

# Elliptic Curve Cryptography

DISSERTATION

INTEGRATED MASTERS OF SCIENCE  
In  
APPLIED MATHEMATICS

Submitted by

*Harsh Kumar Chourasia*

supervised by

Dr. Ram Krishna Panday



DEPARTMENT OF MATHEMATICS  
INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE  
DEPARTMENT OF MATHEMATICS  
ROORKEE-247667

## Declaration

# Abstract

## Acknowledgments

I would like to thank my supervisor, Ram Krishna Panday, Department of Mathematics, Indian Institute of Technology Roorkee for his guidance through each stage of the process.

# Contents

Declaration . . . . .	i
Abstract . . . . .	ii
Acknowledgments . . . . .	iii
<b>1 Introduction to Cryptography</b>	<b>2</b>
1.1 Introduction . . . . .	2
<b>2 Discrete Logarithms and Diffie–Hellman</b>	<b>3</b>
2.1 Discrete Logarithms and Diffie–Hellman . . . . .	3
<b>3 Elliptic Curves and Cryptography</b>	<b>4</b>
3.1 Elliptic Curves . . . . .	4
3.2 Elliptic Curves over Finite Field . . . . .	4
3.3 The elliptic curve discrete logarithm problem . . . . .	4
3.4 Elliptic curve cryptography . . . . .	4



# Chapter 1

## Introduction to Cryptography

### 1.1 Introduction

Intorduction

## Chapter 2

# Discrete Logarithms and Diffie–Hellman

### 2.1 Discrete Logarithms and Diffie–Hellman

chapter 2



## Chapter 3

# Elliptic Curves and Cryptography

3.1 Elliptic Curves

3.2 Elliptic Curves over Finite Field

3.3 The elliptic curve discrete logarithm  
problem

3.4 Elliptic curve cryptography