



Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari College of Computer Application
Semester-1 (BCA)

Subject: Basic Mathematics - BCAXX11201

Type of course: Multidisciplinary

Prerequisite: Set theory, Basic algebraic operation and Matrix, Graph theory etc.

Rationale: These basic concepts of sets, logic functions and graph theory are applied to Boolean algebra and logic networks, while the advanced concepts of functions and algebraic structures are applied to finite state machines and coding theory.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	SEE		CCE		
			Theory		Practical	MSE	LWA	ALA	
4	0	0	4	100	00	30	00	70	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE -Semester End Evaluation; MSE- Mid Semester Examination; V – Viva; CCE - Continuous And Comprehensive Evaluation; ALA- Active Learning Activities.

Note

4 Credits * 25 Marks = 100 Marks (each credit carries 25 Marks)

SEE 100 Marks will be converted in to 50 Marks

CCE 100 Marks will be converted in to 50 Marks

It is compulsory to pass in each individual component.

Continuous Assessment:

(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No.	Active Learning Activities	Marks
1	Model making : Model making upon any formula of mathematics like Pythagoras, any Quadratic equation, Sum, Multiplication etc. Photo/Video must be uploaded on Moodle.	10
2	Quiz: Unit wise MCQ test will be conducted on Moodle. Per unit maximum 10 Questions will be allocated to the students.	10



3	Assignments: Two assignments will be given by faculty. Students have to write assignment and upload on Moodle. (total 5 Questions per assignment).	10
4	Chart: Chart upon application of any topic of syllabus must be prepared by the students and upload to the Moodle.	10
5	Test of Formulas: Students have to list out formulas with example used in given chapter and upload it to Moodle.(Minimum 10 formulas).	10
6	Attendance	10
7	Student's choice activity relevant to course.	10
Total		70

Course Content:

Sr. No	Course content	Hrs	Weightage (%)
1	<p><u>Set and Relation</u> Chapter – 1: Set Concept of sets, Representation of sets, Power Set, Subset, superset, Operations on set, Venn diagrams, Algebra of Set, DE ‘Morgan’s Law and examples.</p> <p>Chapter – 2: Relation Definition, Binary Relation, Representation, Domain & Range, Universal Relation, Void Relation, Union, Intersection, Properties of Binary Relations in a Set: Reflexive, Symmetric, Transitive, Relation Matrix and Graph of a Relation.</p>	12	25%
2	<p>Chapter – 3: Matrix and Algebra operation Definition and types of matrices, Addition and multiplication of matrices, Transpose and adjoint of a matrix, inverse of a 2×2 matrix, Elementary operations, Definition and properties of determinants, Minors, cofactors, and applications of determinants.</p>	11	25%



3	Chapter – 4: Mathematical Logic and Reasoning Propositions, logical operations, and truth tables, Implication, Converse, inverse, Contra-positive, Tautology and Contradiction.	10	25%
4	Chapter – 5: Graph Theory Introduction to Graph, Graph Definition-Vertices, Edges, Loops, Parallel Edges, Simple Graph, Finite Graph, Adjacent vertices, Incidence between vertex and edge, Degree of a vertex, Isolated - Vertex, Pendent Vertex, Null Graph, Labeled Graph, Unlabeled Graph. Walk, Closed Walk, Open Walk, Simple Path, Circuit, - Connected Graph.	12	25%

Suggested Specification table with Marks (Theory):100

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	40%	40%	00	00	00

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Analyze relation among sets, and elements and draw the model of real world situation using mathematical structure like Venn diagram
CO2	Apply mathematical tool of Matrix and determinant to real world problems like image processing, graphics analysis and data science etc.
CO3	Explore how mathematical logic is applied in various fields, including computer science, artificial intelligence and should be proficient in constructing truth tables to evaluate the truth values of complex propositional formulas.
CO4	Determine applications of graph theory in transportation networks, social networks, and optimization problems etc.



Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference:

[1] <https://www.javatpoint.com/discrete-mathematics-tutorial>

[2] <https://www.coursera.org/specializations/discrete-mathematics>

Reference Books:

[1] BCA Mathematics Volume –I (By B. K. Pal and K. Das)

[2] BCA Mathematics Volume –II (By B. K. Pal and K. Das)

[3] B. S. Shah (Mathematics (Science))

[4] B. S. Shah (Mathematics (Science))

