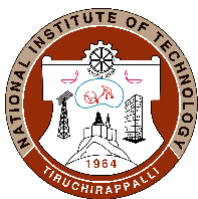


# NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE PLAN – PART I			
<b>Course Title</b>	Mathematical Concepts of Computer Science		
<b>Course Code</b>	CS601	<b>No. of Credits</b>	03
<b>Course Code of Pre-requisite subject(s)</b>	None		
<b>Session</b>	July 2022	<b>Section (if, applicable)</b>	
<b>Name of Faculty</b>	Dr. Kunwar Singh	<b>Department</b>	CSE
<b>Email</b>	kunwar@nitt.edu	<b>Telephone No.</b>	0431 – 2503212
<b>Course Type</b>	<input checked="" type="checkbox"/> <b>Core course</b>	<input type="checkbox"/> <b>Elective course</b>	
<b>Syllabus (approved in BoS)</b>			
<p>Unit I Functional Logic: Proposition Logic, Resolution Proof system, Predicate logic. Congruences, Fermat's theorem, Euler function, Chinese remainder theorem.</p> <p>Unit II Groups, homomorphism theorems, cosets and normal subgroups, Lagrange's theorem, Ring. Field. Linear algebra: Vector Space, Basis, Matrices and Linear Transformations, Eigen values, Orthogonality.</p> <p>Unit III Counting, Probability, Discrete random variable, Continuous random variable, Moment generating function, Markov's inequality, Chebyshev's inequality, The geometric and binomial distributions, The tail of the binomial distribution.</p> <p>Unit IV Graphs, Euler tours, planar graphs, Hamiltonian graphs, Euler's formula</p> <p>Unit V Applications of Kuratowski's theorem, graph colouring, chromatic polynomials, trees, weighted trees, the max-flow min-cut theorem.</p> <p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Donald F. Stanat and David F. McAllister, Discrete mathematics in Computer Science.</li> <li>2. Thomas Koshy, Elementary number theory with Applications, Elsevier</li> <li>3. I.N. Herstein, Topics in Algebra. JOHN Wiley &amp; SONS. 1990.</li> <li>4. Sheldon M. Ross, Introduction to Probability Models, Elsevier.</li> <li>5. H. Cormen, C. E. Leiserson, R. L. Rivest, C Stein, Introduction to Algorithms, Prentice Hall India.</li> <li>6. Douglas B. West, Introduction to Graph Theory, Prentice Hall of India.</li> <li>7. Linear Algebra 2nd Edition (Paperback) by Kenneth Hoffman, Ray Kunze, PHI Learning, 2009.</li> </ol>			



<b>COURSE OBJECTIVES</b>	
1. To gain the ability to use some of the fundamental methods of logic, number theory, algebra, combinatorics, probability and graph theory in Computer Science.	
<b>COURSE OUTCOMES (CO)</b>	
<b>Course Outcomes</b>	<b>Aligned Programme Outcomes (PO)</b>
1. Be able to comprehend the fundamental methods of logic, number theory and algebra.	<b>PO1, PO4</b>
2. Be able to comprehend the fundamental methods of combinatorics, probability and graph theory. Use basic combinatorics in graph theory and to obtain probabilities.	<b>PO1, PO4</b>
3. Be conversant with the Mathematical Rigor that is necessary for computer science and be able to come up with rigorous arguments.	<b>PO1, PO4</b>

<b>COURSE PLAN – PART II</b>			
<b>COURSE OVERVIEW</b>			
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>			
<b>S.No.</b>	<b>Week/Contact Hours</b>	<b>Topic</b>	<b>Mode of Delivery</b>
1	1/3	Functional Logic: Proposition Logic, Resolution Proof system	Chalk & Talk
2	2/3	Predicate logic. Congruences, Fermat's theorem, Euler function,	Chalk & Talk
3	3/3	Chinese remainder theorem, Groups, homomorphism theorems, cosets and normal subgroups,	Chalk & Talk
4	4/3	Lagrange's theorem, Ring. Field. Linear algebra	Chalk & Talk
5	5/3	Vector Space, Basis, Matrices and Linear Transformations	Chalk & Talk
6	6/3	Eigen values, Orthogonality	Chalk & Talk



7	7/3	Combinatorics, Permutation, Combinations	Chalk & Talk
8	8/3	Catlan Number, Samire secret sharing	Chalk & Talk
9	9/3	Counting, Probability, Discrete random variable	Chalk & Talk
10	10/3	Continuous random variable, Moment generating function, Markov's inequality, Chebyshev's inequality	Chalk & Talk
11	11/3	The geometric and binomial distributions, The tail of the binomial distribution.	Chalk & Talk
12	12/3	Graphs, Euler tours, planar graphs, Hamiltonian graphs, Euler's formula, applications of Kuratowski's theorem,	Chalk & Talk
13	13/3	graph colouring, chromatic polynomials, trees, weighted trees,	Chalk & Talk

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test I	5 <sup>th</sup> week	1 hour	20
2	Cycle Test II	10 <sup>th</sup> week	1 hour	20
3	Assignment 1 Assignment 2 Assignment 3 Assignment 4	4 <sup>th</sup> week of September 1 <sup>st</sup> week of October 4 <sup>th</sup> week of October 2 <sup>nd</sup> week of November		10
CPA	Compensation Assessment*	As per academic schedule		20
4	Final Assessment *	As per academic schedule		50

**COURSE EXIT SURVEY** (mention the ways in which the feedback about the course shall be assessed)

Feedbacks are collected before final examination through MIS or any other standard format followed by the institute.



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**COURSE POLICY** (including compensation assessment to be specified)

The Students those have missed the cycle test 1 or cycle test 2 on medical or OD can appear for COMPENSATION ASSESSMENT (Retest) after showing the medical certificate or OD letter signed by competent authority. Portion for the retest will be portions of cycle test 1 and cycle test 2.

**MODE OF CORRESPONDENCE** (email/ phone etc)

Email : kunwar@nitt.edu

**ATTENDANCE POLICY** (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

**ACADEMIC DISHONESTY & PLAGIARISM**

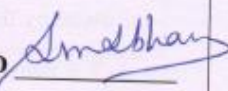
- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

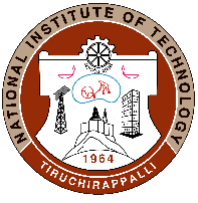
**ADDITIONAL INFORMATION, IF ANY**

**FOR APPROVAL**

  
Course Faculty \_\_\_\_\_

  
CC-Chairperson \_\_\_\_\_

  
HOD \_\_\_\_\_



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