



University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



1st Semester Syllabus for BCA Admission Batch 2026

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University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2026

Subject Name: **Introduction to C Programming**

Credit: 4

Lecture Hours: 40

Subject Code: **BCACC101**

Maximum: 100 marks (Internal: 50 marks; External: 50 marks)

List of Faculty Members handling the Subject –

1. Prof.Dr. Rupam Bhattacharya
2. Prof.Ankita Mandal
3. Prof.Mohit Das

Pre-requisite: Fundamental computer knowledge

Relevant Links:

1. Link for Study Material:

<https://drive.google.com/file/d/1KGeYtfXwmCXnoWIqud89Svt226uuBuQn/view?pli=1>

2. Link for Coursera Course:

<https://www.coursera.org/specializations/c-programming>

3. Link for LinkedIn Learning Course:

https://www.linkedin.com/learning/complete-guide-to-c-programming-foundations?upsellOrderOrigin=default_guest_learning&trk=default_guest_learning

4. Link for Infosys Springboard Course:

https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01384323703937433634517_shared/overview

COURSE OBJECTIVES:

1. To introduce students to a powerful programming language.
2. To understand the basic structure of a program.
3. To gain knowledge of various programming errors.
4. To enable the students to make flowchart and design an algorithm for a given problem.
5. To enable the students to develop logics and programs.

COURSE OUTCOMES:

CO1:Students will be able to learn how to build by the algorithms for problems and basic understanding of programming language.

CO2:Students will be able to learn how to create pictorial representations of the program and to develop an in-depth understanding of logical concepts of C Programming.

CO3:Students will be able to learn how to implement different operations on functions, pointers, structures, unions and choose best way to solve problem.

CO4:Students will be able to enhance their programming skills through implementing files concept and pre-processor.

Module number	Topic	Sub-topics	Chapter Name and Book	Mapping with Industry and International Academia	Lecture Hours
1	Introduction Constants, variables, data	History of C, Importance of C, Sample Program, Basic Structure of C Program, Programming Style, Executing C program Introduction, Character Set, C Tokens, Keywords and identifiers, Constants, Variables, Data types, Declaration of	Programming in ANSI, E. Balagurusamy- Chapter 1, 2, 3, 4	International Academia: Practical Programming in C Industry Mapping: CLion, Eclipse(IDE), Visual Studio, CLion, Clan	14

	types. Operators and Expressions Managing Input and Output operations.	variables, Declaration of storage class, Assigning values to variables. Introduction, Arithmetic operators, Relational operators Logical operators Assignment operators Increment and decrement operators Conditional operators, Bitwise operators, Special operators, Arithmetic expression, Evaluating expression precedence of arithmetic operators, Type conversions in expression Operator precedence and associativity. Introduction, reading a Character, writing a Character Formatted Input, Formatted Output			
2	Decision making and branching Loop Functions Arrays Character Arrays and Strings	Introduction, Decision making with IF statement, IF.ELSE statement, Nesting of IF.ELSE statement, ELSE..IF ladder, Switch statement, The ? : operator, GOTO statement Introduction, The WHILE statement, The DO statement, The FOR statement, Jumps in LOOPS. What are Arrays? One dimensional Array Declaration, One dimensional array Initialization, Two-dimensional array declaration, Two-dimensional array initialization. Introduction, Declaring and initializing string variables, reading strings, writing strings, Arithmetic operations on	Programming in ANSI,E.Balagurusamy- Chapter 5,6,7,8,9	International Standards: Introduction to C MIT OpenCourseWare Industry Mapping: CLion, Eclipse(IDE), Visual Studio, CLion, Clang	12

	User-defined Functions	characters, Putting strings together, Comparison on two strings, String handling function. Introduction, need for user-defined function, A multi-function program, Elements of user-defined function, Definition of functions, return values and types, Function calls, Function declaration, Categories of function, Nesting of function, Recursion, Passing arrays to function, Passing strings to function, Scope, visibility and lifetime of variables			
3	Structures and Union Pointer	Introduction, defining structure, declaring structure variables, accessing structure members, Structure initialization, Copying and comparing structure variables, Operations on individual members Arrays of structures, Structure within structure, Structure and function, Union Understanding Pointers, accessing address of a variable, Declaring pointer variable, Initialization of pointer variable, accessing a variable through its pointer, Pointer expression, Pointer Increments and scale factor, Pointers and arrays, Pointer and character strings, Array of pointers, Pointers as function arguments, Functions returning pointers, Pointer to function, Pointer and structure	Programming in ANSI, E. Balagurusamy - Chapter 10, 11	International Academia: Lecture Notes Practical Programming in C MIT OpenCourseWare Industry Mapping: CLion, Eclipse(IDE), Visual Studio, CLion, Clang	8

4	File Management in C The Preprocessor	Introduction, Defining and opening a file Closing a file, Input/Output Operations on Files, Error handling during I/O operations, Command Line Arguments Macro substitution, File inclusion, Compiler Control Directives	Programming in ANSI, E. Balagurusamy - Chapter 12, 14	International Academia: File handling MIT OpenCourseWare Industry Mapping: CLion, Eclipse (IDE), Visual Studio, CLion, Clang	6

Module 1: Introduction, Constants, variables, data types. Operators and Expressions, Managing Input and Output operations

1st Year, Sec A (Faculty Name: Prof. Dr. Rupam Bhattacharya, Prof. Ankita Mandal)

1st Year, Sec B (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Ankita Mandal)

1st Year, Sec C (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Mohit Das)

1st Year, Sec D (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Mohit Das)

Working Days	Lesson Plan Description
Day 1	History of C, Importance of C
Day 2	Programming Style, Sample Program
Day 3	Structure of C Program, Executing C program
Day 4	Character Set, C Tokens, Keywords and identifiers
Day 5	Constants, Variables, Data types, Declaration of variables,
Day 6	Declaration of variables, Declaration of storage class, Assigning values to variables.
Day 7	Arithmetic operators, Relational operators

Day 8	Logical operators, Assignment operators
Day 9	Increment and decrement operators Conditional operators, Bitwise operators
Day 10	Special operators, Arithmetic expression,
Day 11	Evaluating expression precedence of arithmetic operators
Day 12	Type conversions in expression Operator precedence and associativity.
Day 13	reading a Character, writing a Character Formatted Input
Day 14	writing a Character Formatted Input, Formatted Output

Module 2: Decision making and branching Loop, Functions, Arrays, Character Arrays and Strings, User-defined Functions

1st Year, Sec A (Faculty Name: Prof. Dr. Rupam Bhattacharya, Prof. Ankita Mandal)

1st Year, Sec B (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Ankita Mandal)

1st Year, Sec C (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Mohit Das)

1st Year, Sec D (Faculty Name – Prof. Dr. Rupam Bhattacharya, Prof. Mohit Das)

Working Days	Lesson Plan Description
Day 15	Decision making with IF statement, IF.ELSE statement,
Day 16	Nesting of IF.ELSE statement, ELSE..IF ladder
Day 17	Switch statement, The ?: operator, GOTO statement Introduction
Day 18	The WHILE statement, The DO statement, The FOR statement, Jumps in LOOPS.
Day 19	Arrays, One dimensional Array Declaration, One dimensional array Initialization
Day 20	Two-dimensional array declaration, Two-dimensional array initialization.
Day 21	Declaring and initializing string variables
Day 22	reading strings, writing strings
Day 23	Arithmetic operations on characters, Putting strings together,
Day 24	Comparison on two strings,
Day 25	String handling function.
Day 26	need for user-defined function
Day 27	A multi-function program, Elements of user-defined function, Recursion, Passing arrays to function
Day 28	Definition of functions, return values and types,
Day 29	Function calls, Function declaration, Categories of function, Nesting of function,
Day 30	Passing strings to function, Scope, visibility and lifetime of variables

Module 3: Structures and Union,Pointer

1st Year,Sec A (Faculty Name:Prof.Dr.Rupam Bhattacharya, Prof.Ankita Mandal)

1st Year, Sec B (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Ankita Mandal)

1st Year, Sec C (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Mohit Das)

1st Year, Sec D (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Mohit Das)

Working Days	Lesson Plan Description
Day 31	defining structure, declaring structure variables,
Day 32	accessing structure members, Structure initialization
Day 33	Copying and comparing structure variables, Operations on individual members
Day 34	Arrays of structures
Day 35	Structure within structure,Structure and function,
Day 36	Union with example
Day 37	Understanding Pointers, accessing address of a variable
Day 38	Declaring pointer variable, Initialization of pointer variable
Day 39	accessing a variable through its pointer
Day 40	Pointer expression, Pointer Increments and scale factor, Pointers and arrays,
Day 41	Pointer and character strings, Array of pointers,
Day 42	Pointers as function arguments, Functions returning pointers,
Day 43	Pointer to function, Pointer and structure

Module 4: File Management in C,The Preprocessor

1st Year,Sec A (Faculty Name:Prof.Dr.Rupam Bhattacharya, Prof.Ankita Mandal)

1st Year, Sec B (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Ankita Mandal)

1st Year, Sec C (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Mohit Das)

1st Year, Sec D (Faculty Name – Prof.Dr.Rupam Bhattacharya, Prof.Mohit Das)

Working Days	Lesson Plan Description
Day 44	Defining and opening a file Closing a file
Day 45	Input/Output Operations on Files,Error handling during I/O operations

Day 46	Command Line Arguments
Day 47	Macro substitution, File inclusion
Day 48	Compiler Control Directives

TEXTBOOK:

1. Programming in ANSI, E. Balagurusamy (8th edition)

REFERENCEBOOKS:

1. Let us C by Yashwant Kanetkar
2. Programming in ANSI C by Raw Dawson

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	1	1	1	1	1	1	2
CO2	3	3	3	2	2	2	1	1	1	1	2	2
CO3	3	3	3	2	2	1	1	1	1	1	1	1
CO4	3	3	3	3	3	1	1	1	1	1	2	1

3: Strong correlation

2: Medium correlation

1: Weak correlation

PSO	PSO Description
PSO1	Technical Knowledge and Problem-Solving: Apply fundamental concepts of computer applications, programming languages, data structures, algorithms and database management to analyse and solve computational problems effectively.
PSO2	Software Design and Development: Demonstrate the ability to design, develop, test and deploy software solutions by utilizing modern tools, technologies, and logical programming skills for real-world applications across domains such as web, mobile, and enterprise systems.

PSO3	Professional Skills and Ethics: Exhibit effective communication, teamwork, leadership and ethical practices while adapting to emerging IT trends, thereby contributing responsibly to societal and organizational development.
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QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 10, 2026- August 18,2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
Mid Term 2	October 6,2026- October 13,2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
End Semester Examination	November 17,2026- December 4,2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	100

Examination Rules & Regulations:

https://iemcollege-my.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxIogHKO074XeUBC9qm3XNaf_gUeSiVTNh5OQ?e=MMQn40



University of Engineering and Management
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University of Engineering & Management,
Jaipur



Syllabus for BCA Admission Batch 2026

Subject Name: **Digital Electronics**

Credit: 4

Lecture Hours: 48

Subject Code: **BCACC102**

Maximum: 100 marks (Internal: 50 marks; External: 50 marks)

List of Faculty Members handling the Subject –

Prof. Dr. Priyanka Das

Prof. Kaustav Sarkar

Prof. Sucheta Chanda

Pre-requisite: Fundamental computer knowledge

Relevant Links:

1. Link for Study Material:

https://iemcollege-my.sharepoint.com/personal/pritha_banerjee_iem_edu_in/Documents/Digital%20Electrical/Digital%20Electronics-Study%20material.pdf?CT=1751014172007&OR=ItemsView

2. Link for NPTEL Course:

https://onlinecourses.nptel.ac.in/noc20_ee32/preview

3. Link for Coursera Course:

[Digital Systems: From Logic Gates to Processors | Coursera](#)

4. Link for LinkedIn Learning Course:

COURSE OBJECTIVES:

1. To gain basic knowledge of digital electronics circuits and its levels.
2. To understand and examine the structure of various number system and its conversation
3. To learn about the basic requirements for a design application
4. To enable the students to understand, analyze and design various combinational and sequential circuits
5. To understand the logic functions, circuits, truth table and Boolean algebra expression

COURSE OUTCOMES:

CO1: Convert different type of codes, Boolean algebra and number systems which are used in digital communication and computer systems. **CO2:** Employ the codes and number systems converting circuits and compare different types of logic families which are the basic unit of different types of logic gates and arithmetic circuits in the domain of performance and efficiency.

CO3: Analyze different types of combinational circuits and sequential circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.

CO4: Design different types of with and without memory element digital electronic circuits like Registers and Counters for particular operation.

Module No	Topic	Chapter Name	Sub Topic	Mapping with Industry and International Academia	Lecture Hours	Corresponding Lab Assignment
1	Introduction	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition.(Chapter 1)	Overview of fundamental concepts	<i>International Academia:</i>	8	1 Design and verify the truth table of DeMorgans Law. 2. Design and verify the truth table of Principal of duality.
	Number System		Number System, Floating Point Representation Of Numbers, Arithmetic Operations, 1'S and 2'S Complements, 9'S Complement, 10'S Complement, Binary Coded Decimal (BCD), Codes	Signals and Systems Electrical Engineering and Computer Science MIT OpenCourseWare <i>IndustryMapping: Tinker Cad, Breadboard, powersupply,</i>		

	Boolean Algebra	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition.(Chapter 2)	Introduction, Development Boolean Algebra, Boolean logic operations, Basic Laws of Boolean Algebra, Demorgan's Theorem, Sum of Products and Product of Sums, Karnaugh Map	IC		
	Logic Gates	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, Fifth edition.(Chapter 3)	Logic Gates, Mixed Logic, Multilevel Gating Networks, Multiple Output Gate Networks	<i>International Academia: Complex Digital Systems Electrical Engineering and Computer Science</i>		1. Design and verify the truth table of basic logic gates (AND,OR, NOT)
	Arithmetic Circuits	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition.(Chapter 5)	Introduction, Procedure for the Design of Combinational Circuits, Half Adder, Full Adder, K Map Simplification, Half Subtractor, Full Subtractor, Parallel Binary Adder,4-bit Parallel Adder/Subtractor, Fast Adder, Serial Adder, 4-bit Serial Adder/Subtractor, BCD Adder	MIT OpenCourseWare <i>IndustryMapping: Tinker Cad, Breadboard, powersupply, IC</i>	14	2. Design and verify the truth table of Universal logic gates (NAND,NOR) 3. Design and verify the truth table of XOR and XNOR gates 4. Design basic logic gates (AND, OR, NOT) using the NAND, NOR gate. 5. Design the circuit diagram and verify the truth table for half adder using XOR and AND gate. 6. Design the circuit diagram and verify the truth table for full adder. 7. Implement full adder using two half adders 8. Design the circuit diagram and verify the truth

						table for half subtractor using XOR and AND gate. 9. Design the circuit diagram and verify the truth table for full subtractor.	
3	Combinational Circuits	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition.(Chapter 6)	Introduction, Multiplexer (Data Selectors), Applications of Multiplexer, Demultiplexer (Data Distributors), Decoders, Liquid Crystal Display, Encoders, Parity Generators/ Checkers, Parity Generation, Code Converter	<i>International Academia:</i> https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/resources/lecture-6-binary-trees-part-1/	14	1. Design the circuit diagram for 4:1 Multiplexer. 2. Design the circuit diagram for 1:4 Demultiplexer. 3. Design the circuit diagram for Octal to binary encoder. 4. Design the circuit diagram for binary to octal decoder. 5. Design the circuit diagram for SR flip flop.	
	Flip Flop	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition. (Chapter 7)	Introduction, Latches, Flip flop, S-R Flip flop, D Flip flop, J-K Flip flop, T Flip flop, Triggering of Flip flop, Master Slave Flip flop, Realization of one Flip-flop to another Flip flop, Application of Flip flop	<i>IndustryMapping:</i> Tinker Cad, Breadboard, powersupply, IC			
4	Counters	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition. (Chapter 8)	Introduction, Asynchronous Counter, Ripple Counter with decoded output, Ripple Counter with modulus, Asynchronous down counter, Up Down Counter, Propagation delay in ripple counter,	<i>International Academia:</i> Microelectronic Devices and Circuits Electrical Engineering and Computer Science	12		

			Synchronous Counter, Synchronous Counter with ripple carry, Synchronous Down Counter, Synchronous Up Down Counter, Asynchronous/Synchronous Counter, Design of Synchronous Counter	MIT OpenCourseWare		
	Registers	S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Oxford University Press, fifth edition. (Chapter 9)	Introduction, Shift Register, Universal Shift Register, Shift Register counter, Shift Count	IndustryMapping: Tinker Cad, Breadboard, powersupply, IC		

Module 1: Number Systems, Codes & Boolean Algebra

1st Year, Sec A (Faculty Name –Dr. Priyanka Das, Prof. Kaustav Sarkar)

1st Year, Sec B (Faculty Name – Dr. Priyanka Das, Prof. Sucheta Chanda)

1st Year, Sec C (Faculty Name – Dr. Priyanka Das, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 1	Introduction to Digital Electronics: Applications and System Overview
Day 2	Number Systems: Binary, Octal, Decimal, Hexadecimal
Day 3	Binary Arithmetic: Addition, Subtraction, Multiplication, Division
Day 4	1's and 2's Complement, 9's and 10's Complements
Day 5	Floating Point Representation and BCD
Day 6	Binary Coded Decimal (BCD) Codes, Gray Code, Excess-3 Code
Day 7	Boolean Algebra: Laws and Properties
Day 8	DeMorgan's Theorem, Duality Principle
Day 9	Canonical Forms: SOP and POS
Day 10	Karnaugh Map (K-map): 2- and 3-variable simplification with truth tables

Module 2: Logic Gates & Arithmetic Circuits

1st Year, Sec A (Faculty Name –Dr. Priyanka Das, Prof. Kaustav Sarkar)

1st Year, Sec B (Faculty Name – Dr. Priyanka Das, Prof. Sucheta Chanda)

1st Year, Sec C (Faculty Name – Dr. Priyanka Das, Dr. Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 11	Basic Logic Gates: AND, OR, NOT (Symbol, Truth Table, Realization)
Day 12	Universal Gates: NAND and NOR — Realizing other gates
Day 13	XOR and XNOR: Logic Symbol, Truth Table, Properties
Day 14	Mixed Logic and Multi-Level Gating Networks
Day 15	Half Adder: Logic Expression, Circuit and Truth Table
Day 16	Full Adder: Logic Expression, Circuit and Truth Table
Day 17	Full Adder using Two Half Adders
Day 18	Half Subtractor and Full Subtractor (Design and Verification)
Day 19	Parallel Adder/Subtractor, 4-bit Binary Adder
Day 20	Serial Adder/Subtractor, Fast Adder Design

Module 3: Combinational Circuits

1st Year, Sec A (Faculty Name –Dr. Priyanka Das, Prof. Kaustav Sarkar)

1st Year, Sec B (Faculty Name – Dr. Priyanka Das, Prof. Sucheta Chanda)

1st Year, Sec C (Faculty Name – Dr. Priyanka Das, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 21	Introduction to Combinational Circuits
Day 22	Multiplexer (MUX): 4:1 Design and Application
Day 23	Demultiplexer (DEMUX): 1:4 Design and Application
Day 24	Encoder: Octal to Binary

Day 25	Decoder: Binary to Octal
Day 26	Applications of Encoder and Decoder
Day 27	BCD to Seven Segment Decoder
Day 28	Parity Generator and Parity Checker
Day 29	Code Converter Design
Day 30	Real-Life Applications of Combinational Circuits (e.g., LCD control, ALU units)
Day 31	Review + Design Challenges Based on Combinational Circuits
Day 32	Hands-on Lab/Software Simulation Session (TinkerCAD/Logisim)

Module 4: Flip-Flops & Sequential Circuits

1st Year, Sec A (Faculty Name –Dr. Priyanka Das, Prof. Kaustav Sarkar)

1st Year, Sec B (Faculty Name – Dr. Priyanka Das, Prof. Sucheta Chanda)

1st Year, Sec C (Faculty Name – Dr. Priyanka Das, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 33	Introduction to Sequential Circuits
Day 34	Latches and SR Flip-Flop (SR FF): Construction and Truth Table
Day 35	D Flip-Flop and JK Flip-Flop
Day 36	T Flip-Flop and Master-Slave Flip-Flops
Day 37	Flip-Flop Conversion: SR to JK, JK to D, etc.
Day 38	Triggering Mechanism: Level vs Edge Triggered
Day 39	Application of Flip-Flops (Memory, Control Systems)
Day 40	Realization and Practical Implementation
Day 41	Lab: Flip-Flop-based circuit simulation (e.g., SR latch using NAND)
Day 42	Assessment/Problem Solving on Flip-Flops and Sequential Circuits

Module 5: Counters and Registers

1st Year, Sec A (Faculty Name –Dr. Priyanka Das, Prof. Kaustav Sarkar)

1st Year, Sec B (Faculty Name – Dr. Priyanka Das, Prof. Sucheta Chanda)

1st Year, Sec C (Faculty Name – Dr. Priyanka Das, Prof. Kaustav Sarkar)

Working Day	Lesson Plan Description
Day 43	Introduction to Counters: Asynchronous (Ripple) Counters
Day 44	Synchronous Counters and Design of Mod-n Counters
Day 45	Up-Down Counters, Applications in Clocks and Digital Instruments
Day 46	Introduction to Registers: Serial In/Out, Parallel In/Out
Day 47	Universal Shift Registers and Shift Register Counters
Day 48	Final Review and Case-based Applications: Pattern Detector, Sequence Generator

Learning Resources:

Text Books:				
Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher	
S. Salivahanan and S. Arivazhagan	Digital Circuits and Design	5 th Edition	Oxford University Press	
M. Morris Mano	Digital Design	9 th Edition	Pearson	Download eBook
Reference Books:				
Anand Kumar	Fundamentals of Digital Circuits	–	PHI	
R.P. Jain	Modern Digital Electronics	4th Edition, 2009	Tata McGraw Hill	
W.H. Gothmann	Digital Electronics – An Introduction to Theory and Practice	2nd Edition, 2006	PHI	
D.V. Hall	Digital Circuits and Systems	1989	Tata McGraw Hill	
Charles H. Roth and Lizy Kurian John	Digital System Design using VHDL	2nd Edition	Cengage Learning	

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 10, 2026 to August 18, 2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
Mid Term 2	October 06, 2026 to October 13, 2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2×5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5×2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10×1)	30
End Semester Examination	November 17, 2026 to December 4, 2026	Attempt 10 out of 15 questions; Each question carries 2 marks (2×10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5×6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10×5)	100

Examination Rules & Regulations:

<https://iemcollege->

[my.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxIogHKO074XeUBC9qm3XNaf_qUeSiVTNh5OQ?e=MMQn40](https://iemcollege-my.sharepoint.com/:b:/g/personal/iemcoe_office_iem_edu_in/EXrcoe3d6oxIogHKO074XeUBC9qm3XNaf_qUeSiVTNh5OQ?e=MMQn40)



University of Engineering and Management
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Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2026

Subject Name: **Discrete Structure**

Credit: 4

Lecture Hours: 48

Subject Code: **BCACC103**

Maximum: 100 marks (Internal: 50 marks; External: 50 marks)

List of Faculty Members handling the Subject –

1. Sreelekha Biswas
2. Ankita Mandal

Pre-requisite: Number System, Basic Geometry and Trigonometry

Relevant Links:

1. Link for Study Material:

https://drive.google.com/file/d/1xJVt-c5MuWxv8cuhmLtH_WpdA2uX9fjp/view?usp=sharing

2. Link for LinkedIn Learning Course:

[Programming Foundations: Discrete Mathematics Online Class | LinkedIn Learning, formerly Lynda.com](#)

3. Link for Infosys Springboard Course:

[TOC - Introduction to Graph Theory | Infosys Springboard](#)

COURSE OBJECTIVES:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and indirect proofs.
3. Use counter examples.
4. Apply logical reasoning to solve a variety of problems.

COURSE OUTCOMES:

CO1: Understand the notion of mathematical thinking, mathematical proofs and algorithmic thinking, and be able to apply them in problem solving.

CO2: Understand the basics of discrete mathematics and number theory, and be able to apply the methods from these subjects in problem solving.

CO3: Be able to use effectively algebraic techniques to analyze basic discrete structures and algorithms.

CO4: Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

Module number	Topic	Chapter Name	Sub-topics	Mapping with Industry and International Academia	Lecture Hours
1	Set Theory	BCA Mathematics, Volume-I, B.K.Pal, K.Das, 3 rd Edition Chapter- 1	Set Theory : Basic concepts of sets, terminology, and notation, subset, power set, operation of sets (union, intersection, symmetric difference of two sets) algebra of sets (idempotent law, associative law, commutative law, distributive law, identity law, involution law, complement law, De Morgan's law) universal Set, Venn-Euler diagram, principle of inclusion-exclusion. Functions : Definition, domain, co-domain and range, types of functions (one-one, onto, into, many-one etc.), inverse of function, composition of functions.	International Standards: https://ocw.mit.edu/courses/hst-951j-medical-decision-support-fall-2005/resources/proplogic_sets/ Industry Mapping: Neo4j, Tableau, Gephi, Microsoft Power BI, R and Python(with Pandas and NumPy)	12

2	Graph & it's fundamentals	BCA Mathematics, Volume-III, B.K.Pal, K.Das 4 th Edition Chapter- 2.1	Concept of Graph, Graph and Related Terms, Simple Graph, Regular Graph, Complete Graph, Spanning Sub-graph, Di- Graph (Directed Graph), Walk, Path, Circuit, Connected Graph, Disconnected Graph, Theorems of Graph, Euler Graph, Hamiltonian Graph	International Standards: https://ocw.mit.edu/course/s/18-217-graph-theory-and-additive-combinatorics-fall-2019/resources/lecture-2-forbidding-a-subgraph-i-mantel2019s-theorem-and-turan2019s-theorem/ Industry Mapping: NetworkX graph in Python Programming, Amazon Neptune	12
3	Trees and Fundamental Circuit	BCA Mathematics, Volume-III,, B.K.Pal,K.Das 4 th Edition Chapter-2.2	Trees and related Terms ,Binary Trees ,Theorems on Trees ,Theorems on Binary Trees ,Spanning Tree and Co-Tree ,Finding a Spanning Tree of a Connected Graph, Weight of an edge and Weighted Graph ,Minimal Spanning Tree , Kruskal's Algorithm of finding Minimal Spanning Tree ,Prim's Algorithm of finding Minimal Spanning Tree	International Standards: https://ocw.mit.edu/course/s/18-217-graph-theory-and-additive-combinatorics-fall-2019/resources/lecture-2-forbidding-a-subgraph-i-mantel2019s-theorem-and-turan2019s-theorem/ Industry Mapping: NetworkX graph in Python Programming, Amazon Neptune	12

4	Matrix Representation of a Graph	BCA Mathematics, Volume-III, B.K.Pal, K.Das 4 th Edition Chapter- 2.3	Incidence matrix of a connected graph, Incidence matrix of a connected Di-Graph, Adjacency Matrix of a connected graph, Adjacency Matrix of a Di-Graph.	International Standards: https://ocw.mit.edu/course/s/18-217-graph-theory-and-additive-combinatorics-fall-2019/resources/lecture-2-forbidding-a-subgraph-i-mantel2019s-theorem-and-turan2019s-theorem/ Industry Mapping: NetworkX graph in PythonProgramming, Amazon Neptune	12
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Module 1: Set Theory

1st Year, Sec A (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec B (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec C (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec D (Faculty Name – Sreelekha Biswas, Ankita Mandal)

Working Days	Lesson Plan Description
Day 1	Basic concepts of sets, terminology and notation
Day 2	Subset, power set
Day 3	Operation of sets (union, intersection, symmetric difference of two sets)
Day 4	Algebra of sets (idempotent law, associative law, commutative law, distributive law, identity law, involution law, complement law, De Morgan's law)

Day 5	Algebra of sets (idempotent law, associative law, commutative law, distributive law, identity law, involution law, complement law, De Morgan's law)
Day 6	Universal Set, Venn-Euler diagram, principle of inclusion-exclusion.
Day 7	Functions : Definition, domain, co-domain and range
Day 8	Types of functions (one-one, onto, into, many-one etc.)
Day 9	Inverse of function
Day 10	Composition of functions.
Day 11	Practice Class
Day 12	Practice Class

Module 2: Graph & it's fundamentals

1st Year, Sec A (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec B (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec C (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec D (Faculty Name – Sreelekha Biswas, Ankita Mandal)

Working Days	Lesson Plan Description
Day 11	Concept of Graph, Graph and Related Terms
Day 12	Simple Graph, Regular Graph
Day 13	Complete Graph
Day 14	Spanning Sub-graph, Di- Graph (Directed Graph)
Day 15	Walk, Path, Circuit
Day 16	Connected Graph, Disconnected Graph
Day 17	Theorems of Graph
Day 18	Theorems of Graph
Day 19	Theorems of Graph
Day 20	Euler Graph
Day 21	Euler Graph
Day 22	Hamiltonian Graph
Day 23	Hamiltonian Graph

Day 24	Practice Class
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Module 3: Trees and Fundamental Circuit

1st Year, Sec A (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec B (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec C (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec D (Faculty Name – Sreelekha Biswas, Ankita Mandal)

Working Days	Lesson Plan Description
Day 25	Trees and related Terms
Day 25	Binary Trees
Day 26	Theorems on Trees
Day 27	Theorems on Binary Trees
Day 28	Spanning Tree and Co-Tree
Day 29	Finding a Spanning Tree of a Connected Graph
Day 30	Weight of an edge and Weighted Graph
Day 31	Minimal Spanning Tree
Day 32	Kruskal's Algorithm of finding Minimal Spanning Tree
Day 33	Kruskal's Algorithm of finding Minimal Spanning Tree
Day 34	Prim's Algorithm of finding Minimal Spanning Tree
Day 35	Prim's Algorithm of finding Minimal Spanning Tree
Day 36	Practice Class
Day 37	Practice Class

Module 4: Matrix Representation of a Graph

1st Year, Sec A (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec B (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec C (Faculty Name – Sreelekha Biswas, Ankita Mandal)

1st Year, Sec D (Faculty Name – Sreelekha Biswas, Ankita Mandal)

Working Days	Lesson Plan Description
Day 38	Incidence matrix of a connected graph
Day 39	Incidence matrix of a connected Di-Graph
Day 40	Incidence matrix of a connected Di-Graph
Day 41	Incidence matrix of a connected Di-Graph
Day 42	Adjacency Matrix of a connected graph
Day 43	Adjacency Matrix of a connected graph
Day 44	Adjacency Matrix of a Di-Graph.
Day 45	Adjacency Matrix of a Di-Graph.
Day 46	Practice Class
Day 47	Practice Class
Day 48	Practice Class

TEXTBOOK:

1. BCA Mathematics, Volume-I, B.K.Pal, K.Das (chapter-1)
2. BCA Mathematics, Volume-III, B.K.Pal, K.Das (chapter-2.1, 2.2, 2.3)

REFERENCEBOOKS:

1. Graph Theory, Narsingh Deo
2. Higher Algebra, S.K.Mapa

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2	1	2	1	1	1	2	1	2
CO2	3	3	3	2	2	2	1	1	2	1	2	2
CO3	3	3	3	2	2	2	1	2	1	2	1	1
CO4	3	3	3	3	3	2	1	1	1	1	2	1

3: Strong correlation

2: Medium correlation

1: Weak correlation

PSO	PSO Description
PSO1	Technical Knowledge and Problem-Solving: Apply fundamental concepts of computer applications, programming languages, data structures, algorithms and database management to analyse and solve computational problems effectively.
PSO2	Software Design and Development: Demonstrate the ability to design, develop, test and deploy software solutions by utilizing modern tools, technologies, and logical programming skills for real-world applications across domains such as web, mobile, and enterprise systems.
PSO3	Professional Skills and Ethics: Exhibit effective communication, teamwork, leadership and ethical practices while adapting to emerging IT trends, thereby contributing responsibly to societal and organizational development.

QUESTION PAPER PATTERN AND DATES

EXAMINATION	Dates	PART – A	PART – B	PART – C	TOTAL MARKS
Mid Term 1	August 10, 2026- August 18,2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
Mid Term 2	October 6,2026- October 13,2026	Attempt 5 out of 6 questions; Each question carries 2 marks (2 × 5)	Attempt 2 out of 3 questions; Each question carries 5 marks (5 × 2)	Attempt 1 out of 2 questions; Each question carries 10 marks (10 × 1)	30
End Semester Examination	November 17,2026- December 4,2026	Attempt 10 out of 15 questions; Each question carries 2 marks (2 × 10)	Attempt 6 out of 9 questions; Each question carries 5 marks (5 × 6)	Attempt 5 out of 8 questions; Each question carries 10 marks (10 × 5)	100

Examination Rules & Regulations:

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University of Engineering and Management
Institute of Engineering & Management, Salt Lake Campus
Institute of Engineering & Management, New Town Campus
University of Engineering & Management, Jaipur



Syllabus and Lesson Plan for BCA Admission Batch 2026

Subject Name: **Digital Marketing**

Credit: 4

Lecture Hours: 40

Subject Code: **BCAMD101**

Maximum: 100 marks (Internal: 50 marks; External: 50 marks)

List of Faculty Members handling the Subject –

1. Dr. Dipankar Das
2. Prof. Manjima Saha

Pre-requisite: Basic internet knowledge and an analytical mindset. No technical expertise is required.

Relevant Links:

1. Link for Study Material:

<https://drive.google.com/file/d/1j1Xs2T8fypRT8wn3U6xEcKEwiDppxT1G/view>

2. Link for Coursera Course:

<https://www.coursera.org/specializations/digital-marketing>

3. Link for LinkedIn Learning Course:

<https://www.linkedin.com/learning/digital-marketing-foundations-15054577/connecting-with-customers-online?u=229219690>

4. Link for NPTEL Course:

https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mg06

COURSE OBJECTIVES:

Throughout the course, students will be expected to demonstrate their understanding of Digital Marketing by being able to do each of the following:

1. To apply fundamental concepts of Digital Marketing ecosystem
2. To understand the fundamentals different content marketing social Media Marketing
3. To familiarize yourself with campaigns that are digitally becoming more prevalent in the current scenario.
4. This course is aimed at familiarizing the different styles & strategies of Digital Marketing.

COURSE OUTCOMES:

CO1: To understand the importance and overview About Digital Marketing and be able to apply them.

CO2: To understand and develop and execute transformational digital Marketing Strategies and best practice

CO3: To get familiarize and understand basic of online, social media, content marketing strategies and be able to apply practically

CO4: Understand some basic properties of online marketing and mobile marketing and solve the real-world examples.

Module number	Topic	Sub-topics	Chapter Name and Book	Mapping with Industry and International Academia	Lecture Hours
1	Introduction to Digital marketing	Overview About Digital Marketing, Difference between Traditional Marketing and Digital Marketing, Benefits of using digital media, Inbound and Outbound Marketing, Online marketing POEM: (Paid, Owned, and Earned Media), Components of Online Marketing (Email, Forum, Social network, Banner, Blog) Search Engine Optimization (SEO) About SEO, Need of an SEO friendly website, Search Engine, Role of Keywords in SEO, Off-page Optimization, On-page Optimization concepts, Organic SEO vs Non-organic SEO	Digital Marketing, Vandana Ahuja-Chapter 1, 2, 7 Digital Marketing: Strategy, Implementation and practice, Dave Chaffey-Chapter 1, 9	International Standards: 1. https://www.coursera.org/specializations/seo Industry Mapping Google Analytics, Search Engine Optimization (SEO), Web Trends Analytics	10

2	Social Media Marketing (SMM) & Content Marketing	Social Media Marketing (SMM) About Social Media Marketing, Different types of Social Media Marketing Content Marketing About Content Marketing, Goals of Content Marketing, Types of Contents, etc.	Digital Marketing, Vandana Ahuja-Chapter 5, 10 Digital Marketing: Strategy, Implementation and practice, Dave Chaffey-Chapter 4	International Standards: 1. https://www.coursera.org/specializations/social-media-marketing 2. https://www.coursera.org/learn/content-marketing Industry Mapping Google Analytics, Search Engine Optimization (SEO), WebTrends Analytics	9
3	Online Advertising & Mobile Marketing	Online Advertising About Online Advertising, Advantages of Online Advertising, Paid versus Organic, Pay Per Click (PPC) Model. Basic concepts CPC, PPC, CPM, CTR, CR Mobile Marketing About Mobile Marketing, Objectives of Mobile Advertising, Creating a Mobile Marketing Strategy, About SMS Marketing	Digital Marketing, Vandana Ahuja-Chapter 6 Digital Marketing: Strategy, Implementation and practice, Dave Chaffey-Chapter 3, 7	International Standard: 1. https://www.coursera.org/learn/mobile-marketing-optimization-tactics-and-analytics Industry mapping: Google Ads, Google Analytics	10
4	Online Marketing	Online Marketing Types; Basics of Affiliate Marketing, Viral Marketing, Influencer Marketing. Referral Marketing; Web analytics: About Web Analytics, Types of Web Analytics (On-site, Offsite), Importance of Web Analytics, Online Marketing Impact, Pros & Cons	Digital Marketing, Vandana Ahuja-Chapter 13 Digital Marketing: Strategy, Implementation and practice, Dave Chaffey-Chapter 9, 4	International Standard: 1. https://www.coursera.org/specializations/digital-marketing Industry mapping: Google Analytics	11

Module 1: Introduction to Digital marketing

1st Year, Sec A (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec B (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec C (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec D (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

Working Days	Lesson Plan Description
Day 1	Introduction to Digital Marketing: Overview and evolution of digital marketing
Day 2	Difference between Traditional Marketing and Digital Marketing
Day 3	Benefits and scope of Digital Media in business
Day 4	Inbound Marketing and Outbound Marketing concepts
Day 5	POEM Framework: Paid, Owned and Earned Media
Day 6	Components of Online Marketing: Email Marketing and Forums
Day 7	Components of Online Marketing: Social Networks, Blogs and Banner Ads
Day 8	Introduction to Search Engine Optimization (SEO)
Day 9	Need for an SEO-friendly Website and Search Engine basics
Day 10	Role of Keywords in SEO and keyword planning
Day 11	On-page Optimization techniques
Day 12	Off-page Optimization and Organic vs Non-organic SEO

Module 2: Social Media Marketing (SMM) & Content Marketing

1st Year, Sec A (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec B (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec C (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec D (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

Working Days	Lesson Plan Description
Day 13	Introduction to Social Media Marketing (SMM)
Day 14	Different types of Social Media Platforms and Marketing Strategies
Day 15	Social Media Campaign Planning and Audience Engagement
Day 16	Social Media Content Creation and Scheduling
Day 17	Introduction to Content Marketing
Day 18	Goals and Importance of Content Marketing
Day 19	Types of Content: Blogs, Videos, Infographics and Podcasts
Day 20	Content Marketing Strategy and Content Calendar
Day 21	Case Study Discussion on Social Media Marketing
Day 22	Measuring Social Media Performance and Analytics
Day 23	SEO and Social Media Integration
Day 24	Practical Exercise on Social Media Content Planning
Day 25	Revision of SMM and Content Marketing Concepts
Day 26	Revision of SMM and Content Marketing Concepts

Module 3: Online Advertising & Mobile Marketing

1st Year, Sec A (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec B (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec C (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec D (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

Working Days	Lesson Plan Description
Day 27	Introduction to Online Advertising
Day 28	Advantages and Scope of Online Advertising
Day 29	Paid versus Organic Advertising
Day 30	Pay Per Click (PPC) Advertising Model
Day 31	Basic Metrics: CPC, PPC, CPM
Day 32	Digital Advertising Metrics: CTR and Conversion Rate (CR)
Day 33	Google Ads basics and campaign structure
Day 34	Display Advertising and Banner Advertising Concepts

Day 35	Introduction to Mobile Marketing
Day 36	Objectives and Importance of Mobile Advertising
Day 37	Creating a Mobile Marketing Strategy
Day 38	SMS Marketing and Mobile-based Promotions
Day 39	Mobile-friendly Website and App Marketing Concepts
Day 40	Practical Exercise on Online Ad Campaign Planning
Day 41	Revision of Online Advertising and Mobile Marketing
Day 42	Revision of Online Advertising and Mobile Marketing

Module 4: Online Marketing

1st Year, Sec A (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec B (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec C (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

1st Year, Sec D (Faculty Name – Dr. Dipankar Das, Prof. Manjima Saha)

Working Days	Lesson Plan Description
Day 43	Introduction to Online Marketing and its Types
Day 44	Affiliate Marketing: Concepts and Working Process
Day 45	Viral Marketing and Referral Marketing
Day 46	Influencer Marketing and Brand Collaboration
Day 47	Introduction to Web Analytics: On-site and Off-site Analytics
Day 48	Importance of Web Analytics, Online Marketing Impact, Pros and Cons

TEXTBOOK:

1. **Digital Marketing, Vandana Ahuja, Oxford Press (Chapter -1,2,3,4,5,6,7,8,9,10,11,12,13,14,15)**

REFERENCEBOOKS:

1. **Digital Marketing: Strategy, Implementation and practice, Dave Chaffey and Fiona Ellis-Chadwick**

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CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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CO4	2	3	3	3	3	3	2	2	2	3	2	3

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