2026 Syllabus

Instructor with "＊"means an instructor with company experience.

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S General Required	Academic English IA	1	610300	First	Lecture Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	REYNOLDS, Stephanie / UTSUNOMIYA, Takako	Kanazawa C: 31.104		TBA

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Critical Thinking	In this course, students will be able to improve English communication skills while sharing opinions in discussions, writing, and presentations. Students will learn critical thinking skills and gain knowledge about various topics related to engineering, science, and technology. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing.
2	Communication	
3	Engineering	
4	Writing	
5	Presentation	

Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the new language skills and those that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write some academic essays/written reports and prepare some academic presentations.

It will be important for students to share their own opinions in relation to information from a variety of sources. Appropriate use of AI tools will be discussed, and students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: None (Handouts)
Reference books: Pathways: Reading, Writing, and Critical Thinking, 3rd Edition Levels 2, 3, and 4
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

No.	Program Objectives	Target Abilities for Students (9pt)
①	d	Students will be able to share opinions and ideas through discussions in English.
②	h	Students will be able to think critically about various topics related to engineering, science, technology, and society.
③	g	Students will be able to write an academic essay/report.
④	c	Students will be able to make academic presentations in English.
⑤	c	Students will be able to apply effective communication strategies in presentations and writing.
⑥	b	Students will be able to reference and cite sources appropriately.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	20	30	30	0	20	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	5	10	5	0	5	0	25
	Ability to think, reason and create	0	5	10	5	0	5	0	25
	Collaboration and leadership	0	0	0	10	0	5	0	15
	Announcement / Expression / Communication	0	5	10	10	0	0	0	25
	Attitude and motivation for learning	0	5	0	0	0	5	0	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		Vocabulary, skill review, written response, and/or reading/listening comprehension quizzes based on the content of class activities and assignments (20%): Feedback will be given during the following class sessions.
	②	レ	
	③		
	④		
	⑤	レ	
	⑥		
Reports	①		Some academic essays/written reports (30%) Each assignment will include an outline, first draft, writing conferences, and final draft. Feedback will be given during the following class sessions.
	②	レ	
	③	レ	
	④		
	⑤	レ	
	⑥	レ	
Presentations	①		Some academic presentations (30%) Each presentation will include an outline, preparation of supplementary materials, delivery/participation in discussion, and self-evaluation/reflection. Feedback will be given during the following class session.
	②	レ	
	③		
	④	レ	
	⑤	レ	
	⑥	レ	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①	レ	In-class or assigned handouts for preparation, review, and/or reflection of discussion topics (20%) Feedback will be given during the following class session.
	②	レ	
	③		
	④		
	⑤	レ	
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Professional-level, academic writing and presentations. Discuss 100% in fluent English.	Comprehensible writing and presentations. Discussions mostly in English.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Introduction/Topic 1 (1) Quiz – Reading and writing level assessment. Students will participate in brainstorming and background building communication activities.	Brainstorming as a pre-reading technique, individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50
2 /	Topic 1 (2) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
3 /	Quiz Topic 1 (3) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
4 /	Topic 1 (4) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
5 /	Quiz Topic 1 (5) Students will review and discuss topics related to the reading or videos, brainstorm ideas and opinions, and research information for a written academic assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
6 /	Academic Writing Topic 1 (6) Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Review: Complete final draft due class 8 Reading	50
7 /	Presentation/Discussion Topic 1 (7) Students will brainstorm, outline, prepare materials, deliver, and reflect on an in-class presentation.	Individual, pair, and group work; discussion	Review: Complete presentation reflection due class 8 Reading	50
8 /	Topic 2 (1) Students will participate in brainstorming and background building communication activities..	Individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50
9 /	Quiz Topic 2 (2) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
10 /	Topic 2 (3) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Quiz Topic 2 (4) Students will review and discuss topics related to the reading or videos.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
12 /	Topic 2 (5) Students will review and discuss topics related to the reading or videos, brainstorm ideas and opinions, and research information for a written academic assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
13 /	Academic Writing Topic 2 (6) Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Review: Complete final draft due class 15 Reading	50
14 /	Presentation/Discussion Topic 2 (7) Students will brainstorm, outline, prepare materials, deliver, and reflect on an in-class presentation.	Individual, pair, and group work; discussion	Review: Complete presentation reflection due class 15 Reading	50
15 /	Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course. *Presentation evaluation returned*	Individual, pair, and group work; discussion		

2026 Syllabus

Instructor with "＊"means an instructor with company experience.

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S General Required	Academic English IB (a)	1	610400	Second	Lecture Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	REYNOLDS, Stephanie / UTSUNOMIYA, Takako	Kanazawa C: 31.104		TBA

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Critical Thinking	In this course, students will be able to improve English communication skills while sharing opinions in group discussions, presentations, and in writing. Students will learn critical thinking skills and gain knowledge about content related to various topics in engineering, science, technology, and society. Additionally, students will learn and apply effective and appropriate communication strategies in discussions, presentations, and writing.
2	Communication	
3	Knowledge	
4	Writing	
5	Presentation	

Course Description and Expectations for Students (10.5pt)

This course will offer discussion, group work, and reflection as types of active learning.
Students will prepare and participate in English discussions using the language skills that are already known.
Students will practice and apply new strategies for effective communication in discussions, presentations, and writing.
Students will write some academic essays/written reports and prepare some presentations.

It will be important for students to share their own opinions in relation to information from a variety of sources. Appropriate use of AI tools will be discussed, and students will learn how to appropriately reference and cite sources.
Students should be prepared with a binder or folder to keep handouts, writing tools for in-class work, and laptop computers for preparing presentations, researching related information, downloading class materials, and submitting online assignments.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: None (Handouts)
Reference books: Pathways: Reading, Writing, and Critical Thinking, 3rd Edition, Levels 2, 3, and 4
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Intermediate English ability
Basic computer skills

No.	Program Objectives	Target Abilities for Students (9pt)
①	d	Students will be able to share opinions and ideas through discussions in English.
②	h	Students will be able to think critically about various topics related to engineering, science, technology, and society.
③	g	Students will be able to write an academic essay/report.
④	c	Students will be able to make academic presentations in English.
⑤	c	Students will be able to apply effective communication strategies in presentations and writing.
⑥	b	Students will be able to reference and cite sources appropriately.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	20	30	30	0	20	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	5	10	5	0	5	0	25
	Ability to think, reason and create	0	5	10	5	0	5	0	25
	Collaboration and leadership	0	0	0	10	0	5	0	15
	Announcement / Expression / Communication	0	5	10	10	0	0	0	25
	Attitude and motivation for learning	0	5	0	0	0	5	0	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		Vocabulary, skill review, written response, and/or reading/listening comprehension quizzes based on the content of in-class activities and assignments (20%): Feedback will be given in the following class session.
	②	レ	
	③		
	④		
	⑤	レ	
	⑥		
Reports	①		Some academic essays/written reports (30%) Each assignment will include an outline, first draft, writing conferences, and final draft. Feedback will be given in the following class sessions.
	②	レ	
	③	レ	
	④		
	⑤	レ	
	⑥	レ	
Presentations	①		Some academic presentations (30%) Each presentation will include an outline, preparation of supplementary materials, delivery/participation in discussion, and self-evaluation/reflection. Feedback will be given in the following class session.
	②	レ	
	③		
	④	レ	
	⑤	レ	
	⑥	レ	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①	レ	In-class or assignment handouts for preparation, review, and/or reflection of discussion activities (20%) Feedback will be given in the following class session.
	②	レ	
	③		
	④		
	⑤	レ	
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Professional-level, academic writing and presentations. Discuss 100% in fluent English.	Comprehensible writing and presentations. Discussions mostly in English.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Introduction/ Topic 1 (1) Students will be introduced to the syllabus and contents of the course. Students will participate in brainstorming and background building communication activities.	Brainstorming as a pre-reading technique, individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50
2 /	Topic 1 (2) Mini-presentation/discussion Students will review and discuss topics related to the reading or videos	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
3 /	Topic 1 (3) Quiz Academic Writing Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the written assignment (Due class 4) Reading	50
4 /	Topic 2 (1) Students will review and discuss topics related to the theme.	Individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50
5 /	Topic 2 (2) Mini-presentation/discussion Students will review and discuss topics related to the reading or videos	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
6 /	Topic 2 (3) Quiz Academic Writing Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the written assignment (Due class 7) Reading	50
7 /	Topic 3 (1) Students will review and discuss topics related to the theme.	Individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50
8 /	Topic 3 (2) Mini-presentation/discussion Students will review and discuss topics related to the reading or videos	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
9 /	Topic 3 (3) Quiz Academic Writing Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the written assignment (Due class 10) Reading	50
10 /	Topic 4 (1) Students will review and discuss topics related to the theme.	Individual, pair, and group work; discussion	Review: Complete the worksheet based on the class activities. Reading	50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Topic 4 (2) Mini-presentation/discussion Students will review and discuss topics related to the reading or videos	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the worksheet based on the class activities. Reading	50
12 /	Topic 4 (3) Quiz Academic Writing Students will brainstorm, outline, write, review, and revise a written assignment.	Individual, pair, and group work; discussion	Preview: Study for the quiz Review: Complete the written assignment (Due class 13) Reading	50
13 /	Review of Readings and Topics 1-4 Presentation preparation Students will review and discuss topics related to the reading or videos, brainstorm ideas and opinions, and research information for an academic presentation	Individual, pair, and group work; discussion	Preview: Brainstorm Review: Complete outline and supplemental materials Reading	50
14 /	Review of Readings and Topics 1-4 Students will deliver presentations with appropriately cited sources and supplemental materials connected to their topic of research. Students will share peer feedback and reflect on their learning in the course.	Individual, pair, and group work; discussion	Preview: Practice presentation Review: Complete written reflection Reading	50
15 /	Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course. *Presentation Project Returned*	Individual, pair, and group work; discussion		

2026 Syllabus

Instructor with "＊" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S General Elective	Technical Communication	2	623100	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	REYNOLDS, Stephanie	Kanazawa C. 31-104		TBA

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Communication	Students will learn to write and present appropriately chosen and thoughtfully designed, audience-focused technical and professional information. They will use critical thinking, collaboration, and constructive feedback to explore the language, conventions, technologies, and strategies to effectively, efficiently, and ethically communicate technical information based on the needs of their audience.
2	Critical Thinking	
3	Technical English	
4	Business English	
5	Professional English	

Course Description and Expectations for Students (10.5pt)

Technical Communication is a course for students to learn, practice, and prepare for future research and business in technical and professional fields. This course focuses on language, critical thinking skills, communication strategies, and conventions for writing and speaking about technical subjects with the needs of the audience at the core. Students will have the opportunity to analyze, evaluate, describe, design, collaboratively design, and reflect on several technical communication speaking and writing tasks based on real-world scenarios. Tasks will include writing technical descriptions, instructions, procedures, proposals, and business correspondence, as well as participating in virtual and face-to-face presentations, discussions, and pitches. Students will learn how to give appropriate and constructive feedback and will have numerous opportunities for reflection.

This course will offer group work, discussion, and reflection in class as a type of active learning.
This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute study times for 15 50-minute classes. You should spend about 200 minutes to review and prepare for each lesson.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

None

No.	Program Objectives	Target Abilities for Students (9pt)
①	b ,h	Students will be able to understand and explain the need and purpose of technical communication.
②	g, f	Students will be able to define, describe, and summarize technical terms, instructions, and procedures.
③	e, h	Students will be able to identify, analyze, and evaluate how to appropriately communicate based on their audience
④	a ,g	Students will be able to write and organize technical documents, business correspondence, proposals, and reports.
⑤	a, g	Students will be able to design, produce, and present virtual and face-to-face presentations.
⑥	c ,d ,i	Students will be able to think critically for self-reflection and to provide constructive feedback to their peers.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	15	15	20	10	40	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	5	0	5	0	10	20
	Ability to think, reason and create	0	0	0	5	5	0	10	20
	Collaboration and leadership	0	0	5	5	5	5	0	20
	Announcement / Expression / Communication	0	0	5	5	5	0	10	25
	Attitude and motivation for learning	0	0	0	0	0	5	10	15

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①		Project/Research Proposal (5%) Students will write a project proposal and abstract. Analytical report (10%) Students will write an analytical report
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Presentations	①		Proposal presentation with Q&A (5%) Pitch presentation with Q&A (10%)
	②	∠	
	③	∠	
	④		
	⑤	∠	
	⑥	∠	
Works	①		Technical description (10%) Guide/Tutorial/Infographic (10%)
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Portfolios	①	∠	In-class group discussions and project documentation (10%) Students will complete and keep a record of in-class discussions, project notes, and written reflections. Feedback will be returned in class the following class.
	②	∠	
	③	∠	
	④		
	⑤		
	⑥	∠	
Others	①	∠	Five e-learning modules for out-of-class learning. (40%) Students will complete and submit assignments for each module in an e-learning format. Feedback will be shared online, and grades will be confirmed in class.
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
You will be able to produce exceptional quality technical documents and presentations, showing a deep understanding of the need and purpose of technical communication language and critical thinking.	You will be able to produce appropriate and acceptable technical documents and presentations, showing a basic understanding of the need and purpose of technical communication language and critical thinking.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course Introduction Task-based Project 1 Students will establish teams and choose roles for the first project, discuss, and document project management.	Lecture, discussion, group work, reflection	Preview: E-learning module 1 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
2 /	Task-based Project 1 Students will collaborate to research, create, and outline a project proposal and abstract. They will discuss and document project management.	Lecture, discussion, group work, reflection	Preview: E-learning module 1 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
3 /	Task-based Project 1: Students will produce a first draft. They will discuss and document project management. **Project Proposal – First Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 2 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
4 /	Task-based Project 1 Students will present and submit project proposals and give and receive feedback. **Project Proposal – Final Draft** **Proposal Presentation**	Lecture, discussion, group work, reflection	Preview: E-learning module 2 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
5 /	Task-based Project 2 Students will choose new roles for the next project, discuss, and document project management.	Lecture, discussion, group work, reflection	Preview: E-learning module 2 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
6 /	Task-based Project 2 Students will produce a first draft. They will discuss and document project management. **Technical Description – First Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 3 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
7 /	Task-based Project 2 Students will share and submit technical descriptions and give and receive feedback. **Technical Description – Final Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 3 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
8 /	Task-based Project 3 Students will choose new roles for the next project, discuss, and document project management.	Lecture, discussion, group work, reflection	Preview: E-learning module 3 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
9 /	Task-based Project 3 Students will produce a first draft. They will discuss and document project management. **Guide/Tutorial/Infographic – First Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 4 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
10 /	Task-based Project 3 Students will share and submit instructional materials and give and receive feedback **Guide/Tutorial/Infographic – Final Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 4 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Task-based Project 4 Students will choose new roles for the next project, discuss, and document project management.	Lecture, discussion, group work, reflection	Preview: E-learning module 4 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
12 /	Task-based Project 4 Students will produce a first draft. They will discuss and document project management. **Analytical Report – First Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 5 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
13 /	Task-based Project 4 Students will share and submit analytical reports and give and receive feedback **Analytical Report – Final Draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 5 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
14 /	Task-based Project 5 Students will choose new roles for the next project, discuss, and document project management. **Pitch Deck – First draft**	Lecture, discussion, group work, reflection	Preview: E-learning module 5 Review: Complete any unfinished project documents or preparation for group discussion in the next class	200
15 /	Task-based Project 5 **Pitch Presentations** Self-Evaluation Students will be given oral and written feedback both overall and individually on their work. Students will also be encouraged to share their feedback about the course.	Lecture, discussion, group work, reflection Evaluation & Feedback		200

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 一般 選択	課題学修（語学）	2	623200	－	－ ／認定

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4	－	－		

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	高度な英語スキルの習得	学生が英語の資格取得を通じて、将来のキャリアに直結する実践的な知識・技術を主体的に習得することを目的とする。
2	自主的・継続的学習	
3	キャリア設計	
4	自己評価	
5		

授業の概要および学習上の助言

課題学修（語学）として認定の対象となる資格については学生便覧2026 p.94 別表１に記載されたものに限定する。
申請時には申請書に合格通知書・免状などの原本とコピーを提出し、クラス担任の確認印を受けること。
英語担当教員や指導教員に事前相談し、適切な資格を選定することを推奨する。
第3学年3月末までに課題学修の条件を満たし、第4学年4月に単位の認定を申請すること。

【教科書および参考書・リザーブドブック】
教科書：なし
参考書：各資格試験の公式テキスト・問題集
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

各資格試験の受験要件および英語の知識・技能

No.	教育目標(DP)（記号表記）	学生が達成すべき行動目標
①	i	英語に関連する知識・技能を体系的に理解できる。
②	i	卒業を見据えた長期的な学修計画を自ら立て、実行できる
③	i	資格取得の経験を進路選択や将来設計に結びつけることができる
④	i	学修の成果と課題を整理し、次のステップに向けた目標を設定できる
⑤		
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	0	0	0	0	0	100	100
総合力指標	知識を取り込む力	0	0	0	0	0	0	100	100
	思考・推論・創造する力	0	0	0	0	0	0	0	0
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	0	0	0	0	0	0
	学習に取組む姿勢・意欲	0	0	0	0	0	0	0	0

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評 価 方 法	行動目標		評 価 の 実 施 方 法 と 注 意 点
試 験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①		
	②		
	③		
	④		
	⑤		
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作 品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	✓	別表に定める資格の取得（合格）をもって評価する
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
資格取得を通じて得た知識・技能を実社会で応用できる。	目標の資格試験に合格する。

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 一般科目 選択	人文科学	2	623900	後学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	平泉　紀房 / 清水　節	21・604 21・605		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	日本の歴史	日本における歴史上の人物の生涯を学ぶことで、その生き方・考え方を知り、それらを通して日本人の特質・行動規範などについて理解し、今後の自身の問題と照らし合わせて考える。さらに、各種神話や建国伝承を学ぶことで、多様な価値観の存在を知るとともに、日本人の特質を考える。一方、諸外国のもつ多様な文化・価値観にも眼を向け、日本と異なる歴史や文化・伝統を公平に評価できる真摯な姿勢の大切さを学ぶ。これらのことを通じて、「読む・聞く・考える・書く」といった基礎的能力の向上を図る。
2	日本の神話	
3	日本人の特質、国民性	
4	比較文化	
5	多様な価値観	

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50分45回分の学習とし、100分授業15回に対して100分30回分の自学自習を行って下さい。
この授業ではアクティブラーニングの一環として調査学習、グループワークを行います。
☆本科目の授業概要は以下の通りである。
第1回～第7回目　テーマ：国際比較から日本の特質を考える。（清水担当）
１．日本、および日本人の特色や特質について、歴史や比較文化の観点から学ぶ。
２．グループ活動で「日本と外国」「過去と現在」の比較調査を行い、討議した成果を発表する。
３．相互評価を行って、自身の学習成果について振り返りを行う。
第8回目授業　テーマ：地域の歴史・文化を学ぶ。（清水担当）
４．白山と白山信仰について学習する。
第9回～第15回　テーマ：日本人の生き方・考え方に学ぶ。（平泉担当）
５．日本の歴史上の人物に関する講義を聴き、その人物の生き方・考え方（行動規範）に学ぶ。
６．日本の神話と世界の神話を比較して、日本人の特質を考える。
７．日本の建国伝承から、国の成り立ちと建国の理想について学ぶ。

【教科書および参考書・リザーブドブック】
教科書：指定なし
参考書：指定なし
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：世界主要国価値観データブック〔同友館〕

履修に必要な予備知識や技能

１．予習内容と聴講内容とを総合して理解し、提示されたテーマについて考察する能力
２．適切な日本語で文章にまとめる能力
３．グループ討議に積極的に参加する姿勢、および調査・考察・発表を行うための基礎能力

No.	教育目標(DP) （記号表記）	学生が達成すべき行動目標
①	e	歴史上の人物から学んだ、生き方・考え方について、適切な日本語の文章で説明できる。
②	e	日本・日本人の特質について、学習内容や調査内容をもとに適切な日本語の文章で説明できる。
③	e	日本の建国伝承から学んだ国の成り立ちと建国の理想について、適切な日本語の文章で説明できる。
④	e	海外の人々が多様な価値観をもっていることについて理解を深めることができる。
⑤	e	グループ討議・発表を通じて、自己の見解を口頭および文章で表現することができる。
⑥	i	本科目における学生の達成すべき行動目標を自己評価できる。

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作　品	ポートフォリオ	その他	合　計
総合評価割合		0	0	62	20	0	10	8	100
総合力指標	知識を取り込む力	0	0	25	0	0	0	0	25
	思考・推論・創造する力	0	0	25	0	0	0	0	25
	コラボレーションとリーダーシップ	0	0	0	10	0	0	0	10
	発表・表現・伝達する力	0	0	12	10	0	0	0	22
	学習に取組む姿勢・意欲	0	0	0	0	0	10	8	18

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①	✓	「授業レポート」用紙を配布する。 それに記述された内容で、授業時間外における予習・調査考察の成果や行動目標の達成度を確認・評価して返却する。 第1回～第7回（5点×4回、計20点） 第9回～第15回（6点×7回、計42点） 第9回以降は、配布される『日本学資料集』の指定ページ部分を授業時間外に予習する。 →授業毎にレポートを課し、そのなかで事前学習の成果を評価する。 「授業レポート」用紙の注意事項（評価基準）をよく読んで作成する。 不明な点は教員に質問をする。
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
成果発表 （口頭・実技）	①		グループ内で分担調査し、討議する。（5点） その成果をプレゼンテーションする。（10点） →授業時間外における調査活動やグループ討議・発表準備などの成果（調査レポート、討議記録、発表資料）を踏まえて評価する 発表について相互評価を行う。（5点）
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		本科目における学生の達成すべき行動目標を自己評価する。 自己評価レポート（10点）
	②		
	③		
	④		
	⑤		
	⑥	✓	
その他	①	✓	「授業レポート」の期日外提出（やむを得ない事情がある場合を除く）や、グループ活動時の取り組みで問題が見られる場合は、減点方式で評価をする。
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
行動目標 ①②③④「授業レポート」において、課題の主旨と条件を満たし、評価基準に合致した適切な日本語の文章で、講義内容の要点および考察を具体的に記述できる。 ②④⑤グループ活動を通じて、日本と外国の比較調査を行い、その成果を明快に口頭発表することができる。 ⑥自己の達成度を適切な日本語表現で、明快に論述できる。	行動目標 ①②③④「授業レポート」において、課題の主旨と条件を満たし、評価基準に合致したある程度適切な日本語の文章で、講義内容の要点および考察を記述できる。 ②④⑤グループ活動を通じて、日本と外国の比較調査を行い、その成果を口頭発表することができる。 ⑥自己の達成度を適切な日本語表現で論述できる。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	☆科目説明（ガイダンス） 本科目の目的・意義・運営方法について解説する。 ☆国際比較から日本の特質を考える 担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。	講義と質疑 演習（レポート作成）	Eシラバス配信資料の予習 レポート作成準備	100 100
2 ／	☆国際比較から日本の特質を考える グループ討議① 討議テーマに関する解説、および調査・考察・発表の方法について説明する。 また、インターネットやライブラリーセンターの蔵書などを活用し、官庁や研究所が公表している各種調査データを分析検討する。なお、各自で調査・考察した成果をグループ討議レポートにまとめる。	質疑、演習 ノートパソコン、LANケーブルを持参する。	収集資料の整理と分析 プレゼンテーション準備 グループ討議レポートの作成	120 120 120
3 ／	☆国際比較から日本の特質を考える 担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。 ☆講義レポートの返却、学習成果の振り返り	講義と質疑 演習（レポート作成）	Eシラバス配信資料の予習 レポート作成準備	100 100
4 ／	☆国際比較から日本の特質を考える グループ討議② 前回に続いて、グループ活動（調査・討議・発表準備）を行う。各自で調査・考察した成果をグループ討議レポートにまとめる。また、グループとして発表内容をまとめ、パワーポイントを作成する。	講義と質疑、演習 ノートパソコン、LANケーブルを持参する。 グループ討議レポートの提出	収集資料の整理と分析 プレゼンテーション準備	120 120
5 ／	☆国際比較から日本の特質を考える 担当教員による講義を聴講する。取りあげるテーマや人物は、クラスや学科の特性に合わせる。 ☆講義レポートの返却、学習成果の振り返り	講義と質疑 演習（レポート作成）	Eシラバス配信資料の予習 レポート作成準備	100 100
6 ／	☆国際比較から日本の特質を考える グループ発表① 各グループの成果を発表し、質疑応答と相互評価を実施する。	演習（発表と質疑応答） ノートパソコン、LANケーブルを持参する。	発表評価シートの作成 発表の反省 自己評価レポートの作成	100 30 100
7 ／	☆国際比較から日本の特質を考える グループ発表② 各グループの成果を発表し、質疑応答と相互評価を実施する。	演習（発表と質疑応答） ノートパソコン、LANケーブルを持参する。	発表評価シートの作成 発表の反省	100 30
8 ／	☆地域の歴史・文化を学ぶ オンラインで講義動画を視聴する 白山・白山信仰について学習する。	オンライン講義 教室での授業は行わない。 各自で講義動画を視聴し、聴講メモを作成する。	聴講メモの作成	200
9 ／	☆第9回目以降の授業について（ガイダンス） 第9回目以降の授業目的・意義・運営方法について解説する。 ☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。	講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：学習支援計画書や各種配布資料により、科目の教育目的と行動目標を確認する。	100 60
10 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ提出する。	前回の自己点検 講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：返却された「授業レポート」を見直し、内容を確認する。	120 60

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。	前回の自己点検 講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：返却された「授業レポート」を見直し、内容を確認する。	120 60
12 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。	前回の自己点検 講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：返却された「授業レポート」を見直し、内容を確認する。	120 60
13 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。	前回の自己点検 講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：返却された「授業レポート」を見直し、内容を確認する。	120 60
14 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。	前回の自己点検 講義と質疑 授業レポート作成	予習：『日本学資料集』の指定ページ部分を読んで理解してくる。 復習：返却された「授業レポート」を見直し、内容を確認する。	120 60
15 ／	☆日本人の生き方・考え方に学ぶ 担当教員の講義を聴講して、日本人の生き方、日本国および日本人の特質について学び、提示されたテーマについて考察した内容を授業レポートにまとめ、提出する。 ☆自己点検 これまでの学習成果について、教員・学生相互で確認を行う。	前回の自己点検 講義と質疑 授業レポート作成 自己評価レポートの提出	ポートフォリオを提出する。	200

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 一般科目 選択	技術者倫理	2	624200	前学期	講義/学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	増渕隆史	金沢C： 1.316		火曜 10:35-12:15 水曜 15:10-16:50

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1 2 3 4 5	科学技術者が共有する価値 専門職倫理と倫理綱領 グローバル社会の中の技術者 倫理的意思決定の方法 社会の中の科学技術	本科目の目的は、科学技術がグローバル化の進む今日の社会および環境に与える影響について考察し、科学技術の目的・役割と社会との相互作用についての理解を深めることである。 また、科学技術者が専門職として担う倫理的・社会的責任を検討する。さらに、実務を行う上で直面する倫理的な問題を検討し、それらを解決する問題解決能力の向上を図る。 以上の学習を通して、「科学技術者倫理」が単に規範の遵守ではなく、価値のバランスを取りながら「自らがなすべき行動を設計する」という創造的な知的営みであることを学ぶ。

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50 分45 回分の学習とし、50 分授業15 回に対して50 分30 回分の自学自習を行って下さい。
この授業ではアクティブラーニングの一環としてグループディスカッションを行います。
1. 概要説明および本科目と既習科目およびICTの教育目的との関係に関する解説
2. なぜ、今、科学技術者の倫理が問われているのか
3. 科学技術者の倫理とは何か／科学技術者が特別の責任を負う理由
4. 科学技術者が意思決定を迫られる状況
5. 科学技術者が重視すべき価値とは何か：専門職集団と倫理綱領
6. 科学技術者としていかに行動すべきか：倫理的問題解決の方法
7. 組織のなかの科学技術者：企業倫理と科学技術者倫理
8. 事例の検討（ケーススタディ）：現実の事例を題材
9. 事例の検討（ケースメソッド）：仮想事例などを通して討議
10. グローバル社会における科学技術者の役割
11. 科学技術者の新しい役割と科学技術者倫理
12. 各専門領域における倫理的問題や事例の検討

・新聞などで報道される科学技術に関わる事件などを科学技術者の倫理の観点から分析する姿勢を持つこと。
・第三者的・評論家的に講義に参加するのではなく、科学技術を担う「当事者」として、「道徳的行為者」としての自覚を持ちながら、講義で提示される問題を自分ならどうするかという観点で考えること。

【教科書および参考書・リザーブドブック】
教科書：本質から考え行動する科学技術者倫理[白桃書房]
参考書：　　ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

・「日本学」をはじめとする他の科目の講義内容と深く関連しているので、復習しておくこと。
・グループディスカッションを行うので、これまでの経験を踏まえて、建設的な議論を進めることができるようにしておくこと。
・この科目では、将来の科学技術を担う者として現代社会と科学技術の関係を考察するため、新聞をしっかり読んで政治、経済、文化、科学技術などの動向に常に関心を払い、自分の問題として考える態度を身に付けておくこと。

No.	教育目標(DP) (記号表記)	学生が達成すべき行動目標
①	b, h	科学技術と人間社会の在り方（経済活動を含む）との相互作用について、具体的な例を挙げながら説明できる
②	b, c, g	科学技術者が専門職として実務を行う上で担う責任や共有すべき価値（安全など）について理解し、これを他者に説明できる
③	b, d, f	倫理綱領についての知識を持つとともに、企業などが組織として行う倫理対策について説明できる
④	b, e, h	倫理的ジレンマを疑似体験し、その問題点を分析するとともに自分の経験や事実関係の調査と関連づけながら考察できる
⑤	a, b, h	セブン・ステップ・ガイドなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において適用できる
⑥	b, c, i	本科目の学習教育目標とICTの教育目的・目標、さらに科学技術者が持つべき資質・能力との関係を理解し、自己点検できる

達 成 度 評 価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		25	15	30	15	0	5	10	100
総合力指標	知識を取り込む力	10	7	10	0	0	0	0	27
	思考・推論・創造する力	10	8	10	5	0	0	0	33
	コラボレーションとリーダーシップ	0	0	0	5	0	0	0	5
	発表・表現・伝達する力	5	0	5	5	0	0	0	15
	学習に取組む姿勢・意欲	0	0	5	0	0	5	10	20

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①	レ	・達成度を確認する試験を第14回の時間中に実施する。総合評価に占める割合は25%。受験しない場合は単位を認めない。なお、この試験は「定期試験」ではない。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		
クイズ 小テスト	①		・科目での達成度の指標とするため、授業で検討するケースの倫理的問題構造などを分析する課題、倫理綱領に関する課題、企業倫理プログラムに関する課題を、それぞれ実施（提出）する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		
レポート	①	レ	・本科目の受講を経て倫理的分析能力がどのように変化したかを確認する課題を授業外学習において、実施（提出）する。 ・グループ討議で検討するケースに関して、倫理的な問題の認識、分析能力、倫理的問題解決方法、具体的事例への適応能力等を総合的に問う課題を実施する。 ・科学技術の専門家として求められる価値観について考察する課題を実施（提出）する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	
成果発表 （口頭・実技）	①		・数名のグループを作り、討議を行い、倫理的なジレンマを擬似体験することを通じて、倫理的な問題の存在と種類を分析し、道徳的行為者として、エシックステストなどを適切に用いた問題解決方法を確認し、結果を報告する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		・本科目と、ICTの教育・学習目標との関連について自己点検する記述式の課題を授業外学習において適時に実施（提出）する。
	②		
	③		
	④		
	⑤		
	⑥	レ	
その他	①		・グループ討議には積極的に参加すること。グループ討議への貢献度を相互に評価する。 ・本科目の授業内容を鑑みて、不正行為には十分に注意すること（自ら不正を、不正とみなされることを含めて行わない事は無論、不正をそそのかしたり、看過したりもしないこと）。これらに該当すると判断された場合は、厳重に対処する。
	②		
	③		
	④		
	⑤		
	⑥	レ	

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
・科学技術者として直面する可能性のある倫理的な問題の存在と種類について、具体例を挙げながら十分説明できる。 ・倫理的な想像力、倫理的問題を認識し分析する能力、責任感を向上させる必要性などを、説得力をもって他者に説明できる。 ・倫理綱領とそこに含まれる価値観について、および企業などが組織として行う倫理対策について具体的に説明できる。 ・倫理的ジレンマの疑似体験から得たことを、自分の経験や考え方と関連づけながら、建設的に考察することができる。 ・エシックステストなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において十分適用できる。	・科学技術に関する倫理的な問題の存在と種類について説明できる。 ・倫理的な想像力、倫理的問題を認識し分析する能力、責任感を向上させる必要性などを説明できる。 ・倫理綱領についての知識を持つとともに、企業などが組織そして行う倫理対策について説明できる。 ・倫理綱領とそこに含まれる価値観について、および企業などが組織として行う倫理対策について説明できる。 ・倫理的ジレンマを疑似体験し、そこから得たことを自分の経験や考え方と関連づけながら考察することができる。 ・エシックステストなどの倫理的問題解決の方法について理解し、これらの方法を具体的な事例において適用できる。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	※第1～2回では、本科目への導入として、第2回までの「学習内容」の事項について、講義やグループ討議などを通して検討・考察する。 ・科目の目的・目標、内容、課題、評価方法などに関する解説 ・本学の教育目的・目標との関連に関する解説 ・既習科目との関連についての解説	・PCを用いた講義 ・グループ討議 ・討議結果の発表 など	・復習：初回配布資料や本科目「学習支援計画書」などの熟読 ・次回に向けた予習：事例分析など	50 150
2 ／	（続き） ・直面する可能性のある倫理的問題に関する具体例 ・セブン・ステップ・ガイドの概説　他	・PCを用いた講義 ・グループ討議 ・討議結果の発表 など	・復習：第1～2回で学んだことについての考察の深化 ・次回に向けた予習：教科書の精読	100 100
3 ／	※現実に起きた事例をベースに倫理的考察や意思決定に必要な概念や用語などの解説を行う	・PCを用いた講義 ・関連する視聴覚教材の視聴 ・演習 など	・復習：授業で検討した事例の考察の深化 ・次回に向けた予習：教科書の精読	100 100
4 ／	※技術者としていかに行動すべきか ・倫理的問題解決の方法 ・エシックステストおよびセブン・ステップ・ガイドに関する詳細解説 ・セブン・ステップ・ガイドを用いた演習	・PCを用いた講義 ・関連する視聴覚教材の視聴やグループ討議を行うこともある ・演習	・復習：セブン・ステップ・ガイドを使った事例分析の練習 ・次回に向けた予習：次回の授業で検討する事例の概要の把握	100 100
5 ／	※第5～6回では、ケースメソッド事例に関するグループ討議を経て、第7回の「学習内容」に挙げてある事項についての考察を行う ・グループ討議	・PCを用いた講義 ・与えられた事例に関するグループ討議	・復習・次回に向けた予習：討議内容についてのさらなる検討	150
6 ／	・グループ討議（続き） ・討議結果の発表	・PCを用いた講義 ・与えられた事例に関するグループ討議 ・討議結果の発表 など	・復習：授業内で行った事例に関する考察の深化 ・次回に向けた予習：教科書の精読	150 100
7 ／	※技術者としていかに行動すべきか ※優れた意思決定がもたらすもの	・PCを用いた講義 ・関連する視聴覚教材を視聴することもある	・復習：倫理綱領についての考察の深化 ・次回に向けた予習：教科書の精読	120 80
8 ／	※なぜ、科学技術者倫理が求められているのか	・PCを用いた講義 ・関連する視聴覚教材を視聴することもある	・復習：企業の倫理的取組みについての考察の深化 ・次回に向けた予習：教科書の精読	120 80
9 ／	※第9～10回では、ケースメソッド事例に関するグループ討議を経て、第11～12回の「学習内容」に挙げてある事項についての考察を行う ・グループ討議	・PCを用いた講義 ・与えられた事例に関するグループ討議	・復習・次回に向けた予習 ・討議内容についてのさらなる検討	150
10 ／	・グループ討議（続き） ・討議結果の発表	・PCを用いた講義 ・与えられた事例に関するグループ討議 ・討議結果の発表 など	・復習：授業内で行った事例に関する考察の深化 ・次回に向けた予習：教科書の精読	150 100

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	※各教員による自由講義（1）	・PCを用いた講義 ・関連する視聴覚教材を聴講など	・復習：授業内で行った事例に関する考察の深化 ・次回に向けた予習：教科書の精読	100 100
12 ／	※各教員による自由講義（2）	・PCを用いた講義 ・関連する視聴覚教材を聴講など	・復習：教科書の精読 ・次回に向けた予習：科学技術の専門家として求められる価値観に関する考察	100 100
13 ／	※本質から考え行動する科学技術者倫理	・PCを用いた講義	・復習：これまでの授業内容の振り返り	200
14 ／	※これまでの授業の要点解説と達成度確認	・これまでの授業の要点解説 ・達成度確認テストの実施	・予習：テストの準備 ・復習：これまでの授業内容の振り返り ・次回に向けた予習：ポートフォリオを用いた振り返り	100 100 60
15 ／	※まとめと自己点検	・PCを用いた講義（成績概要の説明など） ・授業アンケートへの回答	・教科書での授業全体の復習	140

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Science, Technology, and Human Society	2	610500	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	BANDA Kiyomi / KOBAYAKAWA Yuko	Program of Interdisciplinary Liberal Arts, Engineering Science and Technology		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Prehistory life (the founding of a country)	- As a marketing strategy, students will develop a problem-solving mindset by learning statistical analysis using statistical software packages such as Python and HAD. - Through an examination of the formation of nation-states and the evolution of human society alongside scientific and technological development, students will develop the ability to envision improved forms of human life in the future.
2	Science, technology, and human society	
3	Globalization	
4	The VUCA world	
5	Fulfilled life	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
In the first half of the semester, students perform data analysis using Python and HAD. At the same time, students consider what types of data to collect to aid in problem-solving and design overall framework of the marketing research.
In the latter half of the semester, students examine the formation of nation-states, evolution of human society alongside scientific and technological development, and the impact of globalization on global values. Building on these perspectives, they explore potential solutions to issues discussed in class through a case study set on an island in the Philippines. The BEVI (Beliefs, Events, and Values Inventory) will be administered in the first class.
Professor Kiyomi Banda will handle classes 1 – 7, while Professor Yuko Kobayakawa will be responsible for the rest of classes, namely class 8– 15.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Reading materials will be distributed either in class or via the KIT system
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

English proficiency to discuss and produce presentations is required. Research skills to come up with concrete information are essential.

No.	Program Objectives	Target Abilities for Students (9pt)
①	b, h	Explain the relationship between science and technology using examples.
②	b, h	Explain the relationship between science, technology, and human society using examples.
③	b, h	Analyze and explain based on social aspects the interactions between science, technology, and human society
④	b, e, h	Critically and logically argue and explain one's thoughts based on knowledge acquired from research.
⑤		
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	40	40	0	0	20	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	40	0	0	0	0	40
	Ability to think, reason and create	0	0	0	40	0	0	0	40
	Collaboration and leadership	0	0	0	0	0	0	10	10
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	0	0	0	0	10	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	Completed in-class assignment worksheets will be evaluated.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Presentations	①	✓	Individual and/or presentations will be evaluated.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	Active engagement and students' original opinions in individual assignments and group work will be evaluated.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
- After learning about statistical analysis methods using Python and HAD in class, students will be able to design data collection strategies that lead to problem-solving. - Critically assess their contributions to human well-being and articulate perspectives on the future relationship between science, technology, and society.	- After learning about statistical analysis methods using Python and HAD in class, the students explored the various types of analysis methods available. - Students will be able to critically examine the causes and underlying mechanisms shaping the impact of science and technology on social life.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	- Introducing the lecturer and the course from Class No.1 to 7 - Cognitive activity	- Lecture - Group work	- Class Work: Report on today's takeaway from the class	200
2 /	- Marketing ➢ 7P: Service marketing ➢ Pest analysis - Accessing Google Collaboratory to use Python	- Lecture - Handling - Discussion	- Class Work: Report on today's takeaway from the class	200
3 /	- Marketing - Python ➢ Scatter plot ➢ Simple Regression Analysis ➢ Multiple Regression Analysis	- Lecture - Handling - Discussion	- Class Work: Report on today's takeaway from the class	200
4 /	- Marketing - Python ➢ Logistic Regression Analysis	- Lecture - Handling - Discussion	- Class Work: Report on today's takeaway from the class	200
5 /	- Marketing - Installing HAD (developed by Dr Hiroshi Shimizu) ➢ Cluster Analysis	- Lecture - Handling - Discussion	- Class Work: Report on today's takeaway from the class - Presentation	200
6 /	- Presentation for marketing design	- Lecture - Presentation	- Class Work: Report on today's takeaway from the class	200
7 /	- Summary	- Lecture - Presentation - Discussion	- Class Work: Report on today's takeaway from the class - Self-evaluation	200
8 11/16 ①	- Introducing the lecturer and the course - Foundation of Nation-State ➢ Formation of Nation-State in Europe and Japan ➢ Colonization ➢ Stateless people - In-class BEVI test, a deep inner assessment tool to learn about values and beliefs that shape you who you are.	- Lecture - Group Discussion: colonization and stateless people - BEVI test	- Class Work: Report on today's takeaway from the class - Homework: "Stateless People"	200
9 11/23 ②	- Presentation on: "Stateless People" (homework) - Nation's tasks - BEVI feedback: getting to know the characteristics of the class	- Lecture - Group Discussion: roles and responsibility of nation-state - Presentation: stateless people	- Class Work: Report on today's takeaway from the class - Homework: how science and technology have changed our lives (your option of an era and a country)	200
10 11/30 ③	- Have science and technology helped us improve our lives? ➢ Yes/No: based on what elements?	- Lecture - Group Discussion - Presentation	- Class Work: Today's takeaway from the class - Presentation: Have science and technology improved our lives?	200

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 12/7 ④	- Caohagan Island: an island with nothing, yet rich ➢ The income on the island is lower than the lowest income in the world ➢ Bartering life ➢ Wisdom to live on the island	- Lecture - Group Discussion - Presentation	- Class Work: today's takeaway from the class - Homework	200
12 / ⑤	- Caohagan Island: invasion of globalism – what overtourism brought to the island? ➢ Easy money, easy life: Is anything wrong? ▪ Income gap ▪ Value changes ▪ Environment (toilet, water, waste, electricity) ▪ Lifestyles	- Lecture - Group Discussion - Presentation	- Class Work: today's takeaway from the class - Homework	200
13 / ⑥	- Message from Caohagan Island ➢ Reality of the island ➢ Current and future issues	- Lecture - Group Discussion - Presentation	- Class Work: today's takeaway from the class - Homework: Solutions of the issues on Caohagan Island	200
14 / ⑦	- Presentation Day ➢ Solutions of issues on Caohagan overviewed	- Presentation - Discussion	- Class Work: today's takeaway from the class	200
15 / ⑧	Wrap-up of the course.			200

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 一般科目 選択	社会調査法	2	613300	後学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	石原　正彦	金沢C： 未定		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	社会調査	本科目は環境デザイン創生学科の学習・教育目標の「コミュニケーションを介して協業する基礎能力」に対応する科目である。世に飛び交う多くの情報から、共に生きる人びとのことを正しく、よりよく知るために手段の一つ”社会調査”について理解を深める。そのために、社会調査方法の意義、種類、具体的なデザイン、調査結果の集計について学ぶ。 。
2	量的調査・質的調査	
3	母集団と標本	
4	社会調査のデザイン	
5	データ集計と分析	

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50 分45 回分の学習とし、50分授業15 回に対して50 分30 回分の自学自習を行って下さい。また、この授業ではアクティブラーニングの一環としてグループワークを行います。
共に生きる人びとや私たちが暮らす環境について理解を深めるための授業である。教科書の指定された章については事前に読んで、疑問に思うことについて積極的に発言し、授業内で議論することを勧める。

【教科書および参考書・リザーブドブック】
教科書：入門・社会調査法[法律文化社]
参考書：指定なし
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：指定なし

履修に必要な予備知識や技能

特になし

No.	教育目標(DP) (記号表記)	学生が達成すべき行動目標
①	d, f	図表を用いて調査結果を相手に適切に説明できる
②	i	社会調査のデザイン、実施及び分析能力を身に付ける。
③	a, l, h	社会調査の結果を踏まえて、現場の問題の実態を発見できる。
④		
⑤		
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	0	40	40	0	0	20	100
総合力指標	知識を取り込む力	0	0	20	20	0	0	0	40
	思考・推論・創造する力	0	0	10	10	0	0	0	20
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	10	10	0	0	0	20
	学習に取組む姿勢・意欲	0	0	0	0	0	0	20	20

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評 価 方 法	行動目標		評 価 の 実 施 方 法 と 注 意 点
試 験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①	レ	授業外で課題についてレポートを作成し、適切に取り組んでいるかどうかで評価する。
	②	レ	
	③	レ	
	④		
	⑤		
	⑥		
成果発表 （口頭・実技）	①	レ	課題及び最終課題の内容を順序立ててわかりやすく説明し、質疑に対して適切に応答できるかを評価する。
	②	レ	
	③	レ	
	④		
	⑤		
	⑥		
作 品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	レ	授業内で行う議論において、発言の回数及び内容を点数化して評価する。
	②	レ	
	③	レ	
	④		
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
社会調査の意義、デザイン、実施及び分析手法について説明できると共に、社会調査の結果をわかりやすく説明でき、さらにその結果から現場の問題の実態を発見できる。 。	社会調査の意義、デザイン、実施及び分析手法について説明でき、調査結果をわかりやすく説明できる 。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	オリエンテーション 第１章「社会調査とは何か」	講義と議論を通して、「社会調査」について理解を深める。	予習：第1章を読んで授業に臨む 復習：授業における議論を踏まえて第1章の復習をする。	300
2 ／	第２章「社会調査の種類」	講義と議論を通して、「社会調査の種類」について理解を深める。	予習：第2章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第2章の復習をする。	300
3 ／	第３章「社会調査のプロセス」	講義と演習を通して、「社会調査のプロセス」について理解を深める。	予習：第3章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第3章の復習をする。	300
4 ／	第4章「社会調査のプロセス」	講義と議論を通して、「社会調査のプロセス」について理解を 深める。	予習：第4章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第4章の復習をする。	300
5 ／	第５章「実査の方法」	講義と演習を通して、「実査の方法」について理解を深める。	予習：第5章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第5章の復習をする。	300
6 ／	第６章「調査票の作成」	講義と演習を通して、「実査の方法」について理 解を深める。	予習：第6章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第6章の復習をする。	300
7 ／	第７章「サンプリング」	講義と演習を通して、「サンプリング」について理解を深める。	予習：第7章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第7章の復習をする。。	300
8 ／	第8章「調査の実施」	講義と演習を通して、「調査の実施」について理 解を深める。	予習：第8章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第8章の復習をする。	300
9 ／	第９章「データの電子ファイル化」	講義と演習を通して、「データの電子ファイル化」について理解を深める。	予習：第9章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第9章の復習をする。	300
10 ／	第10章「データの基礎的集計」	講義と演習を通して、「データの基礎的集計」について理解を深め る。	予習：第10章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第10章の復習をする。	300

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	第11章「統計的推測」	講義と演習を通して、「統計的推測」について理解を深める。	予習：第11章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第11章の復習をする。	300
12 ／	第12章「変数間の関連」	講義と演習を通して、「数間の関連」について理解を深める。	予習：第12章を読んだ上で課題に取り組む 復習：授業における議論を踏まえて第12章の復習をする。	300
13 ／	特別講演「実社会での社会調査」	講義と演習を通して、「実社会での社会調査」について理解を深 める。	特別講師の事業について事前調査する。 特別講師の講義内容のまとめ	300
14 ／	最終課題「社会調査から地域課題の設定」	社会調査の結果及び考察内容をプレゼンする。	社会調査の結果をまとめ、プレゼンの準備をする。 最終課題の議論内容をまとめる。	300
15 ／	最終課題「社会調査」発表 総括＆自己点検	社会調査の結果及び考察内容をプレゼンする 授業の振り返り及び総括 自己点検	社会調査の結果をまとめ、プレゼンの準備をする。 最終課題の議論内容をまとめる。 振り返り	300

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S General Required	Health and Physical Education IIIA	1	613000	First	Experiment/Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	CADZOW Philip	Hakusanroku 101 Gym		Friday 16:30-17:30

Course Objectives

	Keywords	Learning Objectives
1	Sportsmanship	Students will develop sport skills and knowledge in Softball and Tennis. Students will learn and practice training specific components of fitness for lifelong health through self-chosen exercise. Students will demonstrate and understand the importance of sportsmanship and effort as a young adult. Students will understand the health concepts related to being a young adult.
2	Safety	
3	Sports	
4	Exercise	
5	Health	

Course Description and Expectations for Students

The course will initially instruct students with the use and care of the Kanazawa campus facilities which include the gymnasium, training machines, and running course. After the introduction, class will focus on developing Softball skills and then Tennis skills. Students will choose components of fitness to train and be expected to manage their own time and effort to achieve an improvement in their chosen area.

Small-sided games will be used to increase skill practice time per student and transition skills from closed to open while imparting basic tactics. The expectation is for students to be on time for class in clothes that are relevant and fully participate in the activities of class to the best of their abilities, while maintaining a respectful attitude and an inclusive atmosphere. This course will offer student led activities and practical learning in class as a type of active learning.

This course is a practical course and so inability to physically partake in activities – specifically learning of sport skills may result in a reduced score unless alternative work is given. Students who have disabilities preventing participation may be given alternate work, and injured students may request makeup classes outside of the class schedule, if they have taken care to manage their injuries throughout the healing process.

Required Materials (textbooks, reference books, reserved books)

Textbooks:

Reference books:

Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

No required skills are required to take this course.

No.	Program Objectives	Target Abilities for Students
①	d	Students will learn how to train their body correctly for a healthy life.
②	f	Students will be able to learn from failure and develop fortitude.
③	i	Students will develop confidence in their abilities and work with a sincere heart.
④	i	Students will learn the value of enjoying sports and the lifelong benefits of exercise.
⑤	c	Students will be able to support each other in learning new skills.
⑥	b	Students will become accustomed to working for the good of others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	0	0	60	0	40	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	0	0	20	0	0	20
	Ability to think, reason and create	0	0	0	0	10	0	0	10
	Collaboration and leadership	0	0	0	0	10	0	10	20
	Announcement / Expression / Communication	0	0	0	0	10	0	10	20
	Attitude and motivation for learning	0	0	0	0	10	0	20	30

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Softball – 20% Tennis – 10% Exercise and Health – 30% Based on skills, knowledge and performance with rubrics provided in class, and may be evaluated through observation, logbook, worksheet, self-reflection, formative, or summative demonstration, questioning etc. Standards may be referenced by normative, ipsative, or criterion-based data.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		Sportsmanship 40% Based on effort, personal and social behavior which is assessed in reference to the rubric provided in class. Evaluations may take the form of observation, logbook, worksheet, self-reflection, formative, or summative demonstration, questioning etc.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
Players do the following: Perform and select appropriate techniques and for given situations, for example very accurately hitting the ball. Demonstrate very good understanding of rules, tactics and techniques of Softball and Tennis. Demonstrate very good sportsmanship and inclusive play, along with very good effort in personal exercise. Carries out duties and tasks with a willing attitude and helps out others.	Players do the following: Perform and select appropriate techniques and for given situations, for example accurately hitting the ball. Demonstrate good understanding of rules, tactics and techniques of Softball and Tennis. Demonstrate good sportsmanship and inclusive play, along with good effort in personal exercise. Carries out duties and tasks with a willing attitude and helps out others.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Syllabus Explanation Introduction to Kanazawa Gym facilities Exercise unit 3.1 Softball unit 3.1	Practical	Review class material and practice in own time.	100
2 /	Exercise unit 3.2 Softball unit 3.2	Practical	Review class material and practice in own time.	100
3 /	Exercise unit 3.3 Softball unit 3.3	Practical	Review class material and practice in own time.	100
4 /	Exercise unit 3.4 Softball unit 3.4	Practical	Review class material and practice in own time.	100
5 /	Exercise unit 3.5 Softball unit 3.5	Practical	Review class material and practice in own time.	100
6 /	Exercise unit 3.6 Softball unit 3.6	Practical	Review class material and practice in own time.	100
7 /	Exercise unit 3.7 Softball unit 3.7	Practical	Review class material and practice in own time.	100
8 /	Exercise unit 3.8 Softball unit 3.8	Practical	Review class material and practice in own time.	100
9 /	Exercise unit 3.9 Softball unit 3.9	Practical	Review class material and practice in own time.	100
10 /	Exercise unit 3.10 Softball unit 3.10	Practical	Review class material and practice in own time.	100

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Exercise unit 3.11 Tennis unit 3.1	Practical	Review class material and practice in own time.	100
12 /	Exercise unit 3.12 Tennis unit 3.2	Practical	Review class material and practice in own time.	100
13 /	Exercise unit 3.13 Tennis unit 3.3	Practical	Review class material and practice in own time.	100
14 /	Exercise unit 3.14 Tennis unit 3.4	Practical	Review class material and practice in own time.	100
15 /	Exercise unit 3.15 Tennis unit 3.5	Practical	Review class material and practice in own time.	100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S General Required	Health and Physical Education IIIB	1	613100	Second	Experiment/Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	CADZOW Philip	Hakusanroku 101 Gym		Friday 16:30-17:30

Course Objectives

	Keywords	Learning Objectives
1	Sportsmanship	The student will continue learning the fundamental skills of Tennis. Students will develop sport skills in Handball and Futsal through competitive games and further their philosophical understandings of how sports shape society. Students will learn and practice fitness for lifelong health through exercise and learn relevant health concepts for young adults. Students will demonstrate and understand the importance of sportsmanship and effort.
2	Safety	
3	Sports	
4	Exercise	
5	Health	

Course Description and Expectations for Students

The course will continue instruction in the sport of tennis, playing outside when weather allows, students are expected to fulfil the duty of class helper when it is their turn. During most classes students will continue Self-led training for their chosen component of fitness. Students will occasionally be instructed on health for life concepts which may include various types of exercise or health theory needed for young adults.
Small-sided games will be used to increase skill practice time per student and transition skills from closed to open while imparting basic tactics. The expectation is for students to be on time for class in clothes that are easy to exercise in and fully participate in the activities of class to the best of their abilities. If clothes are worn that the teacher judges is not fit for class, then the student may not be able to take part in the days class. Students should maintain a respectful attitude and an inclusive atmosphere. This course will offer student led activities and practical learning in class as a type of active learning.

This course is a practical course and so inability to physically partake in activities – specifically learning of sport skills may result in a reduced score unless alternative work is given. Students who have disabilities preventing participation may be given alternate work, and injured students may request makeup classes outside of the class schedule, if they have taken care to manage their injuries throughout the healing process.

Required Materials (textbooks, reference books, reserved books)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

No.	Program Objectives	Target Abilities for Students
①	d	Students will learn how to train their body correctly for a healthy life.
②	f	Students will be able to learn from failure and develop fortitude.
③	i	Students will develop confidence in their abilities and work with a sincere heart.
④	i	Students will learn the value of enjoying sports and the lifelong benefits of exercise.
⑤	c	Students will be able to support each other in learning new skills.
⑥	b	Students will become accustomed to working for the good of others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	0	0	60	0	40	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	0	0	20	0	0	20
	Ability to think, reason and create	0	0	0	0	10	0	0	10
	Collaboration and leadership	0	0	0	0	10	0	10	20
	Announcement / Expression / Communication	0	0	0	0	10	0	10	20
	Attitude and motivation for learning	0	0	0	0	10	0	20	30

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Handball – 10% Futsal – 10% Tennis – 10% Exercise and Health– 30% Based on skills, knowledge and performance with rubrics provided in class, and may be evaluated through observation, logbook, worksheet, self-reflection, formative, or summative demonstration, questioning etc. Standards may be referenced by normative, ipsative, or criterion-based data.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		Sportsmanship 40% Based on effort, personal and social behavior which is assessed in reference to the rubric provided in class. Evaluations may take the form of observation, logbook, worksheet, self-reflection, formative, or summative demonstration, questioning etc.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
Players do the following: Perform and select appropriate techniques and for given situations, for example very accurately hitting the ball. Demonstrate very good understanding of rules, tactics and techniques of tennis, Handball and Futsal. Demonstrate very good sportsmanship and inclusive play, along with very good effort in personal exercise. Carries out duties and tasks with a willing attitude and helps out others.	Players do the following: Perform and select appropriate techniques and for given situations, for example accurately passing the ball. Demonstrate good understanding of rules, tactics and techniques of Tennis, Handball and Futsal. Demonstrate good sportsmanship and inclusive play, along with good effort in personal exercise. Carries out duties and tasks with a willing attitude and helps out others.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Tennis unit	Practical	Review class material and practice in own time.	100
2 /	Tennis unit	Practical	Review class material and practice in own time.	100
3 /	Tennis unit	Practical	Review class material and practice in own time.	100
4 /	Tennis unit	Practical	Review class material and practice in own time.	100
5 /	Tennis unit	Practical	Review class material and practice in own time.	100
6 /	Games for life unit 1	Practical	Review class material and practice in own time.	100
7 /	Games for life unit 2	Practical	Review class material and practice in own time.	100
8 /	Games for life unit 3	Practical	Review class material and practice in own time.	100
9 /	Games for life unit 4	Practical	Review class material and practice in own time.	100
10 /	Games for life unit 5	Practical	Review class material and practice in own time.	100

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Games for life unit 6	Practical	Review class material and practice in own time.	100
12 /	Games for life unit 7	Practical	Review class material and practice in own time.	100
13 /	Games for life unit 8	Practical	Review class material and practice in own time.	100
14 /	Games for life unit 9	Practical	Review class material and practice in own time.	100
15 /	Games for life unit 10	Practical	Review class material and practice in own time.	100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required * Practical	Engineering Design IVA	2	710600	First	Experiment / Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	MEBUSAYA, Rattiya P / * HAYASHI, Michihiro / SANG-NGENCHAI, Apirak / WOHLFARTH, Brandon			Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Human Center Design	In class, students will work in interdisciplinary teams to tackle problems found within the surrounding community using human centered design. They will incorporate key skills in themes, regarding idea development and implementation, into a solution that generates new value. Students will need to utilize the hard skills learned within their other courses, in conjunction with outside learning, to complete the course project.
2	Problem – Solution Fit	
3	Idea Validation and Impact	
4	Users and Markets	
5	Project Management	

Course Description and Expectations for Students (10.5pt)

This course will offer project-based learning in class as a type of active learning.
This course, primarily relating to the Conceive and Design steps within the CDIO design framework, focuses on problem identification, understanding their markets, generating value, and simple prototyping to develop a solution that incorporates robotics, AI/IoT, and entrepreneurship. Students will be accessed as they step through the design process at various stages.
Students will need to:
-Engage with stakeholders in a professional manner as good representatives of ICT
-Be productive team members that participate in meetings, contribute new ideas, and complete the tasks assigned to them
-Be willing to learn new skills and new ways to incorporate content from other courses into their projects
-Submit assignments and required documents on time and completed. Any late or missing submissions may result in a loss in points
-Attend classes during the scheduled periods

Relationship between this course and business experience

A faculty member who has practical experience in development of automated material handling equipment, for instance, belt-conveyor, vertical lift, sorting system and POS etc., which is utilized for prototype designing, planning and implementation.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

All previous classes knowledge that they have learned through 1st 2nd and 3rd year.

No.	Program Objectives	Target Abilities for Students (9pt)
①	c,d,f	Students are able to work in interdisciplinary teams.
②	a,g,h	Students are able to find problems worth solving to tackle problems within the surrounding community using human centered design.
③	a,g,h	Students are able to find solutions to tackle problems found within the surrounding community using human centered design
④	a,g,h	Students are able to incorporate key skills in themes, regarding idea development and implementation, into a solution that generates new value.
⑤	g,i	Students are able to utilize the hard skills learned within their other courses, in conjunction with outside learning, to complete the course project.
⑥	c,d,f	Students are able to effectively communicate and convey their ideas to others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	25	30	0	30	15	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	5	5	0	10	0	20
	Ability to think, reason and create	0	0	5	8	0	10	5	28
	Collaboration and leadership	0	0	5	6	0	0	5	16
	Announcement / Expression / Communication	0	0	5	6	0	5	3	19
	Attitude and motivation for learning	0	0	5	5	0	5	2	17

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	∠	Students are evaluated through three structured team-based progress reports submitted at the beginning, middle, and end of the semester. The purpose of this evaluation is to assess learning progress, design decision-making, reflection, and problem-solving, rather than only final outcomes.
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Presentations	①	∠	Students are evaluated through two team-based presentations conducted at key stages of the design studio process: (1) Design Review Presentation and (2) Final Presentation. These presentations assess students' ability to communicate design thinking, justify decisions, and reflect on learning outcomes.
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		The portfolio is an individual evaluation component designed to assess each student's skill development, learning process, and personal growth throughout both semesters of the Engineering Design course. While most course activities are conducted in teams, the portfolio ensures that individual learning outcomes and contributions are clearly documented and evaluated.
	②		
	③		
	④	∠	
	⑤	∠	
	⑥		
Others	①	∠	Each team conducts weekly team discussions throughout the semester. During these meetings, students rotate roles (facilitator, notetaker, timekeeper) to ensure balanced participation and skill development. After each meeting, the team completes and submits a meeting memo.
	②		
	③		
	④		
	⑤	∠	
	⑥	∠	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
- Actively leads and collaborates in interdisciplinary teams, takes multiple roles, and supports team decision-making independently. - Independently identifies meaningful community problems using empathy, user research, and data analysis. - Develops validated solutions aligned with user needs through iterative testing and feedback. - Integrates design, engineering, and business skills to create and justify new value. - Purposefully integrates hard skills from coursework and self-directed learning to enhance project quality. - Communicates ideas clearly and professionally to diverse stakeholders using appropriate formats.	- Participates responsibly in teams, completes assigned roles, and collaborates with guidance. - Identifies community problems using basic human-centered design tools with guidance. - Proposes solutions that address user needs with limited validation. - Applies basic idea development skills to create identifiable value. - Applies relevant hard skills from coursework with instructor support. - Communicates ideas clearly to team members and instructors.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
	Phase 1: **CONCEIVE – Problem Discovery & Empathy**			
1	Introduction, Guidance, Evaluation, Competition, Team Up	Design Studio Orientation & Guided Facilitation	Team grouping	30
2	Problem Worth Solving Theme & Local Industry Context	Facilitated Brainstorming Studio	Problem ideas	30
3	Importance of the Problem Background, Data, Current Situation, Alternatives (Empathy)	Research Studio with Coaching Check-in	Research notes	30
4	Problem Exploration (Empathy)	Self-Directed Research Studio + Mentor Support	Insight summary	30
5	Data Analysis Stakeholders Identification & Prioritization Persona Draft	Design Analysis Workshop	Stakeholder map & persona	30
6	Persona Refinement	Team Coaching & Design Critique	Persona revision	30
7 /	Persona & Journey Map Validation Points	Design Studio + Validation Planning	Journey map draft	30
8	Iteration & Refinement	Studio Work + Facilitator Review	Updated journey	30
9 /	Journey Map, Interview, Empathy Map	Field Research & Coaching Session	Interview & empathy map	30
10 /	Validation Synthesis	Reflection & Design Coaching	Validation insights	30
11	Users & Market Size (TAM, SAM, SOM)	Guided Market Analysis Studio	Market estimation	30
12	Concept Integration	CDIO Conceive Phase Review	Concept brief	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time cre\\dit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
	Phase 2: DESIGN – Solution & Prototype Design			
13 /	Solution Concept & Prototype Value Proposition, UX/UI, MVP	Design Ideation Studio	Solution concept	30
14 /	Solution Refinement	Mentored Design Studio	MVP refinement	30
15 /	Rapid Prototyping	Hands-on Prototyping Studio	Prototype v1	30
16 /	Iteration	Studio Work + Coach Feedback	Prototype improvement	30
17 /	Rapid Prototyping (Iteration)	Design–Build Studio	Prototype v2	30
18 /	Design Freeze	Design Review & Readiness Check	Prototype documentation	30
19 /	Design Review & Validation Plan	Stakeholder Validation Workshop	Feedback plan	10
20 /	Validation with Real Users	Field Testing & Coaching	User feedback	30
21	Design Review & Feedback Analysis	Data-Driven Reflection Studio	Feedback analysis	30
22	Iteration Planning	Facilitated Iteration Planning	Revision plan	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
23	Planning for Real Prototype	Implementation Planning Studio	Implementation plan	30
24 /	Refinement	Studio Work + Mentor Review	Final prototype	30
25	Final Presentation Preparation	Presentation Coaching & Design Polish	Final deck	30
26	Final Presentation Preparation	Rehearsal & Coaching Studio	Final rehearsal	30
27 /	Final Presentation	Public Design Review & Evaluation	Final presentation	30
28 /	Reflection	Guided Reflection Session	Reflection notes	30
29 /	Wrap-Up Week	Portfolio & Learning Reflection Studio	Report & portfolio	30
30 /	Course Closure	CDIO Reflection & Feedback	Final submission	10

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required * Practical	Engineering Design IVB	2	710700	Second	Experiment / Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	MEBUSAYA, Rattiya P / * HAYASHI, Michihiro / SANG-NGENCHAI, Apirak / WOHLFARTH, Brandon			Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Human Center Design	In class, students will work in interdisciplinary teams to tackle problems found within the surrounding community using human centered design. They will incorporate key skills in themes, regarding idea development and implementation, into a solution that generates new value. Students will need to utilize the hard skills learned within their other courses, in conjunction with outside learning, to complete the course project.
2	Idea Validation and Impact	
3	Prototyping	
4	Implementation	
5	Project Management	

Course Description and Expectations for Students (10.5pt)

This course will offer project-based learning in class as a type of active learning.
This course, primarily relates to the Implement and Operate steps within the CDIO design framework, focuses on problem identification, understanding their markets, generating value, and simple prototyping to develop a solution that incorporates robotics, AI/IoT, and entrepreneurship. Students will be accessed as they step through the design process at various stages.
Students will need to:
-Engage with stakeholders in a professional manner as good representatives of ICT
-Be productive team members that participate in meetings, contribute new ideas, and complete the tasks assigned to them
-Be willing to learn new skills and new ways to incorporate content from other courses into their projects
-Submit assignments and required documents on time and completed. Any late or missing submissions may result in a loss in points
-Attend classes during the scheduled periods

Relationship between this course and business experience

A faculty member who has practical experience in development of automated material handling equipment, for instance, belt-conveyor, vertical lift, sorting system and POS etc.,which is utilized for prototype designing, planning and implementation.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

All previous classes knowledge that they have learned through 1st 2nd and 3rd year.

No.	Program Objectives	Target Abilities for Students (9pt)
①	c,d,f	Students are able to work in interdisciplinary teams.
②	a,g,h	Students are able to find problems worth solving to tackle problems within the surrounding community using human centered design.
③	a,g,h	Students are able to find solutions to tackle problems found within the surrounding community using human centered design
④	a,g,h	Students are able to incorporate key skills in themes, regarding idea development and implementation, into a solution that generates new value.
⑤	g,i	Students are able to utilize the hard skills learned within their other courses, in conjunction with outside learning, to complete the course project.
⑥	c,d,f	Students are able to effectively communicate and convey their ideas to others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	25	30	0	30	15	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	5	5	0	10	0	20
	Ability to think, reason and create	0	0	5	8	0	10	5	28
	Collaboration and leadership	0	0	5	6	0	0	5	16
	Announcement / Expression / Communication	0	0	5	6	0	5	3	19
	Attitude and motivation for learning	0	0	5	5	0	5	2	17

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	∠	Students are evaluated through three structured team-based progress reports submitted at the beginning, middle, and end of the semester. The purpose of this evaluation is to assess learning progress, design decision-making, reflection, and problem-solving, rather than only final outcomes.
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Presentations	①	∠	Students are evaluated through two team-based presentations conducted at key stages of the design studio process: (1) Design Review Presentation and (2) Final Presentation. These presentations assess students' ability to communicate design thinking, justify decisions, and reflect on learning outcomes.
	②	∠	
	③	∠	
	④	∠	
	⑤		
	⑥	∠	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		The portfolio is an individual evaluation component designed to assess each student's skill development, learning process, and personal growth throughout both semesters of the Engineering Design course. While most course activities are conducted in teams, the portfolio ensures that individual learning outcomes and contributions are clearly documented and evaluated.
	②		
	③		
	④	∠	
	⑤	∠	
	⑥		
Others	①	∠	Each team conducts weekly team discussions throughout the semester. During these meetings, students rotate roles (facilitator, notetaker, timekeeper) to ensure balanced participation and skill development. After each meeting, the team completes and submits a meeting memo.
	②		
	③		
	④		
	⑤	∠	
	⑥	∠	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
- Actively leads and collaborates in interdisciplinary teams, takes multiple roles, and supports team decision-making independently. - Independently identifies meaningful community problems using empathy, user research, and data analysis. - Develops validated solutions aligned with user needs through iterative testing and feedback. - Integrates design, engineering, and business skills to create and justify new value. - Purposefully integrates hard skills from coursework and self-directed learning to enhance project quality. - Communicates ideas clearly and professionally to diverse stakeholders using appropriate formats.	- Participates responsibly in teams, completes assigned roles, and collaborates with guidance. - Identifies community problems using basic human-centered design tools with guidance. - Proposes solutions that address user needs with limited validation. - Applies basic idea development skills to create identifiable value. - Applies relevant hard skills from coursework with instructor support. - Communicates ideas clearly to team members and instructors.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
	Phase 3: (I) IMPLEMENT – Build, Test & Iterate			
1	Semester Kickoff Review Final Prototype Plan (from Sem 1)	Studio Orientation & Project Re-alignment	Project roadmap	30
2	Technical Feasibility & Constraints	Engineering Design Review Studio	Feasibility checklist	30
3	Build Technique I (Hardware / Software / Service Process)	Hands-on Build Studio	Build log	30
4	Build Technique II	Mentored Build Studio	Component completion	30
5	System Integration	Design–Build–Test Studio	Integrated prototype	30
6	Prototype Testing Methods	Testing Strategy Workshop	Test plan	30
7 /	Functional Testing	Hands-on Testing Studio	Test results	30
8	Iteration Cycle I	Coach-Guided Iteration Studio	Improved prototype	30
9 /	UX / Service Flow Test (refer Journey Map)	Experience Testing Studio	UX findings	30
10 /	Iteration Cycle II	Studio Work + Design Critique	Prototype v2	30
11	Reliability & Usability Testing	Validation Lab	Usability report	30
12	Iteration Cycle III	Rapid Improvement Studio	Prototype v3	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
13 /	Product / Service Readiness Review	Design Review Panel	Readiness checklist	30
14 /	Cost Structure & Unit Economics	Business Design Studio	Cost model	30
15 /	MVP Definition & Scope Lock	Facilitated Decision Studio	MVP definition	30
16 /	Implement Phase Review (CDIO)	Milestone Review & Reflection	Implementation report	30
	Phase 4: OPERATE – Market Test & Business Validation **Market, Value, and Revenue Validation**			
17 /	Value Proposition Review (Persona & Empathy Map)	Value Validation Studio	Value statement	30
18 /	Market Test Design (User, Channel, Offer)	Experiment Design Workshop	Market test plan	30
19 /	Channel Exploration (Online / Offline / Partners)	Channel Strategy Studio	Channel map	30
20 /	Market Testing with Real Users	Field Testing & Coaching	User feedback	30
21	Product / Service Test Results Analysis	Data Analysis Studio	Insight report	30
22	Revenue Model Design	Revenue Model Workshop	Revenue model	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
23	Pricing & Willingness-to-Pay Test	Market Experiment Studio	Pricing results	30
24 /	Traction Metrics & Success Matrix (AARRR / KPI)	Metrics Design Studio	Traction matrix	30
25	Business Milestones & Roadmap	Startup Planning Studio	Milestone plan	30
26	Launch Strategy & Go-to-Market Plan	Launch Planning Workshop	Launch plan	30
27 /	Scale-Up Strategy (Market, Tech, Team)	Growth Strategy Studio	Scale plan	30
28 /	Risk, Ethics & Sustainability Review	Responsible Innovation Studio	Risk assessment	30
29 /	Final Pitch Preparation (Product + Business)	Pitch Coaching Studio	Final deck	30
30 /	Final Demo Day & Reflection	Public Demo & Portfolio Review	Portfolio & report	10

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Internship IA	1	720100	First	Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	ITO, Meguru	Hakusanroku C 101,201		

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1 2 3 4 5	Career design Engineering skills and knowledge Skills for research Human skills	Students will gain experience related to their chosen field of study and possible future career. The students will not only improve their skills and knowledge, but also make connections between learning and practice, which the students may not experience in their regular classes. Also, the students will develop the autonomy, responsibility, and attitude needed in order for them to become an individual who can make a positive contribution to society.

Course Description and Expectations for Students (10.5pt)

Students will work on a project under the direction of their advisors, based on their chosen field of study.

Advice on taking this class
- Be aware that this is an opportunity given to students by the hosting institutions.
- Follow the directions of advisors and submit all assignments on time.
- Work independently and in groups.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic background information of an accepting lab.

No.	Program Objectives	Target Abilities for Students (9pt)
①	a, h	Students will be able to complete tasks by applying what they have practiced.
②	e, i	Students will be able to understand their strengths and weaknesses better.
③	b, i	Students will be able to have a deeper understanding of their chosen field of studies.
④	b, i	Students will be able to develop a better idea of what they would like to pursue in the future.
⑤	b, i	Students will be able to reflect on what they did and set goals for the future.
⑥	c, d	Students will be able to develop attitudes and abilities needed to work productively with others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	40	0	10	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	15	0	0	0	0	15
	Ability to think, reason and create	0	0	10	10	0	0	0	20
	Collaboration and leadership	0	0	15	0	0	0	0	15
	Announcement / Expression / Communication	0	0	0	30	0	0	0	30
	Attitude and motivation for learning	0	0	10	0	0	10	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	This evaluation will be made on the evaluation report written by the person in charge of the hosting lab.
	②		
	③	✓	
	④		
	⑤		
	⑥		
Presentations	①	✓	This evaluation will be made by the students' presentation at internship presentation session.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		This evaluation will be made by the report students write.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥	✓	
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Lab work	Research		
2 /	Lab work	Research		
3 /	Lab work	Research		
4 /	Lab work	Research		
5 /	Lab work	Research		
6 /	Lab work	Research		
7 /	Lab work	Research		
8 /	Lab work	Research		
9 /	Lab work	Research		
10 /	Lab work	Research		

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Lab work	Research		
12 /	Lab work	Research		
13 /	Preparation for presentation	Making PowerPoint slides		
14 /	Preparation for presentation	Making PowerPoint slides		
15 /	Presentation			

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Internship IB	1	720200	Second	Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	ITO, Meguru	Hakusanroku C 101,201		

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1 2 3 4 5	Career design Engineering skills and knowledge Skills for research Human skills	Students will gain experience related to their chosen field of study and possible future career. The students will not only improve their skills and knowledge, but also make connections between learning and practice, which the students may not experience in their regular classes. Also, the students will develop the autonomy, responsibility, and attitude needed in order for them to become an individual who can make a positive contribution to society.

Course Description and Expectations for Students (10.5pt)

Students will work on a project under the direction of their advisors, based on their chosen field of study.

Advice on taking this class
- Be aware that this is an opportunity given to students by the hosting institutions.
- Follow the directions of advisors and submit all assignments on time.
- Work independently and in groups.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic background information of an accepting lab.

No.	Program Objectives	Target Abilities for Students (9pt)
①	a, h	Students will be able to complete tasks by applying what they have practiced.
②	e, i	Students will be able to understand their strengths and weaknesses better.
③	b, i	Students will be able to have a deeper understanding of their chosen field of studies.
④	b, i	Students will be able to develop a better idea of what they would like to pursue in the future.
⑤	b, i	Students will be able to reflect on what they did and set goals for the future.
⑥	c, d	Students will be able to develop attitudes and abilities needed to work productively with others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	40	0	10	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	15	0	0	0	0	15
	Ability to think, reason and create	0	0	10	10	0	0	0	20
	Collaboration and leadership	0	0	15	0	0	0	0	15
	Announcement / Expression / Communication	0	0	0	30	0	0	0	30
	Attitude and motivation for learning	0	0	10	0	0	10	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	This evaluation will be made on the evaluation report written by the person in charge of the hosting lab.
	②		
	③	✓	
	④		
	⑤		
	⑥		
Presentations	①	✓	This evaluation will be made by the students' presentation at internship presentation session.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		This evaluation will be made by the report students write.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥	✓	
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Lab work	Research		
2 /	Lab work	Research		
3 /	Lab work	Research		
4 /	Lab work	Research		
5 /	Lab work	Research		
6 /	Lab work	Research		
7 /	Lab work	Research		
8 /	Lab work	Research		
9 /	Lab work	Research		
10 /	Lab work	Research		

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Lab work	Research		
12 /	Lab work	Research		
13 /	Preparation for presentation	Making PowerPoint slides		
14 /	Preparation for presentation	Making PowerPoint slides		
15 /	Presentation			

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Internship IIA	1	720300	First	Experiment/Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	MATSUSHITA, Omihito	Hakusanroku C 101:201		Make an appointment

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1 2 3 4 5	Career design Engineering skills and knowledge Skills for research Human skills	Students will receive practical training related to their career choices and future career at companies and universities. Students will be placed in situations that require more advanced knowledge and skills than Internship I. They will improve their specialized knowledge, learn the significance of engineering, how to be an engineer, manners as a member of society to become an engineer leader who can contribute to society in the future, autonomy, sense of responsibility, and sense of ethics.

Course Description and Expectations for Students (10.5pt)

Students will work on a project under the direction of their advisors, based on their chosen field of study.
Approximately 3 to 5 days of actual work is required to receive credit.

If no evaluation is submitted by the host, no credits will be awarded.

Advice on taking this class
- Be aware that this is an opportunity given to students by the host.
- Follow the directions of advisors and submit all assignments on time.
- Work independently and in groups.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

Academic and personal skills required as a technical college student in each specialized field.

No.	Program Objectives	Target Abilities for Students
①	a, h	Students will be able to complete tasks by applying what they have practiced.
②	e, i	Students will be able to understand their strengths and weaknesses better.
③	b, i	Students will be able to have a deeper understanding of their chosen industry.
④	b, i	Students will be able to develop a better idea of what they would like to pursue in the future.
⑤	b, i	Students will be able to reflect on what they did and set goals for the future.
⑥	c, d	Students will be able to develop attitudes and abilities needed to work productively with others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	40	40	0	0	20	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	10	0	0	0	4	14
	Ability to think, reason and create	0	0	15	10	0	0	4	29
	Collaboration and leadership	0	0	0	0	0	0	4	4
	Announcement / Expression / Communication	0	0	0	30	0	0	4	34
	Attitude and motivation for learning	0	0	15	0	0	0	4	19

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	・Write a report on the contents and results of the work experience. Rather than simply describing the process and results, reflect on the overall content of the experience and describe in detail the knowledge and skills that were utilized in each process. ・Based on the results of reflecting on work experience, plan how to use it in future activities and specify action goals to be implemented.
	②		
	③	✓	
	④		
	⑤		
	⑥		
Presentations	①	✓	This evaluation will be made by the students' presentation at internship presentation session.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		Evaluation will be made by the host company as to whether the student can work/study in the field of expertise in accordance with the engineering ethics.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
Understand the significance of the internship and set the purpose of participation in terms of both improving basic skills for working adults and to confirm the level of one's own expertise. Based on their own career development, they are able to decide which a host they would like to participate in and research the relevant industries or study fields. Students will be able to research the relevant field based on their own career development.	Understand the significance of internships and set a purpose for participating. To be able to research the field. To be able to carry out the work/study which the host gives without any problems.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Understand the purpose and the significant aspects of internship education. Prepare the necessary documents and materials for the internship program.	Lecture		
2 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
3 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed..	Practical work/study experience Instructed by a designated industry.		
4 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
5 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
6 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
7 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
8 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
9 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
10 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
12 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
13 /	Preparation for presentation	Making powerpoint slides		
14 /	Preparation for presentation	Making powerpoint slides		
15 /	Final presentation - Present the achievement of the internship program	Preparation		

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Internship IIB	1	720400	Second	Experiment/Practice Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	MATSUSHITA, Omihito	Hakusanroku C 101:201		Make an appointment

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1 2 3 4 5	Career design Engineering skills and knowledge Skills for research Human skills	Students will receive practical training related to their career choices and future career at companies and universities. Students will be placed in situations that require more advanced knowledge and skills than Internship I. They will improve their specialized knowledge, learn the significance of engineering, how to be an engineer, manners as a member of society to become an engineer leader who can contribute to society in the future, autonomy, sense of responsibility, and sense of ethics.

Course Description and Expectations for Students (10.5pt)

Students will work on a project under the direction of their advisors, based on their chosen field of study.
Approximately 3 to 5 days of actual work is required to receive credit.

If no evaluation is submitted by the host, no credits will be awarded.

Advice on taking this class
- Be aware that this is an opportunity given to students by the host.
- Follow the directions of advisors and submit all assignments on time.
- Work independently and in groups.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

Academic and personal skills required as a technical college student in each specialized field.

No.	Program Objectives	Target Abilities for Students
①	a, h	Students will be able to complete tasks by applying what they have practiced.
②	e, i	Students will be able to understand their strengths and weaknesses better.
③	b, i	Students will be able to have a deeper understanding of their chosen industry.
④	b, i	Students will be able to develop a better idea of what they would like to pursue in the future.
⑤	b, i	Students will be able to reflect on what they did and set goals for the future.
⑥	c, d	Students will be able to develop attitudes and abilities needed to work productively with others.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	40	40	0	0	20	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	10	0	0	0	4	14
	Ability to think, reason and create	0	0	15	10	0	0	4	29
	Collaboration and leadership	0	0	0	0	0	0	4	4
	Announcement / Expression / Communication	0	0	0	30	0	0	4	34
	Attitude and motivation for learning	0	0	15	0	0	0	4	19

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	・Write a report on the contents and results of the work experience. Rather than simply describing the process and results, reflect on the overall content of the experience and describe in detail the knowledge and skills that were utilized in each process. ・Based on the results of reflecting on work experience, plan how to use it in future activities and specify action goals to be implemented.
	②		
	③	✓	
	④		
	⑤		
	⑥		
Presentations	①	✓	This evaluation will be made by the students' presentation at internship presentation session.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		Evaluation will be made by the host company as to whether the student can work/study in the field of expertise in accordance with the engineering ethics.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
Understand the significance of the internship and set the purpose of participation in terms of both improving basic skills for working adults and to confirm the level of one's own expertise. Based on their own career development, they are able to decide which a host they would like to participate in and research the relevant industries or study fields. Students will be able to research the relevant field based on their own career development.	Understand the significance of internships and set a purpose for participating. To be able to research the field. To be able to carry out the work/study which the host gives without any problems.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Understand the purpose and the significant aspects of internship education. Prepare the necessary documents and materials for the internship program.	Lecture		
2 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
3 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed..	Practical work/study experience Instructed by a designated industry.		
4 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
5 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
6 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
7 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
8 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
9 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
10 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
12 /	Working on the internship program . -Follow the policy of the field. - Submit the assigned work results as instructed.	Practical work/study experience Instructed by a designated industry.		
13 /	Preparation for presentation	Making powerpoint slides		
14 /	Preparation for presentation	Making powerpoint slides		
15 /	Final presentation - Present the achievement of the internship program	Preparation		

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Computer Skills IVA	1	720600	First	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	KUSHIMA, Yoshihiro	31.117		16:50-17:30

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	MATLAB	To be able to acquire fundamental skills in numerical computation using MATLAB, learn basic programming concepts, know how to visualize and interpret data, acquire methods for solving differential equations, and construct mathematical models to perform and consider simulation results.
2	Numerical Computation	
3	Data Visualization	
4	Programing	
5	Simulation	

Course Description and Expectations for Students (10.5pt)

This course introduces fundamental skills for numerical computation and data analysis using MATLAB. Students will learn programming basics, matrix operations, data visualization, and numerical methods. Engineering problems will be treated through mathematical modeling and simulation rather than physical experiments.

This course will offer in-class programming exercises and simulation-based tasks as a type of active learning.

All exercises will be completed during class time, and students will acquire skills through hands-on practice in each session. Students are expected to review basic mathematics such as calculus and linear algebra.

Student performance will be evaluated based on continuous in-class exercises and a final project.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of calculus (differentiation and integration)
Basic understanding of vectors and matrices
Fundamental computer operation skills
Ability to follow basic programming instructions

No.	Program Objectives	Target Abilities for Students (9pt)
①	d, h, j	Ability to perform numerical computation using MATLAB
②	d, h, j	Ability to implement basic programming structures
③	d, e, h	Ability to visualize and interpret engineering data
④	d, j, l	Ability to model physical phenomena mathematically
⑤	d, g, j	Ability to analyze simulation results logically
⑥	a, e, j	Ability to communicate results effectively

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	30	10	0	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	40	0	0	0	0	0	40
	Ability to think, reason and create	0	10	20	0	0	0	0	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	10	0	0	0	10
	Attitude and motivation for learning	0	10	10	0	0	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	In-class programming exercises are conducted in each class to evaluate students' understanding of basic concepts and skills. Students are required to complete assigned tasks within class time, and evaluation is based on correctness, completion, and ability to apply the learned methods.
	②	✓	
	③	✓	
	④		
	⑤	✓	
	⑥		
Reports	①		A final project is assigned in the latter part of the course. Students construct a mathematical model, implement simulations using MATLAB, and submit a report. Evaluation is based on the appropriateness of the model, correctness of implementation, and quality of analysis.
	②		
	③		
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		Students present the results of their final project. Evaluation is based on clarity of explanation, use of appropriate graphs and figures, and logical organization of the content.
	②		
	③	✓	
	④		
	⑤		
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students can independently construct appropriate mathematical models, implement MATLAB programs without errors, and perform simulations correctly. They can analyze results quantitatively, compare different conditions, and provide logical interpretations using clear graphs and explanations.	Students can construct basic models with guidance, write MATLAB programs with minor errors, and obtain reasonable simulation results. They can interpret results at a basic level and present them using simple graphs and explanations.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	MATLAB installation and environment setup	Exercise	Complete installation and confirm MATLAB runs correctly	100
2 /	Introduction to MATLAB and basic operations	Lecture + Exercise	Run basic commands and simple calculations	100
3 /	Variables, vectors, and matrices	Lecture + Exercise	Practice matrix operations	100
4 /	Data visualization using plot functions	Lecture + Exercise	Modify and reproduce graphs	100
5 /	Conditional statements (if)	Lecture + Exercise	Modify conditional programs	100
6 /	Loops (for, while)	Lecture + Exercise	Extend loop calculations	100
7 /	Functions and scripts	Lecture + Exercise	Create and modify functions	100
8 /	Numerical calculation methods	Lecture + Exercise	Apply numerical methods	100
9 /	Ordinary differential equations and simulation	Lecture + Exercise	Solve ODEs and change parameters	100
10 /	Simulation of physical systems	Lecture + Exercise	Compare simulation results	100

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Data analysis and curve fitting	Lecture + Exercise	Apply fitting methods	100
12 /	Data handling and processing	Lecture + Exercise	Process and analyze data	100
13 /	Final project (model design)	Exercise	Define problem and model	100
14 /	Final project (implementation)	Exercise	Simulation and analysis	100
15 /	Final project presentation	Presentation	Final report submission	100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Computer Skills IVB	1	720700	Second	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	KUSHIMA, Yoshihiro	31.117		16:50-17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Simulink	To be able to acquire fundamental skills in model-based design using Simulink, learn how to construct block diagram models of dynamic systems, know how to simulate and visualize system behavior, and consider system characteristics through parameter changes and control design.
2	Modeling	
3	Simulation	
4	Control Systems,	
5	Block Diagram	

Course Description and Expectations for Students (10.5pt)

This course introduces fundamental skills for modeling and simulation using Simulink. Students will learn how to construct dynamic system models using block diagrams and analyze system behavior through simulation. The course focuses on model-based design of engineering systems without physical experiments.

This course will offer in-class modeling exercises and simulation-based tasks as a type of active learning.

All exercises will be completed during class time, and students will acquire practical modeling and simulation skills through hands-on practice in each session. Students are expected to review basic mathematics such as calculus and differential equations.

Student performance will be evaluated based on continuous in-class exercises and a final project.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic MATLAB operation skills
Basic knowledge of calculus
Basic understanding of differential equations
Fundamental computer operation skills

No.	Program Objectives	Target Abilities for Students (9pt)
①	d, h, j	Ability to construct simulation models using Simulink
②	d, h, j	Ability to represent systems using block diagrams
③	d, e, h	Ability to visualize and interpret simulation results
④	d, j, l	Ability to model and analyze dynamic systems
⑤	d, g, j	Ability to evaluate system behavior and improve models
⑥	a, e, j	Ability to present simulation results and complete tasks independently

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	30	10	0	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	40	0	0	0	0	0	40
	Ability to think, reason and create	0	10	20	0	0	0	0	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	10	0	0	0	10
	Attitude and motivation for learning	0	10	10	0	0	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	In-class modeling exercises are conducted in each class to evaluate students' ability to construct models, simulate systems, and interpret results. Evaluation is based on correctness, completion, and appropriate use of Simulink blocks.
	②	✓	
	③	✓	
	④		
	⑤	✓	
	⑥		
Reports	①		A final project is assigned in the latter part of the course. Students construct a dynamic system model using Simulink and analyze its behavior. Evaluation is based on model design, correctness, and analysis.
	②		
	③		
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		Students present their simulation results. Evaluation is based on clarity, use of diagrams, and logical explanation.
	②		
	③	✓	
	④		
	⑤		
	⑥	✓	
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students can independently construct accurate Simulink models, design appropriate system structures, perform simulations without errors, and analyze system behavior quantitatively with clear explanations.	Students can construct basic Simulink models with guidance, perform simulations, and interpret results at a fundamental level using simple explanations.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Simulink installation and environment setup	Exercise	Confirm Simulink runs correctly	100
2 /	Introduction to Simulink and basic operations	Lecture + Exercise	Build a simple model	100
3 /	Basic blocks and signal flow	Lecture + Exercise	Connect blocks and simulate	100
4 /	Mathematical operations in Simulink	Lecture + Exercise	Implement mathematical models	100
5 /	Time-based simulation	Lecture + Exercise	Analyze time response	100
6 /	Subsystems and model organization	Lecture + Exercise	Create structured models	100
7 /	Modeling dynamic systems	Lecture + Exercise	Model simple systems	100
8 /	Transfer functions and system response	Lecture + Exercise	Analyze system response	100
9 /	Feedback systems	Lecture + Exercise	Implement feedback models	100
10 /	Parameter tuning	Lecture + Exercise	Compare system behaviors	100

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Simulation analysis	Lecture + Exercise	Interpret results	100
12 /	Model improvement and validation	Lecture + Exercise	Improve model accuracy	100
13 /	Final project (model design)	Exercise	Define system and model	100
14 /	Final project (implementation)	Exercise	Simulation and tuning	100
15 /	Final project presentation	Presentation	Final report submission	100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Mathematics for Engineers I	2	711500	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	YAMAOKA, Hidetaka	Kanazawa C:23.502		Make an appointment in class

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Graph of a Function	Students will learn: (1) graphs of fundamental functions and their displacement. (2) limit value and continuity of functions. (3) derivatives of basic functions and their applications. (4) higher order derivative and its applications. (5) power series expansion and its applications.
2	Limit and Continuity	
3	Differentiation and its Applications	
4	Higher Order Derivatives	
5	Power Series Expansions	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This is a basic course in integrated mathematics and science for engineering. We will cover the following topics:
1. Functions, their graphs, displacement of graphs, and the limit value and continuity of functions.
2. Differentiation and graph.
3. Applications of higher order derivatives.
4. Maclaurin's expansion and approximation of function.

Extra classes may be held depending the comprehension level of students.
Students are required to review and preview each class. As a matter of particular emphasis, students are required to attempt the exercises after each class.
Extra materials may be distributed if necessary.
Students are required to show their solution/calculation procedure logically and clearly in each assignment.
Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Calculus Volume 1, 2, 3 (OpenStax) https://openstax.org/details/books/calculus-volume-1, https://openstax.org/details/books/calculus-volume-2, https://openstax.org/details/books/calculus-volume-3
Reference books: Integrated Math and Science for Engineer (KIT Text)

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic calculation skills of numerical formulas (expansion, factorization, division, and calculation of fractional formula).

No.	Program Objectives	Target Abilities for Students (9pt)
①	h	Draw graphs of fundamental functions and understand the displacement of graphs.
②	h	Understand the theory, limits, and continuity of functions.
③	h	Understand the theory of differentiation and find the derivatives of basic functions.
④	h	Understand the increases and decreases of functions and their extreme values.
⑤	h	Understand the theory of power series expansion and find the approximate expressions of functions.
⑥	i	Be able to demonstrate an understanding of all topics, attend every class, and do the required work.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	10	0	0	0	30	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	25	0	0	0	0	5	30
	Ability to think, reason and create	0	19	6	0	0	0	5	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	8	2	0	0	0	10	20
	Attitude and motivation for learning	0	8	2	0	0	0	10	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Quiz 1 will focus on target abilities ①, ②, and ⑤. Quiz 2 will focus on target abilities ③, ④, and ⑤. In the final quiz, students will be evaluated on target abilities from ① to ⑤. The quizzes 1 and 2 will comprise 10% of the overall evaluation (for a total of 20%) and the final quiz will comprise 40% of the overall evaluation.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Students will be evaluated on the integrated subject (10%). Students are expected to display logical thinking in their report. Students are required to show their solution/calculation procedure logically and are not allowed to copy from others. The subject and the report deadline will be announced by the teacher.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	Students will be evaluated on homework, exercises, preparation, and review, which together will comprise 30% of the overall evaluation. Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher if they have any questions.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
(1) Accurately draw graphs of basic functions. (2) Accurately explain the limit and continuity of a function. (3) Fully understand the theory of differentiation. (4) Accurately calculate power series expansion and find the approximate expression of a function. (5) Demonstrate an understanding of all topics and complete all homework.	(1) Draw graphs of basic functions. (2) Explain the limit and continuity of a function. (3) Understand the theory of differentiation. (4) Calculate power series expansion and find the approximate expression of a function. (5) Demonstrate an understanding of all topics and complete all homework.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Functions	Instruction Lecture and exercise	Understand the objectives of the class Rev.: Definition of function Prev.: Graph of a function	30 100 70
2 /	Graph of a function Polynomial functions and Power functions	Lecture and exercise	Self-study: Elementary functions Rev.: Odd and even functions Prev.: Translations of graph	50 100 50
3 /	Displacement of a graph Inverse functions	Lecture and exercise	Self-study: Graph of an inverse function Rev.: Inverse functions Prev.: Limit value of a function	50 100 50
4 /	Limit value of a function Continuity of a function	Lecture and exercise	Self-study: Gauss symbol Rev.: Limit value of a function Prev.: Shape of graph	50 100 50
5 /	Differential coefficients and Derivatives Characteristics of derivative functions	Lecture and exercise	Self-study: Derivative functions Rev.: Tangent and normal lines Prev.: Derivatives	100 50 50
6 /	Increase and decrease of functions	Lecture and exercise	Self-study: Increase and decrease Rev.: First and second derivative tests Prev.: Quiz 1	50 50 100
7 /	Quiz 1 Higher order derivatives and their application	Quiz Lecture and exercise	Self-study: Higher order derivatives Rev.: Quiz 1 Prev.: l'Hospital's theorem	50 100 50
8 /	l'Hospital's theorem Taylor's theorem and Maclaurin's expansion	Lecture and exercise Return quiz results Self-check	Self-study: Higher order derivatives Rev.: l'Hospital's theorem Prev.: Maclaurin's expansion Self-check: Self-reflection	50 90 40 20
9 /	Power series expansions of various functions	Lecture and exercise	Self-study: Taylor's expansion Rev.: Power series expansion Prev.: Approximation	50 100 50
10 /	n-th order approximation of function	Lecture and exercise	Self-study: Power series expansion Rev.: Approximation Prev.: Trigonometric functions	50 100 50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Euler’s formula	Lecture and exercise	Self-study: Complex numbers Rev.: Euler’s formula Prev.: Quiz 2	50 100 50
12 /	Quiz 2 [Report]	Quiz Lecture and exercise	Self-study: Rev.: Quiz 2 Prev.: Report	50 100 50
13 /	Review	Lecture and exercise Return quiz results Self-check	Rev.: Report Prev.: Final quiz	50 150
14 /	Review of the report Final quiz	Lecture Final quiz	Rev.: Final quiz Prev.: Self-reflection	150 50
15 /	Review of the final quiz Self-check	Review of the final quiz Result announcement of the final quiz Self-check Questionnaire	Rev.: Final quiz Self-check: Self-reflection	100 100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Mathematics for Engineers II	2	711600	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	YAMAOKA, Hidetaka	Kanazawa C:23.502		Make an appointment in class

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Definite and Indefinite Integrals	Students will learn: (1) definite and indefinite integrals. (2) integration by parts and integration by substitution. (3) exponential functions and logarithmic functions. (4) trigonometric functions and their derivatives. (5) inverse trigonometric functions and their derivatives.
2	Integration by Parts	
3	Integration by Substitution	
4	Exponential and Logarithmic Function	
5	Inverse Trigonometric Function	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This is a basic course in integrated mathematics and science for engineering. We will cover the following topics:

1. Definite and indefinite integrals, integration by parts and integration by substitution.
2. Various things related to exponential functions and logarithmic functions.
3. Properties of trigonometric functions and their derivatives.
4. Definition of inverse trigonometric functions and their derivatives.

Extra classes may be held depending the comprehension level of students.
Students are required to review and preview each class. As a matter of particular emphasis, students are required to attempt the exercises after each class.
Extra materials may be distributed if necessary.
Students are required to show their solution/calculation procedure logically and clearly in each assignment.
Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Calculus Volume 1, 2, 3 (OpenStax) https://openstax.org/details/books/calculus-volume-1, https://openstax.org/details/books/calculus-volume-2, https://openstax.org/details/books/calculus-volume-3
Reference books: Integrated Math and Science for Engineer (KIT Text)

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic calculation skills of numerical formulas (expansion, factorization, division, and calculation of fractional formula).

No.	Program Objectives	Target Abilities for Students (9pt)
①	h	Understand the definition of definite integrals and evaluate the integrals of various functions.
②	h	Use the integration by parts and integration by substitution to evaluate the integrals of various functions.
③	h	Understand and use the exponential functions and logarithmic functions.
④	h	Understand and use the trigonometric functions and their derivatives.
⑤	h	Understand and use the inverse trigonometric functions and their derivatives.
⑥	i	Be able to demonstrate an understanding of all topics, attend every class, and do the required work.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	10	0	0	0	30	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	25	0	0	0	0	5	30
	Ability to think, reason and create	0	19	6	0	0	0	5	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	8	2	0	0	0	10	20
	Attitude and motivation for learning	0	8	2	0	0	0	10	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Quiz 1 will focus on target abilities ①, ②, and ⑤. Quiz 2 will focus on target abilities ③, ④, and ⑤. In the final quiz, students will be evaluated on target abilities from ① to ⑤. The quizzes 1 and 2 will comprise 10% of the overall evaluation (for a total of 20%) and the final quiz will comprise 40% of the overall evaluation.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Students will be evaluated on the integrated subject (10%). Students are expected to display logical thinking in their report. Students are required to show their solution/calculation procedure logically and are not allowed to copy from others. The subject and the report deadline will be announced by the teacher.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	Students will be evaluated on homework, exercises, preparation, and review, which together will comprise 30% of the overall evaluation. Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher if they have any questions.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
(1) Accurately explain the definition of definite integrals. (2) Accurately evaluate the integrals of various functions. (3) Accurately evaluate integrals of basic functions and use integration by substitution and integration by parts. (4) Accurately calculate exponential and logarithmic functions and their derivatives. (5) Accurately calculate trigonometric and inverse trigonometric functions and their derivatives. (6) Demonstrate an understanding of all topics and complete all homework.	(1) Explain the definition of definite integrals. (2) Evaluate the integrals of various functions. (3) Evaluate integrals of basic functions and use integration by substitution and integration by parts. (4) Calculate exponential and logarithmic functions and their derivatives. (5) Calculate trigonometric and inverse trigonometric functions and their derivatives. (6) Demonstrate an understanding of all topics and complete all homework.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Riemann sums	Instruction Lecture and exercise	Self-study: Sigma (summation) formula Rev.: Riemann sums Prev.: Primitive functions	50 100 50
2 /	Definite integrals Fundamental theorem of calculus	Lecture and exercise	Self-study: Various indefinite integrals Rev.: Exercises on integration Prev.: Integration by parts	50 100 50
3 /	Integration by parts	Lecture and exercise	Self-study: Indefinite integrals Rev.: Wallis formula Prev.:	50 50 100
4 /	Integration by substitution	Lecture and exercise	Self-study: Integration by substitution Rev.: Improper integrals Prev.: Review of integrations	50 100 50
5 /	Review of integrations		Self-study: Riemann sums Rev.: Review of integrations Prev.: Quiz 1	50 50 100
6 /	Quiz 1 Derivatives of composite functions Derivatives of inverse functions	Quiz Lecture and exercise	Self-study: Derivatives of inverse functions Rev.: Quiz 1 Prev.: Logarithmic function	50 100 50
7 /	Derivatives of exponential and logarithmic functions	Lecture and exercise	Self-study: Logarithmic equations and Inequalities Rev.: Natural logarithm Prev.: Common logarithm	50 100 50
8 /	Semi-logarithmic graph Logarithmic differentiation	Lecture and exercise	Self-study: Logarithmic law Rev.: Semi-logarithmic graph Prev.: Logarithmic differentiation	50 100 50
9 /	Trigonometric functions Inverse trigonometric functions	Lecture and exercise	Self-study: Radian method, a trigonometric function Rev.: Inverse trigonometric functions Prev.: Graph of an inverse trigonometric function	50 100 50
10 /	Derivatives of trigonometric functions and inverse trigonometric functions	Lecture and exercise Return quiz results Self-check	Self-study: Inverse trigonometric functions Rev.: Def. of an inverse trigonometric function Prev.: Integrals involving quadratics	50 100 50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Integrals Involving Quadratics	Lecture and exercise	Self-study: Decomposition of rational Rev.: Integrals involving quadratics Prev.: Relationships among trigonometric functions	50 100 50
12 /	Quiz 2 [Report]	Quiz Lecture and exercise	Self-study: Rev.: Quiz 2 Prev.: Report	50 100 50
13 /	Review	Lecture and exercise Return quiz results Self-check	Rev.: Report Prev.: Final quiz	50 150
14 /	Review of the report Final quiz	Lecture Final quiz	Rev.: Final quiz Prev.: Self-reflection	150 50
15 /	Review of the final quiz Self-check	Review of the final quiz Result announcement of the final quiz Self-check Questionnaire	Rev.: Final quiz Self-check: Self-reflection	100 100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Mathematics for Engineers III	2	711700	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	TANIGUCHI, Tetsuya / EVANS Davis	Kanazawa C:23.403		Make an appointment in class

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Separable differential equations	Students will learn: (1) how to solve separable differential equations. (2) how to solve 1st-order linear differential equations. (3) how to solve 2nd-order linear homogeneous differential equations. (4) calculate a double integral using the iterated integral approach. (5) calculate a double integral using the polar transformation.
2	1st-order linear differential equations	
3	2nd-order linear differential equations	
4	Double integral	
5	Polar Coordinate	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This is a basic course in integrated mathematics and science for engineering. We will cover the following topics:

1. 1st-order differential equations.
2. 2nd-order linear differential equations.
3. Multiple integrals and iterated integrations.
4. Double integrals in polar coordinate.

Extra classes may be held depending the comprehension level of students.
Students are required to review and preview each class. As a matter of particular emphasis, students are required to attempt the exercises after each class.
Extra materials may be distributed if necessary.
Students are required to show their solution/calculation procedure logically and clearly in each assignment.
Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Calculus Volume 1, 2, 3 (OpenStax) https://openstax.org/details/books/calculus-volume-1, https://openstax.org/details/books/calculus-volume-2, https://openstax.org/details/books/calculus-volume-3
Reference books: Integrated Math and Science for Engineer (KIT Text)

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Skills and knowledge from the Integrated Mathematics and Science for Engineering I and II.
Knowledge of exponential functions, logarithmic functions, and trigonometric functions.
Basic calculation skills for differentiation and integration.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h	Solve separable differential equations.
②	h	Solve 1st-order linear differential equations.
③	h	Solve 2nd-order, linear, homogeneous differential equations.
④	h	Understand the concept of multiple integration and perform it by iterated integration.
⑤	h	Evaluate double integrals by polar transformation.
⑥	i	Be able to demonstrate an understanding of all topics, attend every class, and do the required work.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	10	0	0	0	30	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	25	0	0	0	0	5	30
	Ability to think, reason and create	0	19	6	0	0	0	5	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	8	2	0	0	0	10	20
	Attitude and motivation for learning	0	8	2	0	0	0	10	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Quiz 1 will focus on target abilities ①, ②, and ⑤. Quiz 2 will focus on target abilities ③, ④, and ⑤. In the final quiz, students will be evaluated on target abilities from ① to ⑤. The quizzes 1 and 2 will comprise 10% of the overall evaluation (for a total of 20%) and the final quiz will comprise 40% of the overall evaluation.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Students will be evaluated on the integrated subject (10%). Students are expected to display logical thinking in their report. Students are required to show their solution/calculation procedure logically and are not allowed to copy from others. The subject and the report deadline will be announced by the teacher.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	Students will be evaluated on homework, exercises, preparation, and review, which together will comprise 30% of the overall evaluation. Students are expected to utilize the Math. and Science Education Research Center or the office hours of the teacher if they have any questions.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
(1) Accurately solve separable differential equations. (2) Accurately solve 1st-order linear differential equations. (3) Accurately solve 2nd-order, linear, homogeneous differential equations. (4) Understand the definition of multiple integrals, and accurately find multiple integrals of various functions. (5) Use polar transformation to find multiple integrals.	(1) Solve separable differential equations. (2) Solve 1st-order linear differential equations. (3) Solve 2nd-order, linear, homogeneous differential equations. (4) Understand the definition of multiple integrals, and find multiple integrals of various functions. (5) Use polar transformation to find multiple integrals.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Simple, 1st-order differential equations	Instruction Lecture and exercise	Rev.: Simple, 1st-order differential equations Prev.: Separable, 1st-order differential equations	150 50
2 /	Separable, 1st-order differential equations	Lecture and exercise	Rev.: Separable, 1st-order differential equations Prev.: 1st-order linear differential equations	150 50
3 /	1st-order linear differential equations	Lecture and exercise	Rev.: 1st-order linear differential equations Prev.: 2nd-order, linear, homogeneous differential equations	150 50
4 /	2nd-order, linear, homogeneous differential equations	Lecture and exercise	Rev.: 2nd-order, linear, homogeneous differential equations Prev.: Review of differential equations	150 50
5 /	Review of differential equations	Lecture and exercise	Prev.: Review of differential equations	200
6 /	Quiz 1 Multiple integrals	Quiz Lecture and exercise	Rev.: Quiz 1 Prev.: Iterated integrals	150 50
7 /	Iterated integrals	Lecture and exercise Return quiz results Self-check	Rev.: Iterated integrals Prev.: Nonrectangular region	150 50
8 /	Double integrals over a nonrectangular region	Lecture and exercise	Rev.: Double integrals over a nonrectangular region Prev.: Reversing the order of integration	150 50
9 /	Reversing the order of integration	Lecture and exercise	Rev.: Reversing the order of integration Prev.: Polar coordinate	150 50
10 /	Double integrals in polar coordinate	Lecture and exercise	Rev.: Double integrals in polar coordinate Prev.: Review of multiple integrals	150 50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Review of multiple integrals	Lecture and exercise	Prev.: Review of multiple integrals	200
12 /	Quiz 2 [Report]	Quiz Lecture and exercise	Rev.: Quiz 2 Prev.: Report	150 50
13 /	Review	Lecture and exercise Return quiz results Self-check	Rev.: Report Prev.: Final quiz	50 150
14 /	Review of the report Final quiz	Lecture Final quiz	Rev.: Report Prev.: Final quiz	100 100
15 /	Review of the final quiz Self-check	Review of the final quiz Result announcement of the final quiz Self-check Questionnaire	Rev.: Report Self-check: Self-reflection	100 100

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Applied Mathematics	2	711800	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	NAKAGAWA, Hayato / HUSSIEN, Alaa	Kanazawa C: 23.502		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Vectors and matrices	Students will learn: (1) Vector operations and matrix operations. (2) Solving systems of linear equations using “row reduction.” (3) The properties of a determinant and a method to calculate determinants. (4) Eigenvalues and eigenvectors (5) Class management and a special lecture will be given in cooperation with local residents and companies.
2	Row reduction	
3	Determinants	
4	Eigenvalues and eigenvectors	
5	Regional cooperation	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
This is a basic course in applied mathematics. We will cover the following topics:

1. Vectors and Matrices
2. Systems of linear equations and row reduction
3. Linear transformation
4. Determinants
5. Linearly independence
6. Eigenvalues and eigenvectors

Classes include exercises and quizzes.
Daily preparation and review are important. Students are required to complete the designated tasks.
Students should prepare reports and study research topics in a planned manner, and strictly avoid plagiarism.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: A First Course in Linear Algebra, K. Kuttler (https://cdn2.repo.bccws.ca/resources/textbooks/448/formats/OTB_136_03_A_First_Course_in_Linear_Algebra_2023_B_D_86b657ab54.pdf)
Reference books: Linear Algebra (KIT Mathematics, Science, Data Science and AI Programs)

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic computational skills for mathematical expressions (calculation of literal expressions, linear and quadratic equations, trigonometric functions) and knowledge of coordinate planes.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h	Understand the concept of vectors and matrices, and be able to properly perform operations.
②	h	Understand the concept of systems of linear equations by using row reduction.
③	h	Understand the properties of determinants and be able to calculate the value of a determinant.
④	h	Understand the concept of linear transformations and be able to find the eigenvalues and eigenvectors.
⑤	i	Understand the meanings of fundamental English words for mathematics.
⑥	i	Understand the contents of the course and be able to complete the required tasks by the announced deadlines.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	15	0	0	0	25	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	35	0	0	0	0	15	50
	Ability to think, reason and create	0	25	10	0	0	0	0	35
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	5	0	0	0	0	5
	Attitude and motivation for learning	0	0	0	0	0	0	10	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	There will be three quizzes. Each of the 1st and 2nd quiz will comprise 15% of the overall evaluation, and the final quiz will comprise 30% (for a total of 30+30%). The final quiz will be given at the end of the semester to assess the degree of student achievement.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	To support students' self-study, reports will be given as out-of-class work, and the results will account for 15% of the overall evaluation.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		To support students' self-study, homework will be given as out-of-class work, and the results will account for 25% of the overall evaluation.
	②		
	③		
	④		
	⑤		
	⑥	✓	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
・Perform properly vector operations and matrix operations. ・Solve “complex” linear systems using row reduction. ・Understand the concept of linear transformations and properly determine representation matrices. ・Understand the definition and properties of determinants and be able to calculate determinants. ・Understand the properties of cofactors and find inverse matrices. ・Find the eigenvalues and eigenvectors of matrices and apply them to diagonalization.	・Perform vector operations and matrix operations. ・Solve “fundamental” linear systems using row reduction. ・Find representation matrices of linear transformations in a plane. ・Understand the properties of determinants and be able to calculate determinants. ・Find inverse matrices using cofactors. ・Find the eigenvalues and eigenvectors of simple matrices.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Vectors and vector operations (Addition, Subtraction, Scalar multiplication)	Lecture and exercises	Understand the objectives of class Review materials from the previous course Prepare for next class	200
2 /	Matrices and matrix operations (Addition, Subtraction, Scalar multiplication, Matrix multiplication) Square matrices	Lecture and exercises	Review materials from the previous course Prepare for next class	200
3 /	Inverse matrices Row reduction	Lecture and exercises	Review materials from the previous course Prepare for next class	200
4 /	Inverse matrices of order 3	Lecture and exercises	Review materials from the previous course Prepare for next class	200
5 /	Quiz (1) Definition of liner transformation and representation matrix	Quiz on the contents of #1 - #4 Lecture and exercises	Review materials from the previous course Prepare for next class	200
6 /	Compositions of linear transformations Inverse transformations	Lecture and exercises Return quiz results Self-check	Review materials from the previous course Prepare for next class	200
7 /	Definition of determinant Calculation of determinants of order 2 and 3	Lecture and exercises	Review materials from the previous course Prepare for next class	200
8 /	Calculation method of determinants based on the properties of determinants	Lecture and exercises	Review materials from the previous course Prepare for next class	200
9 /	Cofactor expansion and its applications	Lecture and exercises	Review materials from the previous course Prepare for next class	200
10 /	Quiz (2) Dot products of vectors Cross products of 3-dim vectors	Quiz on the contents of #5 - #9 Lecture and exercises	Review materials from the previous course Prepare for next class	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Linear independence, Linear dependence of vectors	Lecture and exercises Return quiz results Self-check	Review materials from the previous course Prepare for next class	200
12 /	Eigenvalues and eigenvectors	Lecture and exercises	Review materials from the previous course Prepare for next class	200
13 /	Diagonalization and its applications Review	Lecture and exercises	Review materials from the previous course. Study for the final quiz	200
14 /	Review Final quiz	Review Quiz on contents of #1 - #13	Study for the final quiz Review of this class	200
15 /	Review the final quiz Self-check	Review the final quiz Self-check	Review: Final quiz	200

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門科目 選択	技術者の統計	2	720900	前学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4	渡辺　秀治	C:23.403		その都度日程調整する

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	データの整理とデータ分布	この科目では，データサイエンスの基礎となる統計的な処理についての学習を行う．偶然性を伴う現象は確率や確率変数を用いて表現することができる．観察や実験，その他のさまざまな取り組みで得られたデータの整理を通じて，確率変数や確率分布の概念を理解できる．また，代表的な確率分布である正規分布などの使用に習熟する．さらに，母集団や標本分布について学び，それらを用いて母数の統計的推定および検定ができる．さらに，統計用プログラミング言語「R」を用いて社会の実データ統計分析を行うことができるようになる．
2	確率と確率分布	
3	確率論に基づく統計的評価	
4	推定と検定	
5	データサイエンス	

授業の概要および学習上の助言

本講義は学修単位であるため，１単位を５０分４５回分の学習とし，５０分授業１５回に対して５０分３０回分の自学自習を行って下さい．
本授業は，以下の内容を扱います．

１．　データの整理とデータ分布
２．　変数間の関係
３．　確率論の基礎
４．　統計的データ解析の基礎
５．　統計的仮説検定と多変量解析
６．　実データを用いた、プログラミング言語Rによる統計解析

授業には演習と小テスト（クイズ）が含まれます．日々の予習・復習は重要であり，指定された課題に取り組むことが求められます．各課題では，解答・計算過程を論理的かつ明確に示してください．必要に応じて，数理・理科教育研究センターや担当教員のオフィスアワーを活用してください．

【教科書および参考書・リザーブドブック】
教科書：なし
参考書：なし
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：なし

履修に必要な予備知識や技能

基礎的な計算技能．順列・組合せ・確率に関する基礎的な計算技能．

No.	教育目標(DP)（記号表記）	学生が達成すべき行動目標
①	h, i	データの整理を行うとともにデータの基本的特徴量を求めることができる．
②	h, i	確率変数の平均と分散を計算できる．
③	h, i	適切な統計量を計算し，データを分析できる．
④	h, i	標本分布を用いて，母平均・母分散・母比率の推定および検定ができる．
⑤	i	継続的に学修し，正確な知識を身につけて効果的に活用できる．
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	50	20	0	0	0	30	100
総合力指標	知識を取り込む力	0	30	10	0	0	0	5	45
	思考・推論・創造する力	0	20	5	0	0	0	5	30
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	3	0	0	0	0	3
	学習に取組む姿勢・意欲	0	0	2	0	0	0	20	22

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①	レ	小テスト（クイズ）は3回実施します. 第１回・第２回の小テストはそれぞれ成績評価の１０%を占め，第３回の小テストは３０%を占めます．合計で成績評価の５０%です.
	②	レ	
	③	レ	
	④	レ	
	⑤		
	⑥		
レポート	①	レ	プログラミング言語Rを用いたレポート課題を4回課します．なお，レポート課題は授業外学習として実施します. 各レポートは成績評価の５%を占めます. 各レポートは，文章・数式・数値・グラフを用いて，論理的に記述しなければなりません. 他者のレポートのコピーを含む盗用（剽窃）は厳禁です.
	②	レ	
	③	レ	
	④	レ	
	⑤		
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	レ	宿題（課題）は１０回課します. 宿題は成績評価の３０%を占めます. 宿題の目的は，単に正答を得ることではなく，理解を深めることです. 宿題は，問題解決への取り組み（試行錯誤や工夫），自己評価・振り返り，および自身の学修の進捗に対する理解に基づいて評価します.
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
（1）データサイエンスの基盤となるデータの整理方法を理解する. （2）確率変数の概念を正しく理解し，確率分布の平均と分散が計算できる. （3）代表的な確率分布を用いて，さまざまな状況で確率を計算できる. （4）データ分析に必要な統計量を正確に計算できる （5）標本分布を用いて，適切な区間推定および仮説検定を行える. （6）授業内容を多様な統計的問題に適用できる.	（1）統計用語を正しく理解し，基本的な統計量を計算できる. （2）条件付き確率に関する問題を解くことができる. （3）確率分布関数から，離散・連続確率変数の確率および基本的な統計量を求めることができる. （4）標本データを用いて，母平均・母分散の点推定および区間推定を行うことができる. （5）仮説検定を正しく実施できる.

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	データの取得と種類 量的データの分布の特徴	講義・演習	課題：宿題１ 復習：授業内容の復習 予習：R のインストールと初期設定	100 50 50
2 ／	データの整理	講義・演習	課題：レポート１ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
3 ／	２変数データの整理 相関と相関係数 回帰分析	講義・演習	課題：宿題２ 復習：第１回～第３回の内容 予習：−	100 100
4 ／	小テスト１（第１回～第３回） 確率論の基本的な考え方	小テスト 講義・演習	課題：宿題３，レポート２ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
5 ／	確率論の基本的な考え方 離散量の確率分布	講義・演習	課題：宿題４ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
6 ／	条件付き確率とベイズの定理	講義・演習	課題：宿題５ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
7 ／	離散量の確率分布	講義・演習	課題：レポート３ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
8 ／	連続量の確率分布	講義・演習	課題：宿題６ 復習：授業内容の復習 予習：次回授業の内容	100 100
9 ／	小テスト２（第４回～第６回） 母集団と標本／標本抽出	小テスト 講義・演習	課題：宿題７ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
10 ／	推測統計の基礎概念 母平均の統計的推定①	講義・演習	課題：宿題８ 復習：授業内容の復習 予習：次回授業の内容	150 40 10

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	母平均の統計的推定②	講義・演習	課題：宿題９ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
12 ／	統計的仮説検定①	講義・演習	課題：宿題１０ 復習：授業内容の復習 予習：次回授業の内容	150 40 10
13 ／	統計的仮説検定②	講義・演習	課題：レポート４ 復習：授業内容の復習 予習：次回授業の内容	100 100
14 ／	小テスト３（第７回～第１３回） 授業内容の総合的応用 （さまざまな統計問題への適用）	小テスト 講義・演習	課題：なし 復習：小テストの振り返り 予習：	200
15 ／	授業の振り返り 自己評価	確認 自己評価	課題：なし 復習：第１回から第１４回の復習 予習：	200

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門科目 選択	データサイエンス物理	2	721000	前学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	西岡 圭太	金沢C 23.502		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	位置・速度・加速度	身の回りの自然現象が物理法則に従っていることを学び，物理学を用いて考えることができる論理的思考力を養成する．また，測定データを解析して帰納的に未知の事象を推論することは，データサイエンスで必要となる重要なスキルである．本科目では，ベクトルと微分積分を用いて，位置・速度・加速度，運動の三法則，仕事とエネルギー，運動量と衝突，回転運動と振動等，物理学の基礎を学び，それらの知識を応用し，論理的思考に基づいたデータ解析を通して，自然現象の背景にある物理を洞察する能力を養成することを目標とする．
2	運動の三法則	
3	仕事とエネルギー	
4	運動量と衝突	
5	回転運動と振動	

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50分45回分の学習とし、50分授業15回に対して50分30回分の自学自習を行って下さい。
物理学において，最初に体系的にまとめられた分野は力学であり，力学を範として他の分野が体系化されて発展してきたことから，力学は物理学全体の基礎を成している．また，測定データを解析し，未知の事象を帰納的に推論することは，データサイエンスにおいて重要なスキルである．本授業では，実際の測定データを用いてデータ解析を行い，論理的思考に基づいて自然現象の背後にある物理法則を洞察することを目的とする．

１．運動と力
　物理量の表し方ー単位・有効数字，位置・速度・加速度の関係，１・２次元の運動，力の概念，運動の三法則，
　微分方程式と積分，簡単な微分方程式の解
２．仕事とエネルギー
　仕事，運動エネルギー，保存力と非保存力，ポテンシャルエネルギー，力学的エネルギー保存則
３．運動量と衝突
　運動量，力積，運動量保存則，1次元および2次元での衝突
４．回転運動と振動
　角速度，角加速度，トルク，角運動量，回転運動の法則，角運動量保存則，円運動，単振動

物理学ではベクトル・微積分の知識が必要であるのでよく復習をしておくこと．

【教科書および参考書・リザーブドブック】
教科書：サーウェイ 基礎物理学 Ｉ．力学[東京化学同人] ISBN 978-4-8079-0830-1
参考書：物理学基礎 第5版 Web動画付[学術図書出版社] ISBN 978-4-7806-0950-9
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：物理の基礎（力学）[学術図書出版社] ISBN 978-4-7806-9022-4

履修に必要な予備知識や技能

予備知識：三角比，ベクトル，微分法，積分法等，初等数学の基本的な知識
技能：三角比，ベクトル，微分法，積分法等，初等数学の計算技能

No.	教育目標(DP) (記号表記)	学生が達成すべき行動目標
①	h, i	位置・速度・加速度の関係を理解し，微分を用いて速度，加速度を求める計算ができる．
②	h, i	積分と微分方程式の計算ができ，運動方程式を立てて解くことにより物体の運動を数式で表すことができる．
③	h, i	仕事とエネルギーの関係を理解し，積分を用いて仕事やポテンシャルエネルギーの計算ができる．
④	h, i	力学的エネルギー保存則，運動量保存則，角運動量保存則を理解し，数式で表すことができる．
⑤	h, i	測定データを用いてデータ解析を行い，論理的思考に基づいてデータの解釈ができる．
⑥	h, i	毎回の授業に出席し，授業内容の理解に努めて，宿題をやり遂げ，グループ活動にも積極的に参加することができる．

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	60	20	0	0	0	20	100
総合力指標	知識を取り込む力	0	30	5	0	0	0	5	40
	思考・推論・創造する力	0	20	5	0	0	0	5	30
	コラボレーションとリーダーシップ	0	0	5	0	0	0	0	5
	発表・表現・伝達する力	0	0	0	0	0	0	0	0
	学習に取組む姿勢・意欲	0	10	5	0	0	0	10	25

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①	レ	小テストを2回以上実施する（授業形態に応じて，担当教員が実施回数を決定する）． 小テストで，達成すべき行動目標の①～④の達成度を，総合評価割合６０％として評価する． 小テストを3回実施する場合の小テストの範囲と試験を実施する授業回数は，それぞれ授業明細表に記載してある．
	②	レ	
	③	レ	
	④	レ	
	⑤		
	⑥		
レポート	①		計２回のグループ学習で実施した成果をレポートとして提出する．各レポートは総合評価の割合１０％とし，合計で総合評価割合の２０％として評価する．実施する授業回数は，授業明細表に記載してある．
	②		
	③		
	④		
	⑤	レ	
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①		学びの成果が発揮されるまで努力を続けられる能力はとても重要である．授業内容に関連した問題演習，授業前後の予習・復習の宿題などを授業外学習課題とし，総合評価割合の２０％として評価する．
	②		
	③		
	④		
	⑤		
	⑥	レ	

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
・位置・速度・加速度を，数式を用いて正確に表すことができる．ベクトルを用いた表現もできる． ・質点の運動方程式を立てて解くことにより，物体の運動を正確に把握することができる． ・仕事とエネルギーを理解し，積分を用いてポテンシャルエネルギーの計算が正確にできる． ・運動量保存則を用いて2物体の衝突を正確に理解することができる． ・基本的な専門用語および簡単な物理現象の英語表現を理解するだけでなく自ら表現することができる． ・毎回の授業に出席し，授業を理解し宿題を正確にやり遂げることができ，グループ活動ではリーダーとして活動できる．	・位置・速度・加速度を，数式を用いて表すことができる． ・質点の運動方程式を立てて解くことにより，物体の運動を把握することができる． ・仕事とエネルギーを理解し，積分を用いてポテンシャルエネルギーの計算ができる． ・運動量保存則を用いて2物体の衝突を理解することができる． ・基本的な専門用語および簡単な物理現象の英語表現を理解することができる． ・授業回数の２／３以上の授業に出席し，宿題をやり遂げることができ，グループ活動では自分の考えを説明することができる．

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	ガイダンス 序論(単位，次元，有効数字など) 1次元の運動(平均速度，瞬間速度，加速度，等速直線運動，等加速度直線運動)	演習を適宜取り入れながら，講義を中心として運営する．	予習：長さ，質量，時間の基準を確認する．平均速度，瞬間速度，加速度の定義を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
2 ／	ベクトルとスカラー，ベクトルの諸性質，2次元の運動(位置ベクトル，速度ベクトル，加速度ベクトル，放物運動)	演習を適宜取り入れながら，講義を中心として運営する．	予習：ベクトルを用いた平均速度，瞬間速度，加速度の定義を確認する．放物運動の飛距離と最大高度の求め方を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
3 ／	2次元の運動(等速円運動，相対速度，相対加速度) 運動の法則(力の概念)	演習を適宜取り入れながら，講義を中心として運営する．	予習：等速円運動する質点の位置・速度・加速度の表式を確認する．相対速度と相対加速度を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
4 ／	運動の法則(ニュートンの運動の三法則，ニュートンの第二法則を使った分析モデル)	演習を適宜取り入れながら，講義を中心として運営する．	予習：ニュートンの第一法則，第法則，第三法則の記述を読み内容を理解する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
5 ／	ニュートンの法則のさらなる応用(摩擦力，等速円運動，速度に依存する抵抗力があるときの運動)	演習を適宜取り入れながら，講義を中心として運営する．	予習：静止摩擦力と動摩擦力の違いを確認する．向心加速度の求め方を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
6 ／	小テスト１(第1回～第5回で学習した内容の理解度を確認する) 系のエネルギー(系と外界，仕事，仕事-運動エネルギーの定理，保存力，非保存力)	小テスト１を行う． 演習を適宜取り入れながら，講義を中心として運営する．	予習：小テスト１に備えて復習をする．系と外界の記述を読み内容を理解する．仕事，運動エネルギー，保存力，非保存力の定義を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
7 ／	グループ活動(第1回～第6回で学習した内容に関連した課題をグループで取り組む．課題にはデータサイエンスの要素を取り入れる)	グループに分かれ課題に取り組む．	予習：指定された課題の内容を確認する． 復習：レポートを作成する． 自己点検：授業の理解度を確認する．	60 120 20
8 ／	系のエネルギー(ポテンシャルエネルギー) エネルギーの保存(力学的エネルギーの保存，非保存力による力学的エネルギーの変化)	演習を適宜取り入れながら，講義を中心として運営する．	予習：ポテンシャルエネルギーの定義，力学的エネルギーの保存則の内容を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
9 ／	運動量と衝突(運動量，力積，運動量の保存，衝突)	演習を適宜取り入れながら，講義を中心として運営する．	予習：運動量の定義を確認する．力積ー運動量の定理の記述を読み内容を理解する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
10 ／	回転運動(角速度，角加速度，トルク，角運動量，角運動量の保存)	演習を適宜取り入れながら，講義を中心として運営する．	予習：角速度，角加速度，トルク，角運動量の定義を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	小テスト２(第6回～第10回で学習した内容の理解度を確認する) 単振動(ばねに取り付けられた物体の運動)	小テスト２を行う． 演習を適宜取り入れながら，講義を中心として運営する．	予習：小テスト２に備え復習をする． 単振動における振幅，角振動数，周期，振動数の定義を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
12 ／	グループ活動(第8回～第11回で学習した内容に関連した課題をグループで取り組む．課題にはデータサイエンスの要素を取り入れる)	グループに分かれ課題に取り組む．	予習：指定された課題の内容を確認する． 復習：レポートを作成する． 自己点検：授業の理解度を確認する．	60 120 20
13 ／	単振動(単振り子，減衰振動) 小テスト３に向けた総復習	演習を適宜取り入れながら，講義を中心として運営する．	予習：単振り子，減衰振動の内容を確認する． 復習：授業で取り扱った例題を復習し，関連する基本問題を解く． 自己点検：授業の理解度を確認する．	60 120 20
14 ／	小テスト３に向けた総復習 小テスト３(第1回～第13回で学習した内容の理解度を確認する)	復習のポイントを講義形式で解説する． 小テスト３を行う．	予習：小テスト３に備え復習をする． 復習：小テスト３で分からなかった問題の内容を復習する．	140 60
15 ／	小テスト３の返却・解説，レポートの解説，アンケート	自己点検をする．	予習：小テスト３，レポートの内容を見返す． 自己点検：小テスト３の結果を踏まえ授業全体を振り返る．	140 60

2026 Syllabus

Instructor with "＊" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Data Science I	2	712200	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	SANG-NGENCHAI, Apirak	KC 31-117-1		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Data Aggregation	This course covers data aggregation, including preparation, cleaning, and collection. Students will also learn machine learning techniques, clustering analysis for pattern recognition, and building decision trees and neural networks to support transparent decision-making. The course considers how these data-driven methods contribute to Society 5.0 and its human-centered tech ecosystem. Overall, it aims to equip students to become responsible, impactful, data-driven innovators.
2	Machine Learning	
3	Clustering Analysis	
4	Decision Tree	
5	Neural Network	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
This course will offer experiential learning in class as a type of active learning.

This course introduces students to the essential principles and practices of modern Data Science, focusing on acquiring, analyzing, and interpreting data to solve real-world problems. Students will learn to aggregate data, apply machine learning techniques, conduct clustering analysis, and develop decision tree and neural network models to generate meaningful insights. In addition, students are required to complete a final project in which they apply the full data science pipeline, from data aggregation to model development, to address a real or simulated societal problem, demonstrating both technical mastery and creative, responsible innovation.

Advice on taking this course:
- **B**e Prepared: Review lecture slides beforehand.
- **O**rganize Your Work: Keep clear notes, structure code, and document projects.
- **S**tay Hands-On: Participate actively in labs and practice sessions.
- **S**eek Solutions: When facing challenges, investigate, troubleshoot, and ask questions.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of data literacy and Microsoft Excel is essential, and it is highly recommended that students also have a basic understanding of statistics for engineers.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Students will be able to understand the basics of data aggregation
②	a, h, i	Students will be able to learn and apply fundamental machine learning methods
③	g, h	Students will be able to perform clustering analysis
④	a, h, i	Students will be able to build and interpret decision-tree models
⑤	a, h, i	Students will be able to construct and evaluate basic neural network models
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	20	20	0	60	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	10	10	0	30	0	0	50
	Ability to think, reason, and create	0	10	10	0	30	0	0	50
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	0	0	0	0	0	0

* The numerical breakdown shown by the Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Students will take short in-class quizzes to check their understanding of the content. There will be a quiz in weeks 4, 7, 10, and 14, which is 20% of the total score.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Students must submit a report covering their final project from initiation to completion, accounting for 20% of the total grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Students must complete weekly assignments based on lectures, which count for 30% of their grade. Absent students should get the assignment sheet from the teacher and submit it on time; otherwise, their score will be deducted after the deadline. For the project, each student will create an application that shows what they've learned in this course. They are required to research, design, and develop an application outside of class, which will constitute 30% of their overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students will demonstrate a deep and comprehensive understanding of data science techniques and apply them in a creative, precise, and independent manner. Students will understand data aggregation concepts and effectively combine complex datasets from various sources. Employing machine learning techniques such as clustering, decision trees, and neural networks.	Students will demonstrate a foundational understanding of data science techniques and apply them correctly with some guidance. Students will grasp key data-aggregation concepts and merge datasets from multiple sources in a clear, organized way. Additionally, students will use machine learning methods such as clustering, neural networks, and decision trees to generate reasonable results, though these may lack depth or optimization.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course Guidance Data Science Introduction Final Project Overview	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
2 /	Data Aggregation	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
3 /	Data Mining	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
4 /	Machine Learning	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 1-3	200
5 /	Cluster Analysis (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
6 /	Cluster Analysis (2)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
7 /	Decision Tree (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 4-6	200
8 /	Decision Tree (2)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
9 /	Decision Tree (3)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
10 /	Neural Network (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 7-9	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Neural Network (2)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
12 /	Neural Network (3)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
13 /	Final Project (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 10 – 12	200
14 /	Final Project (2)	Exercise	Read the given tutorial and proceed with the self-project.	200
15 /	Project Showcase & Wrap-up	Exercise	Read the given tutorial and proceed with the self-project.	200

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Data Science II	2	712300	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	HAYASHI, Ryoko	Yatsukaho C:67.321		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1 2 3 4 5	Probability Statistics Data science	Probability and statistics are two of the basic knowledge of science and technology. Machine learning has been attracting attention in recent years, and probability and statistics are the basis of machine learning. In this course, students will acquire basic knowledge of probability and statistics, which are essential in science and technology, through classroom lectures and practical training.

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This course will offer computer exercises in class as a type of active learning.
In this course, you will learn the basic contents of probability and statistics in classroom lectures, and deepen your understanding through computer exercises.
You will use Python for most computer exercises, but also use Excel.
The order of the learning contents shown in the course schedule is a guide, and the details will be provided by the instructor.
At least the following contents will be included:

- Basics of Python, basics of Excel
- Probability (dependent and independent, conditional probability, random variable, normal distribution)
- Statistics (representative values, scatter, correlation, statistical hypothesis testing, confidence intervals, Bayesian inference)

Other contents may be added at the discretion of the instructor.
Some programming experience is desirable, but not required at the beginning of the course. If necessary, study by yourself during the course period to supplement the programming abilities required to acquire this course.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Data Science from Scratch, Second Edition, Joel Crus, O'Reilly, (2019).
Reference books:
Reserved books: 「ゼロからはじめるデータサイエンス第２版」, (2020) (in Japanese).

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge of mathematics is required. Specifically, you should have a general understanding of the basics of inequalities, equations, elementary functions such as polynomial functions and exponential functions, and calculus.

No.	Program Objectives	Target Abilities for Students (9pt)
①	b	Students will learn the application of probability and understand the significance of returning the knowledge to society.
②	g	Students will learn the basics of how to handle data and understand the possibility of creating new value from data.
③	h	Students will be able to express their thoughts on statistical information on various events.
④	i	Students will acquire basic probability and statistical knowledge and experience with a view to developing into data science.
⑤		
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	0	0	0	0	40	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	30	0	0	0	0	10	40
	Ability to think, reason and create	0	30	0	0	0	0	10	40
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	10	10
	Attitude and motivation for learning	0	0	0	0	0	0	10	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✔	Make sure that you understand the basic knowledge of probability and statistics, and that you can apply it properly.
	②	✔	
	③	✔	
	④	✔	
	⑤		
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✔	Make sure that you understand the basic knowledge of probability and statistics, and that you can apply it properly. In order to confirm whether you can handle the learning contents properly using a computer, you may need to submit deliverables of computer training. Assignments will be given and evaluated during class time, based on learning done outside of class time.
	②	✔	
	③	✔	
	④	✔	
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
You can fully understand the learning contents related to probability and statistics and apply them to real-world problems. You can master both Python and Excel in computer training and apply the learning contents to actual data.	You can generally understand the learning contents related to probability and statistics, and apply the basic contents to real-world problems. In computer training, you can apply the learning contents to actual data using at least one of Python and Excel.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance. Explanation of outline of the subject, how to proceed with the lesson, preparation, review, and evaluation method Textbook Chapter 1 Introduction	It is basically face-to-face, but it may be done online.	Review (install and check Python, try using Python)	200
2 /	Textbook Chapter 2 (First Half) Python Quick Learning Course Chapter 3 Data Visualization	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
3 /	Textbook Chapter 2 (Second Half) Python Quick Learning Course Chapter 4 Linear algebra	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
4 /	Textbook Chapter 5 Statistics Excel work for Statistics	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
5 /	Textbook Chapter 6 Probability (First half) Comprehensive Exercise 1	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
6 /	Quiz 1 Textbook Chapter 6 Probability (Second half)	It is basically face-to-face, but it may be done online.	Review (lean the previous parts of the textbook) Review (resolve the problem)	60 140
7 /	Textbook Chapter 7 Hypothesis and Presumption (First half) Quiz 1 review	It is basically face-to-face.	Preparation for quiz Review (actually process data on a computer using Python)	140 60
8 /	Textbook Chapter 7 Hypothesis and Presumption (Second half)	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
9 /	Textbook Chapter 8 Gradient descent method Comprehensive Exercise 2	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
10 /	Quiz 2 Textbook Chapter 9 Getting Data (First half)	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Textbook Chapter 9 Getting data (Second half) Quiz 2 review	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
12 /	Textbook Chapter 10 Working with Data (First half)	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140
13 /	Textbook Chapter 10 Working with Data (Second half) Comprehensive exercise 3	It is basically face-to-face, but it may be done online.	Review (lean the previous parts of the textbook) Review (resolve the problem)	140 60
14 /	Quiz 3 Textbook Chapter 11 Machine Learning	It is basically face-to-face.	Preparation for quiz Review (actually process data on a computer using Python)	140 60
15 /	Quiz 3 review For future development of probability and statistics, further learning	It is basically face-to-face, but it may be done online.	Preparation (learn the relevant part of the textbook) Review (actually process data on a computer using Python)	60 140

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Discrete Mathematics	2	721200	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	GUO, Qinglian	31.104		Wednesday 2

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Logic	(1) To learn the foundations of logic and sets (2) To learn the basics of counting (3) To learn graphs and the applications (4) To learn trees and the applications
2	Sets	
3	Counting	
4	Graphs	
5	Trees	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.

This course will offer group discussion in class as a type of active learning.

Students are expected to have high school graduate level mathematic knowledge. Also, they are required to have basic skills of using PowerPoint to draw graphs.

【Required Materials (textbooks, reference books, reserved books)】
Textbooks:
Reference books: Discrete mathematics and its application, Kenneth H. Rosen (AT&T), McGraw-Hill, Inc.
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

No.	Program Objectives	Target Abilities for Students (9pt)
①	g, h, i	Ability to capture the basic knowledge of sets, graphs, and trees
②	g, h, i	Ability to use the knowledge of logic, counting, and sets to explain and solve problems
③	b, c, d	Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics
④	g, h, i	Ability to explain sorting algorithms using the knowledge of trees
⑤		
⑥		

Evaluation Criteria

Evaluation Method / Total Percentage		Exams	Quizzes	Reports	Presentations	Works	Portfolio	Other	Total
Total Percentage		0	60	0	0	40	0	0	100
Comprehensive Strength Criterion	Ability to capture knowledge	0	40	0	0	8	0	0	48
	Ability to think, reason and create	0	20	0	0	8	0	0	28
	Collaboration and leadership	0	0	0	0	8	0	0	8
	Announcement / Expression / Communication	0	0	0	0	8	0	0	8
	Attitude and motivation for learning	0	0	0	0	8	0	0	8

* The numerical breakdown shown by Comprehensive Strength Criterion is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Twice 2*30%
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	External evaluations Evaluations related to learning conducted outside of class (including assignments, etc.) eight times 8*5%
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Ability to explain the basic knowledge and applications of logic, sets, counting, graphs, trees, and sorting algorithms. Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics. Ability to create animation of the models.	Ability to explain the basic knowledge of sets, graphs, and trees. Ability to collaborate with members to design 3D models using the knowledge of discrete mathematics.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Orientation Install software of Blender The foundations of logic	Lecture and exercise	Review	200
2 /	Sets Set operations Practicing of set operations (using Blender) Work No. 1	Lecture and exercise	Preview Review	80 120
3 /	Set operations Set applications Practicing of 3D models design and creation Work No.2	Lecture and exercise	Preview Review	80 120
4 /	The basics of counting Practicing of 3D models design and creation	Lecture and exercise	Preview Review	80 120
5 /	Counting and discrete probability Practicing of 3D models design and creation Work No.3	Lecture and exercise	Preview Review	80 120
6 /	Introduction to graphs	Lecture and exercise	Preview Review	80 120
7 /	Various graphs Practicing of 3D models design and creation Work No. 4	Lecture and exercise	Preview Review	80 120
8 /	Euler and Hamilton paths Quiz (30%)	Quiz and exercise	Preview Review	80 120
9 /	Shortest path problems Graph coloring Practicing of 3D models design and creation	Lecture and exercise	Preview Review	80 120
10 /	Introduction to tree Practicing of 3D models design and creation Work No. 5	Lecture and exercise	Preview Review	80 120

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Tree traversal Practicing of trees and 3D models creation	Lecture and exercise	Preview Review	80 120
12 /	Trees and sorting tree Work No. 6	Lecture and exercise	Preview Review	80 120
13 /	Trees and sorting tree Trees and computer Work No. 7	Lecture and exercise	Preview Review	80 120
14 /	Trees and sorting tree Trees and computer Work No. 8	Lecture and exercise	Preview Review	80 120
15 /	Quiz (30%) Explain and Answers Summary Interview	Exam and lecture	Preview Review	80 120

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門科目 選択	マーケティング	2	725600	前学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	三原　克久	8.301		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	マーケティング調査＆戦略	講義を通じて、企業経営に必要なマーケティング活動の概念や理論および手法などを学習し、情報収集と事例分析によってそれらの役割と効果を確認する。 具体的には世界的に広くマーケティング論の学習に使用されているコトラー＆ケラーのマーケティングマネジメントの第一部の習得とコーオプ教育、ＣＤＩＯの実践等の社会との共創に向けたイメージ作りも目指す。
2	Ｎｅｅｄｓ、ＳＴＰ、４Ｐ	
3	ブランディング	
4	地域志向・地域連携	
5	社会との共創	

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50 分45 回分の学習とし、50分授業15 回に対して50 分30 回分の自学自習を行って下さい。また、この授業ではアクティブラーニングの一環としてグループワークを行います。

【授業の概要（進め方）】

○本科目では、①マーケティングの基本概念と戦略の関係、②マーケティングリサーチ、③マーケティングの4P（製品、価格、流通、販売促進）の要点、④ブランドの形成、について主に学習する。

○授業ではPowerPointと板書を併用する。重要なキーワードやポイントを挙げ、事例に対するグループ検討、議論によって理論への理解を深める。また、映像やネット情報なども取り入れ、効果的に学習できるように心掛ける。

【助言】

○知識の丸暗記ではなく、自分の考えを持つことを求める。

○常に最新のマーケットに注目し、その動きに対して自らの考えや解釈を出すこと。その際には、なぜそのように考えたかを論理的に提示すること。

○毎回積極的に授業へ参加することが非常に重要である。欠席・遅刻・態度不良は厳禁である。

【その他（連絡事項）】

※授業の進捗状況により、内容を一部変更する場合があります。また、外部講師による講演も検討しています。予定が変更する場合事前に周知しますので。あらかじめご了承ください。

【教科書および参考書・リザーブドブック】

教科書：コトラー＆ケラーのマーケティングマネジメント　基本編　第3版[丸善出版]

参考書：

ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

◎常にマーケットの動向に注目し、市場の最新情報を収集することが望まれる。

◎予習は基本的に不要であるが、復習は必須です。

No.	教育目標(DP)（記号表記）	学生が達成すべき行動目標
①	h, g	マーケティングの目的と要件を理解し、企業におけるマーケティング活動の重要性について説明できる。
②	h, g	マーケティングに関する重要な概念を平易な言葉で説明できる。
③	h, g	想定する製品市場における各製品のマーケティング手法の共通点、相違点を説明できる。
④	h, g	企業におけるブランド構築の必要性を理解し、説明できる。
⑤	h, g	ある特定市場の動向を常に観察し、マーケット動向を簡潔にまとめ、説明できる。
⑥	h, g	マーケティングの視点から、様々な経営課題解決のための戦略を立案することができる。

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	40	20	10	0	0	30	100
総合力指標	知識を取り込む力	0	20	10	0	0	0	0	30
	思考・推論・創造する力	0	20	10	0	0	0	0	30
	コラボレーションとリーダーシップ	0	0	0	0	0	0	10	10
	発表・表現・伝達する力	0	0	0	10	0	0	10	20
	学習に取組む姿勢・意欲	0	0	0	0	0	0	10	10

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①	レ	クイズ（小テスト）…10点 ・授業内容を理解できているか確認するために実施する 達成度確認試験…30点 ・マーケティング基礎内容を理解し、自身の見解を論理的な文章で論じられているかを評価する 【評価のポイント】①問題を適切に捉えて、それに対し自らの意見を主張できているか ②論理的にストーリを書けているか ③重要なポイントを押さえているか
	②	レ	
	③	レ	
	④	レ	
	⑤		
	⑥		
レポート	①	レ	課題レポート…20点 ・課題レポートの作成は、授業時間外で実施する ・特別講義の内容を適切にレポートできているかを評価する ・マーケティングに関する課題。広く調べて自分なりの経験・言葉でまとめる能力を評価する
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	
成果発表 （口頭・実技）	①	レ	講義内容に沿ったチーム研究を最終講義にて発表する…10点 ・原則　１チーム5分＋質疑応答 ・授業内ではチーム方針やアクションアイテムを話し合い、調査や作業は授業時間外で実施する ・課題の解決策の理由、表現の仕方、説明の明瞭さを評価する
	②	レ	
	③		
	④		
	⑤	レ	
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	レ	授業への貢献度…20点 ・授業への参加度として、質問の回数を評価する。 ・チーム研究に対する貢献度をチーム員で相互に査定し、その内容を評価とする 課題への取組み…10点 ・課題提出について、期日提出、遅延提出、未提出をカウントし、その累積を評価とする
	②		
	③		
	④		
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
①マーケティングの目的と要件を理解し、企業におけるマーケティング活動の重要性について論理的に説明できる。 ②マーケティングに関する重要な概念を平易な言葉で明確に説明できる。 ③想定する製品市場における各製品のマーケティング手法の共通点、相違点を詳細に説明できる。 ④企業におけるブランド構築の必要性を理解し、明確に説明できる。 ⑤感心のある特定市場の動向を常に観察し、マーケット動向を簡潔にまとめ、分かりやすく説明できる。 ⑥マーケティングの視点から、様々な経営課題解決のための戦略を適切に立案することができる。	①マーケティングの目的と要件を理解し、企業におけるマーケティング活動の重要性について概ね説明できる。 ②マーケティングに関する重要な概念を平易な言葉である程度説明できる。 ③想定する製品市場における各製品のマーケティング手法の共通点、相違点をある程度説明できる。 ④企業におけるブランド構築の必要性をある程度理解し、説明できる。 ⑤ある特定市場の動向を継続に観察し、マーケット動向をある程度にまとめられ、説明できる。 ⑥マーケティングの視点から、様々な経営課題解決のための戦略をある程度計画することができる。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	ガイダンス ・授業の全体像 ・スケジュール ・ルールと評価基準 マーケティングとは	PowerPointを用いた講義 質疑応答 アンケート実施	情報収集	100
2 ／	前回レポートの解説 環境分析 ・外部環境 ・業界分析 ・内部環境 ・目標設定	PowerPointを用いた講義 質疑応答	情報収集	300
3 ／	前回レポートの解説 マーケティングリサーチ ・データ収集 ・一次データ二次データ ・定性と定量	PowerPointを用いた講義 質疑応答	情報収集	300
4 ／	前回レポートの解説 市場特定 ・細分化（S） ・標的市場（T） ・立ち位置（P）	PowerPointを用いた講義 質疑応答	情報収集	300
5 ／	前回レポートの解説 製品マネジメント 振り返り①	PowerPointを用いた講義 質疑応答	情報収集	300
6 ／	価格マネジメント	PowerPointを用いた講義 質疑応答	情報収集	300
7 ／	流通マネジメント	PowerPointを用いた講義 質疑応答	情報収集	300
8 ／	前回レポートの解説 プロモーション・マネージメント	PowerPointを用いた講義 質疑応答	今までの内容を復習 情報収集	300
9 ／	クイズ ・基本概念の確認 ・ケース分析 振り返り②	筆記テスト	情報収集	300
10 ／	特別講演 ・外部講師による講演	PowerPointを用いた講演 Ｑ＆Ａ	情報収集	300

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	特別講演 ・外部講師による講演（予定）	PowerPointを用いた講演 Ｑ＆Ａ	情報収集	300
12 ／	ブランディング ・本質的機能 ・構成要素	PowerPointを用いた講演 Ｑ＆Ａ	情報収集	300
13 ／	特別講義 外部講師による講演（予定）	pptによる口頭説明 Ｑ＆Ａ	総合演習課題向けの情報収集	300
14 ／	筆記試験	筆記試験		300
15 ／	チーム研究成果の発表 振り返り③ 授業アンケート	各チーム5分の口頭・pptによる成果発表 成績のフィードバック	振り返り	50

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門科目 選択	企業会計	2	725700	前学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	北川 達也	金沢C：15.509		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	簿記手続きの一巡	経営者および企業の利害関係者の意思決定に寄与する会計情報について、その作成過程を理解するとともに、会計情報伝達手段である財務諸表の内容・役割の理解を目標とする。
2	決算手続き	
3	決算書	
4	減価償却	
5	発生主義	

授業の概要および学習上の助言

本講義は学修単位であるため、１単位を50分45回分の学習とし、50分授業15回に対して50分30回分の自学自習を行って下さい。

企業は、その活動状況について、簿記を用いて記録・集計を行い、財務諸表によって経営者や利害関係者に会計情報を提供している。本科目では、「簿記手続きの一巡」を学習した後で、会計情報提供ツールである財務諸表の意義や作成方法・活用方法を学ぶ。演習課題が豊富に準備されているので、それらに積極的に取り組むことによって、簿記や財務諸表作成・分析の技術的側面と企業活動を貨幣価値によって捉える“ものの考え方”を養うことが大切である。

実務経験と授業科目との関連性

公認会計士として法定監査業務経験を持つ教員が、財務諸表作成方法指導経験・財務諸表の分析経験を活かして、簿記や財務諸表作成・分析の技術的側面と企業活動を貨幣価値によって捉える“ものの考え方”を養う教育を行っている

【教科書および参考書・リザーブドブック】

教科書：よくわかる簿記シリーズ　合格テキスト 日商簿記3級 Ver.15.0[[TAC出版]]　ISBN： 9784300115824

参考書：指定なし

ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：指定なし

履修に必要な予備知識や技能

この科目では、企業活動を貨幣価値で記録・集計して、経営者や利害関係者の意思決定に寄与する会計情報を作成するための技術である「簿記」を学ぶ。また、会計情報の伝達媒体である財務諸表について、その意義・作成方法や利用方法を学ぶ。したがって、これらを適用する企業の活動や企業を取り巻く経済環境に関心を持ち、日々のニュースからの情報収集や関連基礎科目からの知識の習得に心掛けて授業に臨むことが望ましい。

No.	教育目標(DP) (記号表記)	学生が達成すべき行動目標
①	h	資産・負債・資本・収益・費用について理解し、具体的な項目名を挙げることができる。
②	h	簿記手続き一巡（仕訳・転記・決算・財務諸表の作成）を理解し、簡単な資料で行う演習課題を提出することができる。
③	h	減価償却の考え方を理解し、減価償却費の計算ができる。
④	h	貸借対照表を作成することができる。また、貸借対照表に示された情報の概要を読むことができる。
⑤	h	損益計算書を作成することができる。また、損益計算書に示された情報の概要を読むことができる。
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作　品	ポートフォリオ	その他	合　計
総合評価割合		0	40	60	0	0	0	0	100
総合力指標	知識を取り込む力	0	30	20	0	0	0	0	50
	思考・推論・創造する力	0	10	10	0	0	0	0	20
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	10	0	0	0	0	10
	学習に取組む姿勢・意欲	0	0	20	0	0	0	0	20

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①	レ	次のものを評価する。 ①　中間テストの結果 ②　期末テストの結果
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		
レポート	①	レ	次のものを評価する。授業外の課題の目的は、単に正答を得ることではなく、理解を深めること、継続的な学習習慣を身につけることにあります。 ①　各単元ごとに行う小レポート（授業外の課題、13回分の課題を予定）
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①		
	②		
	③		
	④		
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
・会計情報が企業の経営者や利害関係者の意思決定に有用であることを理解できる。 ・会計情報を作成するための「簿記手続きの一巡」について理解し、演習課題を解くことができる。また、主要簿と補助簿の関係を理解することができる。 ・減価償却の考え方が理解でき、減価償却費の計算ができる。 ・発生主義会計の考え方が理解できる。 ・貸借対照表・損益計算書を作成し、さらに、キャッシュ・フロー計算書へ発展させることができる。	・会計情報が企業の経営者や利害関係者の意思決定に有用であることを理解できる。 ・会計情報を作成するための「簿記手続きの一巡」について理解し、演習課題を解くことができる。 ・減価償却費の計算ができる。 ・貸借対照表・損益計算書を作成することができる。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	・ガイダンス：講義方針、運営方法（授業日程、講義方法、課題実施・提出方法、出席確認方法、成績評価方法など）を説明し、講義への取り組み姿勢と具体的な指導方法を確認する。 ・企業会計の必要性 ・決算書と利益計算	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら企業会計の利益計算構造について理解を深める。	50 150
2 ／	仕訳と元帳転記	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら仕訳・元帳転記・簿記手続きの一巡について理解を深める。	50 150
3 ／	簿記手続き一巡 Part1	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら仕訳・元帳転記・簿記手続きの一巡について理解を深める。	50 150
4 ／	簿記手続き一巡 Part2	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら決算予備手続きの理解を深める。	50 150
5 ／	簿記手続き一巡 Part3	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら、決算整理事項、勘定口座の締切について理解を深める。	50 150
6 ／	商品有高帳	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら商品有高帳の記入方法、売上原価計算方法について理解を深める。	50 150
7 ／	【総合演習】 1回から6回までの授業内容の総合演習	講義及び質疑応答、演習	予習：１回から６回までの授業内容を復習する。 復習：総合演習の問題について復習し、理解を深める。	50 150
8 ／	【振り返り】 1回から6回までの振り返り 【中間テスト】 1回から7回までの授業内容に関するテスト	講義及び質疑応答、演習 テスト	予習：テスト範囲の内容を復習する。 復習：テストでできなかった問題について、正解を確認し、できるようにしておく。	150 50
9 ／	貸借対照表の意義と内容	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら、貸借対照表の意義と作成方法について理解を深める。	50 150
10 ／	損益計算書の意義と内容・減価償却 Part1	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら、損益計算書の意義と作成方法、減価償却費及び発生主義会計について理解を深める。	50 150

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	損益計算書の意義と内容・減価償却 Part2	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら、損益計算書の意義と作成方法、減価償却費及び発生主義会計について理解を深める。	50 150
12 ／	貸借対照表および損益計算書の総合作成演習	講義及び質疑応答、演習	予習：テキストの当該箇所を読んで、質問事項を整理しておく。 復習：課題を行いながら、貸借対照表および損益計算書の作成方法について理解を深める。	50 150
13 ／	キャッシュ・フロー計算書 【総合演習】 9回から13回までの授業内容の総合演習	講義及び質疑応答、演習	復習：講義内容を復習して、キャッシュ・フロー計算書について理解を深める。9回から13回の講義内容について復習して理解を深める	200
14 ／	【振り返り】 9回から13回までの振り返り 【期末テスト】 9回から13回までの授業内容に関するテスト	講義及び質疑応答、演習 テスト	予習：テスト範囲の内容を復習する。 復習：テストでできなかった問題について、正解を確認し、できるようにしておく。	150 50
15 ／	期末テストの解説 企業会計基礎の学習・教育内容に関する質疑応答 アンケート 自己点検	講義及び質疑応答 アンケート 自己点検	復習：期末テストの内容について再度確認し、理解する。本科目で学習した内容について再度総合的に確認する。	200

2026 Syllabus

Instructor with "＊" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Electrical and Electronic Circuits I	1	712800	First	Lecture Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	SANG-NGENCHAI, Apirak	KC 31-117-1		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Electrical Power	In this course, students gain basic knowledge of electrical and electronic circuits. Students explore electronic components, electrical power, and circuit design. Through hands-on activities, students learn to assemble circuits on breadboards and design prototypes on PCBs. By the end of the course, students can analyze, design, and test circuits, applying these skills to create various solutions and applications.
2	Electronics Components	
3	Circuit Design	
4	Printed Circuit Board (PCB)	

Course Description and Expectations for Students (10.5pt)

This course offers a hands-on, experiential approach in class, using active learning to understand electrical and electronic circuits. Students will explore the fundamentals of AC and DC circuits, electrical power, and essential components such as resistors, capacitors, inductors, diodes, transistors, and FETs. The course emphasizes practical skills in circuit design using breadboards, prototyping boards, and online circuit simulation tools. Students will also learn circuit design and PCB development. The students' experience concludes with a final project in which students use their knowledge to design and build a circuit that combines concepts covered during the course.

Advice on taking this course:
- **B**e Prepared: Review electrical and electronic basics and component functions before class.
- **O**rganize Your Work: Keep clear notes, circuit diagrams, and project documentation to avoid confusion later.
- **S**tay Hands-On: Actively participate in labs and practice using breadboards, PCBs, and online circuit design tools.
- **S**eek Solutions: When you face challenges, investigate, troubleshoot, and ask questions. Problem-solving is key to mastering circuits.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books: Teach Yourself Electricity and Electronics
(Stan Gibilisco and Simon Monk), ISBN 978-1-2595-8553-1
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

- Basic Mathematics: Understanding algebra and simple equations for circuit analysis.
- Physics Fundamentals: Familiarity with electrical concepts such as voltage, current, and resistance.
- Computer Literacy: Ability to use web-based tools and simulation software for circuit design.
- Problem-Solving Skills: Logical thinking and troubleshooting ability for circuit issues.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Students will be able to understand the fundamentals of electricity.
②	g, h	Students will be able to identify and apply electronic components.
③	a, g	Students will be able to analyze and design circuits.
④	h, i	Students will be able to utilize digital tools for circuit simulation and PCB design.
⑤	a, g, i	Students will be able to develop and implement a functional circuit.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	15	25	0	60	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	10	10	0	30	0	0	50
	Ability to think, reason and create	0	5	10	0	25	0	0	40
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	5	0	5	0	0	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Students will take short in-class quizzes to check their understanding of the content. There will be a quiz in weeks 5, 10, and 15.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①		Students are required to write a report for their final project assignment.
	②		
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Students must complete weekly assignments covering class lectures. If a student is absent, they must obtain the exercise from the teacher and submit it on time. For the final project, each student will design an application that demonstrates the knowledge gained in this class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
1. Students can explain the fundamentals of electricity. 2. Students can identify and apply electronic components. 3. Students can analyze and design circuits. 4. Students can utilize digital tools for circuit simulation and PCB design. 5. Students can develop and implement a functional circuit.	1. Students can define voltage, current, resistance, and power. 2. Students can correctly identify components and understand their basic functions. 3. Students can design circuits, perform calculations, and validate designs through simulation and testing. 4. Students can independently use simulation software and PCB design tools to design, test, and optimize circuits. 5. Students can design and build a fully functional circuit.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course Guidance & Safety Basic Electrical/Electronic Concepts - Background Physics - Electrical Units - Introduction to Semiconductors	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
2 /	Fundamentals of AC and DC Circuits - Characteristics of AC vs DC - Series and parallel circuits - Kirchhoff’s Laws	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
3 /	Electrical Power and Energy - Power in AC/DC circuits - Real, reactive, and apparent power	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
4 /	Resisters and Circuit Analysis - Types of Resistors - Purpose of the Resistor	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
5 /	Capacitors and Inductors - Types of Capacitors - Charging/discharging behavior - Applications in filtering	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises. Quiz from lessons 1-4	200
6 /	Diodes and Rectifiers - Types of Diodes - Diode characteristics, rectification	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
7 /	Transistors and FETs - Types of Transistors - Types of FETs - Switching and amplification principles	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
8 /	Circuit Design Basics - Circuit Design Fundamentals - Circuit Design Software	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
9 /	Circuit Simulation Basics - Circuit Schematics - Online Circuit Simulation platforms	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
10 /	PCB Design Fundamentals - Introduction to PCB design tools - PCB layout principles, schematic capture.	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 5-9	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Advanced Circuit Design - Combining analog and digital components - Integrated Circuits	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
12 /	Electronic Control for Actuators / Motors - Direct-Current Motors - Types of Motors	Lecture Exercise Experiment	Read the lecture slides given and proceed with the exercises.	200
13 /	Project Initialization and Planning	Lecture Exercise	Read the given tutorial and proceed with the self-project.	200
14 /	Project Development	Lecture Exercise	Read the given tutorial and proceed with the self-project.	200
15 /	Project Showcase & Wrap-Up	Activity	Read the given tutorial and proceed with the self-project. Quiz from lessons 10-14	200

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Electrical and Electronic Circuits II	1	712900	Second	Lecture Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	OGAWA, Hayato	31-115		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Digital number system	Students will learn to understand the operation and design of combinational and sequential logic circuits that construct computer memory systems. This course will guide the students to perform conversion of the digital number system, understanding the working of logic gates, using Karnaugh map to simply Boolean expression, and designing a digital counter circuit using flip-flops.
2	Logic gates	
3	Boolean algebra	
4	Karnaugh map	
5	Sequential circuits	

Course Description and Expectations for Students (10.5pt)

In this course, students will be introduced to the basics of digital circuits and systems. The course is prepared to provide students with basic knowledge of digital memory circuits based on combinational logic circuits and sequential circuits. After completing the course, students should be able to explain and discuss the basics principles of digital memory circuits. This course includes lectures, hands-on work, and an individual project.

Advice on taking this course:

- Be prepared for class and study the incoming topics in advance.
- Do the assignment and make sure to submit all your work on time.
- English will be the main challenge in this course. Make sure you ask for help from the teacher or friends.

The use of an electronics dictionary is strongly encouraged.

This course will offer discovery learning, problem-solving learning, experiential learning, investigative learning in class as a type of active learning.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:

Reference books:

Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

1. Ability to perform simple algebra operations.
2. Basics knowledge of mathematical operations (add, subtraction, multiplication, and division)

No.	Program Objectives	Target Abilities for Students (9pt)
①	a,h	Students will be able to perform the conversion of digital number systems.
②	a,h	Students will be able to write Boolean algebra expressions of the given combinational circuits.
③	a,h	Students will be able to use the Karnaugh map to simplify Boolean algebra expression.
④	a,h,i	Students will be able to design circuits from the simplified Boolean algebra expression.
⑤	a,h	Students will be able to explain the operation of latches and flip-flop.
⑥	a,h,i	Students will be able to design an Asynchronous counter and a Synchronous counter.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	20	40	0	40	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	10	0	0	20	0	0	30
	Ability to think, reason and create	0	10	20	0	20	0	0	50
	Collaboration and leadership	0	0	10	0	0	0	0	10
	Announcement / Expression / Communication	0	0	5	0	0		0	5
	Attitude and motivation for learning	0	0	5	0	0	0	0	5

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	There are five quizzes in this course. Each quiz accounted for 5 points out of a total of 25 points. • Students who are absent during the day can ask the teacher to reschedule the quiz. • However, rescheduling must be within the same week of the quiz.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Weekly exercises will be handed to the students based on what they have learned in the week. All target ability related question will be included in the exercise. • If a student is absent, it is the responsibility of the student to collect the weekly exercise from the teacher. Completed weekly exercise must be submitted on time as mentioned by the teacher.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	There are two small projects and one final project. Each small project accounted for 5 points out of the total of 40 points. The remaining 20 points are covered in the final project. The projects will test students' cognitive and psychomotor skills related to what they have learned in the class. Project assignment/worksheet must be submitted on time as mentioned by the teacher.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students can understand and explain the working principle of logic gates with the correct schematic diagram. Students can perform simplification of Boolean expressions using the Karnaugh map. Students can design Asynchronous and Synchronous counter complete with the logic circuits and timing diagram	Students can understand the concept of the working principle of logic gates correctly. Students can perform simplification of Boolean expressions using the Karnaugh map. Students can design Asynchronous and Synchronous counter correctly.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	i. Syllabus guidance ii. Digital number system - Binary, decimal, hexadecimal Conversion of the number system	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
2 /	i. Quiz 1 (Binary, decimal, and hexadecimal) ii. Introduction to basic logic gates and universal gates - Read MIL symbol and Boolean expression. Boolean algebra	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
3 /	i. Quiz 2 (Boolean Algebra) ii. Sum-of-Product (SOP) & Product-of-Sum (POS) Karnaugh map (K-Map)	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
4 /	i. Simplification of Boolean expression using Karnaugh map - Draw circuits from the simplified Boolean expression. Quiz 3 (K-Map)	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
5 /	Project 1 (Simulation software) Design of Binary-Coded Decimal (BCD) circuit.	- Project worksheet	- Read PowerPoint notes. Complete Exercise	200
6 /	i. Binary addition and arithmetic circuits 1 Understand half adder and full adder circuits	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
7 /	i. Binary addition and arithmetic circuits 2 - Subtraction using 2`complement method. - Understand adder-subtractor circuits. ii. Quiz 4 (Binary addition and subtraction)	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
8 /	i. Decoder and Encoder Understand decoder and encoder circuits	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
9 /	i. Latches and flip – flops 1 - Introduction to SR, JK, and D flip-flops - Understand the characteristics of a flip-flop with a truth table and timing diagrams.	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
10 /	i. Latches and flip – flop 2 - Introduction to SR, JK, and D flip-flops - Understand the characteristics of a flip-flop with a truth table and timing diagrams. Quiz 5 (flip-flop)	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	i. Asynchronous counter - Understand the working principle of asynchronous counter. - Design asynchronous counter.	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
12 /	i. Project 2 (Hardware) Design a asynchronous counter.	- Construct a digital circuit. complete project worksheet	- Read PowerPoint notes. Complete Exercise	200
13 /	i. Synchronous counter - Understand the working principle of synchronous counter. - Design a synchronous counter.	- Lecture Worksheet	- Read PowerPoint notes. Complete Exercise	200
14 /	i. Final Project (Simulation software)	- Design and construct a counter simulation using software. worksheet	- Read PowerPoint notes. Complete Exercise	200
15 /	i. Final Project (Simulation software)	- Operation confirmation and trouble shooting worksheet	- Read PowerPoint notes. Complete Exercise	200

2026 Syllabus

Instructor with "＊" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Computer Architecture	2	722500	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	SANG-NGENCHAI, Apirak	KC 31-117-1		Make an appointment in class

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Von Neumann Architecture	This course introduces the principles of computer architecture, including the Von Neumann Architecture, the Instruction Set Architecture, and the roles of key components such as the numbering system, logic gates, the Arithmetic Logic Unit (ALU), and the central processing unit (CPU). Students will gain both theoretical understanding and practical skills, culminating in the design and implementation of a simple 4-bit CPU through hands-on projects.
2	Instruction Set Architecture	
3	Logic Gates	
4	Arithmetic Logic Unit	
5	Central Processing Unit	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
This course will offer an experiential, active-learning approach in class. Students will engage in active learning through hands-on projects that reinforce theoretical knowledge.
This course introduces the fundamentals of computer architecture, covering key concepts such as the Von Neumann Architecture, the Instruction Set Architecture, numbering systems, logic gates, the Arithmetic Logic Unit (ALU), and the central processing unit (CPU). By the end of the course, students will design, simulate, and implement a simple 4-bit CPU. The course emphasizes collaboration, problem-solving, and practical application to bridge theory with real-world digital system design.

Advice on taking this course:
- **B**e Prepared: Review lecture slides beforehand.
- **O**rganize Your Work: Keep clear notes, structure code, and document projects.
- **S**tay Hands-On: Participate actively in labs and practice sessions.
- **S**eek Solutions: When facing challenges, investigate, troubleshoot, and ask questions.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books: Digital Fundamentals (Thomas L. Floyd), ISBN 978-1-2920-7598-3
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

A basic understanding of computers, CPU architecture, digital logic, and binary number systems.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Students will be able to understand and explain the principles of computer architecture
②	a, h	Students will be able to understand and describe instruction set architecture
③	a, h	Students will be able to understand and describe the CPU functionality
④	g, i	Students will be able to design, simulate, and implement a simple 4-bit CPU
⑤		
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	15	20	0	65	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	10	10	0	30	0	0	50
	Ability to think, reason and create	0	5	10	0	30	0	0	45
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	0	0	5	0	0	5

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Students will take short in-class quizzes to check their understanding of the content. There will be a quiz in weeks 5, 10, and 15, which is 15% of the total score.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Reports	①		Students must submit a report covering their final project from initiation to completion, accounting for 20% of the total grade.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Students must complete weekly assignments based on lectures, which count for 35% of their grade. Absent students should get the assignment sheet from the teacher and submit it on time; otherwise, their score will be deducted after the deadline. For the project, each student will create an application that shows what they've learned in this course. They are required to research, design, and develop a 4-bit CPU outside of class, which will constitute 30% of their overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
1. Students can explain the principles of computer architecture, Instruction Set Architecture, and CPU functionality with detailed examples. 2. Students can design, simulate, and successfully implement a fully functional 4-bit CPU. 3. Students can integrate theoretical knowledge with practical application and communicate their design effectively.	1. Students can explain the basic principles of computer architecture, Instruction Set Architecture, and CPU functionality. 2. Students can design and simulate a simple 4-bit CPU and demonstrate partial or basic implementation. 3. Students can apply theoretical concepts to practical exercises with guidance.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course Guidance Recapping Computing Final Project Overview	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
2 /	Von Neumann Architecture	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
3 /	Numbering system	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
4 /	Logic Gates	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
5 /	Electric Memory and Storage	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 1-4	200
6 /	Central Processing Unit (CPU)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
7 /	Pipeline Processor	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
8 /	Instruction Set Architecture	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
9 /	A 1-bit ALU	Lecture Exercise Activity	Read the lecture slides given and proceed with the exercises.	200
10 /	A 4-bit ALU	Lecture Exercise Activity	Read the lecture slides given and proceed with the exercises. Quiz from lessons 5 - 9	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	CPU Design: ROM	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
12 /	CPU Design: Registers	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
13 /	CPU Design: Decoder	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
14 /	CPU Design: 4-bit CPU	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
15 /	Project Showcase & Wrap-Up	Activity	Read the given tutorial and proceed with the self-project. Quiz from lessons 10 - 14	200

2026 Syllabus

Instructor with "＊" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Computer Systems	2	722600	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	SANG-NGENCHAI, Apirak	KC 31-117-1		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Hardware	In this course, students will learn the fundamental technologies of computers, including hardware, software, and networks. Students will gain practical experience with single-board computer technologies, applying theory to real-world digital system design. By the end of the course, students understand hardware-software interaction and can use single-board computers in future projects through hands-on application.
2	Software	
3	Network	
4	Single-board computer	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
This course will offer experiential learning in class as a type of active learning.
This course introduces the fundamental technologies of computers, including how computers work and the roles of memory, CPU, programming, storage, networks, operating systems, and input/output devices. Students will gain a comprehensive understanding of the interaction between hardware and software in modern computing systems. In addition, the course emphasizes practical experience through assignments that involve configuring and using a Raspberry Pi. By combining theory with hands-on activities, students will develop the skills necessary to apply single-board computer technologies in future system development projects.

Advice on taking this course:
- **B**e Prepared: Review lecture slides beforehand.
- **O**rganize Your Work: Keep clear notes, structure code, and document projects.
- **S**tay Hands-On: Participate actively in labs and practice sessions.
- **S**eek Solutions: When facing challenges, investigate, troubleshoot, and ask questions.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of computers and CPU architecture.

No.	Program Objectives	Target Abilities for Students (9pt)
①	i	Students will be able to understand the hardware components of a computer
②	i	Students will be able to understand computer software and its interaction with hardware
③	i	Students will be able to understand the fundamentals of computer networks
④	a, h, i	Students will be able to configure single-board computers
⑤	a, h, i	Students will be able to implement single-board computers in practical applications
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	10	40	20	30	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	5	15	0	0	0	0	20
	Ability to think, reason and create	0	5	15	0	25	0	0	45
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	5	10	0	0	0	15
	Attitude and motivation for learning	0	0	5	10	5	0	0	20

* The numerical breakdown shown by the Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	Students will take short in-class quizzes to check their understanding of the content. There will be a quiz in weeks 5 and 10, which is 10% of the total score.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①	✓	Students will receive weekly exercises related to the week's material, which count for 20% of their grade. If a student is absent, they must obtain the assignment sheet from the teacher and submit it on time. Otherwise, their score will be deducted after the deadline. Students must submit a report covering their final project from initiation to completion, accounting for 20% of the total grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①	✓	Students will give an oral presentation on their projects, which accounts for 20% of their grade. The instructors will specify the format for the presentations, such as slides, posters, or another method, in class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Works	①	✓	Students will engage in many hands-on exercises, beginning with Python programming and establishing a connection to the Raspberry Pi. Outside of class, there is a project in which each student will need to design an application that combines two or more electronic components. This project will constitute 30% of their overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
1. Students can explain the function of each hardware and software element in computer architecture. 2. Students can explain computer networking and perform IP address calculations correctly. 3. Students can design and implement more than a single-board computer.	1. Students can understand the concepts of hardware and software in computer architecture. 2. Students can understand the basics of computer networking and perform simple IP address calculations. 3. Students can design an outline of possible uses for single-board computers.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance, Recapping Computing Overview of what computers do. Final Project Overview	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
2 /	Numbering system	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
3 /	Electric Memory and Storage	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
4 /	Processors	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
5 /	Computer Input and Output	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 1 - 4	200
6 /	Computer Networking (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
7 /	Computer Networking (2)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
8 /	Operating System	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
9 /	Basic Linux Command	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
10 /	Raspberry Pi Electronic Project (1)	Lecture Exercise	Read the lecture slides given and proceed with the exercises. Quiz from lessons 5 - 9	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Raspberry Pi Electronic Project (2)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
12 /	Raspberry Pi Electronic Project (3)	Lecture Exercise	Read the lecture slides given and proceed with the exercises.	200
13 /	Final Project (1)	Lecture Exercise	Read the given tutorial and proceed with the self-project.	200
14 /	Final Project (2)	Exercise	Read the given tutorial and proceed with the self-project.	200
15 /	Project Showcase & Wrap-Up	Presentation	Read the given tutorial and proceed with the self-project.	200

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	System Programming I	1	713000	First	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	OGAWA, Hayato / FUJISAWA, Takeshi	KC 31-115		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	C programming	This course introduces students to fundamental C programming leading to procedural C programming on a Windows PC (WSL) and compile/run/debug C programs. Learn to write procedural C programs using data types, operators, standard I/O, control structures, arrays, and functions, Apply basic algorithmic thinking to solve programming problems and evaluate solutions logically.
2	Data type	
3	Standard I/O	
4	Control Structures	
5	Algorithm	

Course Description and Expectations for Students (10.5pt)

This course will offer experiential learning in class as a type of active learning
In this System Programming 1 course, students learn C programming fundamentals (data types, standard I/O, operators/expressions, control structures, functions, arrays, recursion, user-defined types, file handling, and command-line arguments) using a WSL-based development environment on a Windows PC.
In preparation for System Programming 2, where students are introduced to microprocessor-based embedded systems and Raspberry Pi hardware. Students will use C to interact with peripheral boards/sensors and will build, debug, and test simple hardware–software functions.
Advice on taking this course:
- Have laptops or notebooks ready before class starts.
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Submit assignments on time.

At the end of the course, students will apply their knowledge to a hands-on project where they will design and build their own embedded system.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge and experience learned and acquired so far in computer languages and logical thinking.

No.	Program Objectives	Target Abilities for Students (9pt)
①	a,h	Students will be able to analyze a given programming problem, identify required inputs/outputs, and plan a solution.
②	a,h	Students will be able to implement correct C programs using appropriate data types and control structures.
③	a,h	Students will be able to implement correct C programs using appropriate functions, and basic data structures.
④	a,h	Students will be able to debug and test programs using compiler messages and simple test cases and improve code quality.
⑤	a,h,i	Students will be able to communicate their work clearly through code comments and short reports, explaining results.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	0	50	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	10	0	10	0	0	20
	Ability to think, reason and create	0	0	20	0	20	0	0	40
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	10	0	0	20
	Attitude and motivation for learning	0	0	10	0	10	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	Exercises will be done on every topic. The exercises should be finished by the next class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Students will involve a lot of hands-on exercises starting with programming and establishing a connection to microcontroller peripherals boards. There is a final project in which each student will need to design an application that combines two or more basic functions.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students can design and implement C programs using control structures, functions, arrays, pointers, and structures with clean code and comments. Students can debug systematically using compiler messages and printf, and explain the cause of bugs and their fixes logically. Collaborative Learning: Work collaboratively on projects and labs, and participate in peer learning activities. assignments.	By the end of the course, students can write basic C programs using variables, data types, operators, conditionals, loops, and functions. Students can use arrays and pointers at a basic level, and use structures in simple programs when given examples. Students can fix common errors by reading compiler messages and testing, and can correct simple logic mistakes with guidance. Collaboration: Skills in working effectively in teams, demonstrating flexibility,

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Introduction to C fundamentals course and WSL Environment setup for C programming on Windows PC.	Lecture	Read the given lecture slides.	20
2 /	Basic concept Hardware/software, integer/real type, operator, and standard I/O	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
3 /	Programming input/output (continue)	Exercise	Read the given tutorial and proceed with exercises.	20
4 /	Operators and Expressions	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
5 /	Control structures, loops, breaks	Exercise	Read the given tutorial and proceed with exercises.	20
6 /	Control/Decision-Making Statements, if statements	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
7 /	Understanding Math.h Library	Exercise	Read the given tutorial and proceed with exercises.	20
8 /	Introduction to Arrays	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
9 /	Different types of Functions	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
10 /	Recursions and storage class	Lecture Exercise	Read the given tutorial and proceed with exercises.	20

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	User defined datatypes	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
12 /	File types and command line arguments	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
13 /	Introduction to microprocessor-based computer hardware system, peripherals boards and C programming environment.	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
14 /	Raspberry Pi hardware introduction	Lecture Exercise	Read the given tutorial and proceed with exercises.	20
15 /	Freenove Raspberry Pi overview	Lecture Exercise	Read the given tutorial and proceed with exercises.	20

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	System Programming II	1	713100	Second	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	OGAWA, Hayato	KC 31-115		Make an appointment in class

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Embedded systems	This course introduces students to embedded programming through hands-on microcontroller projects using C, based on prior experience. Programming the digital input/output, Interrupts, Analog to Digital conversion (ADC), PWM control, and User input and output devices. Knowledge from this course is usable in designing digital control units for consumer electronics, industrial automation, telecommunication systems, etc.
2	Microcontrollers	
3	Microprocessors	
4	Real-Time Operating Systems	
5	C programming language	

Course Description and Expectations for Students (10.5pt)

This course will offer experiential learning in class as a type of active learning

This course introduces students to the basis of a microprocessor-based computer hardware system with software that is designed to carry out computation for real-time operations. This course includes lectures, hands-on works, and an individual project. Particularly the Raspberry pi will be studied and utilized together with various microcontroller peripherals. The microcontroller peripherals boards will be built and debugged by students. Students will learn through hands-on experience while doing several experiments and projects.
Advice on taking this course:
- Have laptops or notebooks ready before class starts.
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Submit assignments on time.

At the end of the course, students will apply their knowledge to a hands-on project where they will design and build their own embedded system.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Knowledge and experience learned and acquired so far

No.	Program Objectives	Target Abilities for Students (9pt)
①	a,h	Students will be able to use the C to program digital input/output and an interrupts condition.
②	a,h	Students will be able to use the C to perform Analog to Digital conversion.
③	a,h	Students will be able to use the C for Pulse Width Modulation control (PWM).
④	a,h	Students will be able to use the C to program user input and output devices.
⑤	a,h,i	Students will be able to design an application that utilizes two or more basic functions together.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	0	50	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	10	0	10	0	0	20
	Ability to think, reason and create	0	0	20	0	20	0	0	40
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	10	0	0	20
	Attitude and motivation for learning	0	0	10	0	10	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	Exercises will be done on every topic. The exercises should be finished by the next class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Students will involve a lot of hands-on exercises starting with programming and establishing a connection to microcontroller peripherals boards. There is a final project in which each student will need to design an application that combines two or more basic functions.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students are able to understand and explain the concept of a microprocessor-based computer hardware system for real-time operations with a correct schematic diagram. Students are able to perform and improvise the learned basic operation of the microcontroller using a programming language. Students are able to design an application that utilizes more than three basic operations together. Collaborative Learning: Work collaboratively on projects and labs, and participate in peer learning activities. assignments.	Students are able to understand the concept of a microprocessor-based computer hardware system for real-time operations correctly. Students are able to perform the learned basic operation of the microcontroller using a programming language. Students are able to design an application that utilizes at least three basic operations together. Collaboration: Skills in working effectively in teams, demonstrating flexibility,

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Review System Programming 1 microprocessor-based computer hardware system, peripherals boards and C programming environment.	Lecture	Read the given lecture slides.	200
2 /	Programming of digital input/output	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
3 /	Programming of digital input/output (continue)	Exercise	Read the given tutorial and proceed with exercises.	200
4 /	Programming for Pulse Width Modulation (PWM) control	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
5 /	Programming for PWM control (continue)	Exercise	Read the given tutorial and proceed with exercises.	200
6 /	Programming for Analog to Digital conversion.	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
7 /	Programming for Analog to Digital conversion (continue).	Exercise	Read the given tutorial and proceed with exercises.	200
8 /	Programming for Motor & Driver	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
9 /	Programming for 4-Digit 7-Segment Display.	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
10 /	Programing for the LED Matrix.	Lecture Exercise	Read the given tutorial and proceed with exercises.	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Programing for the LCD.	Lecture Exercise	Read the given tutorial and proceed with exercises.	200
12 /	Final Project (1) Understanding a final project and choosing electronic elements for own project.	Lecture Exercise	Read the given tutorial and proceed with self-project.	200
13 /	Final Project (2) Continuing to work on self-project for a raspberry pi electronic project.	Exercise	Read the given tutorial and proceed with self-project.	200
14 /	Final Project (3) Continuing to work on self-project for a raspberry pi electronic project.	Exercise	Read the given tutorial and proceed with self-project.	200
15 /	Final Project (4) Continuing to work on self-project for a raspberry pi electronic project.	Exercise	Read the given tutorial and proceed with self-project.	200

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Object-oriented Programming I	1	713200	First	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	EVANS, Davis	31.118-1		Weekdays 16:50 ~ 17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Programming	Students should be able to design moderately complex coding projects that use the principles of object-oriented programming to make flexible and well-organized code. Students should also be able to rewrite and refactor codes into modules to efficiently accomplish the program's stated goals.
2	Object-oriented	
3	Refactor	
4	Encapsulation	
5	Interface	

Course Description and Expectations for Students (10.5pt)

This course uses the Python programming language as a medium to teach modern object-oriented and design pattern focused programming skills. Students will expand upon skills learned in previous programming courses, and learn how to refactor code, organize it into distinct modules using encapsulation, and design interfaces for those discrete modules to work with each other.

This course implements active learning through live tutorials and project-based exercises during class sessions.

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: Fluent Python: Clear, Concise, and Effective Programming, 2nd Edition
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students should understand the basics of programming in Python, including the use of development tools like VS Code, and it's Python related packages. This course is design as a follow-up to the introductory programming skills learned in Computer Skills IIB.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Students should be able to understand and describe the use of functions, classes, & methods
②	g, h, i	Students should be able to understand and describe the benefits of using an object-oriented programming style.
③	g, h, i	Students should be able to organize and refactor code into encapsulated modules and interfaces.
④	a, b, g	Students should be able to apply the concept of object-oriented programming to real-world problem solving.
⑤	d, f, h	Students should be able to read, understand, and explain the function of code written by themselves and others.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	20	30	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	20	0	0	0	0	20
	Ability to think, reason and create	0	0	20	10	20	0	0	50
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	10	0	0	0	10
	Attitude and motivation for learning	0	0	10	0	10	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	Students will submit in-class coding exercises for evaluation on a weekly basis.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		Students will have a final presentation of their created coding project at the end of the semester.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥		
Works	①	✓	Students will have a capstone coding project to be submitted at the end of the semester.
	②		
	③	✓	
	④	✓	
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students should be able to create well documented, efficient object-oriented code in Python to solve a variety of given problem statements.	Students should be able to create functional Python code to solve a variety of given problem statements, that implements some object-oriented techniques.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance VS Code & Python Installation Check Review of Functions, Classes, & Methods	Lecture Exercise	Review Textbook Finish In-class Exercise	30
2 /	Review of Documentation and Commenting Review of Libraries and Importing Review of Error types and Troubleshooting	Lecture Exercise	Review Textbook Finish In-class Exercise	30
3 /	Class Layout & Refactoring	Lecture Exercise	Review Textbook Finish In-class Exercise	30
4 /	UML Diagram Reading & Drawing	Lecture Exercise	Review Textbook Finish In-class Exercise	30
5 /	What is an “object” in programming? Constructors and methods	Lecture Exercise	Review Textbook Finish In-class Exercise	30
6 /	Python special methods, collections, & typing	Lecture Exercise	Review Textbook Finish In-class Exercise	30
7 /	Object references, mutability, and recycling	Lecture Exercise	Review Textbook Finish In-class Exercise	30
8 /	Inheritance: Parent & Child Classes Interfaces, Dependencies, & APIs	Lecture Exercise	Review Textbook Finish In-class Exercise	30
9 /	Encapsulation: public vs. private variables and methods	Lecture Exercise	Review Textbook Finish In-class Exercise	30
10 /	Modularity and combining objects to form a program.	Lecture Exercise	Review Textbook Finish In-class Exercise	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Graphical User Interfaces (GUI) & the Python tkinter library	Lecture Exercise	Review Textbook Finish In-class Exercise	30
12 /	Project assignment & introduction	Lecture Project Work	Work on project	30
13 /	Project workday #1	Project Work	Work on project	30
14 /	Project workday #2	Project Work	Work on project	30
15 /	Project Submission & Presentation	Presentation	Finish project	30

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Object-oriented Programming II	1	713300	Second	Exercises Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	EVANS, Davis	31.118-1		Weekdays 16:50 ~ 17:30

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Programming	Students should be able to design moderately complex coding projects that use the principles of object-oriented programming to make efficient code. Students will be able to apply design patterns to make complex programs in a well-organized manner. Furthermore, they should be able to use more advanced techniques such as object composition and concurrency tools like multi-threading to make even more flexible code.
2	Object-oriented	
3	Design-Patterns	
4	Object Composition	
5	Concurrency	

Course Description and Expectations for Students (10.5pt)

This course continues from Object-oriented Programming I in expanding student understanding of object-oriented programming techniques using the Python coding language as the medium. In this course students will learn about common design-patterns for designing more complex coding projects in a logical manner, as well as techniques such as object composition to allow for more flexibility in object-oriented code design. Students will also be introduced to concurrency tools like multi-threading to make non-linear and parallel code execution possible to divide large processing loads effectively.

This course implements active learning through live tutorials and project-based exercises during class sessions.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Fluent Python: Clear, Concise, and Effective Programming, 2nd Edition
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students should understand the basics of programming in Python, including the use of development tools like VS Code, and it's Python related packages. This course is designed as a follow-up to first semester course Object-oriented Programming I

No.	Program Objectives	Target Abilities for Students (9pt)
①	g, h, i	Students should be able to understand and describe the benefits of using an object-oriented programming style.
②	a, b, g	Students should be able to apply the concept of object-oriented programming to real-world problem solving.
③	g, h, i	Students should be able to understand, explain, and implement design patterns in their coding project design.
④	g, h, i	Students should be able to understand, explain, and implement coding techniques such as object composition and concurrency.
⑤	d, f, h	Students should be able to read, understand, and explain the function of code written by themselves and others.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	50	20	30	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	20	0	0	0	0	20
	Ability to think, reason and create	0	0	20	10	20	0	0	50
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	10	0	0	0	10
	Attitude and motivation for learning	0	0	10	0	10	0	0	20

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	Students will submit in-class coding exercises for evaluation on a weekly basis.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Presentations	①		Students will have a final presentation of their created coding project at the end of the semester.
	②	✓	
	③		
	④	✓	
	⑤	✓	
	⑥		
Works	①	✓	Students will have a capstone coding project to be submitted at the end of the semester.
	②		
	③	✓	
	④	✓	
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students should be able to create well documented, efficient object-oriented code in Python to solve a variety of given problem statements. Students should use tools like design patterns and concurrency to make their code well-organized and efficient.	Students should be able to create functional Python code to solve a variety of given problem statements, that implements some object-oriented techniques. Students may partially implement some tools like design patterns and concurrency in their projects.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance VS Code & Python Installation Check Review of Class structure and inheritance	Lecture Exercise	Review Textbook Finish In-class Exercise	30
2 /	Review of collections and implicit typing Introduction to dynamic typing and “duck typing” in Python	Lecture Exercise	Review Textbook Finish In-class Exercise	30
3 /	Object representation	Lecture Exercise	Review Textbook Finish In-class Exercise	30
4 /	Interfaces, Protocols, and ABCs	Lecture Exercise	Review Textbook Finish In-class Exercise	30
5 /	Review of class inheritance Inheritance vs Object composition	Lecture Exercise	Review Textbook Finish In-class Exercise	30
6 /	Design patterns introduction	Lecture Exercise	Review Textbook Finish In-class Exercise	30
7 /	Design pattern examples and exercises	Lecture Exercise	Review Textbook Finish In-class Exercise	30
8 /	Design pattern examples and exercises (cont.)	Lecture Exercise	Review Textbook Finish In-class Exercise	30
9 /	Concurrency, Parallelism, & Multi-threading	Lecture Exercise	Review Textbook Finish In-class Exercise	30
10 /	Concurrency, Parallelism, & Multi-threading (cont.)	Lecture Exercise	Review Textbook Finish In-class Exercise	30

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Project assignment & introduction	Lecture Project Work	Work on project	30
12 /	Project workday #1	Project Work	Work on project	30
13 /	Project workday #2	Project Work	Work on project	30
14 /	Project workday #3	Project Work	Work on project	30
15 /	Project Submission & Presentation	Presentation	Finish project	30

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Data Structures and Algorithms	2	722700	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	FUJISHIMA, Satoshi	Kanazawa C 31.116		Thu. 16:30 - 17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Data Structures	Data structures and algorithms are fundamental concepts of computer science. Knowledge of data representation, data structures, and algorithms is essential in the development, use, and maintenance of adaptable, reusable, and efficient software. In this course, students will learn about basic data structures and algorithms that provide a foundation for writing efficient computer programs.
2	Algorithms	
3	Divide and Conquer	
4	Dynamic Programming	
5	Hash Function	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

This course will offer experiential learning in class as a type of active learning.
Data structures and algorithms have become essential in computer science to develop efficient programs. These programs are used to create web applications, supercomputing, and AI programs, etc.
This course will introduce students to theoretical backgrounds using mathematics. Students will be able to apply their programming knowledge through creating original applications.

Advice on taking this course:
- Have laptop ready before class starts.
- Be sure to prepare sufficiently for class and the incoming topics in advance.
- Submit assignments on time.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Students must have the ability to express their ideas logically.

No.	Program Objectives	Target Abilities for Students (9pt)
①	g, h, i	Students will be able to recognize the importance of data structures.
②	g, h, i	Students will be able to recognize the importance of algorithms.
③	g, h, i	Students will be able to understand basics of sorting algorithms.
④	g, h, i	Students will be able to understand basics of lists, queues and stacks
⑤	g, h, i	Students will be able to understand the divide and conquer vs dynamic programming.
⑥	g, h, i	Students will be able to understand the hash functions.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	15	45	0	40	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	5	10	0	15	0	0	30
	Ability to think, reason and create	0	5	15	0	15	0	0	35
	Collaboration and leadership	0	0	5	0	5	0	0	10
	Announcement / Expression / Communication	0	5	10	0	0	0	0	15
	Attitude and motivation for learning	0	0	5	0	5	0	0	10

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	There will be three quizzes to check the understanding of the content.
	②	✓	
	③	✓	
	④		
	⑤	✓	
	⑥		
Reports	①	✓	Reports are worksheet exercises and written assignments for final project. The reports should be submitted by the due date designated by the instructors. All “Reports” assigned during class also serve as out-of-class learning assignments.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Works are programming exercise assignments assigned during class. The Python source code should be submitted by the due date designated by the instructors. All “Works” assigned during class also serve as out-of-class learning assignments.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students can recognize the importance of data structures and algorithms in computer science. Students further understand that using them is crucial to develop efficient software.	Students can recognize the importance of data structures and algorithms to some extent. Students generally understand their definitions.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Prime numbers Maze Coloring Problem	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
2 /	Big O Sorting: Selection sort	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
3 /	Sorting: Merge sort (1)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
4 /	Sorting: Merge sort (2)	Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
5 /	Sorting: Quick sort (1)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
6 /	Sorting: Quick sort (1)	Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
7 /	Stack & Queue Quiz (1)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
8 /	Knapsack Problem Dynamic programming	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
9 /	Divide and Conquer & Dynamic Programming	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
10 /	Huffman Coding Quiz (2)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Huffman Coding (2) Implementation: Coding Quiz (2)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
12 /	Huffman Coding (3) Implementation: Decoding	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
13 /	Hash (1)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
14 /	Hash (2) Quiz(3)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
15 /	Hash (3)	Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Computer Networks	2	722800	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	FUJISHIMA, Satoshi	Kanazawa C 31.116		Thu. 16:30 - 17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Computer networks	This course introduces the knowledge and theory of TCP/IP protocols supporting the current Internet, and imparts various related communication technologies to students taking this course. Through this, students will gain an understanding of computer networks such as LAN and WAN to acquire basic skills related to network operations.
2	Protocols	
3	OSI reference model	
4	TCP/IP	
5	Internet	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.

Students will systematically learn the basic knowledge and theories related to computer networks as shown below.

1. Basic mechanisms of computer networks
2. OSI reference model and TCP/IP
3. Physical layer and datalink layer
4. Network layer and transport layer
5. Routing protocol and application layer

As part of the active learning approach, students will explain their answers to each assignment in class to deepen their understanding.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Basic knowledge of computers

No.	Program Objectives	Target Abilities for Students (9pt)
①	h,i	Students will be able to explain the basic mechanisms of computer networks.
②	h,i	Students will be able to explain the functions of each layer in the OSI reference model.
③	h,i	Students will be able to explain the functions of each layer in TCP/IP protocols.
④	h,i	Students will be able to explain the basic mechanisms of the Internet.
⑤	h,i	Students will be able to perform network diagnostics using basic network commands.
⑥	h,i	Students will be able to perform network diagnostics using basic network analyzation tools.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	10	40	0	50	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	5	10	0	20	0	0	35
	Ability to think, reason and create	0	0	15	0	20	0	0	35
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	5	0	0	15
	Attitude and motivation for learning	0	5	5	0	5	0	0	15

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	There will be several quizzes to check the understanding of basic knowledge and theories related to computer networks.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Reports	①	✓	Reports are worksheet assignments assigned during class. The reports should be submitted by the due date designated by the instructors. All “Reports” assigned during class also serve as out-of-class learning assignments.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Works are Packet Tracer exercise assignments assigned during class. The Works should be submitted by the due date designated by the instructors. All “Works” assigned during class also serve as out-of-class learning assignments.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Students are able to explain the following items systematically related to computer networks: 1. Basic information and communication systems 2. OSI reference model and TCP/IP model 3. Physical layer and datalink layer 4. Network layer and transport layer 5. Routing protocol and application layer Students are able to use appropriate network commands and tools for network maintenance and management.	Students are able to explain the basic contents of the following items related to computer networks: 1. Basic information and communication systems 2. OSI reference model and TCP/IP model 3. Physical layer and datalink layer 4. Network layer and transport layer 5. Routing protocol and application layer Students are able to use appropriate network commands and tools for basic network diagnostics

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Fundamentals of Networking	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
2 /	Basic Switch & End Device Configuration	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
3 /	Basic Switch & End Device Configuration (2)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
4 /	Protocols & Models	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
5 /	Wired & Wireless LAN	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
6 /	Data Link Layer & Ethernet Switching	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
7 /	Network Layer	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
8 /	Address Resolution	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
9 /	Basic Router Configuration	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
10 /	IPv4 Addressing	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	VLSM Addressing Quiz (1)	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
12 /	VLSM Addressing (2) Quiz (2)	Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
13 /	Transport Layer	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
14 /	Application Layer	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200
15 /	Network Security	Lecture and Exercise	(Preview) Read the given lecture slides (Review, Assignment) Work on an assignment	200

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective * Practical	Database	2	723000	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	* FUJISAWA, Takeshi	Kanazawa C 31:113		Fri. 15:30 – 17:30

Course Objectives

Keywords		Learning Objectives
1	Relational Database	In today's advanced information society, the amount of data handled by information processing systems is enormous, and the growth of data volume is accelerating. The need for data scientists is increasing every year. This course provides an overview of databases, mainly relational databases, and how to write and operate SQL.
2	SQL	
3	Database normalization	
4	Relational Algebra	
5	Transaction	

Course Description and Expectations for Students

This will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minute self-study times for 15 50-minute classes.
This course will offer Problem-solving and experiential learning in class as a type of active learning.

Learn the basics of data models and database management systems, focusing on relational databases. Students will learn the basics of data models and database management systems, focusing on relational databases. Assignments will be given to improve students' understanding and grasp of the content of the course. In the curriculum, this course aims to develop software development skills using databases. In the curriculum, this course aims to cultivate the ability to develop software using databases, and students should take this course with the mastery of SQL as a programming language in mind.

Relevance of practical experience to class subjects

Faculty members with practical experience in software development at major information companies and IT-related Internet venture companies will practice database design and database programming. In the programming exercises, they use database engines that are actually used in the real world, so that students can acquire practical and practical programming know-how based on their work experience.

Required Materials (textbooks, reference books, reserved books)

Textbooks: The Manga Guide to Databases (No Starch Press) ISBN 978-1-59327-190-9

Reference books: None

Reserved books: None

Knowledge/Skills Needed to Take This Course (Prerequisites)

Students should have the skills to install a relational database management system. In the first class, we will practice how to install the relational database management system and how to build the environment. Be sure to bring your textbook and notebook PC to each class.

No.	Program Objectives	Target Abilities for Students
①	i,h	Understand what the given SELECT statement is querying.
②	i,h	Can design a database and create tables.
③	i,h	Can transform from first normal form to third normal form
④	i,h	Can explain the difference between second normal form and third normal form
⑤	h	Can write programs that manipulate SQL.
⑥		

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		55	0	0	0	30	0	15	100
Comprehensive Strength Criteria	Ability to capture knowledge	20	0	0	0	15	0	5	40
	Ability to think, reason and create	20	0	0	0	0	0	5	25
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	15	0	0	0	15	0	5	35

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①	✓	Check whether the students have acquired basic knowledge and skills about each unit they have studied.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		Students will be evaluated about the knowledge and skills about creating a program to operate a database.
	②		
	③		
	④		
	⑤	✓	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	An assignment will be given to support self-study, and its validity will be assessed as the result of self-study done 30 times in 50 minutes.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
In addition to the standard achievement levels, the student should be able to (5) Can write complex SQL statements, including joins and subqueries (6) Can design a database that is correctly implemented up to the third normalization. (7) Can write programs to manipulate databases.	(1) Can explain what a relational data model is. (2) Can write SQL for a given relational algebra. (3) Represent the real world using the entity-relationship model, and translate the representation into a relational database schema. (4) Explain in detail the normalization procedure

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	What is a database? Able to explain why a database is necessary.	Lecture	Read textbook and Assignment	200
2 /	What is a relational database? Able to explain what relational database is.	Lecture	Read textbook and Assignment	200
3 /	Relational Algebra Able to perform relational algebra operations.	Lecture	Read textbook and Assignment	200
4 /	Let's design a database Able to draw E-R model diagrams. Able to normalize non-normal form data to first normal form.	Lecture	Read textbook and Assignment	200
5 /	2nd Normal Form Able to normalize 1st normal form to 2nd one	Lecture	Read textbook and Assignment	200
6 /	3rd Normal Form Able to normalize 2nd normal form to 3rd one	Lecture Quiz	Read textbook and Assignment	200
7 /	SQL① Basic Of SQL	Lecture	Read textbook and Assignment	200
8 /	SQL② Able to make basic select SQL statement Able to create tables Able to insert , update or delete data rows	Lecture	Read textbook and Assignment	200
9 /	SQL③ Able to group data and extract data by using complex extraction conditions of SQL.	Lecture	Read textbook and Assignment	200
10 /	SQL④ Able to make complex SQL statement and join tables, Able to make SQL with subquery	Lecture Quiz	Read textbook and Assignment	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Let’s operate a database / Transaction. Able to explain ACID Able to perform SQL operations using transactions	Lecture	Read textbook and Assignment	200
12 /	Let’s operate a database / Transaction. why deadlock happens. When Disaster Strikes Indexes	Lecture Quiz	Read textbook and Assignment	200
13 /	DB programming ① Basic of a DB programming	Lecture	Read textbook and Assignment	200
14 /	DB programming ② Create a program to perform CRUD operations	Self-Study	Assignment of DB programming	200
15 /	DB programming ③ Create a program to perform CRUD operations	Self-Study	Assignment of DB programming	200
16 /	Final exam			
17 /	Review of final exam and assignment results Self-check Submit assignments			

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Robot Programming I	1	723400	First	Exercise Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	HAN, Justin	Kanazawa C 31.119		Make an appointment in class

Course Objectives

Keywords		Learning Objectives
1	Robots	Robots are machines that interact with the world through the use of various sensors. In this course, students will first learn about the operations of various basic sensors and how to process the information received through those sensors. They will then use the process information to program a microcontroller-equipped mobile robot to react to the environment.
2	Arduino	
3	Sensors	
4	Programming	
5		

Course Description and Expectations for Students

This course will offer problem-based learning and discovery learning in class as types of active learning.

The progression of the class is as follows:

1. Experiments with sensor kits
2. Experiments with Robot kits
3. Comprehensive Project

Students are expected to bring their laptops to every class.

Required Materials (textbooks, reference books, reserved books)

Textbooks:

Reference books:

Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

An understanding of:

- basic programming methodology
- basic electronics

No.	Program Objectives	Target Abilities for Students
①	g, h, i	Be able to read and understand simple circuit diagrams
②	g, h, i	Be able to connect sensors to a microcontroller and read input signals
③	g, h, i	Be able to process input signals and generate output behaviors
④	g, h, i	Be able to connect and program an Arduino microcontroller robot
⑤	g, h, i	Be able to program an Arduino controlled robot to create emergent and specific behavior
⑥	g, h, i	Be able to read and debug errors in Arduino programs

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	60	0	40	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	30	0	10	0	0	40
	Ability to think, reason and create	0	0	10	0	20	0	0	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	5	0	0	15
	Attitude and motivation for learning	0	0	10	0	5	0	0	15

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	There will be a mini-project associated with the introduction of each new topic. Each mini-project will require a written report summarizing the results of each project.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	There will be a final comprehensive assignment at the end of the class that will test the students' knowledge and use of sensors. Time will be given during class. However, if this assignment is not completed within the allotted time, students are expected to complete it outside of class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
- Able to understand and explain simple circuit diagrams. - Able to connect various sensors to obtain sensor input data. - Able to process input signals to directly control output behaviors. - Able to set up and program an Arduino controlled robot - Able to use sensor data to create desired output behaviors - Able to create a program to navigate a robot in an environment.	- Able to read and use simple circuit diagrams. - Able to connect various sensors according to a circuit diagram to read sensor signals. - Able to use input signals to decide output signals. - Able to use and program an Arduino controlled robot - Able to use sensor data to create output behaviors - Able to create a program to allow a robot to react to the environment.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Guidance and Review Students learn about sensors and review their understanding of programming.	Lecture	Complete the provided assignment.	50
2 /	Project #1 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
3 /	Project #1 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
4 /	Project #2 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
5 /	Project #2 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
6 /	Project #3 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
7 /	Project #3 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
8 /	Project #4 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
9 /	Project #4 Students learn about a specific sensor and complete a mini-project based on the sensor.	Exercise	Complete the provided assignment.	50
10 /	Project #5 Students learn about a pre-built robot and complete a mini-project based on the robot and its attached sensors.	Exercise	Complete the provided assignment.	50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Project #5 Students learn about a pre-built robot and complete a mini-project based on the robot and its attached sensors.	Exercise	Complete the provided assignment.	50
12 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and programming to complete a designated task.	Exercise	Complete the provided assignment.	50
13 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and programming to complete a designated task.	Exercise	Complete the provided assignment.	50
14 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and programming to complete a designated task.	Exercise	Complete the provided assignment.	50
15 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and programming to complete a designated task.	Exercise	Complete the provided assignment.	50

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Robot Programming II	1	723500	Second	Exercise Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	HAN, Justin	Kanazawa C 31.119		Make an appointment in class

Course Objectives

Keywords		Learning Objectives
1	Robotics simulation	Robots are machines that interact with the world through the use of various devices. In this course, students will be introduced to the advanced ways robots interact with the world from advanced sensors to actuators. They will then use this knowledge to program a robot to interact and impose effects on the objects in their environment.
2	Python	
3	PID Controller	
4	Sensors	
5	Actuators	

Course Description and Expectations for Students

This course will offer problem-based learning and discovery learning in class as types of active learning.

The progression of the class is as follows:

1. Simulator setup
2. Basic programming tutorials to learn simulator interactions
3. Comprehensive Project

Students are expected to bring their laptops to every class.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:

Reference books:

Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites)

An understanding of:

- basic programming methodology
- basic calculus

No.	Program Objectives	Target Abilities for Students
①	g, h, i	Be able to program and move a simulated robot
②	g, h, i	Be able to process and analyze signals from simulated sensors
③	g, h, i	Be able to use simulated actuators to create designated behaviors
④	g, h, i	Be able to explain PID control
⑤	g, h, i	Be able to use python to implement PID control
⑥	g, h, i	Be able to use python to use various simulated sensors and actuators to perform designated tasks

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	0	60	0	40	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	0	30	0	10	0	0	40
	Ability to think, reason and create	0	0	10	0	20	0	0	30
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	5	0	0	15
	Attitude and motivation for learning	0	0	10	0	5	0	0	15

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①		
	②		
	③		
	④		
	⑤		
	⑥		
Reports	①	✓	For every lab, students will be required to document their progress and results in a written report. If not completed during class, the students are expected to complete them outside of class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	There will be a final comprehensive assignment at the end of the class that will test the students' knowledge and use of sensors. Time will be given during class. However, if these problems are not completed within the allotted time, students are expected to complete them outside of class.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
- Able to use python to navigate a robot in a simulated environment. - Able to process and analyze the signals from multiple advanced sensors. - Able to use specific actuators to interact with the simulated environment. - Able to explain the method and implementation of PID control. - Able to use PID control to navigate a complicated simulated environment. - Able to incorporate sensors and actuators to navigate the environment and complete a task.	- Able to use python to move a robot in a simulated environment. - Able to process and analyze the signals from a sensor. - Able to use actuators to perform specific behaviors. - Able to explain and implement PID control. - Able to use PID control to navigate a simple simulated environment. - Able to use sensors and actuators to complete a task.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 /	Guidance and setup Students will be introduced to the class and will set up the robotics simulation environment on their computers.	Lecture	Complete the provided assignment.	50
2 /	Lab #1 Students learn how to operate a robot in a simulated environment.	Exercise	Complete the provided assignment.	50
3 /	Lab #1 Students learn how to operate a robot in a simulated environment.	Exercise	Complete the provided assignment.	50
4 /	Lab #2 Students learn how to use a robot to perform line-tracking in a simulated environment.	Exercise	Complete the provided assignment.	50
5 /	Lab #2 Students learn how to use a robot to perform line-tracking in a simulated environment.	Exercise	Complete the provided assignment.	50
6 /	Lab #3 Students learn how to perform simple localization using sensors.	Exercise	Complete the provided assignment.	50
7 /	Lab #3 Students learn how to perform simple localization using sensors.	Exercise	Complete the provided assignment.	50
8 /	Lab #4 Students learn how to implement PID control.	Exercise	Complete the provided assignment.	50
9 /	Lab #4 Students learn how to implement PID control.	Exercise	Complete the provided assignment.	50
10 /	Lab #5 Students learn how to navigate their robot in a simulated environment.	Exercise	Complete the provided assignment.	50

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
11 /	Lab #5 Students learn how to navigate their robot in a simulated environment.	Exercise	Complete the provided assignment.	50
12 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and actuators to complete a designated task in the simulator.	Exercise	Complete the provided assignment.	50
13 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and actuators to complete a designated task in the simulator.	Exercise	Complete the provided assignment.	50
14 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and actuators to complete a designated task in the simulator.	Exercise	Complete the provided assignment.	50
15 /	Comprehensive Assignment Students learn how to apply their knowledge of sensors and actuators to complete a designated task in the simulator.	Exercise	Complete the provided assignment.	50

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Robotics	2	723600	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	HAYASHI Michihiro / HAN Justin	31-126-1		Class day: 16:30-17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Mechanism	Students will: (1) learn the basics of robot mechanisms and control. (2) learn how to calculate robot motion. (3) learn how to control a 2-linked robotic arm.
2	Mathematical model	
3	Kinematics	
4	Programming	
5	Engineer ethics	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This course will offer problem-solving learning and experimental learning in class as a type of active learning.
This course deals with the fundamentals of robot mechanisms and control. Further, students will consider the role of robots in society and learn about the ethics of engineers who work with robots.

(1) Basics of robot mechanisms and control
(2) Types of industrial robots
(3) Mathematical models of robot for positioning control
(4) Direct kinematics
(5) Inverse kinematics
(6) Engineering ethics

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Physics, mathematics (trigonometric functions, matrix)
Spreadsheet application (MS-Excel)
Microcomputer programming (Arduino)

	Program Objectives	Target Abilities for Students (9pt)
①	g,h	Be able to explain mechanisms and control of industrial robots.
②	g,h	Be able to make mathematical model of 2-linked robotic arm.
③	g,h	Be able to calculate end effector position from joints angles by using direct kinematics.
④	g,h	Be able to calculate joint angles from end effector position by using inverse kinematics.
⑤	d,h	Be able to assemble and check the operation of 2-linked robotic arm.
⑥	b,e,h	Be able to consider engineering ethics about many types of robots in society.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	20	40	0	20	0	20	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	10	20	0	10	0	10	50
	Ability to think, reason and create	0	10	20	0	10	0	10	50
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	0	0	0	0	0	0

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	∠	Students will be evaluated based on their quizzes about direct and inverse kinematics of 2-linked robotic arms. Quiz #1 is about direct kinematics. Quiz #2 is about inverse kinematics.
	②	∠	
	③	∠	
	④	∠	
	⑤	∠	
	⑥		
Reports	①	∠	Students will be evaluated based on their reports such as mechanical drawings, mathematical models, spread sheets for calculation of robotic arm position, and roles of robots in society. Report #1 is about engineering ethics and robots that are working in society. Report #2 is about industrial robots. Report #3 is about mathematical models of robot manipulators. Report #4 is about motion control of robotic arms.
	②	∠	
	③	∠	
	④	∠	
	⑤	∠	
	⑥	∠	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	∠	Students will be evaluated based on their works such as trajectory and joint angle changes of 2-linked robotic arm.
	②	∠	
	③	∠	
	④	∠	
	⑤	∠	
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	∠	Students will be evaluated based on their drawings and pictures and figures in their report as out-of-class learning activities.
	②	∠	
	③	∠	
	④	∠	
	⑤	∠	
	⑥	∠	

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
(1) Able to fully understand the mechanisms of robots. (2) Able to explain the functions of many types of industrial robots. (3) Able to build mathematical models of various types of robots. (4) Able to create robot motion by using direct and inverse kinematics. (5) Able to understand engineering ethics about robots that are working in society.	(1) Able to understand the mechanisms of robots. (2) Able to explain the functions of some types of industrial robots. (3) Able to build mathematical models of the 2-linked robotic arm. (4) Able to calculate end effector position from joint angles by using direct kinematics. (5) Able to understand engineering ethics about robots that are working in society.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Relationship between robots and society Engineer ethics Basics of mechatronics and robotics	Lecture and Q&A Self-check	Understand the course objectives Confirm the course schedule	200
2 /	The role of robots in society	Lecture and Q&A Self-check	Desktop research	200
3 /	Engineering ethics The risks and benefits of robots	Lecture and Q&A Self-check	Desktop Research Report #1	200
4 /	Basic configuration of robots Classification of robots	Lecture and Q&A Self-check	Desktop research	200
5 /	Types and characteristics of industrial robots	Lecture and Q&A Self-check	Desktop research Report #2	200
6 /	Mathematical model of robots (1) Coordinate system Matrix	Lecture and Q&A Self-check	Confirm types of coordinate system	200
7 /	Mathematical model of robots (2) 2-linked robotic arm	Lecture and Q&A Self-check	Draw the coordinate system of 2-linked robotic arm Report #3	200
8 /	Direct kinematics of 2-linked robotic arm (1)	Lecture and Q&A Self-check	Confirm coordinate system of a 2-linked robotic arm	200
9 /	Direct kinematics of 2-linked robotic arm (2)	Lecture and Q&A Self-check	Calculate the position of end effector of 2-linked robotic arm	200
10 /	Inverse kinematics of 2-linked robotic arm (1)	Lecture and Q&A Self-check Quiz #1	Confirm the method to calculate joint angles from end effector position	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Inverse kinematics of 2-linked robotic arm	Lecture and Q&A Self-check	Calculate joint angles of 2-linked robotic arm	200
12 /	Assembling 2-lnked robotic arm (1)	Lecture and Q&A Self-check Quiz #2	Confirm assembly diagram	200
13 /	Assembling 2-linked robotic arm (2)	Lecture and practice Self-check	Complete assembly 2-linked robotic arm	200
14 /	Programming for positioning control	Lecture and practice Self-check	Confirm robot motions	200
15 /	Positioning control experiment PTP control CP control	Lecture and practice Self-check	Complete report Report #4	200

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Robot Mechanics I	2	723700	First	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	EVANS, Davis	31.118-1		Weekdays 16:50-17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Particle Dynamics	Continue improving your understanding of Newton's equation of motion as the basis for dynamics, such as the movement of a particle caused by external force or torque. Prepare for subsequent specialized mechanics courses. Acquire the knowledge necessary for the design and analysis of complex machines such as robots.
2	Kinematics	
3	Kinetics	
4	Momentum	
5	Impulse	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes. Out-of-class engineering assignments will be assigned weekly and evaluated in the “Reports” section of the evaluation criteria.

This course will offer experimental learning in class as a type of active learning.

This is a continuation of Engineering Mechanics. For studying mechanics, it is important to solve a variety of mechanical problems independently in addition to understanding the meaning of terms and mathematical formulas. In this course, the following basic mechanics topics are covered: Kinematics of a Particle - Force and Acceleration - Work and Energy - Impulse and Momentum

Required Materials (textbooks, reference books, reserved books) (10.5pt)
Textbooks: Engineering Mechanics: Dynamics in SI Units (PEARSON)
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Be familiar with the mathematics and physics used in basic engineering to solve a number of exercise problems. Acquire the content of this class, which is essential for understanding specialized subjects in the following year.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Be able to explain Rectangular, Normal and Tangential Coordinates.
②	h, i	Be able to explain Systems of Particles
③	h, i	Be able to explain Power and Efficiency, for particles or a system of particles.
④	h, i	Be able to explain Conservative Forces, Potential Energy and Conservation of Energy, for particles or a system of particles.
⑤	h, i	Be able to explain Linear Impulse and Momentum, for particles or a system of particles.
⑥	h, i	Be able to explain Angular Impulse and Momentum, for particles or a system of particles.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		30	20	30	0	20	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	15	10	10	0	0	0	0	35
	Ability to think, reason and create	15	10	10	0	10	0	0	45
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	10	0	0	20
	Attitude and motivation for learning	0	0	0	0	0	0	0	0

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①	✓	A final comprehensive exam will be held at the end of the semester to check students' overall comprehension of the course material
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Quizzes	①	✓	Quizzes will be held periodically in class to check student comprehension of specific subjects and learning material
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Reports	①	✓	Students will be given weekly out-of-class homework assignments. These assignments are expected to fulfill the out-of-class learning requirements of this course.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Certain class sessions will be reserved for practical in-class lab exercises. The results from these labs (experiment reports, design files, and other products) will be evaluated under this category.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Able to fully explain the following subjects as they relate to particles or systems of particles: - Rectangular, Normal and Tangential Coordinates. - Systems of Particles. - Power and Efficiency. - Conservative Forces, Potential Energy and Conservation of Energy. - Linear Impulse and Momentum. - Angular Impulse and Momentum	Understanding and the ability to solve simple problems regarding the following subjects as they relate to particles or systems of particles: - Rectangular, Normal and Tangential Coordinates. - Systems of Particles. - Power and Efficiency. - Conservative Forces, Potential Energy and Conservation of Energy. - Linear Impulse and Momentum. - Angular Impulse and Momentum

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Kinematics of a Particle: Basics Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
2 /	Kinematics of a Particle: Basics Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
3 /	Kinematics of a Particle: Basics Quiz	Quiz Out-of-class exercises	Prepare for quiz Do assigned exercises	200
4 /	Kinematics of a Particle: Force & Acceleration Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
5 /	Kinematics of a Particle: Force & Acceleration Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
6 /	Kinematics of a Particle: Force & Acceleration Week 3	Lecture Out-of-class exercises	Do assigned exercises	200
7 /	Kinematics of a Particle: Force & Acceleration Lab	In-class lab Out-of-class exercises	Do assigned exercises	200
8 /	Kinematics of a Particle: Work & Energy Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
9 /	Kinematics of a Particle: Work & Energy Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
10 /	Kinematics of a Particle: Work & Energy Quiz	Quiz Out-of-class exercises	Prepare for quiz Do assigned exercises	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Kinematics of a Particle: Impulse and Momentum Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
12 /	Kinematics of a Particle: Impulse and Momentum Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
13 /	Kinematics of a Particle: Impulse and Momentum Week 3	Lecture Out-of-class exercises	Do assigned exercises	200
14 /	Kinematics of a Particle: Impulse and Momentum Lab	Lecture Out-of-class exercise	Do assigned exercises	200
15 /	Pre-Exam Review	Review	Prepare for exam	200
16 /	Final Exam	Exam	Prepare for exam	
17 /	Test Return			

2026 Syllabus

Instructor with "*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Robot Mechanics II	2	723800	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	EVANS, Davis	31.118-1		Weekdays 16:50-17:30

Course Objectives

Keywords (10.5pt)		Learning Objectives (10.5pt)
1	Rigid Body Dynamics	Continue improving your understanding of Newton's equation of motion as the basis for dynamics, such as the movement of a particle caused by external force or torque. Prepare for subsequent specialized mechanics courses. Acquire the knowledge necessary for the design and analysis of complex machines such as robots.
2	Kinematics	
3	Kinetics	
4	Momentum	
5	Impulse	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes. Out-of-class engineering assignments will be assigned weekly and evaluated in the “Reports” section of the evaluation criteria.

This course will offer experimental learning in class as a type of active learning.

This is a continuation of Engineering Mechanics & Robot Mechanics 1. For studying mechanics, it is important to solve a variety of mechanical problems independently in addition to understanding the meaning of terms and mathematical formulas. In this course, continuing from the particle mechanics introduced in Robot Mechanics 1, the following basic mechanics topics are covered as applied to rigid bodies: Force and Acceleration - Work and Energy - Impulse and Momentum

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks: Engineering Mechanics: Dynamics in SI Units (PEARSON)
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Be familiar with the mathematics and physics used in basic engineering to solve a number of exercise problems. Acquire the content of this class, which is essential for understanding specialized subjects in the following year.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Be able to explain Rectangular, Normal and Tangential Coordinates.
②	h, i	Be able to explain the concept of a Planar Rigid Body
③	h, i	Be able to explain Power and Efficiency, for planar rigid bodies.
④	h, i	Be able to explain Conservative Forces, Potential Energy and Conservation of Energy, for planar rigid bodies.
⑤	h, i	Be able to explain Linear Impulse and Momentum, for planar rigid bodies.
⑥	h, i	Be able to explain Angular Impulse and Momentum, for planar rigid bodies.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		30	20	30	0	20	0	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	15	10	10	0	0	0	0	35
	Ability to think, reason and create	15	10	10	0	10	0	0	45
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	10	0	10	0	0	20
	Attitude and motivation for learning	0	0	0	0	0	0	0	0

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①	✓	A final comprehensive exam will be held at the end of the semester to check students' overall comprehension of the course material
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Quizzes	①	✓	Quizzes will be held periodically in class to check student comprehension of specific subjects and learning material
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Reports	①	✓	Students will be given weekly out-of-class homework assignments. These assignments are expected to fulfill the out-of-class learning requirements of this course.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①	✓	Certain class sessions will be reserved for practical in-class lab exercises. The results from these labs (experiment reports, design files, and other products) will be evaluated under this category.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①		
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Able to fully explain the following subjects as they relate to rigid bodies: - Rectangular, Normal and Tangential Coordinates. - Power and Efficiency. - Conservative Forces, Potential Energy and Conservation of Energy. - Linear Impulse and Momentum. - Angular Impulse and Momentum	Understanding and the ability to solve simple problems regarding the following subjects as they relate to rigid bodies: - Rectangular, Normal and Tangential Coordinates. - Power and Efficiency. - Conservative Forces, Potential Energy and Conservation of Energy. - Linear Impulse and Momentum. - Angular Impulse and Momentum

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Guidance Planar Kinematics of a Rigid Body: Basics Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
2 /	Planar Kinematics of a Rigid Body: Basics Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
3 /	Planar Kinematics of a Rigid Body: Basics Quiz	Quiz Out-of-class exercises	Prepare for quiz Do assigned exercises	200
4 /	Planar Kinetics of a Rigid Body: Force & Acceleration Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
5 /	Planar Kinetics of a Rigid Body: Force & Acceleration Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
6 /	Planar Kinetics of a Rigid Body: Force & Acceleration Week 3	Lecture Out-of-class exercises	Do assigned exercises	200
7 /	Planar Kinetics of a Rigid Body: Force & Acceleration Lab	In-class lab Out-of-class exercises	Do assigned exercises	200
8 /	Planar Kinetics of a Rigid Body: Work & Energy Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
9 /	Planar Kinetics of a Rigid Body: Work & Energy Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
10 /	Planar Kinetics of a Rigid Body: Work & Energy Quiz	Quiz Out-of-class exercises	Prepare for quiz Do assigned exercises	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Planar Kinetics of a Rigid Body: Impulse and Momentum Week 1	Lecture Out-of-class exercises	Do assigned exercises	200
12 /	Planar Kinetics of a Rigid Body: Impulse and Momentum Week 2	Lecture Out-of-class exercises	Do assigned exercises	200
13 /	Planar Kinetics of a Rigid Body: Impulse and Momentum Week 3	Lecture Out-of-class exercises	Do assigned exercises	200
14 /	Planar Kinetics of a Rigid Body: Impulse and Momentum Lab	Lecture Out-of-class exercise	Do assigned exercises	200
15 /	Pre-Exam Review	Review	Prepare for exam	200
16 /	Final Exam	Exam	Prepare for exam	
17 /	Test Return			

2026 Syllabus

Instructor with"*" means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Elective	Fundamentals of Control Engineering	2	724000	Second	Lecture Total

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	KUSHIMA, Yoshihiro	31.117		16:50-17:30

Course Objectives

	Keywords (10.5pt)	Learning Objectives (10.5pt)
1	Complex numbers	Students will: (1) Review complex numbers for frequency response (2) Learn Laplace transforms for solving linear differential equations (3) Learn inverse Laplace transforms for solving linear differential equations (4) Learn transfer function for frequency analysis (5) Learn block diagrams
2	Laplace transforms	
3	Inverse Laplace transforms	
4	Transfer functions	
5	Block diagrams	

Course Description and Expectations for Students (10.5pt)

This course will provide total-time credits. 45 50-minute study times are worth one credit, and students need to have 30 50-minuite self-study times for 15 50-minute classes.
This course will offer experimental learning in class as a type of active learning.

This is a basic course in control engineering. We will cover the following topics:
1. Complex numbers
2. Laplace transforms
3. Inverse Laplace transforms
4. Transfer functions
5. Block diagrams

Students are expected to understand the meaning of the analysis method for control systems and expected to determine the stability of a control system.

Required Materials (textbooks, reference books, reserved books) (10.5pt)

Textbooks:
Reference books:
Reserved books:

Knowledge/Skills Needed to Take This Course (Prerequisites) (10.5pt)

Sufficient mathematical calculation skills.
Basic knowledge of differential and integral calculus.

No.	Program Objectives	Target Abilities for Students (9pt)
①	h, i	Be able to Calculate complex numbers.
②	h, i	Be able to use basic Laplace transforms.
③	h, i	Be able to solve linear differential equations with inverse Laplace transforms.
④	h, i	Be able to use transfer functions.
⑤	h, i	Be able to understand block diagrams.
⑥		

Evaluation Criteria

	Criteria and Ratio \ Evaluation Method	Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
	Total Evaluation Ratio	40	20	0	0	0	0	40	100
Comprehensive Strength Criteria	Ability to capture knowledge	20	10	0	0	0	0	20	50
	Ability to think, reason and create	10	5	0	0	0	0	10	25
	Collaboration and leadership	0	0	0	0	0	0	0	0
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	10	5	0	0	0	0	10	25

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points (10.5pt)
Exams	①	✓	A written exam is given at the end of the term and the results will account for 40% of the overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Quizzes	①	✓	Several 50-minute quizzes are given to improve comprehension and the results will account for 20% of the overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		
Reports	①		
	②		
	③		
	④		
	⑤		
	⑥		
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①		
	②		
	③		
	④		
	⑤		
	⑥		
Others	①	✓	To support self-directed learning, assignments will be given as out-of-class work and the results will account for 40% of the overall grade.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement (10.5pt)	Description of Standard Achievement (10.5pt)
Can show physical phenomena as differential equations and represent them as dynamic systems for analyzing physical phenomena. Discriminate what is necessary in characterizing physical phenomena and analyze dynamic systems appropriately.	Be able to represent physical phenomena presented as differential equations as dynamic systems for analysis. Understand the matters that characterize physical phenomena and be able to analyze dynamic systems appropriately.

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
1 /	Course introduction Overview of System Control Complex numbers Trigonometric Functions	Guidance Lecture and Q&A	Understand the objectives of the course Preview and Review	200
2 /	Laplace Transforms (1)	Lecture and Q&A	Preview and Review lecture content and assignments	200
3 /	Laplace Transforms (2)	Lecture and Q&A	Preview and Review lecture content and assignments	200
4 /	Inverse Laplace Transforms	Lecture and Q&A	Preview and Review lecture content and assignments	200
5 /	Solving differential equations by Laplace transform	Lecture and Q&A	Preview and Review lecture content and assignments	200
6 /	Review for Quiz 1	Review	Prepare for quiz Preview and Review	200
7 /	Quiz 1	Quiz	Preview and Review	200
8 /	Quiz 1 Return Transfer Function (1)	Lecture and Q&A	Preview and Review lecture content and assignments	200
9 /	Transfer Function (2)	Lecture and Q&A	Preview and Review lecture content and assignments	200
10 /	Transfer Function (3)	Lecture and Q&A	Preview and Review lecture content and assignments	200

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content (10pt)	Method (10pt)	Assignments (10pt) (Preview and Review)	Time (Minutes)
11 /	Block Diagram (1)	Lecture and Q&A	Preview and Review lecture content and assignments	200
12 /	Block Diagram (2)	Lecture and Q&A	Preview and Review lecture content and assignments	200
13 /	Review for Quiz 2	Review	Prepare for quiz Preview and Review	200
14 /	Quiz 2	Quiz	Review	200
15 /	Quiz 2 Return Review for Final Exam	Review	Prepare for the final exam	200
16 /	Final Exam	Exam	Review all materials	
17 /	Returning Final Exam Results	Review Self-evaluation		

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門科目 選択	グローバル開発論	2	726000	後学期	講義／学修

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4年	土橋　喜人	15.306		授業時に予約

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	グローバル開発	本科目では、従来の国際協力の在り方を学ぶとともにグローバル開発の意義を考える。国際協力の在り方も多様化しており、日常生活においても、国内外での協力に携わることが多くなっている。必ずしも開発援助機関、国際機関やNGOでなくても、関わることができるような社会となっている。そのことから、本科目では、様々な関わり方が可能となっていること、それらのことについて理解を深めること、そして自ら考えて行動し、グローバル開発や国際協力に貢献できるようになることを目指す。
2	国際協力	
3	グローバルサウス	
4	貧困	
5	共助	

授業の概要および学習上の助言

（本講義は学修単位であるため、１単位を50分45回分の学習とし、50分授業15回に対して50分30回分の自学自習を行うこと。この授業ではアクティブラーニングの一環としてグループワークを行う。）

（授業の概要）　本科目では、多様化する世界情勢について目を向ける契機となるべく、国内外での協力活動について学ぶ。主には開発援助機関、国際機関、NGOが行ってきたグローバル開発についての基礎を学び、その背景を理解できるようになる講義を目指す。　学生は現代社会における、グローバル開発、共助、協力などといったものの考え方や、実際の取り組みを学び、KITのK（思いやりの心）、I（誠実）、T（共同と共想の精神）といったことの実現に向けた実際の取り組みを学び、将来的に行動できるような心構えを身に着ける。

（学習上の助言）

1）日常から世界に目を向けていくこと、国内外の社会課題に目を向けていくこと、そのようなことに関心を持ち続ける姿勢が望まれる。

2）これらの国際問題、社会課題は、KITにおける技術者として社会に出ていく際に役に立つものであり、その社会課題の解決を行うことがKIT卒業生には望まれる。

3)尚、受講人数や学習環境によっては、授業内容を適宜変更することもある。

4)グローバル開発の実務経験者／実務者による特別講義を予定（外部講師と日程調整後、一部講義内容順を変更予定）　尚、講師は、国際協力銀行および国際協力機構というODA実施機関での正規総合職員としての勤務経験があり、かつ、青年海外協力隊（現・JICA海外協力隊）も経験し、NGO/NPO法人の役員も務めており、本授業でもその経験の社会還元を図る。

【教科書および参考書・リザーブドブック】

教科書：

参考書：：開発協力白書[外務省]、世界開発報告書[世界銀行]、国際協力機構年次報告書[国際協力機構]、貧しい人を助ける理由 ： 遠くのあの子とあなたのつながり[日本評論社]

ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

履修に必要な予備知識や技能は特になし。日常より国際問題に関心を持っていることが望ましい。参考程度に一部は英語の教材を使うこともあるが、雰囲気を感じることができれば問題はない。

No.	教育目標(DP)（記号表記）	学生が達成すべき行動目標
①	b, c, d	グローバル開発がどうして必要なのかを理解し、説明できる
②	b, c, d	ODAの役割と必要性について理解し、説明できる
③	b, c, d	政府レベル（ODA）、市民社会（NGO）レベル、民間企業レベルのグローバル開発の在り方を理解し、説明できる
④	d, e, f	国際社会の変化とグローバル開発の変化の関係について説明できる
⑤	d, e, g	自分が現在や近い将来に実施可能なグローバル開発の取り組みについて計画することができる
⑥	g, h, i	グローバル開発やODAに関しての批判的な視点を持つことができる

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作　品	ポートフォリオ	その他	合　計
総合評価割合		0	0	40	30	0	26	4	100
総合力指標	知識を取り込む力	0	0	10	6	0	13	0	29
	思考・推論・創造する力	0	0	10	6	0	13	0	29
	コラボレーションとリーダーシップ	0	0	0	6	0	0	0	6
	発表・表現・伝達する力	0	0	10	6	0	0	0	16
	学習に取組む姿勢・意欲	0	0	10	6	0	0	4	20

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評価方法	行動目標		評価の実施方法と注意点
試験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①	レ	レポート（その１）：JICA海外協力隊への応募書類作成。過去に公募があったJICA海外協力隊の公募案件への応募書類を記載して応募するつもりで回答する。（30点） レポート（その２）：外部講師の特別講義に関するレポート。（10点） （注）いずれも授業内外で実施する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	
成果発表 （口頭・実技）	①	レ	グループワーク（その１）：青年海外協力隊の印象：青年海外協力隊の授業およびビデオを見ての感想をグループごとに発表する。（10点） グループワーク（その２）：SDGsの順番を並べ替え：SDGsの順番の並べ替えを、その理由も考えて、グループごとに発表する。（10点） グループワーク（その３）：貧しい人を助ける理由の講義をうけてのグループワークを通じて感じたことを発表する。（10点） （注）いずれも授業内外で実施する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	
作品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①	レ	リアクションペーパー：毎授業ごとに授業に関するまとめや所感について、100字以上にまとめる。15回中13回。1回分はレポート（その２）と内容が被るため、提出不要。1回分は最終回にあたるため提出不要。 （注）いずれも授業外で実施する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	
その他	①	レ	取り組み姿勢（4点）：外部講師の講義の理解度（１点）、３回のグループワークへの参加度合い（３点）、について、レポート（その２）および３回分のグループワーク・個人ワークの成果（発言や提出物等）から評価する。
	②	レ	
	③	レ	
	④	レ	
	⑤	レ	
	⑥	レ	

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
学際的・多角的な視点から「途上国」　「グローバルサウス」「貧困」とは何かを分析、議論できる手段と方法を理解する。その過程で貧困に立ち向かうグローバル開発の思想的背景を理解する。その上で自らが関与しうるグローバル開発のあるべき姿・これからの自分のキャリアとの関わりを具体的に語ることができる能力を身につける。	一般常識としての視点から「途上国」　「グローバルサウス」「貧困」とは何かを学ぶ。その過程で貧困に立ち向かうグローバル開発の思想的背景を学ぶ。その上で自らが関与しうるグローバル開発の取り組みやこれからの自分のキャリアとの関わりを考える。

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
1 ／	講師の紹介・ガイダンスおよび本講義への期待・希望・要望講師から本講義に関しての概要の説明を受け、学生からは要望を伝える。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
2 ／	講師を通じてみる国際協力（JOCV、IDEAS、IDPM、JBIC、JICA）講師が自らの国際協力の経験を語り、学生は身近な講師の経験を聞くことで、国際協力を身近に感じてもらう。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
3 ／	世界の国々：OECD・アジア・アフリカ・中南米・中近東世界各地の概要についての説明を受け、世界／国際社会の関心を持つようになる。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
4 ／	国際協力とは・ODAとは・日本の援助国際協力の概要、また、その中心である政府開発援助について解説をうけ、仕組みを理解する。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
5 ／	JICAの役割と機能日本における政府開発援助の主たる実施機関である国際協力機構（JICA)の役割と機能について解説を受け、仕組みを理解する。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
6 ／	JICA海外協力隊事業 JICA事業の中でも最も国民に知られたJICA海外協力隊（青年海外協力隊）についての仕組みや実績などについて解説を受けて仕組みを理解する。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
7 ／	青年海外協力隊OBの経験談：講師の場合講師が青年海外協力隊として派遣された経験についての解説を受け、青年海外協力隊を身近に感じる。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
8 ／	JICA海外協力隊：ビデオ鑑賞討論会（グループワーク）JICA海外協力隊に関して、公開されている映像を視聴して、グループワークを行い、どのような学びがあったかを確かめ合う。	講義・演習 グループワーク（その１）	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
9 ／	NGO論国際協力の中でも最も草の根で活動している国際NGOを中心に、NGOの役割と意義について学ぶ。（尚、「NGO論」の一部と重複はある）	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
10 ／	SDGs他の講義や大学の取り組みでなされているSDGsについて、改めてその背景・仕組み・詳細等を体系立てて学ぶ。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60

授業明細表

ＣＬＩＰ学習プロセスについて

一般に、授業あるいは課外での学習では：**「知識などを取り込む」→「知識などをいろいろな角度から、場合によってはチーム活動として、考え、推論し、創造する」→「修得した内容を表現、発表、伝達する」→「総合的に評価を受ける、ＧｏｏｄＷｏｒｋ！」**：のようなプロセス（一部あるいは全体）を繰り返し行いながら、応用力のある知識やスキルを身につけていくことが重要です。このような学習プロセスを大事に行動ください。
※学習課題の時間欄には、指定された学習課題に要する標準的な時間を記載してあります。学修単位科目については、各授業に応じた時間（例えば2単位科目の場合、予習・復習で200分／週）を取るよう努めてください。詳しくは教員の指導に従って下さい。

回数 日付	学習内容	授業の運営方法	学習課題(予習・復習)	時間(分)
11 ／	SDGsワークショップ（グループワーク）SDGsの17のゴールの順番を並べ替えるグループワークを行って発表する。学生はそのワークを通じて、改めてSDGsのそれぞれの意義を考える。	講義・演習 グループワーク（その２）	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
12 ／	民間企業の社会的役割民間企業による国際協力も行われていることから、その取り組みや意義、社会的背景を学ぶ。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す） レポート（その１）JICA海外協力隊レポート	60 60 60 300
13 ／	貧しい人を助ける理由とグループワーク「貧しい人を助ける理由」（参考書）の概要の講義を受けた上で、改めてなぜ貧しい人を助ける必要があるのかを考え直すグループワークを行い、発表する。	講義・演習 グループワーク（その３）	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（eシラバスの資料に目を通す）	60 60 60
14 ／	障害と開発日本などの先進国においても障害者の地位は低く、途上国では最貧層である。その実情とそれに対する可能な支援について学ぶ。	講義・演習	授業の振り返り（eシラバスの資料に目を通す） リアクションペーパー 次回の講義の予習（資料を読む） レポート（その２）：外部講師講義レポート	60 60 60 120
15 ／	本講義の振り返り（まとめ、成績開示、自己点検）本講義の学びに関する考察をする。	講義・演習	通期の授業の振り返り（eシラバスの資料に目を通す）	60

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門 選択	課題学修（専門）	2	725200	－	－　／認定

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4	－	－		

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	高度専門知識の習得	学生が専門的な資格取得を通じて、将来のキャリアに直結する実践的な知識・技術を主体的に習得することを目的とする。
2	自主的・継続的学習	
3	キャリア設計	
4	自己評価	
5		

授業の概要および学習上の助言

課題学修（専門）として認定の対象となる資格については学生便覧2026 p.94 別表１に記載されたものに限定する。
申請時には申請書に合格通知書・免状などの原本とコピーを提出し、クラス担任の確認印を受けること。
専門担当教員や指導教員に事前相談し、適切な資格を選定することを推奨する。
第3学年3月末までに課題学修の条件を満たし、第4学年4月に単位の認定を申請すること。

【教科書および参考書・リザーブドブック】
教科書：なし
参考書：各資格試験の公式テキスト・問題集
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

各資格試験の受験要件および関連する専門科目の知識

No.	教育目標(DP) (記号表記)	学生が達成すべき行動目標
①	i	取得資格に関連する専門的知識・技術を体系的に理解できる。
②	i	卒業を見据えた長期的な学修計画を自ら立て、実行できる
③	i	資格取得の経験を進路選択や将来設計に結びつけることができる
④	i	学修の成果と課題を整理し、次のステップに向けた目標を設定できる
⑤		
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	0	0	0	0	0	100	100
総合力指標	知識を取り込む力	0	0	0	0	0	0	100	100
	思考・推論・創造する力	0	0	0	0	0	0	0	0
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	0	0	0	0	0	0
	学習に取組む姿勢・意欲	0	0	0	0	0	0	0	0

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評 価 方 法	行動目標		評 価 の 実 施 方 法 と 注 意 点
試 験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①		
	②		
	③		
	④		
	⑤		
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作 品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	✓	別表に定める資格の取得（合格）をもって評価する
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
合格した資格試験の知識を実社会で応用できる。	目標の資格試験に合格する。

令和８年度　学習支援計画書

「担当教員名」欄の＊＝実務経験のある教員

授業科目区分	科　目　名	単 位	科目コード	開講時期	授 業 形 態
国際理工学科 専門 選択	課題学修（プロジェクト）	2	725300	－	－ ／認定

対象学年	担当教員名	居室	電子メールＩＤ	オフィスアワー
4	－	－		

授 業 科 目 の 学 習 教 育 目 標

キーワード		学習教育目標
1	高度専門知識の習得	学生がプロジェクト活動を通じて、将来のキャリアに直結する実践的な知識・技術を主体的に習得することを目的とする。
2	自主的・継続的学習	
3	キャリア設計	
4	自己評価	
5		

授業の概要および学習上の助言

課題学修（プロジェクト）として認定の対象となるコンテスト、地域連携活動については学生便覧2026 p.95 別表２に記載されたものに限定する。
申請時には活動の概要、参加者の役割分担、取り組み時間、成果などがわかる資料を添えて申請書を作成し、クラス担任の確認印を受けること。
第3学年3月末までに課題学修の条件を満たし、第4学年4月に単位の認定を申請すること。

【教科書および参考書・リザーブドブック】
教科書：なし
参考書：なし
ﾘｻﾞｰﾌﾞﾄﾞﾌﾞｯｸ：

履修に必要な予備知識や技能

コンテストの参加要件および関連する専門科目の知識

No.	教育目標(DP)（記号表記）	学生が達成すべき行動目標
①	i	コンテスト・プロジェクト活動に関連する専門的知識・技術を体系的に理解できる。
②	i	卒業を見据えた長期的な学修計画を自ら立て、実行できる
③	i	活動の経験を進路選択や将来設計に結びつけることができる
④	i	学修の成果と課題を整理し、次のステップに向けた目標を設定できる
⑤		
⑥		

達　成　度　評　価

評価方法 指標と評価割合		試　験	クイズ 小テスト	レポート	成果発表 口頭・実技	作 品	ポートフォリオ	その他	合 計
総合評価割合		0	0	0	0	0	0	100	100
総合力指標	知識を取り込む力	0	0	0	0	0	0	100	100
	思考・推論・創造する力	0	0	0	0	0	0	0	0
	コラボレーションとリーダーシップ	0	0	0	0	0	0	0	0
	発表・表現・伝達する力	0	0	0	0	0	0	0	0
	学習に取組む姿勢・意欲	0	0	0	0	0	0	0	0

※総合力指標で示す数値内訳は、授業運営上のおおよその目安を示したものです。

評価の要点

評 価 方 法	行動目標		評 価 の 実 施 方 法 と 注 意 点
試 験	①		
	②		
	③		
	④		
	⑤		
	⑥		
クイズ 小テスト	①		
	②		
	③		
	④		
	⑤		
	⑥		
レポート	①		
	②		
	③		
	④		
	⑤		
	⑥		
成果発表 （口頭・実技）	①		
	②		
	③		
	④		
	⑤		
	⑥		
作 品	①		
	②		
	③		
	④		
	⑤		
	⑥		
ポートフォリオ	①		
	②		
	③		
	④		
	⑤		
	⑥		
その他	①	✓	別表に定めるプロジェクトの成果をもって評価する
	②	✓	
	③	✓	
	④	✓	
	⑤		
	⑥		

具体的な達成の目安

理想的な達成レベルの目安	標準的な達成レベルの目安
プロジェクト活動を通じて得た知識・経験を実社会で応用できる。	目標の成果を得る。

2026 Syllabus

Instructor with "＊"means an instructor with company experience

Field	Course Name	Credits	Course Code	Semester	Class Style
Dept. S Specialized Required	Engineering Mathematics	4	711400	All year	Lecture Class

Target Grade	Instructor	Office	E-mail Address	Office Hours
4	HUSSIEN, Alaa	Kanazawa C 31.15		Friday 16:30-17:30

Course Objectives

	Keywords	Learning Objectives
1	Differentiation	To enable students to apply general mathematical principles and equip them with appropriate engineering mathematical skills to solve engineering problems
2	Matrices	
3	Laplace transform	
4	Integration	
5	Differential Equations	

Course Description and Expectations for Students

At the successful completion of this course, students will be able to:
1. Apply techniques of algebra to solve engineering-related problems
2. Apply matrices to solve engineering-related problems
3. Apply techniques of calculus including integration and differential equations to solve engineering-related problems.
4. The lecture style of this course is conducted through a discussion and Q&A between the teacher and students in order to get them involved in to the class. In addition, students help each other through peer learning during the work sheet solving time. These are two types of the active learning applied in the class.

Required Materials (textbooks, reference books, reserved books)
Textbooks: None:
Reference books: None
Reserved books: None

Knowledge/Skills Needed to Take This Course (Prerequisites)

Fundamental understanding of Algebra and Trigonometry

No.	Program Objectives	Target Abilities for Students
①	e	Students will be able to solve engineering problems using algebra.
②	e	Students will be able to perform basic matrix mathematics and use them for real-life applications
③	e	Students will be able to use Laplace transformations
④	e	Students will be able to solve simple math problems using differentiation.
⑤	e	Students will be able to solve simple math problems using integration.
⑥	e	Students will be able to create simple mathematical models to model engineering systems.

Evaluation Criteria

Criteria and Ratio \ Evaluation Method		Exams	Quizzes	Reports	Presentations	Works	Portfolios	Others	Total
Total Evaluation Ratio		0	60	25	0	0	15	0	100
Comprehensive Strength Criteria	Ability to capture knowledge	0	30	10	0	0	5	0	45
	Ability to think, reason and create	0	30	5	0	0	0	0	35
	Collaboration and leadership	0	0	5	0	0	0	0	5
	Announcement / Expression / Communication	0	0	0	0	0	0	0	0
	Attitude and motivation for learning	0	0	5	0	0	10	0	15

* The numerical breakdown shown by Comprehensive Strength Criteria is an approximate guideline for class management.

Evaluation Method

Evaluation Method	Target Ability		Evaluation Methods and Important Points
Exams	①		
	②		
	③		
	④		
	⑤		
	⑥		
Quizzes	①	✓	There will be four quizzes to test students 'comprehension and ability to apply techniques taught in this class. The first quiz will be in the 7th week and the second quiz will be in the 15th week. The third quiz will be in 22nd week and the fourth quiz will be in the last week of the year. Each quiz is worth 15% of the total score.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Reports	①	✓	Students will be given a worksheet every class. They will have to solve the problems and submit it by the beginning of the next class. The reports ae worth 25% of the total score The grading criteria will be based on whether or not they checked the model answer and have corrected their mistakes completely. There will be a rubric that will determine your score.
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Presentations	①		
	②		
	③		
	④		
	⑤		
	⑥		
Works	①		
	②		
	③		
	④		
	⑤		
	⑥		
Portfolios	①	✓	The portfolio aspect of the grade is meant to make sure the student is keeping up with all the daily material in a neat and organized manner. The portfolio is worth 15% of the total score. There will be a rubric that will determine your final score for your portfolio. The rubric will measure the following: 1-Notebook – Did the student take a decent amount of notes for each lecture? 5% 2-Binder – Are the papers of all sections well organized? 5% 3-Work– Did the student go back to correct mistakes in their HW/quizzes? 5%
	②	✓	
	③	✓	
	④	✓	
	⑤	✓	
	⑥	✓	
Others	①	✓	
	②		
	③		
	④		
	⑤		
	⑥		

Specific Achievement Criteria

Description of Ideal Achievement	Description of Standard Achievement
Be able to understand the mathematics topics such as differentiation and integration and use them to solve complicated real-life application	Be able to understand the mathematics topics such as differentiation and integration and use them to solve simple real-life application

Course Schedule

* In the "Time" column of the Assignments, the standard time required for the specified assignment is provided. For total-time credit courses, please take the time corresponding to each class for review and preview. (For example, in the case of a 2-credit course, please try to take 200 minutes per week.) Please follow the teacher's guidance for details.

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Minutes)
1 ~ 2 /	Differential Calculus Definition, differentiation of basic Functions.	Lecture Worksheet	Review course notes	40
3 ~ 4 /	Differential Calculus Product, quotient and chain rule. Turning points, 2nd derivative test.	Lecture Worksheet	Review course notes	40
5 ~ 6 /	Differential Calculus Optimization	Lecture Worksheet	Review course notes	40
7 ~ 8 /	Differential Calculus Parametric differentiation.	Lecture Worksheet	Review course notes	40
9 ~ 10 /	Differential Calculus Implicit differentiation.	Lecture Worksheet	Review course notes	40
11 ~ 12 /	Differential Calculus Application–radius & center of Curvature	Lecture Worksheet	Review course notes	40
13 ~ 14 /	Review lecture Qui z#1	Q&A session Quiz	Prepare for the Quiz	40
15 ~ 16 /	Integral Calculus Integration of basic functions. Linear function rule.	Lecture Worksheet	Review course notes	40
17 ~ 18 /	Integral Calculus Substitution method.	Lecture Worksheet	Review course notes	40
19 ~ 20 /	Integral Calculus Integration by parts. Trig Integrals	Lecture Worksheet	Review course notes	40
21 ~ 22 /	Integral Calculus Partial fractions.	Lecture Worksheet	Review course notes	40

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Min)
23 ~ 24 /	Integral Calculus The definite integral, areas under and between curves.	Lecture Worksheet	Review course notes	40
25 ~ 26 /	Integration Applications Lengths, areas of revolution	Lecture Worksheet	Review course notes	40
27 ~ 28 /	Integration Applications Volumes & centroids	Lecture Worksheet	Review course notes Study for the exam	100
29 / 30	Review lecture Quiz #2	Q&A session Quiz	Study for the quiz	100
31 ~ 32 /	Linear Algebra Systems of equations two-variables and several - variables-Gaussian elimination	Lecture Worksheet	Review course notes	40
33 ~ 34 /	Linear Algebra Matrix definitions REF and RREF methods	Lecture Worksheet	Review course notes	40
35 ~ 36 /	Linear Algebra Matrix Algebra Matrix Inverse	Lecture Worksheet	Review course notes	40
37 ~ 38 /	Linear Algebra Determinants Cramer Rule	Lecture Worksheet	Review course notes	40
39 ~ 40 /	Linear Algebra Matrices Engineering Applications	Lecture Worksheet	Review course notes	40
41 ~ 42 /	Linear Algebra Matrices Engineering Applications	Lecture Worksheet	Review course notes	40
43 ~ 44 /	Review lecture Quiz #3	Q&A session Quiz	Prepare for the Quiz	40

Class No. Date	Class Content	Method	Assignments (Preview and Review)	Time (Min)
45 ~ 46 /	Laplace transform-definition Laplace transform of basic functions	Lecture Worksheet	Review course notes	40
47 ~ 48 /	Inverse Laplace transform Engineering Applications	Lecture Worksheet	Review course notes	40
49 ~ 50 /	Differential Equations Introduction. Direct differential equations, separable and Homogeneous DE's.	Lecture Worksheet	Review course notes	40
51 ~ 52 /	Differential Equations 1st order linear DE's Differential Equations 2^{nd} order linear DE's	Lecture Worksheet	Review course notes	40
53 ~ 54 /	Differential Equations Engineering Applications	Lecture Worksheet	Review course notes	40
55 ~ 56 /	Differential Equations Engineering Applications	Lecture Worksheet	Review course notes	40
57 ~ 58	Introduction to Fourier series	Lecture Worksheet	Review course notes	100
59 ~ 60	Review Quiz #4	Q&A session Quiz	Study for the quiz	100