B.Tech Semester-III (Information Technology)

SCHEME OF EXAMINATION(2026-27 Onwards)

Sr. No.	Course Category	Course Code	Name of Course	BOS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme					
									Theory				Practical	
					Th	TU	P		Exam Hrs.	MSE	CA	ESE	CA	ESE
1	PCC-II	3BIT01T	Data Structures	IT	3	-	-	3	3	30	20	50	-	-
2	PCC-II	3BIT01P	Data Structures Lab	IT	-	-	2	1	-	-	-		25	25
3	PCC-III	3BIT02T	Object Oriented Programming	IT	3	-	-	3	3	30	20	50	-	-
4	PCC-IV	3BIT02P	Object Oriented Programming Lab	IT	-	-	2	1	-	-	-	-	25	25
5	MDM-I	3BITMD01T	Refer MDM Basket	IT	3	-	-	3	3	30	20	50	-	-
6	OE-I	3BOE01T	Refer Open Elective –I Basket	AS&H	3	-	-	3	3	30	20	50	-	-
7	EEM-I	3BEM01T	Refer EEM Basket	AS&H	2	-	-	2	2	15	10	25	-	-
8	VEC-I	3BVE01T	Refer VEC Basket	AS&H	2	-	-	2	2	15	10	25	-	-
9	CEP	3BIT03P	Community Engagement Project	IT	-	-	4	2	-	-	-	-	50	50
Total					16	-	08	20	-	150	100	250	100	100
Total Marks (Theory & Practical)										500			200	
Total Marks (III Semester)										700				

Principal
K. D. K. College of Engg.
NAGPUR

K. D. K. COLLEGE OF ENGG. NAGPUR

List of Multi-Disciplinary Minor Courses (MDM) for 2026-27 batch-Basket-1

Sr. No.	Course Code	Semester	Subject Name	Credits
1	3BITMD01T	III	Sampling and Statistical Modeling	3
2	4BITMD02T	IV	Discrete Structures and Graph Theory	2
3	5BITMD03T	V	Embedded System Technology	3
4	6BITMD04T	VI	Digital Image Processing	3
5	7BITMD05T	VII	Wireless and Mobile Computing	3

List of Multi-Disciplinary Minor Courses (MDM) for 2026-27 batch-Basket-2

Sr. No.	Course Code	Semester	Subject Name	Credits
1	3BITMD01T	III	Sampling and Statistical Modeling	3
2	4BITMD02T	IV	Discrete Structures and Graph Theory	2
3	5BITMD03T	V	Embedded System Technology	3
4	6BITMD04T	VI	Digital Image Processing	3
5	7BITMD05T	VII	Programming with Arduino and Raspberry-Pi	3

List of Program Electives

Sr. No.	Category	Course Code	Semester	Subject Name
1	PEC-I	5BIT04T-A	V	Machine Learning
2		5BIT04T-B		Data Science & Visualization
3	PEC-II	6BIT04T-A	VI	Artificial Intelligence
4		6BIT04T-B		Cloud Computing
5	PEC-III	6BIT05T-A		Deep Learning
6		6BIT05T-B		Block Chain Technology
7	PEC-IV	7BIT03T-A	VII	Natural Language Processing
8		7BIT03T-B		Fundamentals of Cryptography
11	PEC-V	7BIT04T-A		Generative AI
12		7BIT04T-B		Computer Vision
13	PEC-VI	8BIT01T-A	VIII	Social Networks
14		8BIT01T-B		Big Data Computing
15		8BIT01T-C		Business Intelligence & Analytics

			June 2026	1.00	Applicable for AY 2026-27 onwards
Chairman, BoS	Dean (Acad.)	Principal	Date of release	Version	

PRINCIPAL
KDK COLLEGE OF ENGINEER...

K.D.K. COLLEGE OF ENGG. NAGPUR

KDK College of Engineering, Nagpur
Faculty of Science and Technology
B.Tech. Information Technology

Semester III	Subject Code: 3BIT02T	Name of Subject: Object Oriented Programming		
Total Hours Distribution per week				
Total Credit: 3	Lecture (L): 3 Hrs		Tutorial (T) : -	Practical (P): -
Examination Scheme				
Mid Sem Examination	Continuous Assessment	End Sem Examination	Total Marks	Examination Duration:
30 Marks	20 Marks	50 Marks	100 Marks	3 Hours

	Course Objectives
1	To familiarize students with the differences between C and C++, including syntax, type checking, references, and operator overloading.
2	To build a strong foundation in procedural programming concepts using the C programming language.
3	To develop a clear understanding of Object-Oriented Programming (OOP) concepts such as data hiding, encapsulation, and procedural abstraction.
4	To introduce the concepts of generic programming in C++ and their practical applications.
5	To introduce students with File handling concepts using C++
	Course Outcomes
After completion of syllabus, the student will be able to	
1	Understand and apply the differences between C and C++ including syntax, classes, object and operator.
2	Apply C++ functions and object management concepts using inline functions, friend functions, arrays of objects, constructors, and destructors.
3	Apply inheritance concepts to develop C++ programs using inheritance types, virtual base classes, and constructors in derived classes.
4	Develop C++ programs using pointers, pointer to objects, and polymorphism.
5	Develop C++ programs to perform file handling using file classes, file modes, and read/write operations.

Course Competencies:

1. Use C and C++ programming concepts to develop structured and object-oriented applications.
2. Apply functions, classes, constructors, and destructors for effective object management in C++.
3. Implement inheritance and related object-oriented features to design reusable C++ programs.
4. Use pointers and polymorphism to solve programming problems efficiently.
5. Perform file handling operations in C++ for data storage and retrieval.

CO-PO Articulating Matrix

CO	Program Outcomes & Program Specific Outcomes												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1	3	-	-	-	1	-	2	2	3
CO2	3	2	3	1	3	-	-	1	1	-	2	3	3
CO3	3	2	3	1	3	-	-	1	1	-	2	2	3
CO4	3	3	3	3	3	-	-	1	1	-	2	3	3
CO5	3	2	2	3	3	-	-	1	1	-	2	2	3

SYLLABUS

Details of Topic	Hours	Mapped CO
Unit 1: Principles of Object Oriented Programming Procedure Oriented Programming (POP) verses Object Oriented Programming (OOP), Features of Object Oriented Programming, Applications of OOP, Data types, Type compatibility, Declaration of variable, Dynamic initialization of variable, Reference variable, Special Operators in C++: Scope resolution operator, Memory management operators, Structure of C++ program, Basic Input /Output operators and functions in C++, **Class & Object:** Introduction, Specifying a class, Access specifiers. **Defining member functions:** Inside class and Outside class, Creating objects, Memory allocations for objects	8	CO1
Unit 2: Functions and Constructors Inline function, Static data members, Static member function, Friend function: Using two different classes , Using non-member function, Array of Objects, Object as function arguments, Concepts of Constructors, Types of constructors, Constructor overloading and Constructors with default arguments, Destructors	7	CO2
Unit 3: Extending classes using Inheritance Introduction to Inheritance, Defining a derived class, Visibility modes and effects, **Types of Inheritance :** Single, Multilevel, Multiple, Hierarchical, Hybrid, Virtual base class, Abstract class, Constructor in derived class	7	CO3
Unit 4: Pointers and Polymorphism in C++ **Concept of Pointer:** Pointer declaration, Pointer operator, Address operator, Pointer arithmetic, **Pointer to Object:** Pointer to object, **'this'** pointer, Pointer to derived class, **Introduction of Polymorphism**: Types of polymorphism, Compile time Polymorphism: Function overloading, Revision of constructor overloading, Operator overloading: Rules for operator overloading, Overloading of unary and binary operators, Run time polymorphism: Virtual function, Rules for virtual function, Pure virtual function	7	CO4
Unit 5: File operations C++ stream classes, Classes for file stream operations, Detection of end of file, File modes, **Opening files:** Using constructors and open(), Closing files, Reading from and writing to files, Formatted Input/output functions in file, **Types of file:** Random access, Sequential access	7	CO5

Text Books

1.Object Oriented Programming with C++, E. Balaguruswamy, McGraw-Hill Education ISBN-10:0070669074, ISBN13:9780070669079.

2.Programming with C++, D Ravichandran, McGraw-Hill Education ISBN-10: 0070681899, ISBN13: 978-0070681897.

References Books

1. The C++ Programming Language, Stroustrup B, Pearson Education New Delhi ISBN-10: 0275967301, ISBN-13: 978-0275967307.

2. Object Oriented Programming in C++, Robert Lafore, Pearson Education India ISBN-10: 8131722821, ISBN13: 978-8131722824.

			June 2026	1.00	Applicable for AY 2026-27 onwards
Chairman, BoS	Dean (Acad.)	Principal	Date of release	Version	

Principal
K. D. K. College of Engg
NAGPUR

K. D. K. COLLEGE OF ENGG. NAGPUR

KDK College of Engineering, Nagpur
Faculty of Science and Technology
B.Tech. Information Technology

Semester III	Subject Code: **3BITMD01T**	Name of Subject: **Sampling and Statistical Modeling**		
Total Hours Distribution per week				
Total Credit: 3	**Lecture (L): 3 Hrs**		**Tutorial (T) : -**	**Practical (P): -**
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
30 Marks	**20 Marks**	**50 Marks**	**100 Marks**	**3 Hours**

	Course Objectives
1	Develop a strong foundation in probability distributions, statistical methods, linear mappings, sampling techniques, and optimization concepts.
2	Apply mathematical and statistical tools to analyze data, model uncertainty, and solve real-world problems.
3	Understand and utilize linear transformations, sampling methods, and optimization models in scientific and engineering applications.
4	Interpret data effectively through statistical analysis, estimation, and decision-making techniques.
5	Enhance analytical, computational, and problem-solving skills for research, industry, and advanced studies.
	Course Outcomes
After completion of syllabus, the student will be able to	
1	Analyze and interpret data using probability distributions
2	Apply linear and multiple regression models for data analysis.
3	Understand the concept of linear algebra using linear mappings.
4	Apply various sampling methods for hypothesis testing.
5	Apply LPP to real world problems in operations research, economics and management.

Course Competencies:

Upon successful completion of these topics, students gain following abilities:

1. Analyze probability distributions and apply probabilistic models to quantify uncertainty and support decision-making.
2. Apply statistical techniques to collect, summarize, interpret, and draw conclusions from data.
3. Perform operations involving linear mappings and analyze their properties in vector spaces and matrix representations.
4. Design and evaluate sampling methods for obtaining representative data and estimating population characteristics.
5. Formulate and solve optimization problems using appropriate mathematical techniques to obtain efficient and optimal solutions.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	-	-	-	-	1	1	1	-	1	1	1
CO2	3	3	-	-	-	-	1	1	1	-	1	1	1
CO3	3	3	-	-	-	-	1	1	1	-	1	2	2
CO4	3	3	-	-	-	-	1	1	1	-	1	2	2
CO5	3	3	-	-	-	-	1	1	1	-	1	2	2

SYLLABUS

Details of Topic	Hours	Mapped CO
Unit 1: Probability Distributions Binomial distribution, Poisson distribution, Normal distribution, Exponential distribution and their applications in data analysis.	7	CO1
Unit 2: Statistical Techniques **Statistics:** Introduction to multiple correlation and regression, Multiple regression analysis , Regression equation of three variables. **Measures of central tendency and dispersion:** Mean , Mode ,Median , Quartile , Decile, Percentile, Mean Deviation , Standard Deviation. **Skewness:** Test and uses of skewness and types of distribution , Measure of skewness , Karl Pearson's coefficient of skewness, Measure of skewness based on moments.	7	CO2
Unit 3: Linear Mappings Introduction , Matrix Representation of a linear mappings (linear transformations),Kernel and image of linear mapping, Singular and non singular linear mappings, Isomorphisms, Operations with linear mappings.	7	CO3
Unit 4: Sampling Techniques **Sampling:** Population (Universe), Sampling types and distribution, Sampling of mean and variance , Testing a hypothesis, Null and Alternative Hypothesis, t test and F test (Only introduction), Chi-square test and its applications in hypothesis testing.	7	CO4
Unit 5: Optimization Techniques **Linear programming:** Introduction, Graphical method for solving LPs with two variables, Simplex method. **Transportation problem**: Definition, Linear form, North-west corner method, Least cost method, Vogel's approximation method for finding feasible solution, MODI method for finding optimum solution.	7	CO5

Text Books

1.Sharma J. K., Operations Research: Theory and Applications, Fourth Edition, Macmilllan Publishers, 2007.

2.Advanced Engineering Mathematics, H. K. Dass , S. Chand & Company(2008) New Delhi - 110055.

3.Fundamentals of Mathematical Statistics , 12th Edition , S.C. Gupta, V. K. Kapoor , Sultan Chand & Sons Publications , ISBN:978-8180545281

References Books

4.Probability and Statistics (Schaum's Outline Series), Murray Spiegel, John Schiller, R. A. Srinivasan.

5.Probability , Statistics and Random Processes , T. Veerarajan , Third Edition , Tata McGraw – Hill Publishing Company Limited , New Delhi

6.Linear Algebra (Schaum's Outline Series), Murray Spiegel, John Schiller, Tata McGraw – Hill Edition 2005.

7.Advanced Engineering Mathematics , Eighth Edition , John Wiley & Sons, Inc. New York Chichester Brisbane Toronto Singapore

			June 2026	2.00	Applicable for AY 2026-27 onwards
Chairman, BoS	**Dean (Acad.)**	**Principal** K. D. K. College of Engg NAGPUR	**Date of release**	**Version**	

KDK College of Engineering, Nagpur
Faculty of Science and Technology
B.Tech. Information Technology

Semester IV	Subject Code: **4BITMD02T**	Name of Subject: **Discrete Structures and Graph Theory**		
Total Hours Distribution per week				
Total Credit: 2	**Lecture (L): 2 Hrs**		**Tutorial (T) : -**	**Practical (P): -**
Examination Scheme				
Mid Sem Examination	**Continuous Assessment**	**End Sem Examination**	**Total Marks**	**Examination Duration:**
15 Marks	**10 Marks**	**25 Marks**	**50 Marks**	**2 Hours**

Course Objectives	
1	Develop a strong foundation in Set Theory, Relations and Functions, Fuzzy Sets and Fuzzy Logic, Graph Theory, and Combinatorics.
2	Apply mathematical structures and logical reasoning to model and solve real-world and engineering problems.
3	Analyze relationships, mappings, networks, and discrete structures using appropriate mathematical techniques.
4	Enhance analytical, problem-solving, and computational skills for advanced studies and interdisciplinary applications.
Course Outcomes	
After completion of syllabus, the student will be able to	
1	Apply and recognize fundamental set theory in various real-life situations.
2	Understand the core concepts of fuzzy sets, fuzzy logic and design fuzzy systems for various applications.
3	Demonstrate a strong understanding of graph theory concepts and develop problem-solving skills in related areas.
4	Apply recurrence relations , generating functions in computer algorithms and systems.

Course Competencies:

1. Analyze and classify relations and functions and their applications in discrete systems.
2. Utilize fuzzy sets and fuzzy logic to model uncertainty and support intelligent decision-making.
3. Model and solve network-related problems using graph-theoretic concepts and algorithms.
4. Apply combinatorial techniques for counting, arrangement, selection, and optimization problems.

CO-PO Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	-	-	-	-	1	1	-	-	1	1	1
CO2	3	3	-	-	-	-	1	1	-	-	1	1	1
CO3	3	3	-	-	-	-	1	1	-	-	1	1	1
CO4	3	3	-	-	-	-	1	1	-	-	1	1	1

Syllabus

Details of Topic	Hours	Mapped with CO
Unit 1: Set Theory , Relations and Functions **Basic Concepts of Crisp Sets**, Types and Operations on sets , Ordered Pairs and n-tuples. **Relation** : Types of relations, Composite relation, Relation matrix, Graphical representation of a relation, Transitive closure of a relation.Equivalence relations. **Functions:** Definition, Composition of functions, Types of functions, Characteristics function and its properties.	6	CO1
Unit 2: Fuzzy Sets and Fuzzy Logic Fuzzy sets and systems, crisp sets, overview of fuzzy logic and classical logic, fuzzy compliment, fuzzy union, fuzzy intersection and combinations of these fuzzy sets operations crisp and fuzzy relations.	6	CO2
Unit 3: Graph Theory **Concepts of graph theory:** Digraphs, Basic definitions, Types of graphs, Weighted graphs, Isomorphic graphs, Subgraphs, Paths and circuits, Reachability and connectedness, Node base, Euler's path & Hamilton's path, Tree, Binary tree, Undirected tree, Spanning tree, Minimal spanning tree by Prim's algorithm, Kruskal's algorithm.	7	CO3
Unit 4: Combinatorics **Combinatorics:** Permutations , Combinations , Counting techniques , Pigeonhole principle with simple applications, Recurrence relations (Concept and definition only), Generating functions, Solution of recurrence relations using generating functions.	6	CO4

Text Books

1.Discrete Mathematics Structure with application to Computer Science, 23rd re-print, 2005, J. P. Tremblay & R. Manohar ,Tata McGraw-Hills Publication Company Limited, New Delhi.
2.Advanced Engineering Mathematics, 8th revised edition, 2007, H. K. Das by S. Chand & Company Limited , Delhi.
3.Fuzzy Logic with Engineering Applications, T. J. Ross, John Wiley &Sons, Ltd. ISBN: 978-81-265-3126-4.

References Books

4.Discrete Mathematics with Graph Theory , Santosh Kumar Yadav, ISBN 978-3-031-21320-5 Jointly published with Ane Books Pvt. Ltd (Springer) Re-print(2023)
5.Discrete Mathematics and Its Applications , 8th Edition , Kenneth H. Rosen, McGraw Hill Publications, ISBN:978-1259676512
6.Graph Theory with Applications to Engineering and Computer Science, Narsingh Deo , Dover Publications Inc. , Mineola New York.
7.Elements of Discrete Mathematics , 4th Edition , C.L. Liu, D. P. Mohapatra , McGraw Hill Publications, ISBN: 978-1259006395

			June 2026	1.00	Applicable for AY 2026-27 onwards
Chairman, BoS	Dean (Acad.)	Principal	Date of release	Version	

Principal
D. K. College of Engg.
NAGPUR

D. K. COLLEGE OF ENGG. NAGPUR