

Akashi College		Year	2022	Course Title	Application of Electronics
Course Information					
Course Code	4528		Course Category	Specialized / Elective	
Class Format	Lecture		Credits	School Credit: 1	
Department	Electrical and Computer Engineering Computer Engineering Course		Student Grade	5th	
Term	First Semester		Classes per Week	2	
Textbook and/or Teaching Materials					
Instructor	ENOMOTO Ryuji				
Course Objectives					
(1) Understand the typical kinds of clinical tests (laboratory tests) and their purpose and significance. (2) Understand blood cell analysis methods, in particular the principle and characteristics of flow cytometers. (3) Understand the measurement principles and characteristics of spectroscopic detection technologies used in testing of coagulation, biochemistry, and immunity, etc. (4) Understand typical clinical testing equipment systems and component technologies.					
Rubric					
	Ideal Level		Standard Level		Unacceptable Level
Achievement 1	Accurately understand the typical kinds of clinical tests (laboratory tests) and their purpose and significance.		Understand the typical kinds of clinical tests (laboratory tests) and their purpose and significance.		Do not understand the typical kinds of clinical tests (laboratory tests) and their purpose and significance.
Achievement 2	Accurately understand blood cell analysis methods, in particular the principle and characteristics of flow cytometers		Understand blood cell analysis methods, in particular the principle and characteristics of flow cytometers		Do not understand blood cell analysis methods, in particular the principle and characteristics of flow cytometers
Achievement 3	Accurately understand the measurement principles and characteristics of spectroscopic detection technologies used in testing of coagulation, biochemistry, and immunity, etc.		Understand the measurement principles and characteristics of spectroscopic detection technologies used in testing of coagulation, biochemistry, and immunity, etc.		Do not understand the measurement principles and characteristics of spectroscopic detection technologies used in testing of coagulation, biochemistry, and immunity, etc.
	Accurately understand typical clinical testing equipment systems and component technologies.		Understand typical clinical testing equipment systems and component technologies.		Do not understand typical clinical testing equipment systems and component technologies.
Assigned Department Objectives					
Teaching Method					
Outline	Clinical testing is essential for the diagnoses and treatment in today's medicine. As modern medicine advances, technological innovation and further development are progressing. This class will explain the outlines of laboratory tests for analysis of blood, urine, etc., and the basics of the measurement technologies, etc. applied to these tests. It will also cover the basic principles of measurement in the fields of biochemical, immunological, genetic measurement, etc., and the optical, electronic, fluid, chemical, and molecular biological technologies and measuring instruments used for these measurements. In addition, students will deepen their knowledge of disease and health management through this class.				
Style	The goal is to understand genetic testing and bioinformatics, and the class will be taught in a lecture style from week 1 to week 15. Liaison: Kazunari Inoue				
Notice	Knowledge of biology is preferred. Students who miss 1/3 or more of classes will not be eligible for a passing grade.				
Characteristics of Class / Division in Learning					
☐ Active Learning		☐ Aided by ICT		☐ Applicable to Remote Class	☐ Instructor Professionally Experienced
Course Plan					
			Theme	Goals	
1st Semester	1st Quarter	1st	Introduction to clinical testing (1)	Understand the role and type of testing in health management, diagnosis, and treatment, as well as the overall outline of clinical testing. Understand how to interpret inspection results and control accuracy.	
		2nd	Introduction to clinical testing (2)	Same as above	
		3rd	Biochemical testing (1)	Understand the significance of the items in biochemical testing and the method of testing, and the outline of biochemical testing technologies. Understand the outline of biochemical testing equipment and the principles of measurement and spectroscopy applied to the equipment.	
		4th	Biochemical testing (2)	Same as above	

		5th	Hematology testing (1)	Understand an overview of testing technologies for blood cells and coagulation testing technologies. Understand the hydrodynamics and engineering technologies used in flow cytometers used in cell analysis such as red blood cells and white blood cells.
		6th	Hematology Testing (2)	Same as above
		7th	General examination (urine, and feces)	Understand an overview of urinary qualitative testing, urinary sediment testing technologies and their measuring equipment. Also understand the outline of fecal occult blood testing.
		8th	Midterm exam	
	2nd Quarter	9th	Company tour	By visiting a company that develops and produces clinical testing equipment and reagents, and by seeing the activities of a company involved in actual testing equipment and clinical testing, the students can deepen their understanding of clinical testing.
		10th	Immunology Testing (1)	Understand the overview of immunological testing technologies. Understand the general description of chemiluminescent immunoassay measuring devices and the principles of measurement and detection technologies that are applied to them.
		11th	Immunology Testing (2)	Same as above
		12th	Genetic Testing (1)	Understand an overview of genetic testing technologies. Understand the outline of PCR instruments, sequencers and other genetic test instruments, and the measurement principles and detection technologies applied to them.
		13th	Genetic Testing (2)	Same as above
		14th	Microbiology Testing	Understand the outline of microbiology testing technologies. Understand the test equipment used for microbiology testing and the measurement principles and detection technologies applied to it.
		15th	Topics for clinical tests	Understand recent topics in clinical testing. Can review all of previous lectures.
		16th	Final exam	Final exam
Evaluation Method and Weight (%)				
	Examination		Presentation	Total
Subtotal	80		20	100
Basic Proficiency	0		0	0
Specialized Proficiency	80		20	100
Cross Area Proficiency	0		0	0