

都立国際高校 年間授業計画/Tokyo Metropolitan Kokusai High School Course Syllabus

科目基礎情報/Course information							
開講年度/Academic year	令和4年度/2022年度						
開講学科/Department	国際学科国際バカロレアコース/IBDP(International Baccalaureate Diploma Programme)						
教科/Subject	Mathematics						
科目/Course Title	Mathematics: Applications and Interpretation, Higher Level						
学年・クラス/Year・Class	DP1						
単位数/credits	6						
科目概要情報/Course description							
講座概要/Course description	This course recognizes the increasing role that mathematics and technology play in a diverse range of fields in a data-rich world. As such, it emphasizes the meaning of mathematics in context by focusing on topics that are often used as applications or in mathematical modelling. To give this understanding a firm base, this course also includes topics that are traditionally part of a pre-university mathematics course such as calculus and statistics.						
到達目標/Course objectives	Enjoy seeing mathematics used in real-world contexts and to solve real-world problems. Have good algebraic skills and experience of solving real-world problems. Get pleasure and satisfaction when exploring challenging problems and comfortable to undertake this exploration using technology.						
評価方法と評価基準/Evaluation method and criteria	1. Knowledge and Understanding 2. Problem-solving 3. Communication and Interpretation 4. Technology 5. Reasoning 6. Inquiry Approaches						
教科書/Textbooks	Mathematics: Applications and Interpretation, Higher Level, Pearson Education Limited						
校外学習/Field trip							
授業計画/Course schedule							
	指導項目/Topic	指導内容/Contents	評価の方法・基準/Evaluation method and criteria	予定時数/Allocated hours			
1学期/1st semester	4月	Exponentials and Logarithms	Students will be able to understand and state the different properties of both exponential and logarithmic expressions and solve equations using these properties.	Homeworks, Quizzes, Take-Home Assignments, Examinations	7		
		Approximation, percentage errors	Students will be able to choose an appropriate degree of accuracy and calculate measurements errors.		2		
		Systems of linear equations	Students will be able to use technology to solve systems of linear equations.		2		
	5月	Sequences and Series	Students will understand the difference between an arithmetic and geometric sequence (and series) and, after comparing the two, apply the appropriate formulae to each. Students will solve a range of questions including applications to real events both algebraically and through the use of graphical display calculators (GDCs).		9		
		Complex Numbers	Students will understand the meaning of the complex numbers in different forms. They will be able to perform calculations with numbers consisting of real and imaginary parts. Students will learn how to convert between different forms by hand and technology.		9		
		Matrices	Students will understand operations with matrices and model and solve real-life problems.		6		
2学期/2nd semester	6月	Functions and their Graphs	Students will distinguish different types of functions and draw appropriate graphs both by hand and using a GDC. Students will compare and contrast different types of functions and verify results. Students will model real-life problems using different functions.	Homeworks, Quizzes, Take-Home Assignments, Examinations	24		
		Functions and their Graphs	Students will model real-life problems using different functions.		9		
	9月	Trigonometric Functions	Students will understand the concept of radians as an alternative measurement to degrees and link this to prior knowledge to solve questions in radians. Students will understand graphs of trigonometric functions and solve trigonometric equations.		Homeworks, Quizzes, Take-Home Assignments, Examinations	21	
		Voronoi Diagrams	Students will understand the concept of Voronoi diagrams and solve problems with applications in geography, economics.			4	
	10月	Vectors	Students will learn about vectors in two and three dimensions. Students will learn vector equation of a line and solve problems with lines. Students will learn vector applications to kinematics.			Homeworks, Quizzes, Take-Home Assignments, Examinations	13
		Graph Theory	Students will understand the concept of graphs, how to use matrices to solve problems with graphs. They will learn a range of algorithms in graphs, allowing to find a shortest route.				12
11月	Differential Calculus	Students will understand the concept of limits, they will compare and contrast a range of functions to determine which differentiation rules should be used. Students will apply the different differentiation techniques to find the key points in a graph and then draw an appropriate function graph either by hand or with the use of a GDC.	Homeworks, Quizzes, Take-Home Assignments, Examinations	17			
	Integral Calculus	Students will understand integration as the opposite process of differentiation and calculate integrals by hand and using technology. Students will learn how to find areas and volumes of revolution using integration and solve kinematics problems.		14			
12月	Basic Statistics	Students will confirm their knowledge and understanding of statistics and apply this knowledge to calculate various examination style questions, both with and without a GDC.		Homeworks, Quizzes, Take-Home Assignments, Examinations	8		
	Basic Probability	Students will be able to state the laws of probability and deduce the probability of certain events based on the information provided.			5		
3学期/3rd semester	1月	Statistical Distributions			Students will solve a range of real world applications involving probability density functions and distributions using a GDS. They will use hypothesis testing to check their predictions.	Homeworks, Quizzes, Take-Home Assignments, Examinations	22
		Bivariate statistics			Students will learn about correlation of bivariate data and find equations of regressions lines for prediction purposes.		7
	2月	Markov Chains	Students will understand the concept of Markov chains and how to use matrices to solve problems using Markov chains.		Homeworks, Quizzes, Take-Home Assignments, Examinations		5
		Hypotheses testing	Students will learn about hypothesis testing and will use it to check their predictions.				6
	3月	Review	Students will review materials learned and prepare for the Year-end examination.	Homeworks, Quizzes, Take-Home Assignments, Examinations			32