

Department of Mathematics

Faculty of Science

MATH 738 (206738)

Combinatorics

3(3-0-6)

Prerequisite

Consent of the instructor

Course Description

Preliminaries. General counting methods for arrangements and selections. Generating Functions. Recurrence relations. The principle of inclusion and exclusion. The Polya Theory of Counting. Ramsay Number.

Course Objectives

To let the students know about general counting methods for arrangements and selections, generating functions. To find some formulas in the form of recurrence relations. To learn how to count by using the principle of inclusion and exclusion. To find the number of patterns by using Polya Theory of Counting. To learn how to find some Ramsey Numbers.

Course Contents

No. of Lecture Hours

1. Preliminaries	5
1.1 Set theory and logic	
1.2 Mathematical induction	
1.3 Probability	
1.4 The Pigeonhole Principle	
2. General counting methods for arrangements and selections and selections	8
2.1 Basic counting principle	
2.2 Simple arrangements and selections	
2.3 Arrangements and selections with repetition	
2.4 Distributions	
2.5 Binomial coefficients	
2.6 Generating permutations and combinations	
3. Recurrence relations	7
3.1 Recurrence relation models	
3.2 Solution of linear recurrence relations	
3.3 Solution of inhomogeneous recurrence relations	
3.4 Solution with generating functions	

Course Contents	No. of Lecture Hours
4. The principle of inclusion and exclusion	7
4.1 Counting with venn diagrams	
4.2 Inclusion-exclusion formula	
4.3 Rook polynomials	
5. The Polya Theory of counting	9
5.1 Equivalence and symmetry groups	
5.2 Burnside's lemma	
5.3 The cycle index	
5.4 Polya' formula	
6. Ramsey Numbers	9
6.1 Introduction to Graph theory	
6.2 Ramsey' Theorem	
6.3 The Ramsey Numbers	
6.4 Bounds of Ramsey numbers	
	Total 45 hours

คำอธิบายภาษาไทยในเล่มหลักสูตร

บทนำเกี่ยวกับความรู้เบื้องต้น วิธีการนับทั่วไปของจำนวนวิธีของการจัด และการเลือกฟังก์ชันเจนเนอเรติง ความสัมพันธ์รีเคอร์เรนซ์ หลักการของอินคลูชันและเอกซ์คลูชัน ทฤษฎีการนับของพอลยา จำนวนรวมเชย์