DISCRETE MATHEMATICS
IB.Tech –IISemester(Code:20DS205)

Lectures	:	2 Hours/Week	Tutorial	:	1 Hour/Week	Practical	:	0
CIEMarks	:	30	SEE Marks	:	70	Credits	:	3

Pre-Requisite:None

CourseObjectives: Studentswilllearnhowto

➢	Understand operations on discrete structures such as sets, functions, and relations. Formulateshortproofsusingmethodsofproofofanimplication.Verifythecorrectness ofanargumentusingpropositionallogicandtruthtables.Constructmathematical argumentsusinglogicalconnectivesandquantifiers.
➢	Verify the correctness of an argument using rules of inference for quantified propositions.Applyalgorithmsandusedefinitionstosolveproblemstoprovestatements inelementarynumbertheory.Understandcountingandindirectcountingtechniquesand combinatoryin thecontextof discrete probability.
➢	Understandsequences,generatingfunctions,andrecurrencerelations.Understandand computecoefficientsforgeneratingfunctions.Understandandsolve homogeneous recurrence relations.
➢	UnderstandandsolveInhomogeneousrecurrencerelations.Understandthepropertiesof binaryrelations,partialorderingsandlattices.Construct graphsandadjacency matrices for binary relations.

CourseOutcomes:After studyingthiscourse, thestudentswillbeable to

CO-1	Understandthebasicprinciplesofsets,relations,functionsandinferencerulesfor validatingarguments.
CO-2	Provethatthegivenstatementisvalidbyusingmathematicalinductionandutilizea varietyof countingstrategies to solvecomputational problems.
CO-3	Discussdifferentmethodsforsolvingdifferenttypesofrecurrence relations.
CO-4	Understandvarious operations and representationsof abinary relation.

MappingofCourseOutcomeswithProgramOutcomes&ProgramSpecificOutcomes

CO	PO's												PSO's		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO-1	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-
CO-2	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-
CO-3	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-
CO-4	3	3	-	-	-	-	-	-	-	-	-	-	-	3	-

UNIT-1	(12 Hours)

Foundations: Sets,RelationsandFunctions,FundamentalsofLogic,LogicalInferences,Methods of Proof of an implication, First order Logic & Other methods of proof.

UNIT-2	(12 Hours)

RulesofInferenceforQuantifiedpropositions,MathematicalInduction.
Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration ofCombinationsandPermutations,EnumeratingCombinationsandPermutationswithrepetitions, Enumerating Permutation with Constrained repetitions..

UNIT-3	(12 Hours)

Recurrence relations: Generating functions of sequences, CalculatingCoefficients of Generating Functions
RecurrenceRelations: SolvingrecurrencerelationsbySubstitutionandgeneratingfunctions,The methods of characteristic roots.

UNIT-4	(12 Hours)

RecurrenceRelations:solutionsofInhomogeneousrecurrencerelations.

Relations: Specialpropertiesofbinaryrelations,Operationsonrelation.Orderingrelations, Lattice, Paths and Closures, Directed Graphs and Adjacency Matrices.

TextBooks :	ToeL.Mott,AbrahamKandel&TheodoreP.Baker,"DiscreteMathematicsfor Computer Scientists & Mathematicians", PHI 2ndedition, 2012.
References:	[1] C.L.Liu,"ElementsofDiscreteMathematics",McGraw-HillEducation,2ndedition [2] Rosen,"DiscreteMathematics".", McGraw-HillEducation, 8thedition.