Tokyo University of Agriculture and Technology (TUAT)

WISE Program
(Doctoral Program for World-leading Innovative & Smart Education)

Excellent Leader Development for Super Smart Society
by New Industry Creation and Diversity

WISE-TUAT
東京農工大学
卓越大学院プログラム

Course Guide 2022
(May 2022)

Introduction

The world is moving toward an era with a global population of 9 billion, and Japan is facing many social problems due to its declining and aging population. In response to such issues, the Tokyo University of Agriculture and Technology—in its role as a scientific research university focuses on the fields of agriculture and engineering—is cultivating high-level innovation leaders capable of action on the international stage, through a combination of problem-exploration abilities in agriculture and problem-solving abilities in engineering. Many points of the Sustainable Development Goals (SDGs) for 2030, in particular, involve agriculture and engineering. Beyond these issues, there is a global trend toward mutual respect for diversity, and a need to develop human resources capable of serving as core leaders of problem-solving teams while appreciating and respecting diversity. “Excellent Leader Development for Super Smart Society by New Industry Creation and Diversity”—That is the heart of the WISE Program, which brings together the strengths of the Tokyo University of Agriculture and Technology.

WISE-TUAT
東京農工大学 卓越大学院プログラム

WISE Program, Tokyo University of Agriculture and Technology
http://www.wise.tuat.ac.jp

Table of Contents

1. Overview of the WISE Program

Launched in 2018, the Doctoral Program for World-leading Innovative & Smart Education (WISE Program) is a five-year integrated doctoral degree program bringing together world-class education and research capabilities—a collaboration of universities, research institutions, and private companies structured around the strengths of the individual universities. Based on this approach, the program develops excellent human resources with doctoral degrees capable of driving a variety of sectors in agriculture, engineering, and related fields. Through human resource development and academic/technical exchange both domestic and overseas, we will spark innovation, and form a hub of excellence that can be continually expanded.

The distinctive features of the WISE Program at the Tokyo University of Agriculture and Technology (TUAT) are creation of new industries and diversity. One example of a research theme is the creation of new industries that revolutionize agricultural distribution through the application of cutting-edge engineering technology. This is being achieved through agriculture-engineering collaboration and cooperation with private companies and overseas research/educational institutions. The program seeks to cultivate high-level human resources with doctoral degrees, and students have great freedom in selecting a research theme from various research fields.

1.1 Significance and Distinctive Features of Study in the WISE Program

Significance

Global innovation is accelerating in today's world, and there is a need for human resources with doctoral degrees to spark innovation. Realizing the Society 5.0 “Super Smart Society,” in particular, will require the ability to solve social problems while leveraging academic specialization. At TUAT, we bring together agriculture and engineering capabilities, and enable innovation through creation of new industries and diversity. Furthermore, as social changes—such as shrinking and aging of the population in Japan, and growth of the global population—there is a strong need for diversification of graduate school education and recurrent education across ages and genders as we move toward an era where the human life-span will be 100 years. It is also essential to appreciate diversity of gender, age, cultural/social background, and other characteristics.,

In responding to such demand, this Program provides educational opportunities to foster students’ research and innovation-producing potential with “Creation of New Industries” and “Diversity,” taking advantage of its strengths of collaboration of agriculture and engineering of TUAT. The program has a system to enable students to strengthen their big-picture perspective for using knowledge horizontally while keeping to their existing specialized knowledge and techniques. The curriculum is designed for students to put their acquired academic knowledge into the engineering level.

WISE students are expected to engage in an industry-academic joint research with their own initiatives and acquire the foundation as “a professional of knowledge” who is leading Super Smart Society.

Distinctive Features

The WISE Program incorporates: (1) Support for study and travel abroad, (2) Support for collaboration with company, (3) Support for active learning, and (4) Support after the program completion.

As support for study and travel abroad, the WISE Program provides various types of economic assistance for cultivating global human resources. For example, program students engage in short-term study abroad in their first and second years, and we provide assistance for travel-related expenses. We also financially support the expenses of students’ research-related activities including. To receive such expense support, it is required that students apply for the expense and the application is approved. We will also provide them with opportunities to strengthen their English language skills to prepare for those study abroad programs.

As support relating to work experience, students can attend lectures by people actually working at private firms or partner research institutions, and hear stories of the unvarnished reality in the industrial world. From their third year, students can receive various types of support designed to cultivate doctoral human resources with a strong awareness of contributing to the industry that you can hardly experience in conventional graduate school education. This support includes guidance on proposing themes for joint research with corporations.

Each program student assembles a portfolio of what he or she has learned through lectures, exercises, and other experiences, and continuously evaluate him or herself regarding learning achievements and/or acquired skills. Competency evaluation is also performed to encourage independent self-growth. This involves self-evaluation - as well as evaluation by advisors and faculty members of partner institutions -of student abilities in terms of problem-setting, development of solutions, idea generation, big-picture thinking, diversity, management, leadership, Creation of New Industries and practical action. These data can be checked via the Internet using a smartphone or other device, and students can efficiently learn while confirming, at any time, how experiences in the program connect with the student's own growth.

We hope that students who complete the WISE program will themselves expand into various industries in Japan and overseas and create new industries. In addition to that, we will build and introduce “a doctor matching system,” which is designed to connect students with private companies and/or related institutions for students to broaden their horizons or a network of people.

1.2 Vision of Human Resources Cultivated by the WISE Program

In the WISE program, we provide a 5-year integrated program (master's + doctorate) to foster doctorate-holding human resources with the following three characteristics:. Students who have completed a master's course are also accepted to start a conventional doctoral program (second phase of the integrated program). The goal of the WISE Program is to foster human resources with the following three characteristics, and the curriculum has been designed for those purposes: (1) Challenging “creating new industries through agri-engineering collaboration” and thereby leveraging cutting-edge engineering technology to solve the social challenges relating to agriculture, (2) Strengthening the understanding of diversity (gender, nationality, social experiences, etc.) which is essential for innovative human resources, and (3) Excellent leadership with a big-picture perspective, originality, appreciation of diversity, international competitiveness, and high-level specialization.

1.3 Admission Policy, Curriculum Policy, and Diploma Policy

Admission Policy

Our aim is to develop excellent leaders with specialization and big-picture thinking from an international perspective, and we are looking for human resources with the following qualifications:

・Admission for the five-year integrated course

- Satisfactory basic academic ability in agriculture, engineering, and related fields
- The diversity mindset needed for research activities in international society and English skills and communication skill for practical activities
- Wide-ranging perspective and interests, with the spirit of inquiry and execution ability for deploying highly creative research and technology to create new industries

・Admission for the doctoral course only

The following in addition to the above:

- Specialized knowledge and skills as a holder of a master's degree, as well as strong interest and desire in a specialized research domain and related fields, and the desire and diversity mindset for driving innovation to create new industries

Curriculum Policy

We offer an educational curriculum for developing excellent leaders capable of driving the creation of new industries based on a diversity mindset in international society.

A) Acquisition of high-level specialized knowledge on international cutting-edge results in agriculture, technology, and related fields, through multifaceted lectures and exercises in areas ranging from natural science to the humanities and social science

B) Cultivation of basic knowledge and techniques in the student's own specialty; acquisition of methods for approaching global social issues, big-picture thinking, and logical thinking; creation of new industries and sparking innovation by learning cutting edge knowledge and experimental techniques; and acquisition of practical techniques

C) Establishing global standard research ethics, intellectual property management, and other attributes needed by a researcher or specialized engineer

D) Cultivation of a global standard diversity mindset, language skills, human skills needed for presentation and debate, and leadership ability for carrying out research or projects

Diploma Policy

We cultivate excellent leaders with the following four characteristics for driving the creation of new industries based on a diversity mindset in the global society.

A) Outstanding specialized capabilities as an independent researcher or creative engineer in the own area of specialization

B) Abilities in big-picture thinking, logical thinking, creative thinking, and practical action enabling execution of industry-academia collaboration and multidisciplinary research to create new industries

C) Leadership ability enabling management of people in different fields from the perspective of diversity to solve problems with both global and local perspectives

D) Ability to bring together the results of one's own research and investigation as reports or academic papers, and produce research results and to present or provide those results at academic meetings and international conferences with research ethics

1.4 Visualization of Learning through Competency Evaluation

In the WISE Program, we use competency evaluation as an indicator allowing individual students to visualize in real-time their progress in terms of the curriculum and diploma policies presented in 1.3. This information is also useful for future learning and activities.

Competency can be developed as an indicator of personal characteristics linked with action and thinking which bring high performance in settings such as companies, education, and research. In companies, they analyze the behavioral characteristics of "high- performers" to extract their behavior and thinking which resulted in high performance, and use them for their human resources allocation and education.

In WISE program, we have analyzed the ideal of excellent leaders in the science-technology field capable of acting on the global stage, and extracted nine important competencies: problem-setting, development of solutions, idea generation, big-picture thinking, diversity, management, leadership, creation of new industries and practical action. These competencies can be obtained by learning, experiences, or training regardless of person's natural character or personality.

	Keyword	Competency gained at completion of the WISE Program
Conceptual	Problem setting	Identifies social problems through appropriate information gathering
	Development of solutions	Develops the best solution for solving social problems
	Idea generation	Generates creative ideas for social implementation
	Big-picture thinking	Has big-picture perspective/thinking for creating new industries
Human	Diversity	Makes decisions with a diversity perspective
	Management	Respects diverse values, and employs the best coordination and negotiation in each situation (society)
	Leadership	Clearly demonstrates his or her own reason for being in a global society (using English), and attracts people
Technical	New industry creation	Acquires cutting-edge knowledge and technology in engineering and agriculture for creating new industries
	Practical action	Cutting-edge technologies in agriculture and engineering are practically used for researches and projects.

Competency evaluation is conducted twice a year at the end of the first half and at the end of the second half. In addition to a self-evaluation by individual students, the faculty members and the specially-appointed faculty members of the WISE Program also make the evaluation through the portfolio (described later). At the end of the second half, the student's supervisor joins the evaluation and shares the student's growth.

Based on these competency assessments, the program students and related faculty members are able to understand the students' strengths and weaknesses, the necessary points to be developed for the future, and challenges to be outstanding leaders. This helps the students to make effective plans of learning and activities.

1.5 Curriculum Characteristics and Course Tree

(1) Curriculum Characteristics

In the WISE Program, years 1–5 of the integrated doctoral course are indicated as follows: 1st year (**P1**), 2nd year (**P2**), 3rd year (**P3**), 4th year (**P4**), 5th year (**P5**).

In P1, through lectures by cutting-edge researchers, students learn about the development of collaborative research in agriculture and engineering and examples of social implementation of research, and consider the development of their own research. In addition, the "Problem Exploration Program" is conducted in collaboration with companies through PBL (Project Based Learning, Problem Solving), in which students tackle problems through group work. In terms of diversity, students will deepen their basic understanding of diversity and inclusion and leadership diversity. By utilizing online overseas training programs conducted jointly with overseas partner institutions and the "Study Abroad Support Program," students can develop the basic English communication skills and international mindset necessary to be a global outstanding human resource. Those who wish to do so can plan and apply for research and research-related activities on their own initiative, using the "Proposal-based Project Funding Support System," etc., and develop their ability to make proposals. Through these activities, students will gain an understanding of social issues, deepen and develop their specialized research, and promote an understanding of diversity.

In P2, students learn from partner companies about R&D in the industrial world and actual examples of commercialization of research, and consider how to develop their research in the real world by applying it to their own research. In addition, students will learn specifically about doctoral careers and life events as a doctoral student, and draw their future life plans based on the various careers and lives that surround doctoral students. At the end of P2, students take the Qualifying Examination (QE1) as a mid-term review of their achievement in the program.

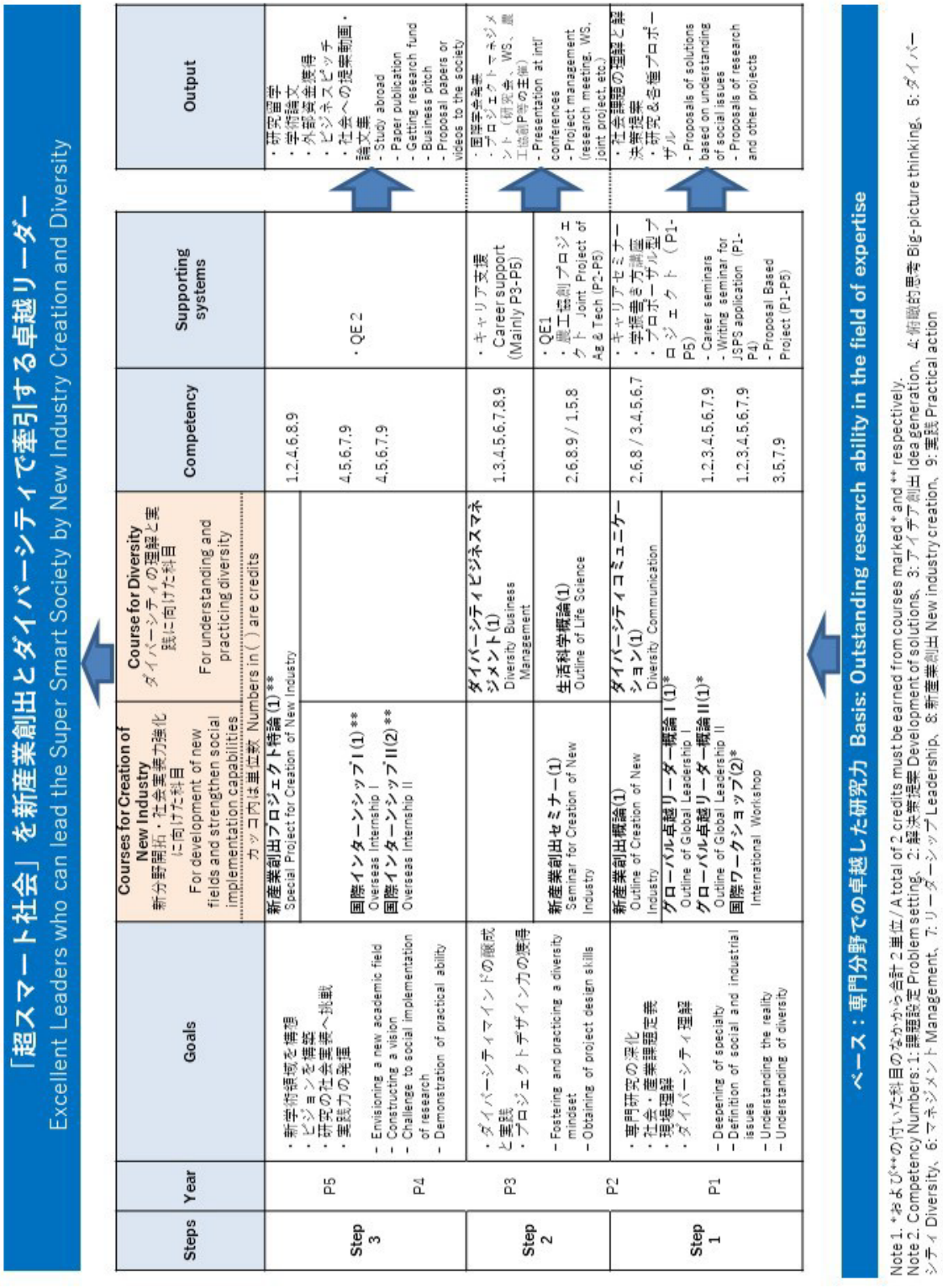
From P3, we will accelerate the strengthening of our research capabilities and at the same time, we will be more active in social implementation and practice. For example, we will engage in global practices such as international joint research and study abroad at overseas partner institutions. Students may also devise commercialization ideas based on the results of their research and challenge business idea contests, or, if they wish, utilize the "Agriculture-Industry Cooperative Creation Project Funding Support System" to engage in agriculture-industry cooperative creation research, prototype production, demonstration experiments, and other practical activities. In the diversity course, students learn the importance of diversity management in academia and industry based on case studies, with a view to after graduation. In the final course, students will develop a vision of the society they wish to create with their research at its core, boldly envision new academic fields and new industries to be pioneered, and work to develop the organizations necessary to achieve these visions and demonstrate them to society. When appropriate, the students can receive advice from leading researchers within the university, faculty members with experience in social implementation, and partner companies.

In P5, each student works toward the completion of the doctoral program in his/her department. If the student is expected to complete the doctoral program, he/she will undergo the Qualifying Examination (QE2), which is the final examination of his/her achievement in the WISE Program in practical skills, diversity acquisition, and leadership for the creation of new industries and the development of new academic fields. Upon successful

completion of the QE2, a statement of completion of the Graduate Program for Graduate Excellence will be affixed to the student's degree.

(2) Course Map

Ideally, you should take the three steps of the required courses according to this curriculum map. Please work to achieve the goals and output of each step.



2. Courses and requirements

Students in the WISE Program belong to the Graduate School of Agriculture, the Graduate School of Engineering, the United Graduate School of Agricultural Science, the Cooperative Division of Veterinary Sciences, or the Graduate School Bio-Applications and Systems Engineering. To graduate, students must meet the study requirements of their departments. In addition, completion of the WISE Program is recognized when the student completes the following courses offered in the WISE Program and passes the QE1 and QE2.

2.1 Overview of courses categories

The following course groups have been arranged to build the foundation of leaders who can drive innovation by linking and integrating agriculture, engineering, and related fields. Categories (1)–(4) below are studied mainly in the periods P1 and P2, while (5) and (6) are studied from P3 to P5.

(1) Basic Courses for TUAT Co-Creation

By learning basic courses relating to agriculture, engineering, and related fields, knowledge essential for appreciating diversity, and the basic science of food and living, students are expected to cultivate specialized knowledge and a cross-cutting perspective to build a foundation for generating innovation.

(2) Basic Courses for Industry-Government-Academia Collaboration

From partner organizations (companies and research institutions) both domestic and overseas, students learn the realities of joint research, and the procedures for securing research funds and reporting on research, and gain a clearer view of the significance in the research and technology development process. Instructors are invited from partner organizations to broaden understanding of technology development in front-line settings such as companies and research centers.

(3) Courses for International Training

Students acquire a basic foundation for leadership in projects that move from problem-exploration to solution. They do this through double degree programs with overseas partner universities, overseas training, studying abroad, overseas joint research, and similar activities. In addition, students learn the process of research and technology development in diverse environments through activities such as practical internships and joint research with partner institutions.

(4) Special Courses for TUAT Co-Creation

Students learn the specialized knowledge of agriculture, engineering, and related fields which forms the core of innovation, and then undergo practical training for putting those specialized skills into practice. In particular, we foster the knowledge and techniques of data mining that enable analysis, evaluation, and examination of multifaceted, large-scale data.

(5) Advanced Courses for TUAT Co-Creation and Industry-Government-Academic Collaboration

Students acquire a foundation enabling formation and management of groups capable of bringing out the best performance from the diverse human resources with various backgrounds needed in research and technology development at universities, research institutions, and companies.

(6) Advanced Exercise for TUAT Co-Creation and Industry-Government-Academic Collaboration

By proposing practical projects using the student's own specialized knowledge, and collaborating with people in the field and partner organizations in Japan and overseas, students learn problem-solving techniques and specific examples of approaches and management for creating new industries.

(7) Courses for Special Evaluation

Students can apply for credits and competencies in this course group, if they voluntarily attend extracurricular seminars and courses and meet certain conditions aiming to become an outstanding global PhD candidate. Those credits cannot be included in the credits required for QE and completion of the WISE Program.

2.2 Course table (For regular students enrolled from P1)

科目群 Subject category	科目名 Course name	単位数 Number of credits		P1				P2					P3				P4				P5				
		必要数 Required number	科目別 Credits	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q		1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
農工協創基盤 科目群 Basic Subjects for TUAT Co-Creation	ダイバーシティコミュニケーション Diversity Communication	2	1	◎	◎			◎	◎																
	生活科学概論 Outline of Life Science		1			◎				◎															
	データサイエンス概論 Outline of Data Science		1			○				○															
産官学連携科目群 Basic Subjects for Industry-Government-Academia Collaboration	新産業創出概論 Outline of Creation of New Industries	2	1	◎				◎																	
	新産業創出セミナー Seminar for Creation of New Industries		1					◎	◎	◎	◎														
国際科目群 Subjects for International Training	グローバル卓越リーダー概論Ⅰ Outline of Global Leadership I	2	1	●	●			●	●																
	グローバル卓越リーダー概論Ⅱ Outline of Global Leadership Ⅱ		1			●	●			●	●														
	国際交流ワークショップ* International Workshop		2			●				●		QE1													QE2
農工協創専門科目群 Special Subjects for TUAT Co-Creation	国内外実習Ⅰ* Practical Training in Domestic and Overseas I	2	2	◎	◎	◎	◎	◎	◎	◎	◎														
	国内外実習Ⅱ* Practical Training in Domestic and Overseas Ⅱ		2	○	○	○	○	○	○	○	○														
	データサイエンス演習 Exercise for Data Science		1				○				○														
農工協創産官学連携国際科目群 Advanced Subjects for TUAT Co-Creation and Industry-Government-Academia Collaboration	ダイバーシティビジネスマネジメント Diversity Business Management	1	1												◎	◎			◎	◎			◎	◎	
	新産業創出特別セミナー Special Seminar for Creation of New Industries		1												○	○			○	○			○	○	
農工協創産官学連携国際演習科目群 Advanced Excerceise for TUAT Co-Creation and Industry-Government-Academia Collaboration	新産業創出プロジェクト特論 Special Project for Creation of New Industries	1	1										●	●	●	●	●	●	●	●	●	●	●	●	
	国際インターンシップⅠ* Oversea Internship I *		1										●	●	●	●	●	●	●	●	●	●	●	●	
	国際インターンシップⅡ* Oversea Internship II *		2										●	●	●	●	●	●	●	●	●	●	●	●	
特別評価科目群 Subjects for Special Evaluation	卓越大学院展開セミナーⅠ* Extended WISE Seminar I	0	1	随時 As needed									随時 As needed												
	卓越大学院展開セミナーⅡ* Extended WISE Seminar II		1	随時 As needed									随時 As needed												
	卓越大学院展開セミナーⅢ* Extended WISE Seminar III		1	随時 As needed									随時 As needed												

◎: Required, ●: Required elective , ○: Recommended, *: Transferable Course

*：Transferable Course (The courses in your department and your activities, etc. are transferable with each course by applying with "WISE Program Credit Application Document")

For transferring courses, courses offered in the student's department and/or activities applicable to transferring can be transferred upon applying them with "WISE Program Credit Application Form."
Please check "2.7 Credit Transfer Application" for more details before applying

2.3 Completion requirements

To complete the WISE Program, students must meet the completion requirements of their department, and pass the QE below or "Section 2.5" of WISE Program.

✔ QE1 (Basic abilities as WISE Ph.D. holders) requirements

In order to take QE1, students must have the expectation of passing the final offence of the master's thesis in their departments and have acquired 8 credits or above in total from the following courses.

TUAT Collaboration Basic Courses	2 credits or above
Basic Courses for Industry-Government-Academia Collaboration	2 credits
Courses for International Training	2 credits or above
Special Courses for TUAT Co-Creation	2 credits or above

* Students wishing to complete the program in a shorter period can consult with us.

✔ QE2 (Abilities as WISE Ph.D. holders) requirements

In order to take QE2, students must have the expectation of passing the final offence of the doctoral thesis in their departments and have acquired 2 credits or above in total from the following courses.

Advanced Courses for TUAT Co-Creation and Industry-Government-Academia Collaboration	1 credit or above
Advanced Exercise for TUAT Co-Creation and Industry-Government-Academia Collaboration	1 credit or above

* Students wishing to complete the program in a shorter period can consult with us.

2.4 Transferred students from P3

(1) Completion Requirements

Students transferred from P3 to the integrated doctoral course, or only the doctoral portion of the integrated course, must meet all of the following requirements in order to complete the WISE Program.

1 Students must meet the completion requirements in the department to which each student belongs and have acquired 6 credits or above in total of "Diversity Communication (1 credit)," "Outline of Creation of New Industries (1 credit)," "Outline of Global Leadership I (1 credit)," and "Outline of Global Leadership II (1 credit)," in addition to the QE2 completion requirements credits (2 credits or above) in 2.5 - namely "Diversity Business Management (1 credit)" and "Special Project for Creation of New Industries(1 credit)".

2 The student must take and pass Qualifying Examination 2 (QE2) and Ph.D. defense.

(2) Course table (For transferred students from P3)

科目群 Subject category	科目名 Course name	単位数 Number of credits		P3				P4				P5				
		必要数 Required number	科目別 Credits	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
農工協創基盤 科目群 Basic Subjects for TUAT Co-Creation	ダイバーシティコミュニケーション Diversity Communication	1	1	◎	◎			◎	◎			◎	◎			
	生活科学概論 Outline of Life Science		1			○				○				○		
	データサイエンス概論 Outline of Data Science		1			○				○				○		
産官学連携科目群 Basic Subjects for Industry-Government-Academia Collaboration	新産業創出概論 Outline of Creation of New Industries	1	1	◎				◎				◎				
	新産業創出セミナー Seminar for Creation of New Industries		1													
国際科目群 Subjects for International Training	グローバル卓越リーダー概論Ⅰ Outline of Global Leadership I	2	1	◎	◎			◎	◎			◎	◎			
	グローバル卓越リーダー概論Ⅱ Outline of Global Leadership II		1			◎	◎			◎	◎			◎	◎	
	国際交流ワークショップ* International Workshop		2			○				○				○		QE2
農工協創専門科目群 Special Subjects for TUAT Co-Creation	国内外実習Ⅰ* Practical Training in Domestic and Overseas I	0	2													
	国内外実習Ⅱ* Practical Training in Domestic and Overseas II		2													
	データサイエンス演習 Exercise for Data Science		1				○				○				○	
農工協創産官学連携国際科目群 Advanced Subjects for TUAT Co-Creation and Industry-Government-Academia Collaboration	ダイバーシティビジネスマネジメント Diversity Business Management	1	1			◎	◎			◎	◎			◎	◎	
	新産業創出特別セミナー Special Seminar for Creation of New Industries		1			○	○			○	○			○	○	
農工協創産官学連携国際演習科目群 Advanced Excerceise for TUAT Co-Creation and Industry-Government-Academia Collaboration	新産業創出プロジェクト特論 Special Project for Creation of New Industries	1	1	●	●	●	●	●	●	●	●	●	●	●	●	
	国際インターンシップⅠ* Oversea Internship I *		1	●	●	●	●	●	●	●	●	●	●	●	●	
	国際インターンシップⅡ* Oversea Internship II *		2	●	●	●	●	●	●	●	●	●	●	●	●	
特別評価科目群 Subjects for Special Evaluation	卓越大学院展開セミナーⅠ* Extended WISE Seminar I	0	1	随時 As needed												
	卓越大学院展開セミナーⅡ* Extended WISE Seminar II		1	随時 As needed												
	卓越大学院展開セミナーⅢ* Extended WISE Seminar III		1	随時 As needed												

◎: Required, ●: Required elective , ○: Recommended, *: Transferable Course

*：Transferable Course (The courses in your department and your activities, etc. are transferable with each course by applying with "WISE Program Credit Application Document")

For transferring courses, courses offered in the student's department and/or activities applicable to transferring can be transferred upon applying them with "WISE Program Credit Application Form."

2.5 Qualifying Examinations (QE)

In the WISE Program, at the P2 and P5 stages, the degree of achievement of the research and other abilities to be acquired in this program is evaluated. Please understand well the "Goals to be achieved" shown below, and engage in research, courses, and activities up to that point.

The following is an overview. For more detail please check the notification to the target person and the related forms.

(1) QE1 (Basic abilities as WISE Ph.D. holders) requirements

In order to take QE1, students must have the expectation of passing the final offence of the master's thesis in their departments and acquire 8 credits or above in total from the following courses.

TUAT Collaboration Basic Courses	2 credits or above
Basic Courses for Industry-Government-Academia Collaboration	2 credits
Courses for International Training	2 credits or above
Special Courses for TUAT Co-Creation	2 credits or above

* Students wishing to complete the program in a shorter period can consult with us.

(2) Goals and conditions of QE1

Goals to accomplish

QE1 is a midterm evaluation in WISE program. The student must establish a foundation as a leader, with a combined foundation in agriculture and engineering, insight, and high-level research capabilities in a specialized field, as well as innovation-generation abilities, international deployment abilities, and human abilities.

Requirements to pass the QE1

The student must have an understanding of various scientific and technical domains and an appreciation of diversity, a foundation for social implementation abilities and international deployment abilities achieved through practical education making active use of industry-government-academia collaboration and overseas partnerships, and the ability to understand a specialization and fields related to it.

Eligibility

Students who are expected to pass the master's thesis defense in their own major and to acquire the minimum credits (8 credits) required for the WISE program.

Time of evaluation

1–2.5 years after the start of P1. Conduct twice a year (January-February and July-August) in principle. Depending on the completion time of the master's thesis, it will be conducted in the spring and autumn. For students who have completed a master's course in shorter period, they can choose when to do it.

Contents

1. Document screening (created either in English or Japanese)
2. Presentation screening (half or more of the presentation and Q&A must be done in English)

Evaluation

Evaluation is performed from the achievements, competency and goals/planning.

Competency evaluation include the following two points:

1. Numerical quantification, based on grades, of the competency in the courses (70%).
2. Observation and evaluation by multiple people, including self-evaluation, advisor, WISE professors, and WISE appointed professors (30%).

Documents to be submitted

1. Report for QE1 (Form 2) * The form is available in the shared Google Drive for downloading.
2. Portfolio document (PDF)

Others

- The date, time, and venue of QE1 will be determined by the WISE Program Committee, and will be conducted jointly and openly within the WISE Program (participants from outside will be required to submit a confidentiality agreement).
- Chair of the screening committee will be a committee member of the WISE Program Committee.
- Judges will refer to the submitted documents, the presentation and interview, and the result of the observation evaluation.
- After the QE1, the chair will report the results to the director of WISE Program Committee using Form 3.

(3) QE2 requirements (Examination of abilities as WISE Ph.D. holders)

In order to take QE2, students must have the expectation of passing the final offence of the doctoral thesis in their departments and have acquired 2 credits or more in total from the following courses.

Advanced Courses for TUAT Co-Creation and Industry-Government-Academia Collaboration	1 credit or above
Advanced Exercise for TUAT Co-Creation and Industry-Government-Academia Collaboration	1 credit or above

* Students wishing to complete the program in a shorter period can consult with us.

(4) Goals and conditions of QE2

Goals to accomplish

The student must be a leader with expertise/specialty through agri-engineering collaboration, insights in the core specialized field, the ability to independently carry out researches and projects, and international deployment abilities and human abilities with the diversity mindset.

Requirements to pass the QE2

The student must have an understanding of various scientific and technical domains and an appreciation of diversity, social implementation abilities achieved through practical research making use of industry-government-academia collaboration and overseas partnerships, the ability to deploy these abilities internationally, and the ability to achieve a big-picture understanding of specialization and related fields.

Eligibility

Students who are expected to pass the doctoral thesis defense in their own major and to acquire the minimum credits (2 credits, or 6 credits for those students who enrolled from P3) required for the WISE program.

Time of evaluation

2.5 - 3 years after the start of P3. Conduct twice a year (January-February and July-August) in principle. For students who have completed a doctoral course in shorter period, they can choose when to do it.

Contents:

1. Document screening (created either in English or Japanese)
2. Presentation screening (half or more of the presentation and Q&A must be done in English)

Evaluation

Evaluation is performed from the achievements, competency and goals/planning.

Competency evaluation include the following two points:

1. Numerical quantification, based on grades, of pertinent competency in studied courses (70%)
2. Observation and evaluation by multiple people, including self-evaluation, advisor, WISE professors, and WISE specially appointed professors (*TOKUNIN*s). (30%)

Documents to be submitted

1. QE2 Report (Form 5) * The form is available in the shared Google Drive for downloading.
2. Portfolio document (PDF)

* Other documents may be required. The details will be announced to the target students.

Others

- The date, time, and venue of QE1 will be determined by the WISE Program Committee, and will be conducted jointly and openly within the WISE Program (participants from outside will be required to submit a confidentiality agreement).
- Chair of the screening committee will be a committee member of the WISE Program Committee.
- Judges will refer to the submitted documents, the presentation and interview, and the result of the observation evaluation.
- After the QE1, the chair will report the results to the director of WISE Program Committee using Form 3.

(5) Examination period of QE 1 and 2

QE1 and 2 for the students enrolled in spring:

Early January: Receiving the applications from students

January to February. Implementation of QE1 and QE2

March: Reporting the examination results to each department

QE1 and 2 for the students enrolled in autumn:

Middle of July: Receiving applications from students

July to August: Implementation of QE1 and QE2

September: Reporting the examination results to each department

2.6 Course registration and evaluation

(1) Course registration

Student need to register the courses at the website (Google Form) announced at the beginning of the semester. Students should discuss courses to take with their major supervisor or also with their minor supervisor, plan appropriately, and complete course registration within the specified period.

Note, depending on the course, you will need to enroll/register separately from the above. Therefore, carefully collect the registration information from the orientation guidance and/or the email notifications given at each academic year for details.

If there should be some error in registration, please inquire with the WISE Program Office later mentioned in section 6 of this guideline.

(2) Grades

1. Grading criteria

S, A, B, and C are treated as passing, and credits are awarded. D is non-passing.

2. Checking grades

If you have any questions or other issues regarding your grades, inquire with the WISE Program Office later mentioned in section 5.

2.7 Credit (Transfer) application

Courses with * mark in the list 2.2 and 2.4 are applicable or transferable as WISE credit after the prescribed procedure.

In order for the credit(s) to be granted, the required competencies for each course (refer to the list of competencies) must be fulfilled, and the requirements for each course (number of lectures, goals) must be met. Complete the prescribed procedure by the end of February of the fiscal year to surely impart credit.

For details, please refer to the "Credit Transfer Application Examples" provided separately.

[The procedure for credit application /transfer]

(1) Submit the form 7-1 "TUAT-WISE Credit Transfer Application Plan（単位(互換)申請計画書）"
Submit the form 7-1 by 2 weeks prior to the activity. If it is difficult to submit before the 2 weeks, consult with the lecturer of the course. Also, feel free to contact the lecturer and/or WISE office in case you have any question during the planning.
(2) Consult with the lecturer of the course beforehand
(3) Conduct the activity
(4) Submit the form 7-2 "TUAT-WISE Credit Transfer Application & Report（単位(互換)申請兼実施報告書）"
(5) Report and presentation on the activity content. Basically, the presentation will be scheduled during the WISE student seminar to share and exchange with all WISE students.

2.8 Sharing with WISE forms

All the forms and documents required for WISE program can be obtained from the shared folder.

To access the folder, login using your TUAT-ID and its password.

WISE office registers students to share, download and/or read them, so if you cannot open the folder, contact WISE program office.

- Forms and documents for download use
  "WISE-TUAT_Data Share_Download_ダウンロード資料共有"
- Forms and documents for viewing only
  "WISE-TUAT_Data Share_Just for Seeing_閲覧のみデータ共有"

3. Financial Support for Students' Proposing Activities

The WISE Program has the following expense supports so that students can actively take on the research and projects aimed at by this program. Please consult with your academic advisor when applying. Students should take initiatives in planning and implementing, and if they receive support, they are supposed to submit reports to the program. They also need to record the activities in the portfolio system described later.

① Proposal-based project

Program supports expenses for individual students' activities such as research activities, research-related events, and internships as research practices to deepen and develop your own research (other than RA expenses). You need to make a proposal, apply, and be adopted after the screening.

② Joint Project for Agriculture and Engineering

Program supports expenses for joint projects among students with different specialties for activities such as research, demonstration, and prototype production that challenge the creation of new academic fields and new industries (other than RA expenses). You need to form a team of two or more program students from different specialized fields, make a proposal, apply, and be adopted after the screening.

③ RA (Research Assistant) expenses

Program supports RA expenses that you will pay to yourself for conducting research activities. You need to apply and be adopted in the screening.

④ Master's study abroad expenses

Program supports a part of the study abroad expenses to encourage master's students to study abroad.

4. Special evaluation

Apart from the regular courses in WISE Program, we will grant credits or evaluate competencies for the following activities in order to encourage students to become outstanding global PhD holders in order to encourage them.

(1) Extended WISE Seminar I, II, and III

If the students voluntarily engaged in input-based learning activities such as attending seminars and lectures that have academic significance, we will evaluate them and grant credits and competencies as the course "Extended WISE Seminar", based on the application from students. Application procedures and evaluations can be done on the portfolio system described below. Details will be provided separately.

The regular courses offered in each department are not applicable to this course application. The earned credits or competency evaluation obtained in these courses cannot be counted in requirements for QE completion of the WISE Program, or observation evaluation that is examined in QE. Those credits and competencies are referred as additional information.

[Examples of targeted seminars]

- WISE Seminars
- Lectures or e-learning which will be announced accordingly

(2) Voluntary activities (tentative title)

Apart from research activities (paper publication, presentations at academic conferences, etc.), if the students voluntarily engaged in output-based activities such as those to exert their specialty, project management, or practical activities, we will evaluate obtained competencies based on the application from the student (credits will not be given).

Application procedures and evaluations can be done on the portfolio system described below. Details will be provided separately.

[Examples of activities]

- Start up and entrepreneurial activities
- Volunteer activities at NGOs/NPOs
- Workshop facilitation
- Participation in and operation of robot contest
- Management and planning of youth associations
- TA/RA (teaching work)
- Part-time teacher
- Exhibition of your work
- Information transmission related to science and culture, commentary, etc.

5. Portfolio system

The portfolio system for education is a system that records various learning, research outcomes and activities of the students, and allows them and faculty members to share and utilize the learning process, growth and educational effect.

Students can utilize this system by accumulating their actions and learning and objectively understanding them to identify their current position with respect to their goals, confirm necessary elements, and modify strategies for achieving them. In addition, they can use those records in such as resume or CV to appeal externally what kind of knowledge, experience, technology and evaluation you have received.

The WISE Program introduced this portfolio system to share the students' progress and achievements in the WISE courses and to make the observation evaluation, competency evaluation (see "1.4 Visualization of learning through competency evaluation") and special evaluation, etc. on this system.

Since this portfolio system can be accessed from off-campus via such as smartphones, students can check and reflect effectively how your experience in this program has led to your own growth anytime.
The details will be announced later.

6. Inquiries

If you have any questions about the course of study, please address your inquiry to one of the following contacts.

[WISE Program Office]

- Fuchu
  Global Information Office, 1F, Main Building
  Tel.: 042-367-5615 (Shibata, Ozaki) / 5618 (Ichijo)
- Koganei
  Room 403, Building 13
  Tel.: 042-388-7773 (Wang)

[Specially appointed faculty members (*TOKUNIN*) for WISE Program]

- Sakae Shibusawa (Part time) sshibu@cc.tuat.ac.jp
- Yoko Ichijo (Mainly in Fuchu) ykichijo@cc.tuat.ac.jp
- Hirokazu Ozaki (Mainly in Fuchu) ozakihirokazu@go.tuat.ac.jp
- Wang Duo (Mainly in Koganei) wangduo@go.tuat.ac.jp

[Administration staffs for WISE Program]

- Reina Shibata (In Fuchu) fw2365@go.tuat.ac.jp
- Riseko Takasaki (In Koganei) tkkyomu1@cc.tuat.ac.jp

Appendix

(1) Partner Organizations

Ten partner organizations and fields

Kubota Corporation	AI agricultural machinery, ICT agriculture, robots
Aeon Agri Create Co., Ltd.	Agricultural production management, distribution, weather data
Shimadzu Corporation	Measurement systems, image big data
Japan Automobile Research Institute	Self-driving systems, mobility
Japan Agricultural Corporation Association	Agricultural management surveys and research, smart agriculture
TAMA (Technology Advanced Metropolitan Area) Industrial Vitalization Association	Industry-academia collaboration, research and development support
Leave a Nest Co., Ltd.	Development of problem proposal abilities, agribusiness
Recruit Career Co., Ltd.	Doctoral capabilities, doctoral career placement systems
Jissen Women's University	Specialized education in nutrition science, development of women in the sciences
AgVenture Lab	Agriculture & Food, Life & Community, Technology & Innovation

Overseas partner universities and type of collaboration

Oxford University	Mutual exchange, international workshops
ZALF Germany	Mutual exchange, international joint research
University of Bonn	International joint research, student exchange
Gadjah Mada University	Double degrees, overseas training programs
Vietnam National University of Forestry	Student exchange, overseas training programs
Cornell University	Student exchange, international workshops
University of California, Davis	Double degrees, international workshops
North Carolina State University	International joint research

(2) Competency list

Subject group	Subject name	Conceptual				Human			Technical	
		Problem setting	Development of solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
I. Basic Subjects for TUAT Co-Creation	Diversity Communication			1	1	1	1	1		
	Outline of Life Science	1				1			1	
	Outline of Data Science	1	1	1	1				1	
II. Basic Subjects for Industry-Government-Academia Collaboration	Outline of Creation of New Industries		1				1		1	
	Seminar for Creation of New Industries		1				1		1	1
III. Subjects for International Training	Outline of Global Leadership I	1	1	1	1	1	1	1		1
	Outline of Global Leadership II	1	1	1	1	1	1	1		1
	International Workshop			2		2		2		2
IV. Special Subjects for TUAT Co-Creation	Practical Training in Domestic and Overseas I		2			2		2		2
	Practical Training in Domestic and Overseas II		2			2		2		2
	Exercise for Data Science	1	1	1	1				1	1
V. Advanced Subjects for TUAT Co-Creation and Industry-Government-Academia Collaboration	Diversity Business Management	1		1	1	1	1	1	1	1
	Special Seminar for Creation of New Industries	1	1	1	1	1	1	1	1	1
VI. Advanced Excerceise for TUAT Co-Creation and Industry-Government-Academia Collaboration	Special Project for Creation of New Industries	1	1		1		1		1	1
	Overseas Internship I				1	1	1	1		1
	Overseas Internship II				2	2	2	2		2

(3) Syllabus

See also SPICA.

AY2022, Courses and Faculty in charge

科目群 Subject category	科目名 Course name	単位数		2022年度 担当教員 Name of the instructors in AY2021 ★Principal *TOKUNIN*
		必要数 Required number	科目別 Credits	
農工協創基盤 科目群 Basic Subjects for TUAT Co-Creation	ダイバーシティコミュニケーション Diversity Communication	2	1	古谷、岩田、★一條 Furuya, Iwata, ★Ichijo
	生活科学概論 Outline of Life Science		1	実践女子：於保、白尾 農工大：吉野、★一條 Jissen Women's Univ.：Oho, Shirao TUAT：Yoshino, ★Ichijo
	データサイエンス概論 Outline of Data Science		1	近藤、★王 Kondo, ★Wang
産官学連携科目群 Basic Subjects for Industry-Government-Academia Collaboration	新産業創出概論 Outline of Creation of New Industries	2	1	滝山、大川、★尾崎 Takiyama, Ookawa, ★Ozaki
	新産業創出セミナー Seminar for Creation of New Industries		1	斎藤、澁澤、★尾崎 Saito, Shibusawa, ★Ozaki
国際科目群 Subjects for International Training	グローバル卓越リーダー概論Ⅰ Outline of Global Leadership I	2	1	五味、★一條、小林、尾崎、王 Gomi, ★Ichijo, Kobayashi, Ozaki, Wang
	グローバル卓越リーダー概論Ⅱ Outline of Global Leadership II		1	五味、★一條、小林、尾崎、王 Gomi, ★Ichijo, Kobayashi, Ozaki, Wang
	国際交流ワークショップ* International Workshop		2	吉田、大津、船田、五味、一條、小林、尾崎、王 Yoshida, Otsu, Funada, Gomi, Ichijo, Kobayashi, Ozaki, Wang
農工協創専門科目群 Special Subjects for TUAT Co-Creation	国内外実習Ⅰ* Practical Training in Domestic and Overseas I	2	2	斎藤、★王 Saito, ★Wang
	国内外実習Ⅱ* Practical Training in Domestic and Overseas II		2	斎藤、★王 Saito, ★Wang
	データサイエンス演習 Exercise for Data Science		1	近藤、★王 Kondo, ★Wang
農工協創産官学連携国際科目群 Advanced Subjects for TUAT Co-Creation and Industry-Government-Academia Collaboration	ダイバーシティビジネスマネジメント Diversity Business Management	1	1	吉田、岩田、★一條 Yoshida, Iwata, ★Ichijo
	新産業創出特別セミナー Special Seminar for Creation of New Industries		1	笹原、★尾崎 Sasahara, ★Ozaki
農工協創産官学連携国際演習科目群 Advanced Excerceise for TUAT Co-Creation and Industry-Government-Academia Collaboration	新産業創出プロジェクト特論 Special Project for Creation of New Industries	1	1	大津、★尾崎、一條、王 Ohtsu, ★Ozaki
	国際インターンシップⅠ* Oversea Internship I *		1	笹原、豊田、★尾崎 Sasahara, Toyoda, ★Ozaki
	国際インターンシップⅡ* Oversea Internship II *		2	笹原、豊田、★尾崎 Sasahara, Toyoda, ★Ozaki
特別評価科目群 Subjects for Special Evaluation	卓越大学院展開セミナーⅠ* Extended WISE Seminar I	0	1	五味、★一條 Gomi, ★Ichijo
	卓越大学院展開セミナーⅡ* Extended WISE Seminar II		1	五味、★一條 Gomi, ★Ichijo
	卓越大学院展開セミナーⅢ* Extended WISE Seminar III		1	五味、★一條 Gomi, ★Ichijo

：必修、●：選択必修、○：推奨

*：互換科目（所属専攻で開講されている科目の履修や、互換に該当する活動を「卓越大学院プログラム単位申請書類」により申請することで互換することができます。）

*：Transferable Course (The courses in your department and your activities, etc. are tranferable with each course by applying with "WISE Program Credit Application Document")

Ⅰ. Basic Courses for TUAT Co-Creation

Course Name: Diversity Communication

Overview

What is diversity and diversity? The course will deepen students' understanding of the nature and reality of diversity from various perspectives. As an outstanding leader, deepen your insight on "leadership," understand the diversity of leadership itself, promote self-understanding based on the leadership assessment. They also develop communication skills as a leader that are effective for collaborative projects with diverse people.

Ultimately, students will acquire a mindset and skills that can be applied to group work in courses offered at the same time and to various projects they will undertake in the future.

This course is offered in the first semester.

Standard of achievement

- Can give his/her own definition and opinion on diversity.
- Understand the diversity of leadership and be able to envision their ideal leader.
- Based on the above opinions and ideas, take a leadership role that considers and includes diversity in the projects in which you participate as part of your research and other activities, and communicate optimally with members.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
		1	1	1	1	1		

Class content

Session 1 (1 session) Wednesday, July 6, 13:00-14:30

1. lecture and discussion: basic understanding of diversity and inclusion
2. lecture and discussion: understanding diversity in leadership

Sessions 2-4 (3 sessions) Saturday, July 16, 9:00-14:30

Leadership Assessment, Self-Understanding

Conceptual Training

Sessions 5-7 (3 sessions) Saturday, July 30, 9:00-14:30

Communication Skills Training

Session 8 (1 session) Report Assignment

*In principle, classes will be conducted in English.

Prerequisites, related information

A required course for all WISE Program students.

Texts, textbooks

Slides are used as the main text. Other materials are distributed as necessary.

Reference books

None specified.

Grading method

50% evaluation of class discussions and presentations, 50% evaluation of report assignments

A word from the teaching staff
Through this lecture, we hope you will deepen your understanding of diversity, improve your communication skills with diverse people, expand your perspectives in research and other activities, and hone your effective team management skills.
Keywords
Diversity, communication, and leadership
Office hours
Provided as needed.

Course Name: Outline of Life Science

Overview

As one of the diversity subjects, this course will be a subject to learn and think about the diversity and many aspects and events of the life of doctors (Ph.D. holders).

In the first half of the session, students will receive a lecture from an TUAT faculty or invited lecturers on the diversity of doctoral careers.

The second half of the course will focus on work-life balance, child rearing, human development, nutrition education, and other aspects of "human life" that doctors may face in their own lives as well as in their interpersonal relationships.

This course is offered in the second semester.

Standard of achievement

- Gain knowledge about the diversity of doctoral careers, and life events and responses to them for PhDs.
- Build a career plan at this point in time.
- The program is designed to deepen academic knowledge of "human life" as it is faced in daily life and interpersonal relationships.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1				1			1	

Class content

Details will be announced later in the year.

- 1st-3rd Sessions: Knowing and thinking about doctoral careers
- 4th-8th Session: Work-life balance, childcare studies, developmental studies, nutrition education, etc.
- Report Submission

*In principle, classes will be conducted in English.

Prerequisites, related information

Required course for students of the Graduate Program of Excellence in the regular process (Master's admission).
(Students who have already taken this course may also attend.

Texts, textbooks

Printouts handed out when appropriate

Reference books

Introduced accordingly as needed.

Grading method

Lecture participation and attitude 40%, Report 60%

Keywords

PhD career, diversity, work-life balance, childcare/developmental studies, nutrition education

Office hours

Respond accordingly.

Course Name: Outline of Data Science

Overview

Due to the rapid progress of measuring equipment and communication technology, we can now obtain huge amounts of data in a variety of areas ranging from natural phenomena to the social activities of human beings. Data science systematizes methodologies for extracting valuable information from these vast amounts of data, and related fields cover a wide range, including mathematical statistics, information science, machine learning, and information visualization. The purpose of these lectures is for beginners in data science to learn the methodologies of the field by gaining a broad overview of everything from data preprocessing to the basics of machine learning (both unsupervised and supervised). This class also introduces the latest trends in machine learning in order to direct students' interest toward the ever-evolving technology of data science.
This course starts in the last semester. Students need to take this course in the same semester of Data Science Exercise.

Standard of achievement

・Understand the basics of data science
・Understand the basic methods of machine learning (unsupervised and supervised)

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1	1	1				1	

Class content

1st session) Introduction: Data science and machine learning
2nd session) Data science fundamentals: Data Acquisition
3rd session) Data science fundamentals: Data preprocessing
4th session) Unsupervised learning: Clustering, dimensionality reduction
5th session) Supervised learning: Linear regression
6th session) Supervised learning: Support vector machines, decision trees
7th session) Supervised learning: Neural networks
8th session) Future of data science

Prerequisites, related information

Must have mastered fundamentals of linear algebra and mathematical statistics.

Texts, textbooks

Handed out when appropriate.

Reference books

Introduced as appropriate.

Grading method

General evaluation based on grades on mini-tests during lectures and report assignments.

A word from the teaching staff

It is hoped that students will master the basics of data science, and put the techniques to use in actual research.

Keywords

Data processing, machine learning

Office hours

As appropriate

II . Basic Courses for Industry-Government-Academia Collaboration

Course Name: Outline of Creation of New Industries

Overview

(Purpose) This course is designed to deepen students' thinking through case studies in academia as fundamental knowledge for considering how to develop their current research in the future in order to create new fields using their own specialized technologies and implement them in society.
(Overview) Omnibus lecture by the President and 7 other researchers of the University. Eight lectures will be given on the process and issues of how these researchers have grasped society, developed agricultural-and-engineering collaborative research there, and how they have achieved social implementation. Students will consider from what perspective they should look at society in order to link their own research to social implementation, and consider their own future research development from the perspectives of agricultural-engineering collaborative creation (fusion), diversity, and the creation of new industries.

The class will be held every Friday during 4th or 5th period from June to July, and students are required to submit a report based on discussions in the class after the completion of 8 classes. Grades will be determined by class attendance, attendance attitude such as speaking during the question and answer period, and evaluation of the report.

Achievement Criteria

As a basis for acquiring the abilities to boldly envision the future and steadily implement step-by-step, students will have an idea of what is really required, what are the challenges, and what should be done to implement the results of one's own research in society.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
	1				1		1	

Class content

"The first half of each session will be a lecture. Students will consider from what perspective they should look at society in order to further advance their own research techniques and knowledge and turn them into research seeds, as well as the future development of their own research from the viewpoints of agricultural-engineering fusion, diversity, and the creation of new industries. In the latter half of the class, students who have listened to the lecture on "Creation of New Fields through Advanced Research (Power) = Creation of New Industries" will think of their own research and express their opinions on what issues need to be addressed in order to "create new fields and their social implementation through their own specialized technology"

Schedule, time, venue and lecturers:
【4th period…14:45-16:15, 5th period…16:30-18:00 / Fuchu… Lecture hall #1 (1 講)-23, Koganei…L1342】
June 10, 4th period (Koganei): Prof. Tomoko Yoshio (WISE Vice director), Div. Biotech. Life Sci., Inst. Eng.
June 17, 5th period (Koganei) : Prof. Takeshi Suzuki, Div.Sci. Biological System, Inst. Agr.
June 24, 4th period (Fuchu) : Prof. Tetsuya Furuya, Div. Animal Life Sci., Inst. Agr.
July 1, 5th period (Koganei) : Prof. Akihiko Terada, Division of Applied Chemistry, Inst. Eng.
July 8, 4th period (Fuchu) : Prof. Taiichiro Ookawa, Div. Sci. Biological Production, Inst. Agr.
July 15, 5th period (Koganei) : Prof. Kazuhiko Misawa (Vice President), Div. Advanced Applied Physics, Inst. Eng.
July 22, 5th period (Fuchu) : Prof. Kazuhiro Chiba (TUAT President), An Expert of Biological Organic Chemistry (Div. Applied Biological Chemistry)
July 29, 4th period (Fuchu) :Prof. Makoto Yoshida (Vice President), Div. Natural Resources and Ecomaterials, Inst. Agr.

Prerequisites, related information
Offered as a required course of the WISE Program. “Seminar for Creation of New Industries” is closely related. If students of M2 or higher grade who have not attended "Outline of Creation of New Industries 2021" but who has attended "Seminar for Creation of New Industries 2021" wishe to attend "Seminar for Creation of New Industries 2022,", they can receive the credit as "Outline of Creation of New Industries 2022" by attending "Seminar for Creation of New Industries 2022." In this case, please check ON the box to request credit transfer when you register for the course.
Texts, textbooks
Assigned based on the course content.
Reference books
Assigned based on the course content.
Grading method
Submit report after the 8 classes based on the discussion in the class. Grading is done based on class attendance, participation attitude to discussion and report.
Message from the teaching staff
To becoming a high-level human resource with a doctoral degree, please learn examples of social implementation by researchers in agriculture and engineering, and deepen your thinking by replacing them with your own research.
Keywords
Agriculture-engineering collaboration, Social implementation of research output, Society-oriented research, creation of new industries
Office hours
Arranged with the lecturer through WISE faculty.

Course Name: Seminar for Creation of New Industries

Overview

(Purpose) In order to create a new field by one's specialized technology and implement it in society, students will understand how research results are utilized and applied in private companies, comparing them with examples in academia, and deepen their thoughts on how to develop their current research in the future.

(Overview) Corporate uses are positioned as one of the social implementations of research results. Students will learn about the activities of private companies (partner companies of WISE program, etc.) as concrete examples of "creation of new fields using one's own specialized technology and their social implementation." Through this, students will consider from what perspective they should look at society in order to further advance their own research technologies and knowledge and turn them into research seeds, and will consider the future development of their own research from the viewpoints of agricultural-engineering collaborative creation (fusion), diversity, and the creation of new industries. Students will present their thoughts on their future research development in the real world, based on the recognition that "creation of new fields through advanced research capabilities = creation of new industries."

The class will be held every Friday from mid-October to late December (4th or 5th period), and students are required to submit a report based on discussions in the class after the completion of 8 classes. Grades will be determined by class attendance, attendance attitude such as speaking up during the question and answer period, and evaluation of the report.

Achievement Criteria

As a basis for acquiring the ability to boldly envision the future and to steadily implement the results step by step, students will consider how the results of research are being utilized by partner companies and develop ideas about what is required to implement the results of their own research in society, what the issues are, and what they should do, taking into account the activities of both research divisions and private companies.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
	1				1		1	1

Class content

The first half of each session will be a lecture. Students will learn how research results are utilized in corporate activities. They will also consider how they should look at society in order to further advance their own research techniques and knowledge into research seeds, and how they should develop their own research in the future from the viewpoints of agriculture-engineering collaboration (fusion), diversity, and the creation of new industries. In the latter half of the class, students who have listened to the lecture on "Creation of new fields based on advanced research results and steps toward building a super-smart society = creation of new industries" will think of their own research and express their opinions on what issues need to be addressed in order to "create new fields and their social implementation through their own specialized technology."

Prerequisites, related information

Offered to the regular coarse students (enrolled from Master course) as a required subject. This course is closely related with “Outline of Creation of New Industries”.
If students of M2 or higher grade who has attended "Outline of Creation of New Industries 2021" but not attended "Seminar for Creation of New Industries 2021" attend "Seminar for Creation of New Industries

2022," the content of the course will be overlapped with the "Outline of Creation of New Industries 2021." Therefore, in that case, please attend "Outline of Creation of New Industries 2022," instead. The credit can be replaced to that for "Seminar for Creation of New Industries 2022."
In addition, if a student who has not yet attended "Outline of Creation of New Industries 2021" but has attended "Seminar for Creation of New Industries 2021" wishes to attend "Seminar for Creation of New Industries 2022," by attending this "Seminar for Creation of New Industries 2022," the student can receive the credit as "Outline of Creation of New Industries 2022".
In this case, please check ON the box to request credit transfer when you register for the course.

Texts, textbooks

Assigned based on the course content.

Reference books

Assigned based on the course content.

Grading method

Submit report after the 8 classes based on the discussion in the class. Grading is done based on class attendance, participation attitude to discussion and report.

A word from the teaching staff

To becoming a high-level human resource with a doctoral degree, please learn examples of social implementation by private companies in agriculture, engineering ant their related fields, and deepen your thinking by replacing them with your own research.

Keywords

Agriculture-engineering collaboration, Application and social implementation of research output, Creation of new industries

Office hours

Arranged with the lecturer through WISE faculty.

III . Course for International Training

Course Name: Outline of Global Leadership I

Overview

[Purpose]

Understand social and corporate issues, and study and propose solutions through Project-Based Learning (PBL). Students will acquire the ability to explore issues on their own, interview potential customers or users, analyze, and propose business plans for solutions based on scientific thinking. Students will also gain a practical understanding that this series of steps is common to research proposals based on social needs and is an important basic element of both research and business.

In particular, we will strive to make proposals that make the most of our respective expertise and research capabilities, and search for points of contact with society where our own research values and research fields can make a contribution.

Furthermore, based on teamwork, leadership and team management skills will be strengthened.

[Overview]

Each team gathers information on social and corporate issues prepared by the program or the students themselves, including interviews with partner companies, parties involved in the issue, targets (customers), etc., to extract, explore, analyze, and understand the issues. In addition, students will devise a business plan based on new technology as a method for proposing solutions, and learn the steps for building such a plan in a practical manner. In this course, students will receive guidance from industry mentors.

*This course will be held in conjunction with Introduction to Global Excellence Leader II.

Standard of achievement

- Explore and extract issues in society and industry from a global perspective, and define the real issues based on stakeholder surveys.
- Abele to devise an appropriate new technology for the defined problem and present an effective business plan that takes advantage of the new technology as a team.
- Able to use this experience to propose plans for advanced research.
- Acquire communication and team management skills to discuss and reach conclusions while incorporating the opinions of diverse team members in teamwork.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1	1	1	1	1	1		1

Class content

* Registrants will be notified after the schedule is fixed.

Session 1 (1 h) June 20-24 (Video viewing)

Introduction of the assignment and preparation of the pitch

Session 2 (2.5 hrs) June 29 (Wed) 15:30-18:00

Team building, lectures "How to promote teamwork" and "Needs assessment methods"

Session 3 (2.5 hrs) July 28 (Thu) 9:00-12:00

Needs Assessment Debriefing, Lek "Business Planning"

Session 4 (7 hrs) August 6 (Sat) and 7 (Sun)

New technology-based business plan review meeting (2-day intensive)

Session 5 (3.5 hrs) September 16 (Fri) 13:00-16:30

Business Plan Competition

Final report

*In addition to the above class participation, team activities are required.
*In principle, classes will be conducted in English.

Prerequisites, related information
This course is offered as an elective required course for the Graduate Program of Excellence (required for third-year transfer students). This course must be taken together with "Introduction to Global Excellence Leader II".
Texts, textbooks
Provided accordingly.
Reference books
Discovered by each student based on identified problems.
Grading method
Contribution to group activities, content of presentations, attitude toward the course as a whole 70% Report 30%
A word from the teaching staff
We hope that you will actively participate in problem-solving and group activities to strengthen the perspective required to bridge academia and industry, and use the opportunity to acquire skills that can be applied to the future experience of corporate collaborative research and the creation of new industries/fields.
Keywords
PBL, social issues, corporate issues, needs assessment, team management
Office hours
Offered by a faculty member in charge of the WISE Program.

Course Name: Outline of Global Leadership II

Overview

[Purpose]

Understand social and corporate issues, and study and propose solutions through Project-Based Learning (PBL). Students will acquire the ability to explore issues on their own, interview potential customers or users, analyze, and propose business plans for solutions based on scientific thinking. Students will also gain a practical understanding that this series of steps is common to research proposals based on social needs and is an important basic element of both research and business.

In particular, we will strive to make proposals that make the most of our respective expertise and research capabilities, and search for points of contact with society where our own research values and research fields can make a contribution.

Furthermore, based on teamwork, leadership and team management skills will be strengthened.

[Overview]

Each team gathers information on social and corporate issues prepared by the program or the students themselves, including interviews with partner companies, parties involved in the issue, targets (customers), etc., to extract, explore, analyze, and understand the issues. In addition, students will devise a business plan based on new technology as a method for proposing solutions, and learn the steps for building such a plan in a practical manner. In this course, students will receive guidance from industry mentors.

*This course will be held in conjunction with Introduction to Global Excellence Leader I.

Standard of achievement

- Explore and extract issues in society and industry from a global perspective, and define the real issues based on stakeholder surveys.
- Abele to devise an appropriate new technology for the defined problem and present an effective business plan that takes advantage of the new technology as a team.
- Able to use this experience to propose plans for advanced research.
- Acquire communication and team management skills to discuss and reach conclusions while incorporating the opinions of diverse team members in teamwork.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1	1	1	1	1	1		1

Class content

* Registrants will be notified after the schedule is fixed.

Session 1 (1 h) June 20-24 (Video viewing)

Introduction of the assignment and preparation of the pitch

Session 2 (2.5 hrs) June 29 (Wed) 15:30-18:00

Team building, lectures "How to promote teamwork" and "Needs assessment methods"

Session 3 (2.5 hrs) July 28 (Thu) 9:00-12:00

Needs Assessment Debriefing, Lek "Business Planning"

Session 4 (7 hrs) August 6 (Sat) and 7 (Sun)

New technology-based business plan review meeting (2-day intensive)

Session 5 (3.5 hrs) September 16 (Fri) 13:00-16:30

Business Plan Competition

Final report

*In addition to the above class participation, team activities are required. *In principle, classes will be conducted in English.
Prerequisites, related information
This course is offered as an elective required course for the Graduate Program of Excellence (required for third-year transfer students). This course must be taken together with "Introduction to Global Excellence Leader II".
Texts, textbooks
Provided accordingly.
Reference books
Discovered by each student based on identified problems.
Grading method
Contribution to group activities, content of presentations, attitude toward the course as a whole 70% Report 30%
A word from the teaching staff
We hope that you will actively participate in problem-solving and group activities to strengthen the perspective required to bridge academia and industry, and use the opportunity to acquire skills that can be applied to the future experience of corporate collaborative research and the creation of new industries/fields.
Keywords
PBL, social issues, corporate issues, needs assessment, team management
Office hours
Offered by a faculty member in charge of the WISE Program.

Course Name: International Workshop

Overview

International exchange workshops with overseas partner institutions WISE Program will be held online.
In the workshop, participants will discuss global issues and solutions based on scientific evidence in English, focusing on their own research themes and interests, and from the viewpoints of agriculture-engineering collaboration and smart society.
In addition, through exchanges with graduate students, faculty members, and researchers belonging to partner institutions, students will cultivate the qualities of global professionals.
This will help students develop language skills, global communication skills, and network building that will lead to the realization of future overseas research study abroad (credits will be awarded for "International Internship I or II"), international joint research, and writing of international co-authored papers.

In AY2022, a joint online workshop with the Leibniz Institute for Agricultural Landscape Research (ZALF) and the University of Bonn in Germany will be held in the second semester.

In addition to the recommended participation in the international exchange workshops conducted by the WISE Program, students may apply for transfer credit for this course if they have other courses in their own major, courses taken in other majors, or other activities equivalent to this course that provide the course content, study hours, achievement standards, and competencies acquired in this course.
For instance, “Steinbeis Training” provided by FLOuRISH Institute of TUAT is subject to apply the credits of this course. For more details, please refer to the "Credit (Transfer) Application Guidelines" to be provided separately.

Standard of achievement

- Deepen understanding of issues facing the world from the perspectives of agriculture-industry cooperation and creation, smart society, etc., and to develop logical thinking and explanatory skills based on scientific evidence.
- Develop discussion skills on cutting-edge research in English
- Develop cross-cultural communication and teamwork skills

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
		2		2		2		2

Class content

■Prior Learning
Acquire and improve skills in communication, discussion, debate, presentation, etc. in English
Research on workshop topics
Acquire basic knowledge of the history, society, and culture of the partner country, etc.
■Workshops
Attend lectures on the theme
Group discussion and group work on themes
Presentation, etc.
■Post-study
Reflection, discussion, presentation
Report Submission

Prerequisites, related information

Attend all pre-study, workshop, and post-study sessions.
Grading method
Attitude 50% ・Working attitude 50% ・Report content

IV . Special Subjects for TUAT Co-Creation

Course Name: Practical Training in Domestic and Overseas I

Overview

To enhance expertise and experience by engaging in discussions and actions with relevant parties with a view to applying the findings obtained through lectures and practical training at the WISE Program and research in the laboratory to real-world situations in Japan and abroad, or to social implementation of research (e.g., connection to commercialization and technology diffusion).

Specifically, the students will identify issue in the field related to their own research and examine from a broad perspective the research, technologies, and other methods that will lead to solutions, as well as deepen their understanding of the field through exchanges of opinions with those involved in the field and those with practical experience where these methods are applied, and trial implementations. The program will also develop the ability to communicate with stakeholders and to implement solutions.

By gaining practical skills and work experience as engineers and researchers in Japan and abroad, the participants will gain confidence in their ability to apply their knowledge in diverse environments and cultivate the flexibility to respond flexibly. In addition, the participants will recognize how their research fields are (or could be) utilized in the field, and utilize them to build their visions.

This course allows students to apply for credits based on their own activities. Students may apply for credit (transfer) for this course if they have their own activities, courses in their own majors, or courses taken in other majors that provide the course content, study hours, targeted achievement standards, and acquired competencies of this course. You may also take advantage of opportunities to present at academic conferences. For details, please refer to the "Guidelines for Credit (Transfer) Application," which will be provided separately.

Standard of achievement

To integrate specialized knowledge, research results, etc. learned in graduate school with practical experience, and to clarify a sense of purpose for specialized knowledge and research.

Specific goals to be achieved are as follows

1. The students will be able to clarify issues in the application, implementation, and development of knowledge and explore the seeds of research, based on examples of how the knowledge and technologies they have learned through their studies and research have been used in real-world settings in Japan and overseas, or how their research has been implemented in society.
2. To raise awareness of safety and environmental concerns in domestic and international settings, and to take a pro-research stance on research ethics, morals, and responsibility.
3. Gain experience in discovering research needs in the real world.
4. In research and the realization of an ideal society, the student will understand the stakeholders surrounding the subject matter, and acquire communication, negotiation, and etiquette skills with these stakeholders of various cultures, generations, etc.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
	2			2		2		2

Class content

This course consists of pre-study, implementation of practical training, and post-study report (report and presentation).

Time allocation will be based on student progress. 1-3 times: Preliminary study (gathering information, reviewing papers, writing a plan, etc.) 4 to 10 times: Practical training 11-15 times: Post-event report (report compilation, data organization, presentation, etc.) Refer to the "Credit (Transfer) Application Guidelines" to be provided separately.
Prerequisites, related information
Willingness to learn and practice in the field at home and abroad.
Texts, textbooks
None
Reference books
None
Grading method
Practical training (50%), report and presentation (50%)
A word from the teaching staff
Discoveries at sites in the field will become seeds of new research, and connect with innovation.
Keywords
Domestic and international training, conference presentations, internships
Office hours
As appropriate

Course Name: Practical Training in Domestic and Overseas II

Overview

To enhance expertise and experience by engaging in discussions and actions with relevant parties with a view to applying the findings obtained through lectures and practical training at the Graduate School of Excellence and research in the laboratory to real-world situations in Japan and abroad, or to social implementation of research (e.g., connection to commercialization and technology diffusion).
This course is developed from Domestic and Overseas Practical Training I. The content and themes of this course are developed from those of Domestic and Overseas Practical Training I.

Specifically, the program will identify issues in the field related to their own research and examine from a broad perspective the research, technologies, and other methods that will lead to solutions, as well as deepen their understanding of the field through exchanges of opinions with those involved in the field and those with practical experience where these methods are applied, and trial implementations. The program will also develop the ability to communicate with stakeholders and to implement solutions.
By gaining practical skills and work experience as engineers and researchers in Japan and abroad, the participants will gain confidence in their ability to apply their knowledge in diverse environments and cultivate the flexibility to respond flexibly. In addition, the participants will recognize how their research fields are (or could be) utilized in the field, and utilize them to build their visions.

This course allows students to apply for credits based on their own activities. Students may apply for credits (transfer credits) for this course if they have their own activities, courses in their own majors, or courses taken in other majors that provide the course content, study hours, targeted achievement standards, and acquired competencies of this course.
For details, please refer to the "Credit (Transfer) Application Guidelines," which will be provided separately.

Standard of achievement

Learn practical skills and techniques, integrate them with practical experience, including specialized knowledge and research results learned in graduate school, and clarify a sense of purpose for specialized knowledge and research.
Specific goals to be achieved are as follows

1. The students will be able to clarify issues in the application, implementation, and development of knowledge and explore the seeds of research, based on examples of how the knowledge and technologies they have learned through their studies and research have been used in real-world settings in Japan and overseas, or how their research has been implemented in society.
2. To raise awareness of safety and environmental concerns in domestic and international settings, and to take a pro-research stance on research ethics, morals, and responsibility.
3. Gain experience in discovering research needs in the real world.
4. To be able to practically match research needs and seeds, and to present the results.
5. In research and the realization of an ideal society, the student will understand the stakeholders surrounding the subject matter, and acquire communication, negotiation, and etiquette skills with these stakeholders of various cultures, generations, etc.
6. To be able to summarize the contents of the study as a report, etc., and respond appropriately to presentations and questions.

Acquisition competencies (The number of competencies gained in case of grade A)								
Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
	2			2		2		2

Class content

This course consists of pre-study, implementation of practical training, and post-study report (report and presentation).
Time allocation will be based on student progress.

1-3 periods: Preliminary study (gathering information, reviewing papers, writing a plan, etc.)
4 to 10 periods Practical training
11-15 periods: Post-event report (report compilation, data organization, presentation, etc.)

Refer to the "Credit (Transfer) Application Guidelines" to be provided separately.

Prerequisites, related information

Willingness to learn and practice in the field at home and abroad.

Texts, textbooks

None

Reference books

None

Grading method

Practical training (50%), report and presentation (50%)

A word from the teaching staff

Discoveries at sites in the field will become seeds of new research, and connect with innovation.

Keywords

Domestic and international training, conference presentations, internships

Office hours

As appropriate

Course Name: Exercises for Data Science

Overview

This is an exercise class linked with Outline of Data Science. The Python programming language is used to carry out practical exercises relating to processing, analysis, and visualization of the data which forms the foundation of data science. In addition, students learn and develop an understanding of basic methods of machine learning (e.g., support vector machines, neural networks).

Standard of achievement

- Learn the fundamentals of python.
- Ability to process and analyze data using Python, NumPy, SciPy, and Pandas.
- Ability to visualize data using matplotlib.
- Ability to practically implement basic machine learning methods using scikit-learn.

Acquisition competencies(The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1	1	1				1	1

Class content

1st session) Orientation, setup of programming exercise environment
2nd session) Fundamentals of Python (variables, data types, control structures)
3rd session) Fundamentals of NumPy (arrays, matrix operations)
4th session) Fundamentals of Pandas (DataFrame construction, data visualization)
5th session) Data visualization (matplotlib)
6th session) Supervised learning using scikit-learn (support vector machines)
7th session) Fundamentals of deep learning
8th session) Summary

Prerequisites, related information

Must take “Outline of Data Science” course before or in the same semester. Good to have programming experience

Texts, textbooks

Handed out as appropriate.

Reference books

Books on Python programming

Grading method

In-class activities (contribution, mini-quiz): 20%
Exercise assignments to check level of understanding (40%)
Final assignment (40%)

A word from the teaching staff

It is hoped that students will master the practical techniques of data science, and use those skills in their own research.

Keywords

Python, NumPy, SciPy, Pandas, scikit-learn

Office hours

Questions will be received at any time by email.

V . Advanced Courses for TUAT Co-Creation and Industry-Government-Academia Collaboration

Course Name: Diversity Business Management

Overview

[Purpose]

In today's business world, where globalization is remarkable, it is extremely important to have management skills to form a group that can maximize the abilities of diverse human resources with various backgrounds, including gender, nationality, language, age, and social experience.

In this class, we will consider the background of the demand for diversity management in academia and business, and its effectiveness, and use case studies of actual diversity-related problems that can occur in society and the workplace to maximize organizational performance as outstanding leaders. The course aims to help participants acquire skills and behaviors related to communication and management that will maximize organizational performance.

[Overview]y

Lectures will be given by both internal and external speakers on diversity business management required in universities, research institutes, and companies. In the second half of the course, case studies related to diversity business management will be conducted in an active learning format, with discussion, communication, and presentations.

This course is offered in the second semester.

Understand the importance of diversity management in academia and business.
The ability to construct one's own opinions on the above and to discuss them with a diverse range of people in a respectful manner.
Develop skills in communication, leadership, and strategy based on diversity and inclusion to maximize organizational performance.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1		1	1	1	1	1	1	1

Class content

The following is a schedule. The detailed schedule will be notified in the second semester.
Session 1 Orientation

- Session 1: Lecture and discussion "What is People Management?", "Case Studies in Academia"
- Session 2: Lecture and Discussion "Diversity Management in Organizations" and "Case Studies in Companies
- Session 3-4: Research, work, training
- Session 5-7: Practice in Workshops
- Session 8: Report

Prerequisites, related information

It is preferred that students have already taken Diversity Communications.

Texts, textbooks

Mainly slides will be used and materials will be distributed as needed.

Reference books

Assigned as appropriate, when necessary

Grading method

Classroom attitude including attendance (20%), discussion and comments during the lecture (40%)

Report (40%)
A word from the teaching staff
Diversity management is extremely important in the increasingly globalized world of academia and business. We hope that you will take the opportunity to think clearly about this and develop your skills.
Keywords
Diversity management
Office hours
Faculty members in charge of the Graduate Program of Excellence will respond to the request.

Course Name: Special Seminar for Creation of New Industries

Overview

[Purpose]Students will develop the ability to conceive projects based on one's own interests and to prepare business plans for the realization of Society 5.0, the "super-smart society". In this course, students will strengthen their ability to plan and propose R&D projects in academia or industry, especially from the viewpoint of "funding".
[Overview]This course is designed for students who are considering commercialization in the doctoral program. Students will learn to conceive a project based on their own interests and to acquire the ability to prepare a business plan for the project, especially to strengthen the concept of financial planning. Students will also improve their planning skills with regard to "finance," which is essential for any project, whether it is a research project or an industrial project. The students will receive advice from experts on the plans they have prepared, and will strengthen their ability to prepare practical business plans.

Courses are scheduled between December (2022) and February (2023). Details will be announced as soon as possible.

Achievement Criteria

Students will gain knowledge of capital and financial planning and the ability to develop effective business plans for both academia and industry.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1	1	1	1	1	1	1	1

Class content

[1st-2nd lesson] (Lecture) Lectures especially on financial planning covering business forms, intellectual property, patents, labor laws, and so on.

[3rd-4th lesson] (Lecture and individual work) Lecture on business plan preparation, with particular focus on financial planning (costs and fundraising).

[5th-6th lesson] (Individual work): Business plan preparation and submission.

[7th-8th lesson] Students will present their business plans and receive advice from the lecturers.

Prerequisites, related information

Offered as a recommended course of the WISE Program. Those who hope to try commercializing and/or have project to commercialize are encouraged to take this course. This course is closely related to “Special project for Creation of New Industries”.

If a student who has attended the "Special Seminar for Creation of New Industries 2021" but has not attended the "Special Project for Creation of New Industries 2021" attends the "Special Project for Creation of New Industries 2022," the content of the course will be overlapped with the "Special Seminar for Creation of New Industries 2021." In this case, please take the "Special Seminar for Creation of New Industries 2022" and can receive the credit as "Special Project for Creation of New Industries 2022.”
In addition, if a student has not attended the "Special Seminar for Creation of New Industries 2021" but has attended the "Special Project for Creation of New Industries 2021" wishes to attend the "Special Project for Creation of New Industries 2022," by attending this course, the students can receive the credit as "Special Seminar for Creation of New Industries 2022".
In this case, please check ON the box to request credit transfer when you register for the course.

Texts, textbooks

Handed out as appropriate.

Reference books
Assigned as appropriate.
Grading method
Comprehensively evaluated based on abilities in problem-setting, conceptualization, creativity, planning/implementation, and integration.
A word from the teaching staff
We hope students will exploit their own specialized knowledge, boldly take up the challenge of adjacent and different fields, and develop the practical problem-solving abilities necessary to be high-level human resources with doctoral degrees in the future.
Keywords
Super Smart Society, Creation of new industries, Business plan document, Business proposal, Financial plan
Office hours
Arranged with the lecturer through WISE faculty.

VI . Advanced Exercise for TUAT Co-Creation and Industry-Government-Academia Collaboration

Course Name: Special Project for Creation of New Industries

Overview

[Purpose]

- How you build "a future society 30 years from now" based on your research as the core while creating what kind of new fields and new industries. Boldly envisioning it and showing it to society, students will have that idea.
- To develop the ability to give a presentation that conveys what you want to say to your audience (you decide what kind of audience you want).
- To discuss with experienced people in industry and academia, and refine the ability to conceive and implement ideas.

[Overview]

The class will be conducted in a setting where students aim to realize an ideal society (realization of a super-smart society) in 30 years by starting a research-and-development project based on their own expertise. Lectures will be given on practical matters and points to keep in mind in order to start a business using research results. Students then make a video proposing their plans (what they want to do, what they can do now, what they want to ask for such cooperation, what they want to do by when, and what they want to accomplish in the end). The video will then be finalized with advice and discussion from the partner companies, etc., as well as with a review of all the learning in WISE Program so far, to summarize the learning in this program.

Courses are scheduled between June and September. Details will be announced as soon as possible.

Achievement Criteria

Students will be able to plan projects and activities while keeping in mind timeline (milestones), based on their own research interests and results (including expected results), and in light of the future society they envision. Students will be able to communicate and present the plan to the audience and gain their understanding.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
1	1		1		1		1	1

Class content

[1st-2nd lesson] (Lecture) Introduction

Students will be given lectures on "How to start an R&D-based business," which will cover the points to keep in mind and practical business operations, assuming that an R&D-based business is to be started.

[3rd-4th lesson] (individual work) Based on the student's own expertise, they will assume that they will conduct an R&D business in order to build a super-smart society 30 years from now. The business plan should be summarized in a 4-5 minute video and a text abstract of about 1/3 of an A4 sheet of paper (further attachments may be provided). The video should include a description of the background and issues in the specialized research field and a plan for research and business development for the future (what you want to do, what you can do, what kind of collaborators you need, and interim goals every 5 years or so).

[5th lesson] (Lecture) Interim presentation of the proposed video: Q&A session among students.

[6th lesson] (Individual work) Afterwards, students will create a revised version of the video.

[7th lesson] The revised video will be viewed by partner companies, faculty members, etc., and advice will be given.

[8th lesson] (Individual work) Finalize and submit the final version of the video.

Prerequisites, related information
Offered as a Required elective course of the WISE Program. If a student who has attended the "Special Seminar for Creation of New Industries 2021" but has not attended the "Special Project for Creation of New Industries 2021" attends the "Special Project for Creation of New Industries 2022," the content of the course will be overlapped with "Special Seminar for Creation of New Industries 2021." In this case, please take the "Special Seminar for Creation of New Industries 2022" and receive the credit as "Special Project for Creation of New Industries 2022. In this case, please check ON the box to request credit transfer when you register for the course.
Texts, textbooks
Handed out as appropriate.
Reference books
Assigned as appropriate.
Grading method
Comprehensively evaluated in terms of abilities such as problem setting, conceptualization, creativity, planning/implementation, appreciation of diversity, and communication.
A word from the teaching staff
We hope students will gain experience in designing the future society with new ideas, utilizing their own specialized knowledge, and cultivating practical abilities to be advanced doctoral candidates.
Keywords
Super Smart Society, R&D-based business, creation of new industries
Office hours
Offered by a faculty member in charge of the WISE Program.

Course Name: Overseas Internship I

Overview

[Purpose] The aim of the WISE Program is to develop globally-active human resources with doctoral degrees. In this course, students experience short-term (*) study abroad or internship at an overseas organization (e.g., university, research institution, company). The aim is to improve English skills and acquire a global experience and perspective.
[Overview] Students participate in a short-term study abroad in overseas organizations. Experience of short-term study abroad or internship serves as a valuable opportunity for acquiring English skills as well as discussion skill with global perspective, and a basis for full-fledged medium/long-term study abroad.

(*)
- Study or internship abroad for 3 weeks or more.
- Or, an internship in Japan of 45 hours or more of actual work time. However, the activity has to include an international perspective and significance, which should be explained in the Application for Credit Transfer (Form 7-1).

Students are allowed to apply for credits (transferring) to this course based on their own activities. When students took the equivalent courses in their or other departments, or when students conducted activities equivalent to this course, in terms of contents, hours, and desired goals and competencies, they may apply for credit transferring to this course. For details, please refer to the Credit Transfer Application Guidelines provided separately.

Standard of achievement

Ability to engage and learning using English. Ability to use English to present research, exchange views, acquire information, and carry out other tasks, acquired by exploiting opportunities for short-term study abroad, etc.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
			1	1	1	1		1

Class content

The international conference or other events to be participated in is determined by students in the WISE Program through consultation with an advisor in light of each student's research plan. Students can study abroad for a short-term at an overseas organization (e.g., university, research institution, company). As pre-learning for these activities, students make preparations to improve their English abilities, and their skills for presentation and discussion in English.

1. 3 months before: Determination of activity details (entry in an international conference, negotiation with destination for short-term study abroad, submission of English abstract)
2. 2 months before: Preparation before activities (improvement of English skills, and learning relating to presentation and discussion in English)
3. 1 month before: Preparation before activities (practice for presentation in English, training for discussion in English)
4. Short-term study abroad or presentation at an international conference, etc.
5. 1 month after: Reflection on specifics of activities (communication with destination for study abroad, identification of problems)
6. Report on results (report submission and English oral presentation and exchange of views at such as WISE joint presentation seminars)

Prerequisites, related information

Students can apply their activity for credit to this course by applying in advance. A required elective course.
Texts, textbooks
Designated by advisor based on specifics of activities.
Reference books
Designated by advisor based on specifics of activities.
Grading method
Evaluated based on report, English presentation, and discussion.
A word from the teaching staff
We recommend students to have overseas experiences.
Keywords
Study abroad at an overseas institution, Discussion in English
Office hours
Offered by a faculty member in charge of the WISE Program.

Course Name: Overseas Internship II

Overview

[Purpose] To develop human resources with doctoral degrees active on the global stage, learning and/or internship at an overseas institution are effective. In this course, students engage in medium/long-term (*) research activities or trainingat an overseas organization (e.g., university, research institution, company). Purposes include: improving English communication abilities, improving ability to engage in international research, carrying out research in English at overseas universities or other institutions, carrying out international joint research, and acquiring the ability to propose commercialization at overseas companies.
[Overview] In medium/long-term (*) study abroad at an overseas organization (university, research institution, company, etc.), students carry out international joint research, participate in related academic meetings, and participate in the international community. After returning to Japan, students continue collaborating in international joint research, and writing international co-authored papers. In internships at overseas companies or other organizations, the purpose is to promote concrete participation in business/projects, and more mature proposal abilities in English.

(*)

- Study or internship in foreign organization for 6 month or more.
- Activities with a global perspective in Japan is accepted for International students.

Students are allowed to apply for credits (transferring) to this course based on their own activities. When students took the equivalent courses in their or other departments, or when students conducted activities equivalent to this course, in terms of contents, hours, and desired goals and competencies, they may apply for credit transferring to this course. For details, please refer to the Credit Transfer Application Guidelines provided separately.

Standard of achievement

Ability to engage in medium/long-term study abroad, and carry out research activities and international joint research in English.
Ability to participate in projects and other activities in internships at overseas companies, etc.

Acquisition competencies (The number of competencies gained in case of grade A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action
			2	2	2	2		2

Class content

Students consult with their advisors regarding progress of their own research, plans for presenting results, and other issues, and engage in medium/long-term overseas study at an overseas organization (university, research institution, company, etc.) or internship at an overseas company. As preparation beforehand for these activities, students improve their ability to carry out research activities, paper writing, presentation, and discussion in English, and this makes it possible to obtain beneficial effects from these activities.

1. 6 months before: Determination of activity details (negotiation with destination for medium/long-term study abroad, negotiation with an overseas company, etc.)
2. 2 months before: Preparation beforehand for activities (improvement of English skills, and improvement of ability to engage in research activities in English)
3. 1 month before: Preparation beforehand for activities (travel-related procedures, preparation of housing and other arrangements in the local area)
4. Medium/Long-term study abroad or internship at overseas company, etc.
5. 1 month after: Reflection on specifics of activities (continued communication with destination of study abroad)

6. Research report (report submission and English oral presentation and exchange of views at such as WISE joint presentation seminars) 7. Continuation after activities: Moving forward with international joint research aimed at writing academic papers
Prerequisites, related information
Students can apply their activity for credit to this course by applying in advance. A required elective course.
Texts, textbooks
Designated by advisor or accepting teaching staff for study abroad based on specifics of activities.
Reference books
Designated by advisor or accepting teaching staff for study abroad based on specifics of activities.
Grading method
Evaluated based on report, English presentation, and discussion.
A word from the teaching staff
We hope students will experience medium/long-term study abroad and carry out international joint research.
Keywords
Medium/Long-term study abroad, international joint research, internship at overseas company
Office hours
Offered by a faculty member in charge of the WISE Program.

VII . Courses for Special Evaluation

Course Name: Extended WISE Seminar I, II, and III

Overview

Apart from the regular courses of the WISE program, "Extended WISE Seminar I, II, and III" in the category of Subjects for Special Evaluation was established in order to encourage students' activities aimed at becoming outstanding global Ph.D. holders who drive the "super smart society" through the creation of new industries and diversity,

In these courses (I, II, and III), when students voluntarily engage in input-based learning activities, such as attending seminars and lectures of high academic significance, which meet the above objectives, students apply for evaluation together with the submission of the report. The faculty members in charge will evaluate the students' performance and grant credits and competencies.

Regular courses offered in students' departments are not eligible for this course. In addition, the credits and competencies earned in these courses are not included in the credits required for QE or the program completion, or the observation/behavior evaluations for QE, but will be referred to as additional information.

※ As a reference, the WISE program may provide recommended seminars that are eligible for this course.
※ Applications can be processed via the portfolio system. If you need any help in the application, just feel free to contact with specially appointed faculty members.
※ As a guide, about 12 hours in total and report making will be considered as one course (1 credit). These seminars do not have to be consecutive and their themes can be different from each other. When submitting the report, however, students should comprehensively explain what you have intended to study and acquire in those seminars and your actual acquisitions.
※The report should be approximately 1500-2000 letters in Japanese; 600-700 words in English per course and should be accompanied by supporting materials that will show the contents of the seminar and lectures. There is no specific form.
※ At the time of application, the students will be asked to indicate the competencies they believe they have gained from those activities, and the faculty members in charge will evaluate and judge based on the reports. As a result, the competencies you earn may differ from your application.

Standard of achievement

・Proactively seize opportunities other than curriculum, independently plan and implement learning activities that are consistent with the purpose of the WISE Program.
・Objectively understand the knowledge, experience, and competencies that should be developed or supplemented in your own growth strategies, and set them to obtain them as goals, and achieve them.
・Report and explain persuasively the outcome of your voluntary learning in the light of your initial goals.
Acquisition competencies (Number of competencies acquired for a grade of A)

Acquisition competencies (Number of competencies acquired for a grade of A)

Problem setting	Development of Solutions	Idea generation	Big-picture thinking	Diversity	Management	Leadership	New industry creation	Practical action

You can apply up to 5 competencies with 1 score for each

Class content

Depends on the seminars and courses.

Prerequisites, related information

None

Texts, textbooks

None

Reference books
None

Grading method
・Report contents (in some cases, an oral explanation may necessary)
A word from the teaching staff
This course is aiming at encouraging your positive extracurricular learning activities, so please join the useful seminars and lectures and reflect those opportunities to this course.
Keywords
Proactive activities, competency acquisition, strategic learning.
Office hours
For each seminar or course, please contact the respective instructor or organizer. For consultation as a subject, please consult with professors (Prof. Gomi and specially appointed faculty members (*TOKUNIN*)) as appropriate.

(4) Overseas business trip procedures

[Before travel]

<table>
<tr><th></th><th>Documents to be submitted</th><th>Deadline</th><th colspan="3">Submission / Document Acquisition</th><th>Remarks</th></tr>
<tr><th></th><th></th><th></th><th>Graduate School of Agriculture</th><th>Graduate School of Engineering / BASE</th><th>United Graduate School of Agriculture</th><th></th></tr>
<tr><td>1</td><td>Study abroad application</td><td>~ 2 months before departure</td><td rowspan="3">(Fuchu)
Student Affairs Section ／
http://t-board.office.tuat.ac.jp/A/menu.php#Boar
（WEB bulletin board, search for academic information tag “学外研究”）</td><td rowspan="3">(Koganei)
Student Affairs Section ／
http://web.tuat.ac.jp/~tkyomu/Tkyomu-site/tkyomu.htm
(List of documents for Faculty of Engineering)
http://www.tuat.ac.jp/base/download/
(List of documents for BASE)</td><td>Office of United Graduate School of Agriculture</td><td>Not available in the homepage of United Graduate School of Agriculture</td></tr>
<tr><td>2</td><td>Travel Notification</td><td>~ 2 weeks before departure</td><td rowspan="2">Office of United Graduate School of Agriculture ／
http://www.tuat.ac.jp/uni-grad/yoshiki/index.html
（homepage）</td><td></td></tr>
<tr><td>3</td><td>Travel pledge</td><td>~ 2 weeks before departure</td><td></td></tr>
<tr><td>4</td><td>Copy of travel overseas insurance purchase voucher</td><td>~ 3 weeks before departure</td><td colspan="3">http://web.tuat.ac.jp/~intl/ja/tuat_student/travelinsurance.html
(Homepage of TUAT International Exchange Office)</td><td></td></tr>
<tr><td>5</td><td>Written pledge regarding international trip</td><td rowspan="2">Approximate payment:
~ 2 months before departure

Settlement payment:
~ 2 weeks before departure</td><td rowspan="2">GIO</td><td rowspan="2">GIO</td><td rowspan="2">GIO</td><td></td></tr>
<tr><td>6</td><td>Notification of Going Abroad</td><td>For whom have not register yet</td></tr>
</table>

[After travel]						
1	Boarding pass	Immediately after returning	GIO	GIO	GIO	If lost, proof of boarding is required.
2	Copy of passport					A page that indicates that you have entered and exited Japan
3	Business travel report					
4	Travel Expenses Invoice					Required for rough payment.
5	Completion report					WISE Program form

Travel FAQ

Q. Will I receive a daily allowance?

A. Daily allowance cannot be provided to students. For domestic and international travel, travel expenses are calculated starting from Tokyo Station or Haneda/Narita airports.

Q. Will I be reimbursed for VISA, ESTA, etc.?

A. You will be responsible for the cost of obtaining VISA and ESTA.

Q. Will I be reimbursed for overseas travel insurance?

A. You are responsible for the cost of travel insurance.

(5) Sharing of information, forms, etc.

- You can download orientation materials, course information, various forms, and other downloadable materials from the following Google Drive " WISE-TUAT_Data Share_Download_ダウンロード資料共有".
  *You must enter with a TUAT-ID.
  https://drive.google.com/drive/u/0/folders/0AC8xsQP3eU3bUk9PVA

- The video recordings of the orientation, which are not available for download but can be viewed, can be obtained from Google Drive " WISE-TUAT_Data Share_Just for Seeing_閲覧のみデータ共有" below.
  *You must enter with a TUAT-ID.
  https://drive.google.com/drive/u/0/folders/0ADpLE4Tv9g8NUk9PVA

- Set of documents required for overseas business trip
  Varies depending on the Graduate School of Agriculture, United Graduate School of Agricultural Sciences, Graduate School of Engineering, and BASE. Normally, procedures should be completed 1.5 to 2 months prior to travel. Please check the necessary procedures carefully with your department well in advance.

- You are subscribed to the following group email (mailing list) according to your year of participation in the Graduate Program of Excellence. You are free to post to the group mail for your year. If you would like to send information to other distinguished students, please inform the specially-appointed faculty members.
  wise_st_2022-groups@go.tuat.ac.jp
  wise_st_2021-groups@go.tuat.ac.jp
  wise_st_2020-groups@go.tuat.ac.jp
  wise_st_2019-groups@go.tuat.ac.jp

(6) Equipment list

Item	Brand code	Location
Tractor	Kubota MR97QMAXWUR	Large farm equipment storehouse
Panel saw	Synchro HP1-1800	Forestry processing room
Speed-linked organic blade for tractors	Kubota CM601WD-OL	Large farm equipment storehouse
Seed drill tractor	Kubota N250-21D	Large farm equipment storehouse
Planer	Iida Industries EJ304	Forestry processing room
Band sawing machine	Audio BS-1100-5AS	Forestry processing room
JINS MEME ES_R Data measurement equipment	JINS MEME ES_R	Faculty of Engineering Bldg. 7 Room 305 (Laboratory)
Gas fire muffle furnace	1-5925-02 HPM-1G	Faculty of Engineering Bldg. 4 Room 401 (Open lab (laboratory))
Digital lock-in amplifier	LI5645	Faculty of Engineering Bldg. 4 Room 401 (Open lab (laboratory))
High Speed Refrigerated Micro Centrifuge	MX-107	Faculty of Engineering Bldg. 10 Room 114 (Student Laboratory)
Haptic feedback device	3D Systems Touch	Faculty of Engineering Bldg. 4 Room 401 (Open lab (laboratory))
Haptic feedback device	3D Systems Touch	Faculty of Engineering Bldg. 4 Room 401 (Open lab (laboratory))
Medical training system	BSLADV-W / M	Faculty of Engineering Bldg. 4 Room 401 (Open lab (laboratory))
Image analysis system	Neoc-Pro / P	Engineering Building No. 5 (Instrument Analysis) Instrument Room 4
Nanomaterial system	CADE-4T	Engineering Building No. 5 (Instrument Analysis) Instrument Room 4
AI Autonomous Driving Deep Image Analysis System		Engineering Building No. 5, Room 304A (server room)
Smart agricultural data collection system		Faculty of Engineering Bldg. 7 Room 211 (server room 1)
Shimadzu ultraviolet-visible spectrophotometer		Faculty of Engineering New Building No. 1 1N-406B Room (Laboratory)
Multimode microplates	Varioskan LUX	Faculty of Agriculture Bldg.4 Room 323 (Student Lab)
Arbosonic 3D	10 channels	Faculty of Agriculture Building No. 1 Room 314 (Laboratory)
Wood penetration resistance measuring instrument	RESI PD400	Faculty of Agriculture Building No. 1 Room 314 (Laboratory)
Soundproof room	NS NS 2.5 tatami mat Dr-40	Faculty of Agriculture Building No. 2 Room 112 (Common Equipment Room)
Water-cooled GPU calculator	RC GPU Server nami4II	Faculty of Engineering Bldg. 7 Room 211 (server room 1)
Biological reaction sub-molecule quantitative mapping system	NSVW-U Base	Engineering Building No. 5 (Instrument Analysis) Instrument Room 4
Fourier transform infrared spectrophotometer	IRSPIRIT-T	Faculty of Engineering Bldg. 10 Room 221 (Laboratory)
Compact flow cytometer	Decal water tar B4-RO-VO (1L4C)	Faculty of Agriculture Building No. 1 Room 107 (Student Lab)
Fourier transform infrared spectrophotometer	FT / IR-4600AC	Faculty of Engineering New Building No. 1 Room 1N-407 (Laboratory)
Epilog laser cutting machine	Mini24-40W	Faculty of Engineering Monozukuri Creative Engineering Center
High-definition image capture device PCI hardware	PCI SS S / W Ver9.0 and New USB SS H / W P / N: PCI017 / E	Engineering Building No. 5 (Instrument Analysis) Instrument Room 4
Animal breeding system	MH-K1600L	Faculty of Agriculture Building No. 1 Room 409 (Laboratory)

AV equipment set	RICOH PA-904	Faculty of Agriculture Lecture Room 2 Lecture 2-Room 41A (Lecture Room)
AV equipment set	RICOH PA-904	Faculty of Agriculture Lecture Building 2 Lecture Room 2-Room 42 (Lecture Room)
AV equipment set	RICOH PA-904	Faculty of Agriculture Lecture Building 2 Lecture Room 2-31 (Lecture Room)

Usage: please contact the WISE faculty member via email for the first use.

Email information:

- Title: "Request for the use of outstanding shared equipment
- To: Assistant professors for WISE Program
- Address: tuat-wise@m2.tuat.ac.jp

- Fuchu Campus

- Koganei Campus