SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Applied Mathematics	LP: MA18354 Rev. No: 00
B.Tech: Artificial Intelligence & Data Science Regulation: 2018 Sub. Code / Sub. Name : MA18354 / Mathematics for Data Analysis Unit 1 : Combinatorics	Date: 23.08.2021

Unit Syllabus: Sets - Operations - Inclusion and exclusion principle and its applications – Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations – Generating functions.

Objective: Apply the concepts of basic principles of Combinatorics and its Applications.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Sets and Operations	R3, Ch 2, Pg. No 115 - 138.	PPT/Black board
2	Inclusion and exclusion principle	R3, Ch 8, Pg No 552 - 558.	PPT/Black board
3	Applications of Inclusion and exclusion principle	R3, Ch 8, Pg No 558 - 565.	PPT/Black board
4	Mathematical induction	R3, Ch 5, Pg No 311 - 332.	PPT/Black board
5	Strong induction and well ordering	R3, Ch 5, Pg No 333 - 343.	PPT/Black board
6	Tutorial class	R3, Ch 2, 5, 8.	PPT/Black board
7	The basics of counting, Pigeonhole principle	R3, Ch 6, Pg No 385 - 406.	PPT/Black board
8	Permutations and combinations	R3, Ch 6, Pg No 407 - 414.	PPT/Black board
9	Tutorial class	R3, Ch 6.	PPT/Black board
10	Recurrence relations and solving linear recurrence relations	R3, Ch 8, Pg No 501 - 526.	PPT/Black board
11	Generating functions	R3, Ch 8, Pg No 537 - 557.	PPT/Black board
12	Tutorial class	R3, Ch 8.	PPT/Black board

Content beyond syllabus covered (if any):
Functions, sequences and summations.

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18354 / Mathematics for data analysis

Unit II: Divisibility theory and canonical decompositions

Unit Syllabus: Division algorithm – Base - b representations – Number patterns – Prime and composite numbers – GCD – Euclidean algorithm – Fundamental theorem of arithmetic – LCM

Objective: Understand the basic concepts in Number Theory and its Applications in Data Science.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Division algorithm	T1, Ch 2, Pg No 69 - 79.	PPT/Black board
14	Base - b representations	T1, Ch 2, Pg No 80 - 88.	PPT/Black board
15	Number patterns	T1, Ch 2, Pg No 98 - 102.	PPT/Black board
16	Tutorial class	T1, Ch 2.	PPT/Black board
17	Prime and composite numbers	T1, Ch 2, Pg No 103 - 127.	PPT/Black board
18	GCD	T1, Ch 3, Pg No 155 - 165.	PPT/Black board
19	Tutorial class	T1, Ch 3.	PPT/Black board
20	Euclidean algorithm	T1, Ch 3, Pg No 166 - 170.	PPT/Black board
21	Problems in Euclidean algorithm	T1, Ch 3, Pg No 170 - 172.	PPT/Black board
22	Fundamental theorem of arithmetic	T1, Ch 3, Pg No 173 - 183.	PPT/Black board
23	LCM	T1, Ch 3, Pg No 184 - 187.	PPT/Black board
24	Tutorial class	T1, Ch 3.	PPT/Black board

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: MA18354 / Mathematics for data analysis

Unit III: Regression analysis

Unit Syllabus: Introduction – The Simple Linear Regression Model – Estimating Model Parameters. Inferences about the Slope Parameter and the Prediction of Future Y Values. Introduction to Non-Linear and Multiple Regression Models.

Objective: Provide the required support to develop regression models which can be used in data analytics.

Session No *	Topics to be covered	Ref	Teaching Aids
25	Introduction	T3, Ch 11, Pg No 324 - 326	PPT/Black board
26	The Simple Linear Regression Model	T3, Ch 11, Pg No 327 - 331	PPT/Black board
27	Problems involving the Simple Linear Regression Model	T3, Ch 11, Pg No 327 - 331	PPT/Black board
28	Tutorial class	T3, Ch 11	PPT/Black board
29	Estimating Model Parameters	T3, Ch 11, Pg No 332 - 334	PPT/Black board
30	Problems involving estimating model parameters	T3, Ch 11, Pg No 339 - 344	PPT/Black board
31	Inferences about the Slope Parameter	T3, Ch 11, Pg No 334 - 338	PPT/Black board
32	Prediction of Future Y Values	T3, Ch 11, Pg No 334	PPT/Black board
33	Tutorial class	T3, Ch 11	PPT/Black board
34	Non-Linear Models	T3, Ch 11, Pg No 346 - 351	PPT/Black board
35	Multiple Regression Models	T3, Ch 11, Pg No 352 - 358	PPT/Black board
36	Tutorial class	T3, Ch 11	PPT/Black board

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18354 / Mathematics for data analysis

Unit IV: Fundamentals of graph theory

Unit Syllabus: Graphs and Interconnection Networks – Types of Graphs – Trees and Decision Trees – Planar Graphs – Kuratowski's Theorem – Degree Sequence – Matrix Representation of Graphs and Graph Isomorphism, Spectrum of Graphs – Graph Measurements: Length, Distance, Diameter, Eccentricity, Bisection width and Betweenness Centrality - Euler and Hamilton Concepts.

Objective: Understand the fundamental concepts of graph theory.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Graphs and Interconnection Networks	T2, Ch 1, Pg No 1 - 4	PPT/Black board
38	Types of Graphs	T2, Ch 1, Pg No 4 - 14	PPT/Black board
39	Trees and Decision Trees	T2, Ch 2, Pg No 25 - 27	PPT/Black board
40	Tutorial class	T1, Ch 1, 2	PPT/Black board
41	Planar graphs and Kuratowski's Theorem	T2, Ch 9, Pg No 135 -151	PPT/Black board
42	Degree Sequence	T2, Ch 1, Pg No 11.	PPT/Black board
43	Matrix Representation of Graphs and Graph Isomorphism	T2, Ch 1, Pg No 4 - 8	PPT/Black board
44	Tutorial class	T1, Ch 1, Ch 9.	PPT/Black board
45	Length, Distance, Diameter, Eccentricity, Bisection width and Betweenness Centrality	T1, Ch 1, Pg No 14.	PPT/Black board
46	Eulerian graphs	T2, Ch 4, Pg No 51 - 53	PPT/Black board
47	Hamiltonian graphs	T2, Ch 4, Pg No 53 - 60	PPT/Black board
48	Tutorial class	T1, Ch 4.	PPT/Black board

Content beyond syllabus covered (if any):
Finding the shortest path in a directed graph.

*** Session duration: 50 mins**

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MA18354 / Mathematics for data analysis

Unit V: Applications of graph theory

Unit Syllabus: Connectivity and Paths: Cuts and Connectivity, Menger's Theorem, k-Network Flow – Ford-Fulkerson Algorithm, Max-Flow Min-cut Theorem – Labeling: Graceful and Cordial – Domination: Independent and Connected, Matching: Matching and Perfect Matching applications to optimal assignment problem- Colorings and Vizing's Theorem – Timetabling Problem

Objective: Understand the advanced concepts of graph theory and its applications to computer science.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Connectivity and Paths, Cuts and Connectivity	T2, Ch 3, Pg No 42 - 44	PPT/Black board
50	Max-Flow Min-cut Theorem	T2, Ch 11, Pg No 196 - 198	PPT/Black board
51	Ford-Fulkerson Algorithm	T2, Ch 11, Pg No 198 - 200	PPT/Black board
52	Menger's Theorem	T2, Ch 11, Pg No 203 - 205	PPT/Black board
53	Tutorial class	T2, Ch 3 and Ch 11	PPT/Black board
54	Graceful and Cordial Labelling	Appendix IV, Pg No 248.	PPT/Black board
55	Matching and perfect matching	T2, Ch 5, Pg No 70 – 78.	PPT/Black board
57	Optimal assignment problem	T2, Ch 5, Pg No 86 - 90	PPT/Black board
56	Tutorial class	T2, Ch 5	PPT/Black board
58	Colorings and Vizing's Theorem	T2, Ch 6, Pg No 91 – 95.	PPT/Black board
59	Timetabling Problem	T2, Ch 6, Pg No 96 – 100.	PPT/Black board
60	Tutorial class	T2, Ch 6	PPT/Black board

Content beyond syllabus covered (if any):

*** Session duration: 50 mins**

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name: MA18354 / Mathematics for data analysis

TEXT BOOKS:

1. Koshy, T., "Elementary number theory with applications", Elsevier Publications. New Delhi. 2002.
2. Bondy, J. A and Murty, U. S. R., "Graph theory and Applications", The Macmillan Press Limited, New York, 1982.
3. Johnson, R. A., and Gupta, C. B., "Miller and Freund's Probability and Statistics for Engineers", Pearson education, Asia, 7th edition, 2007.

REFERENCE BOOKS:

1. Devore, J. L., "Probability and statistics for engineering and the sciences", Cengage learning, New Delhi, 8th edition, 2012.
2. Niven, I., Zuckerman, H.S., and Montgomery, H.L., "An introduction to theory of numbers", John Wiley and Sons, Singapore, 2004.
3. Kenneth Rosen, H., and Krithivasan, K., "Discrete mathematics and its applications with Combinatorics and graph theory", McGraw Hill companies, 7th edition, 2012.

	Prepared by	Approved by
Signature		
Name	Dr. G. Satheesh Kumar	Dr. R, Muthucumarswamy
Designation	Assistant Professor	Professor and Head
Date	23.08.21	23.08.21
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD