

Tsuyama College		Year	2021		Course Title	Image Processing
Course Information						
Course Code	0035		Course Category	Specialized / Elective		
Class Format	Lecture		Credits	Academic Credit: 2		
Department	Advanced Electronics and Information System Engineering Course		Student Grade	Adv. 2nd		
Term	First Semester		Classes per Week	2		
Textbook and/or Teaching Materials	Textbooks : Nothing, Reference : Resources on the Internet, such as related books					
Instructor	YABUKI Noboru					
Course Objectives						
Learning purposes : To understand the concept of image processing and image processing methods for practical use of image processing technology. In addition, to understand how to configure an image processing system and to learn how to configure the system.						
Course Objectives : To understand the field of image processing that has not been covered in other subject areas. 1. To be able to understand and explain image processing methods. 2. To understand how to configure image processing systems. 3. To deepen the understanding through exercises, research presentations and assignment reports.						
Rubric						
	Excellent	Good	Acceptable	Not acceptable		
Achievement 1	To be able to explain in detail the methods of image processing, including applications.	To be able to explain the basic methods of image processing in detail.	To be able to explain the basic methods of image processing (presentation).	Cannot explain the methods of image processing.		
Achievement 2	To be able to construct an image processing system in detail and explain it fully.	To be able to construct an image processing system in detail.	To be able to explain the basic configuration of an image processing system (examination).	Cannot explain the configuration of an image processing system.		
Achievement 3	Be able to serve as a role model for other students in research presentations and assignment report writing.	To be able to make sufficient research presentations and reports.	Be able to make a presentation and write a report.	Cannot make a presentation or write a report.		
Assigned Department Objectives						
Teaching Method						
Outline	General or Specialized : Specialized Field of learning : Information / Control Foundational academic disciplines : Engineering / Electrical and Electronic Engineering / Instrumentation Engineering Relationship with Educational Objectives : This class is equivalent to "(2) Knowledge in the following specialized technical fields can be applied to mechanical and system design, manufacture, and operations. Specialized technical fields pertaining to electrical/electronic engineering, and information/control systems." Relationship with JABEE programs : The main goal of learning / education in this class are "(A)... A-2...", incidentally also involved in "A-3". Course outline : With the development of computers, image processing technology has come to be used in all fields of industry. In this course, students will learn the concept of image processing and image processing methods for using image processing technology, and check the actual processing results. In addition, students will be explained how to construct an image processing system by using examples.					
Style	Course method : The basic information of image processing will be explained first, and then the students will present their research on various image processing methods. In other words, the students are asked to report the results of their investigations and examples of the class contents, and the missing items are explained. In addition, students are required to learn the configuration of the image processing system as extra time to deepen their understanding. Grade evaluation method : Examination(60%)+Research presentation (20%)+ assignment report, etc. (20%) ・ Examination allow notebooks to be brought in. ・ For those who have less than 60 points in each regular test, supplementary lessons will be given, and if the understanding can be confirmed by the retest, the points may be changed. However, the evaluation after the change shall not exceed 60 points. List of Research presentation Sampling theorem, density transform, histogram, spatial filtering, smoothing, edge extraction, Histogram, Spatial Filtering, Smoothing, Edge Extraction, Fourier Transform, Frequency Filtering, Binarization, Binary Image Processing, Line Detection, Color Image, Pattern Recognition, Video Image Processing, Image Coding, etc. Lessons Learned in Extra Time * Research on the class contents and prepare presentation materials * Configuration of image processing systems and preparation of assignment reports Content of the report Objectives Flow of the image processing system Summary (Prograss report of the system configuration will be given during the lecture.)					

Notice	Precautions on the enrollment : For network program choosers, students must take this class (no more than one-third of the required number of class hours missed) in order to complete the 5th year course. This is a class that requires study outside of class hours. A total of 45 hours of study is required per credit, including both class time and study outside class time. Follow the instructions of the instructor regarding study outside of class hours. Course advice : As a preparatory study, students should research the applications of using images. Foundational subjects : Differential and Integral I , II (2nd,3th), Applied Mathematics I , II (E4th,C4th), Digital Signal Processing(C5th) Related subjects : Digital Signal Processing(EC-2nd), etc. Attendance advice : There is a certification examination related to image processing (Image Processing Engineer Certification Examination), and it would be a good idea to challenge this examination. Students who have not taken imaging courses in this course should actively seek advice from their instructors if they have any questions about research methods or content. Check for late arrivals in quarters of class time. Late arrivals of 25 minutes or more are treated as one absence. Students are required to submit a report on their overtime study after all lectures.
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Characteristics of Class / Division in Learning

☐ Active Learning	☐ Aided by ICT	☒ Applicable to Remote Class	☐ Instructor Professionally Experienced
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E l e c t i v e S u b j e c t s

Course Plan

			Theme	Goals
1st Semester	1st Quarter	1st	Guidance, overview and history of image processing	Understand the overview of image processing
		2nd	Basics of digital images, Application fields of image processing, Examples of image processing applications	Be able to explain the basics of image processing
		3rd	Basics of image processing systems	To understand the basics of image processing systems
		4th	To be able to explain the structure of input/output devices (digital cameras, etc.)	To be able to explain the structure of input/output devices
		5th	Presentation of assignment	Presentation of assignment Questions and answers
		6th	Presentation of assignment	Presentation of assignment Questions and answers
		7th	Presentation of assignment	Presentation of assignment Questions and answers
		8th	Presentation of assignment	Presentation of assignment Questions and answers
	2nd Quarter	9th	Presentation of assignment	Presentation of assignment Questions and answers
		10th	Presentation of assignment	Presentation of assignment Questions and answers
		11th	Presentation of assignment	Presentation of assignment Questions and answers
		12th	Presentation of assignment	Presentation of assignment Questions and answers
		13th	Configuration of image processing system	Preparation of the concept of image processing system configuration
		14th	Creation of algorithms for image processing system	Completion of creation of algorithms for the image processing system
		15th	Summary of image processing and final exam of the previous semester	Confirmation of summary of image processing so far and the final exam
		16th	(Final exam of the first semester)	(Later, return and check the answer sheets of the final exam)

Evaluation Method and Weight (%)

	Examination	Presentation	Assignment	Total
Subtotal	60	20	20	100
Basic Proficiency	0	0	0	0
Specialized Proficiency	60	20	20	100
Cross Area Proficiency	0	0	0	0