BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus

INSTRUCTION DIVISION
SECOND SEMESTER 2017-2018
Course Handout (Part-II)

Date: 06/01/ 2018

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 : TRILOK MATHUR

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

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.**

3. 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.**

4. 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. $\mathbf{Z}_n$ 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 Mobiöus 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
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
25-26	Factoring in Q[x]	Eisenstein's criteria for Irreducibility	18	T-1
27-29	Factoring in $Z_p[x]$	Berelekamp's algorithm	22-A, 30-B	T-1
30-32	Introduction to advanced method of computing	Generating functions and Recurrence relations	2 (Part-I)	T-2
33-35		Polya's theory of enumeration	3 (Part-II)	T-2
36-40	Introduction to Design	Block design Latin square and Hadamard matrix	Part-VIII 29-A Part-VIII	T-2 T-1 T-2

5. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage (in %)	Date & Time	Nature of Component
1.	Mid-Term Test	90 Min.	30	8/3 2:00 - 3:30 PM	Close Book
2.	Comprehensive Exam.	3 Hrs.	50	9/5 FN	Partially Open Book
3.	Class performance test*	20 Min.	20		

(*) *Classroom performance tests will be conducted in lecture sessions. Total **3** such tests will be conducted and **best 2** will be considered for final evaluation.* ***No makeup for classroom performance test will be given in any circumstances*****.**

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

7. Chamber consultation hour: To be announce in lecture.

8. Notices: All notices regarding MATH F441/MATH C441 will be put on Department of Mathematics Notice Board and on NALANDA website.

Instructor-In-Charge
MATH F441