



St. JOHN'S COLLEGE OF ARTS & SCIENCE

(Accredited with B++ by NAAC & Approved by UGC under section 2(f) & 12(B) status)

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(A Christian Minority Institution)

**St. John's College Road, Ammandivilai, Kanyakumari District - 629 204,
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DEPARTMENT OF MATHEMATICS - ELECTIVE PAPERS

**Semester-V
Major Elective-I**

DISCRETE MATHEMATICS

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical	Credits (C)
Part-III	Non Major - I		Discrete Mathematics	60	-	-	4

Contact hours per semester:60

Contact hours per week:4

Year	Semester	Internal Marks	External Marks	Total marks
III	V	25	75	100

Objective: To study concepts of mathematical logics and to understand the basics of Lattices and Boolean Algebra.

Course Outcomes: On successful completion of the course, the students should be able to

CO No.	Course Outcome	Knowledge Level
CO1	Illustrate and use the statements, notations and connectives. Construct truth table and utilize conditional and biconditional statements.	K2, K3
CO2	Analyze and explain Predicate calculus	K1, K4
CO3	Elaborate Groups and monoids. Also to develop Group codes	K6
CO4	Construct Lattices and special lattices. Analyze and explain Boolean algebra	K5
CO5	Convert From one form to another form (Decimal, Binary, Octal, Hexadecimal). Evaluate Binary addition, subtraction multiplication and division.	K2, K6

K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create

CO-PSO mapping (Course Articulation Method)

PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	1	3
CO2	3	3	3	3	2
CO3	3	3	2	1	3
CO4	2	3	3	3	3

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CO5	1	3	2	3	2
Total contribution of COs to PSOs	12	14	13	11	13
Weighted Percentage of COs contribution to PSOs	80	93.33	86.67	73.33	86.67

Course Content

UNIT-1: Mathematical logic – Statements and notation, Connectives, Negation, Conjunction, Disjunction, Statement formula and truth table, Conditional and biconditional statements, Well defined formulae, tautologies.

UNIT-2: Normal forms - The theory of inference for the statement calculus, The Predicate, Theory of inference for the Predicate Calculus.

UNIT-3: Algebraic structures - Groups and monoids, Simple properties, Group codes.

UNIT-4: Lattices and Boolean algebra - Lattices as posets, Properties of lattices, special lattices, Boolean algebra, Gating networks, Minimal sum of products.

UNIT-5: Number system and codes - Decimal, Binary, Octal, Hexadecimal – Conversion from one to another – Binary addition, subtraction, multiplication and division, BCD, Weighted excess time, Gray code.

Text Book:

- ❖ J.P. Tremblay and Manohar-Discrete mathematical structures with application to Computer Science (Tata McGraw Hill) New Delhi, 43rd edition 2013.

Books for Reference:

- M. K. Venkataraman and others – Discrete mathematics- The National Publishing Pvt. Ltd. (2000).
- G. Balaji – Discrete mathematics – Balaji Publishers Chennai (2013).
- T. Veerarajan – Discrete mathematics Tata McGraw Hill – 2009.
- Garrett Birkhoff – Lattice Theory, American Mathematical Society (1948).
- M.K. Sen, B.C. Chakraborty, Introduction to Discrete Mathematics, Books and Allied (P) Ltd (2009).

Semester-V
Major Elective-I
OPERATIONS RESEARCH -I

Category	Course Type	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical	Credits (C)
Part-III	Major elective		Operations Research-I	60	-	-	4

Contact hours per semester:60

Contact hours per week:4

Year	Semester	Internal Marks	External Marks	Total marks
III	V	25	75	100

Objective: To introduce the various techniques of operations research

Course Outcomes: On successful completion of the course, the students should be able to

CO No.	Course Outcome	Knowledge Level
CO1	Solve Linear Programming Problem by making use of Graphical method, Simplex method.	K4
CO2	Interpret the concept of duality. Classify primal and dual problems. Utilizing the concept of duality, solve problems on dual simplex method.	K3
CO3	Solve Transportation problems by making use of North – west corner rule, Matrix-Minima method, Vogel's Approximation rule. Evaluate Degeneracy and unbalanced transportation problems.	K2, K5
CO4	Determine the solution for Assignment problems.	K1, K6
CO5	Solve sequencing problems.	K5

K1-Remember, K2-Understand, K3-Apply, K4-Analyze, K5-Evaluate, K6-Create

CO-PSO mapping (Course Articulation Method)

PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
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Cos					
CO1	3	3	3	1	3
CO2	2	1	2	3	3
CO3	2	1	2	3	2
CO4	2	3	1	3	3
CO5	3	3	2	3	3
Total contribution of COs to PSOs	12	11	10	13	14
Weighted Percentage of COs contribution to PSOs	80	73.33	66.67	86.67	93.33

Course Content

UNIT-1:

Linear Programming Problem: Mathematical formulation of LPP – Graphical method, Simplex method Artificial variable technique.

UNIT-2:

Concept of Duality – Primal and Dual problems – Duality – Dual Simplex method.

UNIT-3:

Transportation Problem: North-west Corner rule – Matrix-Minima method – Vogel's approximation method – MODI method – Degeneracy and unbalanced Transportation problem.

UNIT-4:

Assignment Problem: Hungarian method – Unbalanced assignment problems.

UNIT-5:

Sequencing Problem: n jobs and two machines – n jobs and three machines – 2 jobs and m machines.

Text Book:

- ❖ Kanti Swarup, P. K. Gupta and Manmohan – Operations Research – Sultan Chand and sons, (New Delhi) 12th edition (2006)

Books for Reference:

- Gupta P. K. and D. S. Hira – Operations Research – S. Chand & Sons Reprint (2012).
- B. J. Ranganathan and A. S. Srikantappa – Operations Research – Yes Dec Publishing House, Chennai (2017).
- Hamdy A. Taha – Operations research, An introduction - 8th Edition Prentice-Hall India (2006).
- A. C. S. Kumar, Operation Research, Yes Dec Publications, Chennai, 3rd Reprint 2019.



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DECLARATION

I hereby declare that the details and information given above are complete and true to the best of my knowledge and belief.


Dr. M. EDWIN GNANADHAS
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