COURSE PLAN

Department :	MATHEMATICS		
Course Name & code :	Elementary Number Theory	**MAT 2137**	
Semester & branch :	III SEMESTER	Mathematics and Computing	
Name of the faculty :	**Dr Vadiraja Bhatta G. R.**		

No of contact hours/week:

L	T	P	C
2	1	0	3

COURSE OUTCOMES (COS)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks	Program Outcomes (POs)	PSO	BL (Recommended)
CO1	Construct models for solving problems using basic concepts of number theory.	10	8			1, 2
CO2	Apply the fundamentals of number theory to solve advanced number theoretic problems.	6	10			1, 3, 4
CO3	Evaluate number theoretic functions applicable for factoring large integers.	8	12			2,3,4,5
CO4	Analyse cryptographically significant concepts using number theory.	5	10			4, 5
CO5	Apply the number theoretic concepts, methods and functions to cryptogrphy.	**7**	10			3, 4
	Total	**36**	**50**			

*** COURSE LEARNING OUTCOMES (CLOS)

At the end of this course, the student should be able to:		No. of Contact Hours	Marks	Program Outcomes(POs)	Learning Outcomes (LOs)	BL (Recommended)
CLO1	Construct models for solving problems using basic concepts of number theory.	10	8			1, 2
CLO2	Apply the fundamentals of number theory to solve advanced number theoretic problems.	6	10			1, 3, 4
CLO3	Evaluate number theoretic functions applicable for factoring large integers.	8	12			2,3,4,5
CLO4	Analyse cryptographically significant concepts using number theory.	5	10			4, 5
CLO5	Apply the number theoretic concepts, methods and functions to cryptogrphy.	**7**	10			3, 4
	Total	**36**	**50**			

***** Applicable to programs applied for IET accreditation only.**

Assessment Plan

IN – SEMESTER ASSESSMENTS

S. No.	Assessment Mode		Assessment Method	Time Duration	Marks	Weightage	Typology of Questions (Recommended)	Schedule	**Topics Covered
1	**MISAC**	**1**	**Assignment 1**	**15 days**	**5**	10 MCQs × ½ = 5	Bloom's taxonomy (BT) level of the question should be L3 and above.		L1—L10
		2	**Assignment 2**	**15 days**	**5**	2 STQ× 2½= 5	Bloom's taxonomy (BT) level of the question should be L3 and above.		L11—L20
		3	**Mid-semester Exam**	**60 Mins**	**30**	**Objective:** 5M 10 MCQs × ½ = 5 marks **Descriptive:** 25 Marks (3 Questions of 2 marks + 5 Questions of 3 marks+ 1 question of 4 Marks)	Bloom's taxonomy (B) level of the question should be L3 and above.		L1 – L15
		4	**Assignment 3**	**15 days**	**5**	10 MCQs × ½ = 5	Bloom's taxonomy (BT) level of the question should be L3 and above.		L21—L26
		5	**Assignment 4**	**15 days**	**5**	2 STQ× 2½= 5	Bloom's taxonomy (BT) level of the question should be L3 and above.		L27—L34
END – SEMESTER ASSESSMENT									

1	**Regular/Make–Up Exam**	180 Mins	50	Answer all 5 full questions of 10 marks each. Each question can have 3 parts of 2/3/4/5/6 marks.	Bloom's taxonomy (BT) level of the question should be L3 and above.	17th week of the semester	Comprehensive examination covering full syllabus.

***** Individual faculty will be entering the topics***

****** Individual faculty must identify the assessment method from table 3 and fill in the details.***

NOTE: Information provided in the table is as per the In-semester assessment plan and schedule of V and VII semester B. Tech provided from Academic Section.

LESSON PLAN

L No	TOPICS	Course Outcome Addressed
1	Divisibility- properties of divisibility	1
2	Division Algorithm – related problems	1
3	The Greatest Common Divisor	1
4	Euclidean Algorithm- Finding GCD	1
5	Guassian Integers – GCD of Gaussian Integers.	1
6	Primes as a Sum of Two squares.	1
7	The Theory of Congrences - Examples	1
8	Basic properties of Congruencs	1
9	Linear Congrences and Chinese Remainder Theorem	1
10	Problems on Chinese Remainder Theorem	1
11	The Diophantine Equation	2
12	Solution of Diophantine equations.	2
13	Prime numbers and their distributions	2
14	Fundamental Theorem of Arithmetic	2
15	Some more problems on prime numbers	2
16	Wilson's Theorem and Problems	2
17	Fermat's Little Theorem and problems	3
18	Euler's Phi-function and properies	3
19	Properties of Euler's phi-function	3
20	Euler's Theorem and problems on Euler's theorem	3
21	Some more problems on Euler's phi- function	3
22	Number Theoretic functions	3
23	Greatest Integer Function and Application	3
24	Problems on Greatest Integer Function	3
25	Quadratic Reciprocity – Introduction	4
26	Euler's Criterion	4
27	Legendre symbol and properties of Legendre symbol	4
28	Evaluation of Legendre Symbols	4
29	Problems on law of quadratic reciprocity	4
30	Square root mod p	4
31	Factoring Large Integers.	4
32	Crypography- Introduction.	5
33	Basic cryptosystems- problems	5
34	Problems on Basic cryposystems	5
35	Discrete log problem	5
36	The Knapsack problem and Knapsack Cryptosystem	5

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3						1				1			
CO2	3	3						1				1			
CO3	2	3						1				1			
CO4	2	2						1				1			
CO5	2	1						1				1			
Articulation Level	2.4	2.4						1				1			

FACULTY MEMBER TEACHING THE COURSE: Dr Vadiraja Bhatta G. R.

References:

1. David M. Burton- Elementary Number Theory, 6th Edition, Tata Mc Graw Hill, 2007
2. Neal Koblitz - A Course in Number Theory and Cryptography, Springer, second Edition.
3. Neville Robbins- Beginning Number Theory, Narosa Publishing House, 2007.
4. Tom M. Appostal- Introduction to Analytic Number Theory, Springer, 1976

Submitted by: Dr. Vadiraja Bhatta G R

(Signature of the faculty)

Date: 21.7.2025

Approved by: Dr Kuncham Syam Prasad.

(Signature of HOD)