



**INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout (Part-II)**

Date: 01-08-2016

In addition to Part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **MATH F441**
Course Title : **Discrete Mathematical Structures**
Instructor-in-charge : **A. Michael Alphonse**

1.Scope and Objective of the course:

The objective is to present and discuss some of the methods of discrete mathematics and some discrete mathematical structures at graduate level. The first part deals with some functions and techniques of discrete nature used in design and analysis of algorithms and the second part deals with Combinatorial Structures and algorithm. (Since there is a separate course offered on Graph theory, graphical structures are not discussed in detail in this course)

2. Text Books:

- 1) *Lindsay Childs*, A Concrete Introduction to Higher Algebra-2e, Springer-Verlag, 1979.
- 2) *V. Krishnamurthy*, Combinatorics, Theory and Applications, East-West Press, 1985.

Reference Books:

- (1) *Graham, Ronald and others*, **Concrete Mathematics**, Addison-Wesley, 1990.
- (2) *R. Lide and H. Niederreiter*, **Introduction to finite fields & their applications**, Cambridge University Press, 1986.

3. Course Plan: (Sections/Articles refer to Text-Book)

Lect No.	Learning Objectives	Topic	Chapters	Book
1-4	Introduction to Groups	Definition and examples of groups. Z_n and Permutation group S_n ,	9-E, 11-A,B 8-A,B 2 (Part-IV)	T-1 T-1 T-2
5-8	Introduction to the number theory	Euler's ϕ function, Euler's theorem and Möbius function μ , The Legendre symbol	9-C 30-E 27-B	T-1 T-1 T-1
9-12	The Chinese remainder theorem (CRT)	CRT for integers CRT for polynomials Application of CRT to fast polynomial multiplication	12-A,C 20 21-B	T-1



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13-16	Introduction to the theory of finite fields.	Construction of finite fields and simple field extension	28-A,B 30-C	T-1
17-24	Introduction to the coding theory	Secret Codes, Error correcting codes and Reed-Solomon codes	7-F, 10-B, 13-E, 13-F, 29-B,C	T-1
25-27	Factoring in $\mathbb{Q}[x]$	Eisenstein's criteria for Irreducibility	18	T-1
29-30	Factoring in $\mathbb{Z}_p[x]$	Berelekamp's algorithm	22-A, 30-B	T-1
31-34	Introduction to advanced method of computing	Generating functions and Recurrence relations	2 (Part-I)	T-2
35-37		Polya's theory of enumeration	3 (Part-II)	T-2
38-42	Introduction to Design	Block design Latin square and Hadamard matrix	Part-VIII 29-A Part-VIII	T-2 T-1 T-2

4. Evaluation Scheme:

EC No.	Evaluation Component	Weightage (in %)	Date & Time	Nature of Component
1.	Test 1	20	10/9, 10.00--11 AM	Closed Book
2.	Test 2	20	22/10, 10.00--11 AM	Open Book
3.	Take Home Assignment	20	Details will be announced in the class	Open Bok
4	Comprehensive Examination	40	09/12 AN	Closed Book

5. Make-up: Make-up will be given only in genuine cases.

6. Chamber consultation hour: To be announced in the class.

7. Notices: All notices regarding MATH F441 will be put up on CMS website only.

**Instructor-In-Charge
MATH F441**

