Elective Course Description (1. Fall Semester)

Subject (English)	Basic Computer Science		Semester	Fall	Day/Slot	
科目名 (日本語)	情報科学基礎					
Course Code		Course Numbering	TMA-MEE206		Period	Oct. – Feb.
Instructor (Post)	Assoc. Prof. Takehiro ITO Assoc. Prof. Takeshi OBAYASHI Assoc. Prof. Hiroki NISHIYAMA Assoc. Prof. Zubair Md. FADLULLAH				Campus	
					Building	
Faculty	Department of Electrical, Information and Physics Engineering		Credits	2	Class Room	

Class subject	Basic Computer Science

Object and summary of class

This course provides a quick overview of four research fields of computer science to bridge fundamental theories of computer science with the cutting-edge research in our department. The course consists of four parts (given by four professors): algorithm theory, bioinformatics, communication network, and cyber security.

Keywords	algorithm theory, bioinformatics, communication network, cyber security

Goal of study

Students will come to understand the association between the fundamental knowledge about computer science and the research activities. The emphasis will be on giving a broad overview of the research areas in computer science.

Contents and progress schedule of class

■ Algorithm Theory (Associate Professor Takehiro ITO)

Algorithms now play a very important role for the reliability and efficiency in several social systems. In this part, we focus on design and analysis of algorithms from the viewpoint of theoretical computer science. The main topics are as follows:
  - What is algorithm?
  - Power of "efficient" algorithms
  - How to evaluate algorithms
  - Basic techniques for algorithms

■ Bioinformatics (Associate Professor Takeshi OBAYASHI)

Living organism is a sophisticated system to decide appropriate outputs in fluctuating environment. In this part, we focus on the biological system to deeply understand general property of intelligent systems. The main topics are as follows:
  - Encode and decode biosystems
  - Gene network
  - Genetic diversity and adaptive evolution
  - Research approaches using biological big data

■ Communication Network (Associate Professor Hiroki NISHIYAMA)

Communication network infrastructure needs to be resilient to natural disasters. In this part, we focus on the information and communication technology for disaster response and recovery. The main topics are as follows:
  - Basic technologies for communication networks
  - Disaster resilient and recovery network
  - Wireless mesh network
  - Device to Device (D2D) network

■ Cyber Security (Associate Professor Zubair Md. FADLULLAH)

Cyber security aims to protect sensitive information stored in computers and/or exchanged over networks (including the Internet) from malicious access and tampering. In this part, we focus on computer and network security concepts and practices. The main topics are as follows:
  - Preliminaries of cyber security.
  - Computer network security.
  - Web security.
  - Applications of security, bitcoin, blockchain.

Preparation	Nothing special
Record and evaluation method	Attendance to the lectures, reports, etc. Details will be announced by each professor.
Textbook and references	Textbook and references will be introduced by each professor.
Self study	Nothing special
In addition	