

Course details
Bachelor of Science Program
Agricultural Machinery and Mechatronics
Revised curriculum 2022

Name of Higher Education Institution	Kasetsart University
Campus/Faculty/Department	Kamphaeng Saen Campus, Faculty of Agriculture at Kamphaeng Saen, Department of Farm Mechanics

Section 1 General Information

1. Program Code and Name

Program Code 25550021101983

Program Name

English : Bachelor of Science Program in Agricultural Machinery and Mechatronics

2. Degree name and major

Full name : Bachelor of Science (Agricultural Machinery and Mechatronics)

Abbreviation : B.S. (Agricultural Machinery and Mechatronics)

3. Major (if any)

None

4. Total number of credits studied throughout the program

Not less than 141 credits

5. Program format

5.1 Format (academic)	4-year bachelor's degree program
5.2 Languages used	Thai and English
5.3 Admissions	Accept both Thai and international students
5.4 Cooperation with other institutions	Specific course of the institution.
5.5 Granting degrees to graduates	Granting degrees in only one subject area

6. Curriculum status and consideration of curriculum approval

Curriculum status

- Revised curriculum, scheduled for implementation in the first semester of the 2022 academic year.
- Renamed to Bachelor of Science Program in Agricultural Machinery and Mechatronics as part of the revision.
- Originally introduced in the academic year 1998.
- Last revised in the academic year 2017.

Curriculum approval/consent consideration

- Considered and screened by the Academic Committee, Kasetsart University, in the meeting no.....on.....

-Approved/consented the curriculum from the Kasetsart University Council at the meeting no.on

7. Readiness to publish quality and standard curriculum

The curriculum will be published as a quality and standard curriculum in accordance with the Higher Education Qualifications Framework 2015 in the academic year 2024.

8. Occupations that can be pursued after graduation

1. Civil service in the field of agricultural machinery and related areas.
2. Employees in companies, farms, and various agricultural enterprises.
3. Academics and researchers in both the public and private sectors.
4. Private entrepreneurs in businesses directly and indirectly related to agriculture.
5. Other freelance professions.

9. Name, surname, position and educational qualifications of the lecturer responsible for the curriculum.

No	Name - surname	Academic position	Education Level	Field of academic	Graduated	
					Institute	Year
1.	Mr. Nonthawat Chainarong	Assistant Professor	B.S.	Agriculture	Kasetsart University	1997
			MS.	Agricultural System & Engineering	Asian Institute of Technology	2002
2.	Mr. Buntoon Chunnasit	Assistant Professor	B.Arch	Architecture and Environment	King Mongkut's University of Technology Thonburi	1986
			M.U.E.P.	Urban and Environmental Planning	King Mongkut's University of Technology Thonburi	1991
3.	Mr. Pongsak Chontanasawat	Associate Professor	B.S.	Agriculture	Kasetsart University	1991
			M.S.	Computer and Engineering Management	Assumption University	1998
4.	Mrs. Ratana Tangwongkit	Associate Professor	B.S.	Agriculture	Kasetsart University	1983
			M.S.	Agricultural Machinery and Management	Asian Institute of Technology	1989
			Ph.D.	Agricultural Systems and Engineering	Asian Institute of Technology	2006
5.	Mr. Sombat Khawprateep	Assistant Professor	B.S.	Agriculture	Kasetsart University	1995
			M.Eng.	Agricultural Engineering	Kasetsart University	2003
			Ph.D.	Agricultural Engineering and Management	The University of Southern Queensland, Australia	2018

10. Place of teaching

Only in the institute, Department of Farm Mechanics, Faculty of Agriculture at Kamphaeng Saen, Kamphaeng Saen Campus

11. External situations or developments that need to be considered in curriculum planning

11.1 Economic situations or developments

Agriculture has been the cornerstone of Thailand's economy from the past to the present. The majority of the population has traditionally engaged in farming to meet the demand for agricultural products both domestically and internationally. Therefore, development in the agricultural sector is crucial not only for the country but also for the world.

However, today's agricultural production faces increasing constraints, including shrinking farmland, unpredictable weather patterns, declining agricultural labor, and a rising proportion of elderly workers in the sector. Consequently, curriculum planning must take into account the following factors:

11.1.1 Importance of agricultural machinery, technology and mechatronics in the agricultural sector

Currently, the issue of labor shortages in the agricultural sector is becoming increasingly serious, with the majority of the workforce being elderly. Agricultural machinery and various technologies are therefore essential to replace labor, enhance agricultural efficiency, and improve both the quantity and quality of agricultural products. The adoption of machinery not only modernizes agricultural practices but also streamlines tasks and boosts productivity.

Modern technologies, such as automated irrigation systems, post-harvest processing technologies, agricultural greenhouses, agricultural management information systems, and automatic control systems, play a crucial role in increasing agricultural efficiency. As a result, there is a growing demand for personnel skilled in the development, design, production, and management of these agricultural machines and technologies. These professionals are needed to work in both the public and private sectors, provide knowledge and training to farmers, and promote career development. Additionally, they play an essential role in conducting research and transferring technology to farmers, ensuring the continued advancement and sustainability of the agricultural sector.

11.1.2 Developing the country into an agricultural-industrial country

Agricultural products are among Thailand's main exports, generating significant income for the country. To enhance the competitiveness and export capacity of these products, the agricultural production system has increasingly adopted advanced agricultural technologies. These include agricultural machinery technology, greenhouse technology for crop and livestock production, irrigation systems, post-harvest technology, agricultural mechatronics, and agricultural machinery and resource management. Together, these technologies contribute to the development of Thailand's economy, positioning it to evolve into a leading agro-industrial nation.

Therefore, it is essential to cultivate personnel with the knowledge, skills, and expertise in agricultural technologies to support the country's progress toward becoming an agricultural-industrial powerhouse.

11.2 Social and cultural situation or development

Due to the rapid changes in Thailand's social structure, the ideas, lifestyles, and culture of Thai people have evolved significantly over the past several years. People are now more conscious of the quality of their lives, including concerns about food safety and the surrounding environment. Therefore, in developing the Bachelor of Science program in

Agricultural Machinery and Mechatronics, it is essential to also emphasize the following factors:

11.2.1 Awareness of managing agricultural machinery and resources efficiently and cost-effectively in production.

11.2.2 Commitment to safe agricultural production to ensure the health and well-being of consumers.

11.2.3 Understanding of social and cultural impacts, as well as upholding strong morality and ethics, to guide and drive the agricultural industry in a manner that aligns with and respects the way of life of Thai society.

12. Impact of Sections 11.1 and 11.2 on Curriculum Development and Relevance to the Institution's Mission

12.1 Curriculum Development

This revision of the Bachelor of Science Program in Agricultural Machinery and Mechatronics is designed to address the evolving economic, social, and cultural changes both within Thailand and globally, while also meeting the demands of the agricultural industry and related sectors.

12.1.1 The curriculum is designed to meet the nation's need for skilled personnel in the agricultural machinery and mechatronics sectors, equipping them with the necessary knowledge, expertise, and practical skills in agricultural machinery, agricultural technology, mechatronics, and other related industries.

12.1.2 Revise the curriculum to adapt to the evolving economic, social, and cultural landscapes of both the country and the world.

12.2 Relevance to the mission of the institution

Kasetsart University has offered a 5-year Agricultural Engineering program since its founding in 1943. Over the years, the program was revised and rebranded as Agricultural Mechanics. In 2007, it was further revamped and renamed the Bachelor of Science Program in Agricultural Machinery and Mechatronics. To date, Kasetsart University has produced over 2,000 graduates in agricultural machinery, technology, and agricultural mechatronics. These graduates are now serving in diverse sectors, including the agricultural machinery industry, irrigation systems, sugar factories, farming businesses, and more, across both public and private sectors. The revised Bachelor of Science Program in Agricultural Machinery and Mechatronics continues to uphold Kasetsart University's mission of producing competent graduates who are well-equipped to meet the country's evolving needs.

13. Relationship with other courses offered in other faculties/departments of the institute

13.1 Subject categories/subject groups/subjects in the curriculum offered by other faculties/departments/programs

- General Education Categories: Well-being, Entrepreneurship Science, Thai and Global Citizenship, Language and Communication, and Aesthetics.
- Basic Science Categories: General Chemistry, General Chemistry Laboratory, Principles of Statistics, and Principles of Biology.

- General Agricultural Science Categories: Basic Agricultural Pest Management, Agricultural Technology Promotion and Transfer, Animal Science and Technology, Field Crop Science and Technology, Soil Science, Horticultural Science and Technology, and Fertilizers.
- Required Specialized Subjects: Calculus, Physics in Brief, and Physics in Brief Laboratory.
- Elective Specialized Subject: Cooperative Education.

13.2 Subject categories/subject groups/subjects in the curriculum that are offered to other faculties/departments/programs

None

13.3 Management

The responsible lecturer coordinates with representatives from other departments within the relevant faculties to organize subject content, schedule classes, and arrange examinations.

Section 2 Specifics of the Curriculum

1. Philosophy, Importance and Objectives of the Curriculum

1.1 Philosophy of the Curriculum

To achieve excellence in management, technology, machinery, and agricultural mechatronics through teaching, research, and academic services, producing graduates with knowledge, morality, and ethics. This includes the development of research and academic work that contributes to the sustainable development of the country's economy and society.

1.2 Importance

Thailand is an agricultural country, generating significant income from agricultural exports and industries. The country has strong potential to expand agricultural production in both quantity and quality to remain competitive in the global market. However, the agricultural sector is increasingly facing labor shortages, with a majority of its workforce comprising elderly individuals. This challenge can be addressed through the use of agricultural machinery and a range of modern technologies, including irrigation systems, post-harvest processing technologies, greenhouse and building technologies, and computer information systems and mechatronics applied to agriculture. These innovations can effectively replace labor, enhance production efficiency, and improve both the quantity and quality of agricultural products.

Furthermore, the integration of agricultural machinery into farming operations not only modernizes agriculture but also contributes to precision agriculture, enhances safety in food production, and strengthens Thailand's competitive edge in agricultural exports. To support this transformation, there is a critical need for skilled personnel in the development, design, production, and management of agricultural machinery and technologies. These professionals are required in both the public and private sectors to promote and transfer knowledge to farmers, conduct research, develop career pathways, and effectively transfer technology, ensuring sustainable growth and advancement in the agricultural sector.

1.3 Objectives

Producing graduates with knowledge, abilities, skills, and positive attitudes toward careers in agricultural machinery and mechatronics, while also fostering leadership

qualities, good character, kindness, teamwork abilities, social responsibility, public-mindedness, and a love for the organization.

2. Development and improvement plan

Development/Change Plan	Strategy	Evidence/Indicators
1. Institutional research to develop teaching and learning and curriculum development	1.1 Classroom research in the curriculum subjects 1.2 Institutional research to develop the curriculum	1.1 Report on classroom research results to develop teaching and learning / Use of classroom research results to develop and improve teaching and learning. 1.2 Report on institutional research results for curriculum development / The use of institutional research results for curriculum development and improvement
2. Promote and develop the qualifications and academic positions of the program's lecturers and teaching staff in the program.	2.1 Allocate a budget to support research and presentation of academic work to lecturers and lecturers in the curriculum.	2.1 Plans and budgets to support research and presentation of academic works to regular lecturers and lecturers in the curriculum / There are plans and budgets to support research and presentation of academic works to regular lecturers and lecturers in the curriculum.

Section 3 Educational management system, operations and curriculum structure

1. Educational system

1.1 System

The curriculum adopts a dual system, dividing each academic year into two regular semesters, with each semester having a study period of no less than 15 weeks.

1.2 Summer Education Management

None

1.3 Credit Conversion in Dual Semester System

None

2. Course Implementation

2.1 Operating Days and Times

Office Hours

- Semester 1 June - October

- Semester 2 November – March

2.2 Qualifications of the applicants

Applicants must have completed high school or its equivalent in the science-mathematics track and must not possess the following prohibited characteristics:

1. Serious misconduct or criminal behavior.
2. Insanity or severe mental illness.
3. Serious contagious disease or a medical condition that would impede education.
4. Dismissal from an educational institution due to disciplinary violations.

2.3 Problems of new students

- **Adjustment Challenges:** Students may face difficulties transitioning from secondary to university-level education, as the learning format differs from what they were previously accustomed to. They must learn to manage both classroom learning and extracurricular activities effectively.
- **Foundational Knowledge Gaps:** Some students entering the program may lack a solid foundation in science, which can affect their ability to keep up with course content.
- **Language Proficiency Issues:** Students may also struggle with inadequate skills and knowledge in using both Thai and English effectively, which are essential for academic success and future careers.

2.4 Strategies for implementing to solve problems / limitations of students in item

2.3

- **Advisory Support:** All lecturers are assigned advisory duties, providing guidance on both academic matters and university life. This includes organizing orientation sessions for new students, offering advice on setting life goals, study techniques, and effective time management.
- **Faculty Advisory Committee:** The Faculty of Agriculture, Kamphaeng Saen, has an advisory committee that supports individual advisors by organizing student care activities, such as orientation, parent meetings, and supplementary teaching activities in basic subjects.
- **University Orientation Courses:** Kasetsart University, Kamphaeng Saen Campus, has a policy requiring first-year students to register for *01999111 Knowledge of the Land* in the first semester. This course introduces students to the university's history, identity, and its role in national well-being. It also cultivates Thai and global citizenship, learning and working skills, determination, creativity, and unity. Additionally, students must take *02999144 Life Skills for Undergraduate Students* in the first semester, which equips them with essential life skills, including adaptation to the university environment, understanding rules and regulations, and effective time management for academics, activities, and social participation.
- **Curriculum Support:** The program offers additional instruction in basic science subjects required in the curriculum to strengthen students' foundational knowledge.
- **English Skills Enhancement:** The curriculum includes training programs designed to improve students' English proficiency.

2.5 Plan for accepting students and graduates within 5 years

Year	Academic year				
	2022	2023	2024	2025	2026
1	50	50	50	50	50
2	-	50	50	50	50
3	-	-	50	50	50
4	-	-	-	50	50

Total	50	100	150	200	200
Number of students expected to graduate	-	-	-	-	50

2.6 Planned budget

Use the budget of the Department of Agricultural Mechanics, Faculty of Agriculture, Kamphaeng Saen, Kasetsart University as follows:

(Unit: Baht)

Income details	Fiscal year				
	2022	2023	2024	2025	2026
Budget Income					
Tuition Fee (Lump Sum)	600,000	1,200,000	2,400,000	4,800,000	4,800,000
Registration Fee	830,000	1,600,000	3,200,000	6,400,000	6,400,000
Total	1,430,00	2,800,000	5,600,000	11,200,000	11,200,000
Expenditure budget					
Personnel budget	1,022,000	1,040,000	1,062,000	1,082,000	1,102,000
Operation budget	2,034,200	2,134,200	2,214,000	2,294,000	2,274,000
Investment budget	886,500	1,000,000	1,000,000	1,000,000	1,000,000
Subsidy budget	441,800	500,000	500,000	500,000	500,000
Total	4,384,500	4,676,200	4,776,000	4,876,000	4,876,000
Number of students	50	100	150	200	200
Cost per capita for producing graduates according to the curriculum	87,690	46,762	31,840	24,380	24,380

2.7 Education system

Classroom and self-study

2.8 Credit transfer and cross-institutional registration (if any)