# Introduction to Advanced Sciences and Technologies

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### 1. Course Description

Teachers who are also the most experience researchers will introduce a conference style of the latest knowledge and technologies of various special fields focusing on information engineering and electronic engineering from the basic principles to concrete applications.

Furthermore, you will take lectures for understanding and introspecting the general ability of each student, introduction of the three courses in our department, and proceeding to graduate schools in order to give you the hints about their future direction

This course corresponds to DP1, DP4C, DP4M, and DP4E.

### 2. Course Objectives

According to DP1, DP4C, DP4M, and DP4E, students will increase their interest in sciences and technologies.

Students will understand the advanced knowledge of the sciences and technologies, and their applications.

Students will deliberate their own future directions.

Students will seize an opportunity to decide their focusing fields to study in the university individually.

### 3. Grading Policy

In case that you are qualified according to the guide of courses, 60 points will be given if you pass the final report.

If you pass the final report, maximum pooints up to 40 points will be added according to examinations or reports from teachers.

According to the guide of courses, the students within top 10% will be graded as S-grade.

Regardless of the above evaluations, those who attend less than 10 lectures of all 15 lectures will be considered fail.

There is no reexamination for this course.

The students should visit the teachers and have directions for the advanced contents.

There are feedbacks through LMS, etc. as needed.

### 4. Textbook and Reference

Textbook

No need of textbooks or reference books.

Teacher will distribute individual documents through LMS.

### 5. Requirements(Assignments)

For the preparations, students must study them for about 1.0 hour according to instruction of each class shown in LMS.

For the reviews, students must study them for about 2.0 hours according to instruction of each class shown during class or in LMS.

Teachers will give a report or instruct summarizing the related books or papers etc.

During student's spare time, students should read newspaper articles or watch TV programming related to each class.

If there are interesting themes in this course, students should read the related books etc. to deepen their knowledge.

After the 8th class, please make a summary and save it electronically about the methods and significance to proceed to graduate schools as below.

·Types of graduate schools.

·Methods to proceed to graduate schools.

·Studying contents and requirements for the completion.

·The difference between college graduates and graduate-school graduates, and the career paths for graduate-school graduates.

### 6. Note

Students should make efforts to obtain the attitude and skills to listen to technical conferences.

The class order in the syllabus may be changed without prior notice such as a bulletin board notice.

### 7. Schedule

[1]     Guidance for this class (Class teachers for the first grade) and a research of the teacher in charge: Guidance for this class will be given first and a research of the teacher in charge will be introduced later. Psychological distances and social isolation: Experiencing web applications to observe human relations will make you deeply consider how a person comprehends the relations between himself and others. (T. Shionome)

[2]     PROG test: You will take PROG test to understand your own general ability at this stage. (Class teachers for the first grade)

[3]     Speech information processing: Existing technologies for speech information processing such as speech recognition and speech synthesis and the present trend of this field with state-of-the-art research will be introduced. (T. Nagata)

[4]    Numerical simulation for thermal fluid engineering: Parallel computing and visualization for calculation results etc. about numerical simulation for thermal air current including analysis examples for fire safety by computers will be introduced. (S. Nishiki)

[5]    Robotics technology: Robots are active in industries, medical treatment, welfare, life, etc. Their history and state-of-the-art technology for the modern robots will be introduced. (Y. Fukushima)

[6]    Analysis and modelling of behavior: There is a wide variety of problems in human society. Here, by paying attention to and modelling human behavior, the theories and procedures to decide the most suitable plan to maximize the future possibilities will be explained. (M. Masaka)

[7]    Technology for optoelectronics: Various optoelectronics technologies are applied from life to advanced technology. Their principles, technologies, and the industrial viewpoints will be introduced. (K. Muro)

[8]    What you study in the electronics course 1: The overview of lectures for robotics and the results of the students' education and research will be explained. Furthermore, the major employment places will be introduced. (Y. Hasuda)

[9]    What you study in the electronics course 2, the methods and significance for proceeding to graduate schools, and introduction of research for biomedical engineering and boundary regions: What you will study in the electronic course will be reviewed and the methods and significance for proceeding to graduate schools will be also explained. Later, biomedical engineering and boundary regions that concern medical science, biology, and engineering will be explained. (M. Ogawa)

[10]    What you study in the information media course: seminars and lectures in the information media course will be explained. Furthermore, the creation methods and examples of three-dimensional computer graphics (3DCG) as materials of multimedia contents. (S. Sasaki)

[11]    Let's be a systems engineer through studying in the information science course: A systems engineer (SE) plans, develops, and operates information systems. You will understand what the information systems is and how they are useful to us. (H. Watanabe)

[12]    Workshop for activity targets: You will introspect your own general ability at this stage and how to develop it through the results of PROG test etc. (Members of workshop to educate the general ability)

[13]    Human computer interaction and information science: Mutual relation between people and computers from prior art to state-of-the-art research with a focus on user interfaces. (K. Mizutani)

[14]    Recognition informatics: For recognition informatics, which is developing considerably in recent years, the theoretical overview to make computers understand images, speech, and documents and its research trend will be introduced. (K. Hamada)

[15]    A research of the teacher in charge and guidance for graduate schools.
Intelligent information processing: Overviewing intelligent systems and robots will make the limitation of classical artificial intelligence understood, and the state-of-the-art research and the future perspective will be explained. (K. Yamane)
Furthermore, guidance for graduate schools and the conclusion to prepare the final report will be given. (Class teachers for the first grade)