Department of Computer Applications
National Institute of Technology Tiruchirappalli

1.Course Outline			
Course Title	Mathematical Foundations of Computer Science		
Course Code	CAMI10		
Department	CA	**No. of Credits**	3
Pre-requisites Course Code	NIL	**Faculty Name**	Mrs. K. Bakiya
Course Co-ordinator			
E-mail	bakiya@nitt.edu	**Telephone No.**	0431-2503730
Course Type	Minor Course		
Course Material available at	https://docs.google.com/file/d/0B8pig2KdTaOBNkk1dHBqaUY3b1U/view		

2. Course Overview

The Course deals with Set theory, Mathematical Logics, Groups, Rings and Fields which emphasizes the computer applications also. Basic Number theory gives clear roadmap on congruence and Modular Exponentiation. Graph Theory delineates Spanning Trees, Euler circuits and Hamiltonian graphs.

3. Course Objectives

- To acquire skills in solving mathematical and logical problems.
- To comprehend mathematical principles and logic.
- To understand fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science

4. Course Outcomes (CO)

- Apply the concepts of discrete mathematics in the modeling and design of computational problems.

5. Course Outcome (CO)	Aligned Programme Outcome (PO)		
	PO-1	PO-2	PO-3
Ability to comprehend the basics Principles and Logic	S	M	B
Ability to design the computational Problems	S	B	S
Ability to design/Model the logic for a given computer based application	S	B	S

S = 0.6 M = 0.4 B = 0.0

6. Course Teaching and Learning Activities

Week	Class	Topics covered	Mode of Delivery
1.	Class-I	Set Theory: Sets and operations	Chalk and Talk
	Class-II	properties - power set - methods of proof	Chalk and Talk
	Class - III	Tutorial on Set theory	Chalk and Talk
2.	Class-I	relations -types of relations	Chalk and Talk
	Class-II	Types of Relations (Tutorial)	Chalk and Talk
	Class - III	functions – types of functions	Chalk and Talk
3.	Class-I	properties of functions (Tutorial)	Chalk and Talk
	Class-II	Mathematical Logic: Propositions	Chalk and Talk
	Class - III	logical operators	Chalk and Talk
4.	Class-I	Equivalences and implications	Chalk and Talk
	Class-II	Connectives	Chalk and Talk
	Class - III	PCNF	Chalk and Talk
5.	Class-I	DCNF	Chalk and Talk
	Class-II	Groups, Rings and Fields: Introduction-	Chalk and Talk
	Class - III	Algebraic Structures	Chalk and Talk

Week	Class	Topics covered	Mode of Delivery
6.	Class-I	Groups- Abelian Group,	Chalk and Talk
	Class-II	Order- Cyclic Group	Chalk and Talk
	Class - III	Rings- Fields	Chalk and Talk
7.	Class-I	Basic Number Theory : Basic Notions- Prime Number Theorem	Chalk and Talk
	Class-II	GCD- Euclidean algorithm, Solving $ax + by = d$,	Chalk and Talk
	Class - III	Congruence- The Chinese Remainder Theorem- Modular Exponentiation	Chalk and Talk
8.	Class-I	Fermat and Euler- Primitive Roots-	Chalk and Talk
	Class-II	Inverting Matrices Mod n- Square Roots Mod n.	Chalk and Talk
	Class - III	Tutorial on Groups, Rings and Fields	Chalk and Talk
9.	Class-I	Graph Theory: Definitions and basic results	PPT, Chalk and Talk
	Class-II	Representation of a - Trees - Cycles - Properties - Paths and connectedness	PPT, Chalk and Talk
	Class - III	Sub graphs - Graph Isomorphism - Operations on graphs	PPT, Chalk and Talk
10.	Class-I	Cut sets - Spanning Trees	PPT, Chalk and Talk
	Class-II	Euler circuits- Hamiltonian graphs	PPT, Chalk and Talk
	Class - III	Tutorial on Graph Theory	PPT, Chalk and Talk

The assessment in Theory component has periodical cycle tests, Assignments and end semester examination whose details are given in Table 7. The assessment in the course will be done for a total of 100 marks. The final marks will be computed for a total of 100 based on which the grades will be assigned.

7. Course Assessment Methods				
Sl. No.	**Mode of Assessment**	**Week/Date**	**Duration**	**Weightage(%)**
1.	Cycle Test – 1	4^{th} week	60 Mins	20
2.	Cycle Test – 2	8^{th} week	60 Mins	20
3.	Assignments	5^{th} week,9^{th} week		10
4.	End Semester Exam	-	180 Mins	50
			Total	100

8. Essential Readings (Textbooks, Reference books, Websites, Journals, etc.)

Reference Books

1. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", 7th Edition, McGraw-Hill, 2012.
2. Mahima Ranjan Adhikari and Avishek Adhikari, "Basic Modern Algebra with Applications", Springer, 2014.
3. Kolman, Busby and Ross, "Discrete Mathematical Structures", 6th Edition, PHI, 2009.

9. Course Exit Survey (mention the ways by which the feedback about the course is assessed and indicate the attainment level)

- The students through the class rep may give their feedback at any time to the course Faculty which will be duly addressed.
- The students may also give their feedback during Class Committee meeting.
- The COs will be computed after arriving at the final marks.

10. Course Policy (including plagiarism, academic honesty, attendance, etc.)

- **Plagiarism**
  The students are expected to come out with their original algorithm design and code for problems given during the class work, home work, and tests/examinations. If found to copy from internet/other students, zero marks will be assigned.
- **Attendance**
  65% is a must. However, relaxation upto 15% will be given for leave on emergency requirements (medical, death, etc.) and representing institute events.
- **Academic Honesty**
  (i) Possession of any electronic device, if any, found during the test or exam, the student will be debarred for 3 years from appearing for the exam and this will be printed in the Grade statement/Transcript.
  (ii) Tampering of MIS records, if any, found, then the results of the student will be with held and the student will not be allowed to appear for the Placement interviews conducted by the Office of Training & Placement, besides (i).

11. Additional Course Information

- The students can get their doubts clarified at any time with their faculty member with prior appointment.

For Senate's Consideration

Dr. (Mrs.) S. SANGEETHA	Mrs K. BAKIYA	Dr.S.R.BALASUNDARAM
Class Committee Chairperson	Course Faculty	HoD