University of Kerala

Descipline	Mathematics				
Course Code	UK1DSCMAT107				
Course Title	Relations, Functions and Number theory				
Type of Course	DSC				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical	Total Hours per week
	4	4	-	-	4
Pre-requisites	Sets				
Course Summary	Sets, relations, functions and basics of number theory				

Detailed Syllabus

Module	Unit	Contents	Hrs
I		**Relations and Functions I**	**12**
	1	Set operations, Relations, Types of relations, Some operations on relations, Composition of relations, Properties of relations, Equivalence classes, Partition of a set, Partitioning of a set induced by an equivalence relation These topics can be found in Chapter 5 of Text [2].	
II		**Relations and Functions II**	**12**
	2	Representation of relations by graphs, HASSE diagrams for partial orderings, Terminology related to posets, Definitions, Lattices: Definition and Examples, Properties of lattices (without proof). These topics can be found in Chapter 5 of Text [2].	

Module	Unit	Contents	Hrs
III		**The fundamental theorem of arithmetic**	**12**
	3	Mathematical induction, binomial theorem, The division algorithm, the greatest common divisor, the Euclidean algorithm, The fundamental theorem of arithmetic. Chapter 1:Sections 1.1, 1.2, Chapter 2:Sections 2.2, 2.3, 2.4, Chapter 3: Section 3.1 of Text [1]) (Exclude all proof).	
IV		**Congruences**	**12**
	4	Basic properties of congruences, binary and decimal representation of integers, Fermat's theorem, Wilson's Theorem (Avoid proofs of theorems). The sum and number of divisors. Chapter 4: Sections 4.2, 4.3, Chapter 5:Sections 5.2, 5.3, Chapter 6 : Section 6.1 of Text [1]).	
V		**Suggestions for teacher designed module**	**12**
	5	Basic concepts and notations, Ordered pairs and Cartesian product, Principle of Duality, Proof of Euclidean algorithm, Proof of Fermat's theorem and Wilson's Theorem. Chapter 5 of Text [2], Chapter 2 : Section 2.4, Chapter 5 : Sections 5.2, 5.3.	

Textbooks

1. David M. Burton, *Elementary Number Theory*, 7th Edition, McGraw Hill, 2011.
2. T. Veerarajan, *Discrete Matematics with Graph Theory and Combinatorics*, Tata McGraw Hill, 2007.

References

1. G A Jones, J M Jones, *Elementary Number Theory*, Springer, 1998.
2. C L Liu, D P Mohapatra, *Elements of Discrete Mathematics, A Computer oriented approach*, Tata McGraw-Hill, 2008.
3. Rajendra Akerkar, Rupali Akerkar, *Discrete Mathematics*, Perason Education, 2007.
4. R M Somasundaram, *Discrete Mathematical Structures*, Prentice Hall of India, 2003.
5. Thomas Koshy, *Elementary Number Theory with Applications*, 2nd Edition, Academic Press, 2007.

Course Outcomes

CO No.	Upon completion of the course the graduate will be able to	PO/PSO	Cognitive Level	Knowledge Category	Lecture(L) Tutorial (T)	Practical (P)
CO 1	Understand the concept of set theory	PSO 1, PO2, 6	R, U	F,C	L	
CO 2	Analyze real world problems	PSO 1, 2, PO1, 2, 3, 4, 5, 6	Ap, An	P	L	
CO 3	Examine integrated approach to number theory	PSO 1, 3, PO1, 2, 6	U	F, C	L	
CO 4	Apply the concept of congruences	PSO 2, 3, 4, PO1, 2, 5, 6	Ap, An	P	L	

(R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create)
(F-Factual, C-Conceptual, P-Procedural, M-Metacognitive)

Mapping of CO with PSOs and POs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	-	-	-	-	-	-	1	-	-	-	1	-	-
CO2	2	2	-	-	-	-	2	2	1	1	2	1	-	-
CO3	3	-	2	-	-	-	1	1	-	-	-	1	-	-
CO4	-	2	3	2	-	-	1	2	-	-	1	1	-	-

(- -Nill, 1-Slightly/Low, 2-Moderate/Medium, 3-Substantial/High)