

	Course name: MATH 323 Combinatorics		Department: Mathematics				Semester
	Methods of Education						5
	Lecture	Recitation/ (Etud)	Lab	Homework/Quiz	Exams	Other	Total
42	0	0	12	42	84	180	6
Language	English						
Compulsory/Elective	Elective						
Prerequisites	None						
Course Contents	Week	Subjects					
	1	<ul style="list-style-type: none"> ▪ Basic counting principles. ▪ Permutations, circular permutations, combinations. 					
	2	<ul style="list-style-type: none"> ▪ Injection and bijection principles. ▪ Arrangements and selections with repetitions. ▪ Distribution problems. 					
	3	<ul style="list-style-type: none"> ▪ Binomial theorem. ▪ Combinatorial identities. 					
	4	<ul style="list-style-type: none"> ▪ Shortest routes in a grid. ▪ Properties of binomial coefficients. 					
	5	<ul style="list-style-type: none"> ▪ The pigeon hole principle and examples. 					
	6	<ul style="list-style-type: none"> ▪ Ramsey type problems and Ramsey numbers. ▪ Bounds for Ramsey numbers. 					
	7	<ul style="list-style-type: none"> ▪ The principle of inclusion and exclusion. 					
	8	<ul style="list-style-type: none"> ▪ Stirling numbers. 					
	9	<ul style="list-style-type: none"> ▪ Ordinary generating functions, partitions of integers. 					
	10	<ul style="list-style-type: none"> ▪ Exponential generating functions. 					
	11	<ul style="list-style-type: none"> ▪ Recurrence relation models. ▪ Catalan numbers. 					
	12	<ul style="list-style-type: none"> ▪ Tiling and coloring. 					
	13	<ul style="list-style-type: none"> ▪ Invariance principle. 					
	14	<ul style="list-style-type: none"> ▪ Problems involving games. 					
15	<ul style="list-style-type: none"> ▪ Review 						
Course Objectives	<p>The purpose of this course is</p> <ul style="list-style-type: none"> • to give fundamental combinatorial tools, • to teach basic techniques and methods used in combinatorics. 						
Learning Outcomes and Competences	<p>Upon completion of this course students will</p> <ul style="list-style-type: none"> • have a basic background on enumerative combinatorics, • be able to apply basic principles in combinatorics to solve problems. 						
Textbook and /or References	<ol style="list-style-type: none"> 1) Chen, C. C. and Koh, K. M., <i>Principles and Techniques in Combinatorics</i>, World Scientific. 2) Tucker, A., <i>Applied Combinatorics</i>, 6th edition Wiley. 3) Koh, K. H. and Chen, C. C., <i>Principles and Techniques in Combinatorics</i>, 3rd edition World Scientific. 						

		If any, mark as (X)	Percentage (%)
Assessment Criteria	Midterm Exams	X	30
	Quizzes	X	20
	Homework		
	Projects		
	Term Paper		
	Laboratory work		
	Other		
	Final Exam	X	50
Instructors			