

Elective Course Description (2. Spring Semester)

Subject (English)	Fundamentals of Information Science I		Semester	Spring* Quarter Subject	Day/Slot	
科目名 (日本語)	情報科学基礎 I					
Course Code		Course Numbering	TMA-MEE320		Period	Apr. – Jun. (Quarter)
Instructor (Post)	Prof. Hiroaki Kobayashi				Campus	
					Building	
Faculty	Department of Mechanical and Aerospace Engineering		Credits	2	Class Room	
Class subject	As the learning goal, students have acquired the knowledge of circuit design and organization of modern computer systems.					
Object and summary of class						
<p>After the quick review of computer systems development in the history, the course gives the mathematical foundation for computer system design. Based on the mathematical foundation, the design methodology of basic circuits such as combinational circuits and sequential circuits is given. And then, the course describes how a computer system is constructed by using several basic combinational and sequential circuits, and discusses its functionality to carry out arithmetic and logic operations. In addition, the format of a machine language to direct operations to the computer system and its interpretation to generate control signals will be presented.</p>						
Keywords	-					
Goal of study						
<p>In this course, students should be able to:</p> <ol style="list-style-type: none"> (1) know the concept of today's computers based on the history of computers development, (2) learn data representation for computers and the mathematical foundation of computer arithmetic, and (3) understand the concrete structure and functionality of modern computer systems through their basic components of arithmetic unit, memory and control unit as building blocks in terms of hardware and software. 						
Contents and progress schedule of class						
<ol style="list-style-type: none"> 1. Course Introduction, and History and Fundamentals of Computers 2. Number Representation: Binary Digit (Part I) 3. Number Representation: Binary Digit (Part II) 4. Boolean Algebra (Part I) 5. Boolean Algebra (Part II) 6. Combinational Logic and it Applications (Part I) 7. Combinational Logic and it Applications (Part II) 8. Sequential Logic: Basics (Part I) 9. Sequential Logic: Basics (Part II) 10. Sequential Logic: Applications (Part I) 11. Site Visit to Supercomputer Center of Tohoku University 12. Sequential Logic: Applications (Part II) 13. Organization of Computer Systems 14. Control Mechanism of Computer Systems 15. Final Examination 						
Preparation	-					
Record and evaluation method	Students will be evaluated based on: class attendance, homework assignments, reports and the final exam.					
Textbook and references	David A Patterson and John L. Hennessy, Computer Organization & Design: The Hardware/Software Interface, Morgan Kaufmann, November, 2011.					
Self study	-					
In addition	<p>Students are strongly recommended to take</p> <ol style="list-style-type: none"> 1) The Basics of Information Sciences and 2) Computer Software Engineering 					