Toyama College	Year	2022	Course Title	Mathematical Analysis Ⅱ

Course Information

Course Code	0072	Course Category	General / Elective
Class Format	Lecture	Credits	School Credit: 2
Department	Department of Electronics and Computer Engineering	Student Grade	3rd
Term	Second Semester	Classes per Week	4
Textbook and/or Teaching Materials			
Instructor	Sakurai Hideto		

Course Objectives

At the completion of this course, students will be able to
1) understand and carry out fundamental calculations on extreme values in two variable functions correctly.
2) understand and carry out fundamental calculations on double integrals correctly.
3) understand and carry out fundamental calculations on first order differential equations correctly.

Rubric

	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Clearly understands, and is able to carry out fundamental calculations on extreme values in two variable functions.	Ability to understand and carry out fundamental calculations on extreme values in two variable functions.	Does not display understanding and is unable to carry out fundamental calculations on extreme values in two variable functions.
Evaluation 2	Clearly understands, and is able to carry out fundamental calculations on a double integral by writing it as an iterated integral.	Ability to understand and carry out fundamental calculations on a double integral by writing it as an iterated integral.	Does not display understanding and is unable to carry out fundamental calculations on a double integral by writing it as an iterated integral.
Evaluation 3	Clearly understands, and is able to carry out fundamental calculations on changing the order of integration in double integrals.	Ability to understand and carry out fundamental calculations on changing the order of integration in double integrals.	Does not display understanding and is unable to carry out fundamental calculations on changing the order of integration in double integrals.
Evaluation 4	Clearly understands, and is able to carry out fundamental calculations on first order differential equations.	Ability to understand and carry out fundamental calculations on first order differential equations.	Does not display understanding and is unable to carry out fundamental calculations on first order differential equations.

Assigned Department Objectives

MCCコア科目
ディプロマポリシー 3

Teaching Method

Outline	In this course, students will learn about the basic analysis, specifically: extreme values in two variable functions, double integrals, and first order differential equations. And, students will make basics calculations of them.
Style	Lectures and exercises
Notice	This course uses mathematics learned in previous years. The recognition of credit requires 60 points or more rating.

Characteristics of Class / Division in Learning

☐ Active Learning	☑ Aided by ICT	☑ Applicable to Remote Class	☐ Instructor Professionally Experienced

Course Plan

			Theme	Goals
2nd Semester	3rd Quarter	1st	Guidance Extreme values in two variable functions	Guidance: Discuss the goals and structure of this course. Learn how to find extreme values in two variable functions.
		2nd	Implicit function and implicit differentiation	Learn the definition and basic property of the implicit functions and implicit differentiation.
		3rd	Conditional extrema	Learn how to find conditional extrema in two variable functions.
		4th	Double integrals	Learn the definition and basic property of the double integral.
		5th	Iterated integrals -1-	Learn how to compute a double integral over a rectangular region by writing it as an iterated integral.
		6th	Iterated integrals -2-	Learn how to compute a double integral over a general region by writing it as an iterated integral.
		7th	Changing the order of integration	Learn how to chang the order of integration in double integrals.
		8th	Midterm exam	Midterm examination.
	4th Quarter	9th	Change of variables -1-	Can calculate double integrals using change of variables.

		10th	Change of variables -2-	Can calculate the double integrals in the polar coordinate system.
		11th	Application of double integrals -1-	Learn the definition of improper integrals and will be able to calculate that of a given function.
		12th	Application of double integrals -2-	Students can calculate the volume of a solid and the centroid by using double integrals.
		13th	Differential equation -1-	Learn the meaning of differential equations and initial conditions. Can solve differential equations of variable separation type.
		14th	Differential equation -2-	Can solve a first-order linear differential equation.
		15th	Final exam	Final examination.
		16th	Summary	Summarize the study content and confirm grades.

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	70	0	0	0	30	0	100
Basic Ability	70	0	0	0	30	0	100
Technical Ability	0	0	0	0	0	0	0
Interdisciplinary Ability	0	0	0	0	0	0	0