



**Course Syllabus**  
**Secon Semester, Academic Year 2024**

**1. Faculty of Agriculture at Kamphaeng Saen      Department of Farm Mechatronics**

**2. Course code: 02027262**

**Credit: 3(2-3-6)**

**Pre: 01420119**

**Course name:** Fundamental of  
Agricultural Control System

**3. Instructor team:**

Mr. Pavit Tangwongkit

E-mail : ptangwongkit@gmail.com

Dr. Chawalit Khanakornsuksan

E-mail : chawalit.kh@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.

**5. Course Objectives:**

5.1 Able to connect electronic devices and basic programs writing with microcontroller boards.

5.2 Able to design a program for the operation of a microcontroller board by writing a Flow Chart.

5.3 Able to use the Flow Chart to develop a program for a real microcontroller board.

**6. Course Description:**

Sensor and transducer, signal measurement and signal condition, signal conditioning circuit, actuator equipment and controlling, programmable controller functions and programming of programmable controller and its application on agricultural mechatronics.

**7. Program Learning Outcomes: PLOs (8 PLOs of the 2022 AMM 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 | -Equipment in agricultural control system<br>- Basic agricultural control system program | - Able to select the appropriate equipment related to the agricultural control system<br>- Having skills and be able to assemble the agricultural control system<br>- Equipment application and basic control system programs | - Can use technical terms (English)<br>- Have skills in working with others | - Taking care of yourself and others' safety<br>- Punctuality<br>- 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  |

| PLOs  | Knowledge | Specific skills  | Generic skills  | Attitude   |
|---|-----------|--|---|--|
| 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<br>- 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<br>-Have problem-solving skills   | -Be responsible and disciplined in your work<br>- Be diligent and patient<br>- Be punctual<br>- Be honest | -Love the profession and the institution that you study<br>- Have good interpersonal skills in working with others |

### 8. Course Learning Outcomes (CLOs) and Methods for measuring learning outcomes:

| Course Learning Outcomes: CLOs   | Methods for measuring learning outcomes   | PLOs                 |
|--|---|----------------------|
| CLO1: Able to explain basic analog and digital electrical circuits.<br>CLO2: Can write and explain the flowchart of the program's operation.<br>CLO3: Able to explain and use various types of Sensors, Transducers and Actuators<br>CLO4: Able to use basic control boards.<br>CLO5: Can use open-source programs to create prototypes of electronic control systems. | 1. Evaluate operational skills and provide advice during every operation<br>2. Evaluate at the end of every chapter<br>3. Do a project (Term Project) | PLO5<br>PLO6<br>PLO7 |
| CLO6: Display a responsible, moral, ethical, disciplined, punctual, honest, and responsible.   | 4. Attend classes and be attentive to learning and practice and submit assigned work on time.   | PLO8                 |
| CLO7: Have the skills to work with others as a good leader and member and can adapt to various situations appropriately. towards themselves and society.   | 5. 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

9.2.1 Skill and learning outcomes assessment 50%  
(at the end of every chapter)

9.2.2 Learning achievement measurement from the Term Project 40%

9.2.3 Interest in learning, determination to do the operation, 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:**

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](http://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 4.68 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 4.68.
  - ☒ **No improvement,** .....
  - ☐ Improvements as follows.....

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

Tuesday Lecture 9:00-11:00 Laboratory 11:30-14:30  
at the Computer & Mechatronic lab, Agricultural Mechatronics Laboratory Building.

Signature



(Mr. Pavit Tangwongkit)

18 November 2024

**Table 1 Schedule of activities related to teaching and learning of the 02027262 Fundamental of Agricultural Control System**

*Tuesday Lecture 9:00-11:00 Laboratory 11:30-14:30 at the Computer & Mechatronic lab, Agricultural Mechatronics Laboratory Building.*

| No    | Lesson  | LLOs  | L-level                  | Teaching/Learning method  | Assessment  | Lecturer          | CLOs         | PLOs                         |
|-------|---|---|--------------------------|---|---|-------------------|--------------|------------------------------|
| 1     | - Consider Course Syllabus together and reach a mutual agreement.<br>-Important components of microcontroller board and use of Digital Output | -Important components of microcontroller board<br>-The use of Digital Output        | K: U<br>S: Man<br>A: Res | -Explain the learning outcomes (CLOs), teaching methods, assessment and measurement of learning outcomes through the Course Syllabus which is uploaded on Ed-Farm.<br>-The course distributes a control board and equipment to each student, 1 set, for students to check and use in their studies until the course finishes.<br>- Explain, demonstrate and let students do together in topic the operation of important components of the microcontroller board and the use of Digital Output. | 1. Evaluate operational skills and provide guidance during every operation.<br>2. Evaluate key components of the microcontroller board and use of Digital Output. | Pavit<br>Chawalit | CLO1<br>CLO6 | PLO5<br>PLO6<br>PLO7<br>PLO8 |
| 2     | Basics of Program Development with C/C++  | - Programming in C/C++ language.  |                          | - Explain and demonstrate, let students do together in each topic, when students understand, have them practice by themselves under the supervision of the teacher and teaching assistant.<br>- Test individual learning until students can actually do it.   | 1. Evaluate operational skills and provide guidance during every operation.<br>2. Complete a final assessment for every chapter.                                  | Pavit             | CLO2<br>CLO6 |                              |
| 3     | Basics of Serial Communication and Digital Input  | - The principles of Serial Communication<br>- Use Digital Input                     |                          |   |   | Pavit             |              |                              |
| 4     | Basics of Analog Input  | -The principles of Analog Input<br>-Use Analog Input                                |                          |   |   | Chawalit          |              |                              |
| 5     | Basics of Analog Output (PWM)   | -Use Analog Output (PWM)  |                          |   |   | Chawalit          |              |                              |
| 6     | Flow Chart drawing and Program Development  | - Flow Chart drawing for program development  |                          |   |   | Pavit             |              |                              |
| 7-8   | Sensor Applications   | -Use sensor   |                          |   |   | Pavit             | CLO3<br>CLO6 |                              |
| 9-10  | Actuator Control  | -Principle of actuator  |                          |   |   | Pavit             |              |                              |
| 11    | Applications Combining Sensors and Actuators  | -Use sensor and actuator<br>-Get appropriate small microcontroller project          |                          |   |   | Chawalit          |              |                              |
| 12-13 | Design and Development of Small Microcontroller Projects  | -Get appropriate small microcontroller project                                      |                          | - Let students apply the knowledge gained from the opening of the course to study and design small microcontroller projects<br>- Present the concept to the teacher and provide suggestions<br>- Develop the project (Term-Project)   | 1. Evaluate the concept in project design<br>2. Monitor and evaluate the project development (Term-Project)   | Pavit<br>Chawalit | CLO2 to CLO7 | PLO5<br>PLO6<br>PLO7<br>PLO8 |
| 14-15 | Term-Project presentation   | -Understand the project<br>-Have presentation skills<br>-Have question answer skill |                          | -Students present their projects (Term-Project)   | -Answer questions using the RUBRIC principle to evaluate learning outcomes  |                   | CLO4 to CLO7 |                              |

