

Tsuyama College		Year	2021	Course Title	Modern Mathematics
Course Information					
Course Code	0157		Course Category	Specialized / Compulsory	
Class Format	Lecture		Credits	Academic Credit: 2	
Department	Department of Integrated Science and Technology Advanced Science Program		Student Grade	5th	
Term	First Semester		Classes per Week	2	
Textbook and/or Teaching Materials					
Instructor	MATSUDA Osamu				
Course Objectives					
Acquire basic knowledge about Bayesian statistics and stochastic processes. 1 To understand the basic idea of Bayesian statistics. 2 To understand the basic idea of stochastic processes.					
Rubric					
	Excellent	Good	Acceptable	Unacceptable	
Achievement 1	A good understanding of the basic idea of Bayesian statistics.	Understand about 70% of the basic idea of Bayesian statistics.	Understand about 60% of the basic ideas of Bayesian statistics.	Not understand about 60% of the basic ideas of Bayesian statistics.	
Achievement 2	A good understanding of the basic idea of stochastic processes.	Understand about 70% of the basic idea of stochastic processes.	Understand about 60% of the basic ideas of stochastic processes.	Not understand about 60% of the basic ideas of stochastic processes.	
Assigned Department Objectives					
Teaching Method					
Outline	General or Specialized : Specialized Field of learning : Mathematics / Physics (Specialized Subjects) Required, Elective, etc. : Elective must complete subjects Foundational academic disciplines : Mathematical science / Mathematics / Basic analysis Relationship with Educational Objectives : This class is equivalent to "(3) Acquire foundation knowledge of the major subject area". Relationship with Educational Objectives : The main goals of learning / education in this class are "(A) , A-1. " Course outline : Explain the basic theory of Bayesian statistics and stochastic processes.				
Style	Course method : In addition to lectures, practice in group discussions to learn the basics of algebra. Grade evaluation method: Two regular examinations (50%) and the exercise reports (50%). In addition, depending on the grade, an additional report may be imposed.				
Notice					
Characteristics of Class / Division in Learning					
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input type="checkbox"/> Applicable to Remote Class	
				<input type="checkbox"/> Instructor Professionally Experienced	
Must complete subjects					
Course Plan					
			Theme	Goals	
1st Semester	1st Quarter	1st	What is a hypothesis test?	Understand the difference between Bayesian statistics and frequency theory tests	
		2nd	Basic hypothesis testing of Bayesian statistics	Learn the basics of basic hypothesis testing	
		3rd	Hypothesis test based on Bayesian statistics frequency theory	Learn the posterior odds ratio and the hypothesis test using it	
		4th	Bayes factor	Understand Bayes factor and learn hypothesis testing using it	
		5th	Bayesian statistics hypothesis test in pointless hypothesis	Learn the test when the null hypothesis is a point	
		6th	Problems and summary in the hypothesis test of Bayesian statistics	Understand the problems of Bayesian statistics	
		7th	First term midterm exam		
		8th	Binomial process	Learn the probability calculation of the binomial process	
	2nd Quarter	9th	Poisson process	Learn the probability calculation of Poisson process	
		10th	Markov chain	Understanding Markov Chains and State Probabilities	
		11th	Markov chain	Understanding Markov Chains and State Probabilities	
		12th	Brownian motion	Understanding Brownian motion as a stochastic process	
		13th	Stochastic differential equation	Learn how to solve basic stochastic differential equations	

		14th	Chaos and stochastic differential equations	Understand stochastic differential equations for chaos
		15th	Last term exam	Answers and explanations for the final exam
		16th		

Evaluation Method and Weight (%)							
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	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	50	0	0	0	0	50	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	50	0	0	0	0	50	100
Cross Area Proficiency	0	0	0	0	0	0	0