interpersonal skills in working with others

8. Course Learning Outcomes: CLOs and method of learning outcomes assessment)

Course Learning Outcomes: CLOs	Method of learning outcomes assessment	PLOs
CLO1: Able to explain the architecture of microcontroller boards. CLO2: Able to explain the steps of program development, principles of writing computer programming languages for microcontroller boards. CLO3: Able to apply sequence the steps of processing, checking and fixing errors in the program. CLO4: Able to be programming to command the microcontroller board to read values from the sensor and control the actuator.	1. Individual classroom performance results 2. Term Project 3. Presentation of work 4. Evaluate behavior, intention, responsibility, and teamwork	PLO5 PLO6 PLO7
CLO5: Display a responsible, moral, ethical, disciplined, punctual, honest, and responsible.	5. Attend classes and be attentive to learning and practicing 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 various situations appropriately. towards themselves and society.	6. Evaluate group work skills and provide advice on how to interact well in group work.	PLO8

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

- 1) Evaluate individual skills and learning outcomes during class 50%
- 2) Measuring learning outcomes from project-based (Term Project) 30%
- 3) Presentation 10%
- 4) Interest in learning, determination to perform, responsibility and teamwork. 10%

Total 100%

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

10. Documents to read:

www.arduino.cc is a website that collects knowledge from basic to advance for programming and using microcontrollers.

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** were satisfied with the teaching in the previous session with a score of 4.72 and had no suggestions for improvement.
- ☐ Reviewed by reviewing from.....
 - ☐ Not revised.....
 - ☐ Revised to be consistent with.....

13. Teaching improvement from teaching evaluation results:

- ☐ No teaching evaluation
- ☒ **Teaching evaluation,** the average score of the previous evaluation is equal to 4.72 but it is from only 16.67% of evaluators. Therefore, the next class must involve inviting students to participate in the assessment, more than 80%.
- ☒ **No improvement,**
- ☐ Improvements as follows.....

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

Signature



(Mr. Pavit Tangwongkit)

18 November 2024

Table 1: Schedule of activities related to teaching and learning 02027362

Lecture: Friday 12.30-13.30 Laboratory: Friday 13.30-16.30 at Agricultural Mechatronics Laboratory Building

No.	Lesson	LLOs	L-Level	Teaching/Learning method	Assessment	Instructor	CLOs	PLO
1	-Explain Course Syllabus -Basic architecture of microcontroller board	-Able to explain architecture of microcontroller board	K: An S: Pre A: Val	- Explain the learning outcomes (CLOs), teaching methods, assessment and measurement of learning outcomes via Course Syllabus uploaded on Ed-Farm 1) Learning methods and materials which are patterns for using in every lesson 1.1) Materials: Students use the control board and equipment provided by the curriculum, 1 set per student, starting from subject 02027262 in every lesson and have students check the operation of the board to ensure it is in working condition. 1.2) Learning methods: -Lecture and demonstrate the basic architecture of the microcontroller board and have students follow along. - When students understand, have them practice by themselves under the supervision of the teacher and teaching assistant. - Test individual learning until students can actually do it.	1. Evaluate operational skills and provide advice during every operation. 2. Evaluate individual knowledge and skills.	Pavit Surasak	CLO1 CLO2 CLO5 CLO6	PLO5 PLO6 PLO7 PLO8
2	Development of computer programs for microcontroller boards	-Able to discuss microcontroller boards programing				Surasak Chalvalit Pavit	CLO1	
3	Flow chart writing and program development	-Able to create flow chart of program development					CLO2	
4	-Control of Actuator (LED) ON/O -Delay control	-Able to control of Actuator (LED) ON/O And Delay control					CLO3	
5	Digital Sensor Applications	-Able to apply digital sensor using					CLO4	
6	- Analog Sensor Applications - PWM Actuator (LED) Control	-Able to apply Analog Sensor Applications and PWM Actuator (LED) Control					CLO5	
7	- Using Analog Sensor to Control Servo Motor Actuator	-Able to use Analog Sensor to Control Servo Motor Actuator					CLO6	
8	- Advanced Delay Control	Able to be Advanced Delay Control						
9	Control LCD Display Actuator	Able to control LCD Display Actuator						
10	Development of a computer program using a counter	Able to develop computer program using a counter						

No.	Lesson	LLOs	L-Level	Teaching/Learning method	Assessment	Instructor	CLOs	PLO
11-12	Development of a small microcontroller project (group work)	-Able to develop a small microcontroller project (group Works)		<ul style="list-style-type: none"> - Let students apply the knowledge gained since the opening of the course to study and design a small microcontroller project - Present the concept to the teacher and provide suggestions - Develop the project (Term-Project) 	1. Evaluate the concept in the project design 2. Monitor and evaluate the project development (Term-Project)			
13-15	Presentation of Small microcontroller Project (group Works))	-Have presentation skill to present a Small Project (group Works))		<ul style="list-style-type: none"> - Students present the project (Term-Project) - Answer questions 	Use the RUBRIC principle to evaluate the learning outcomes			