

**Course Code: BCA 201**  
**Course Name: Computer Networks**

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**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following: -

1. To study different types of media, multiplexing, switched networks, the Internet, TCP/IP suite, fiber-optic communications and the state-of-art networking applications.
2. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.
3. Identify and discuss the underlying concepts of IPv4 & IPv6 protocols, along with their characteristics and functionality.
4. Details of IP operations in the Internet and associated routing principles
5. Analyzing various layering protocols in computer networks.

**PRE-REQUISITES:**

1. Fundamentals of Computers and IT

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Utilize the fundamentals of data communication and networking to identify the topologies and connecting devices of networks.	BTL1 BTL2	PO1, PO2, PO3, PO7,PO8
CO2	Understand and describe the layered protocol model (OSI and TCP/IP model)	BTL2	PO1, PO2, PO3, PO7
CO3	Analyze the elements and protocols for peer – peer and communication between layers.	BTL3 BTL4	PO1, PO2, PO3, PO4, PO6, PO7
CO4	Evaluate and implement routing algorithms and Router basic configuration.	BTL3 BTL5	PO1, PO2, PO3, PO4, PO7, PO8
CO5	Evaluate the protocols and Principles in computer networking	BTL5 BTL6	PO1, PO2, PO3, PO4, PO5, PO6, PO7

### UNIT – I

**No. of Hours: 10**      **Chapter/Book Reference: TB1[Chapter-1], TB2[Chapter-1, 2]**

**Basic Concepts:** Components of data communication, distributed processing, Line configuration, topology, transmission mode, and categories of networks. **OSI and TCP/IP Models:** Layers and their functions, comparison of models. **Transmission Media:** Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Shannon Capacity.

### UNIT – II

**No. of Hours: 12**      **Chapter/Book Reference: TB1[Chapter-2, 3], TB2[Chapter-3, 9]**

**Telephony:** Multiplexing, WDM, TDM, FDM, circuit switching, packet switching and message switching. **Data Link Layer:** Types of errors, Framing (character and bit stuffing), error detection & correction methods; Flow control; Protocols: Stop & wait ARQ, Go-Back- NARQ, Selective repeat ARQ.

### UNIT – III

**No. of Hours: 12**      **Chapter/Book Reference: TB1[Chapter-5], TB2[Chapter-18, 19, 20, 22]**

**Network Layer:** Internetworking & Devices: Repeaters, Hubs, Bridges, Switches, Router, Gateway, Modems; Addressing: IPv4 and IPv6 addressing, IPv4 subnetting; Routing: Unicast Routing Protocols: RIP, OSPF, BGP; Routing: Routing Methods- Static and Dynamic Routing, Routing basic commands, Distance vector protocol, Link state protocol

### UNIT – IV

**No. of Hours: 10**      **Chapter/Book Reference: TB1[Chapter-6,7], TB2[Chapter-23, 24,25]**

**Transport and upper layers in OSI Model:** Transport layer functions and Protocols, connection management, functions of session layers, Presentation layer, and Application layer.

### TEXT BOOKS:

**TB1.** A. S. Tenenbaum, “Computer Networks”; Pearson Education Asia, 4th Ed., 2003.

**TB2.** Behrouz A. Forouzan, “Data Communication and Networking”, 2nd edition, Tata Mc Graw Hill.

### REFERENCES:

**RB1.** D. E. Comer, “Internetworking with TCP/IP”, Pearson Education Asia, 2001.

**RB2.** William Stallings, “Data and computer communications”, Pearson education Asia, 7th Ed., 2002.

**RB3.** Leinwand, A., Pinsky, B. (2001). Cisco router configuration. United Kingdom: Cisco Press.

**Course Code: BCA 203**  
**Course Name: Computer Organization and Architecture**

**L T C**  
**3 1 4**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. To study the various logic gates and design principles of different digital electronic circuits
2. To design different combinational and sequential circuits.
3. Identify the functional units of the processor and the factors affecting the performance of a computer
4. To learn about the Input –Output organization of a typical computer

**PRE-REQUISITES:**

Fundamentals of Computer

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Able to understand the fundamentals of digital principles and able to design digital circuits by simplifying the Boolean functions	BTL2 BTL3 BTL5	PO1, PO7, PO11
CO2	Implement the combinational and sequential circuits for the given specifications	BTL3 BTL6 BTL1	PO1, PO4, PO7, PO11
CO3	Able to trace the execution sequence of an instruction through the processor	BTL1 BTL2	PO1, PO7, PO11
CO4	Demonstrate computer architecture concepts related to design of modern processors, memories and I/Os.	BTL2 BTL4	PO1, PO4, PO7, PO11
CO5	Demonstrate the ability to classify the addressing modes, instructions set	BTL2 BTL5	PO1, PO4, PO7, PO11

**UNIT – I**

**No. of Hours: 11**      **Chapter/Book Reference: TB2[Chapter-2, 4], RB1 [Chapter-5, 6]**

**Boolean Algebra and Logic:** Basics Laws of Boolean Algebra, Logic Gates, Simplifications of Boolean equations using K-maps SOP and POS, Don't Care condition.

**Arithmetic Circuits:** Adder, Subtractor, Parallel binary adder/Subtractor.

**UNIT – II**

**No. of Hours: 11**      **Chapter/Book Reference: TB2 [Chapter-5, 6], RB1[Chapter-6,7]**

**Combinational Circuits:** Multiplexers, De-Multiplexers, Decoders, Encoders.

**Flip-flops:** S-R, D, J-K, T, Clocked Flip-flop, Race around condition, Master slave Flip-Flop, Realisation of one flip-flop using other flip-flop, Applications of flip flop: Latch, Registers, Counters (elementary treatment to be given).

**UNIT – III**

**No. of Hours: 11**      **Chapter/Book Reference: TB1[Chapter-5, 9], RB3[Chapter-11]**

**Data Transfer Operations:** Register Transfer, Bus and Memory Transfer, Registers and micro-operations.

**Basic Computer Organizations and Design:** Instruction Codes, Computer Registers, Instruction Cycle, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes,

#### UNIT – IV

**No. of Hours: 11**                      **Chapter/Book Reference: TB1[Chapter-12, 13], RB3[Chapter-7]**

**Input-Output Organization:** Peripheral Devices, Input-Output Interfaces, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA)

**Memory Organization:** Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

#### TEXT BOOKS:

**TB1.** Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.

**TB2.** Morris Mano, “Digital Logic and Computer Design”, PHI Publications, 2002

#### REFERENCES:

**RB1.** R. P. Jain, “Modern Digital Electronics”, TMH, 3rd Edition, 2003.

**RB2.** William Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001

**RB3.** Subrata Ghosal, “Computer Architecture and Organization”, Pearson 2011

**RB4.** Malvino, “Digital Computer Electronics: An Introduction to Microcomputers”, McGraw Hill

**Course Code: BCA 205**  
**Course Name: Object Oriented Programming with C++**

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**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. Gain knowledge and develop a broad understanding of bottom up approach
2. Construct object oriented solutions for real world scenarios

**PRE-REQUISITES:**

1. Knowledge of C programming
2. Basic Programming Skills

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO#
CO1	Understand the basic principles of Object-Oriented Programming	BTL2	PO2, PO3
CO2	Apply OOPs principles using C++ constructs	BTL3	PO3
CO3	Develop expertise in classification hierarchies and polymorphism using C++	BTL3	PO3, PO4
CO4	Comprehend the working of files and generic programming	BTL5	PO3, PO4

**UNIT – I**

**No. of Hours: 10**      **Chapter/Book Reference: TB1 [Chapters 1, 2], TB2 [Chapters 1, 2, 3]**

**Object Oriented Paradigm:** Procedural vs. object-oriented development, basic concepts of object-oriented programming, applications and benefits of OOP, comparison between C and C++.

**Beginning with C++:** Stream based I/O, literals- constant qualifiers, operators in C++, reference variable, functions, default arguments, parameter passing by value, reference and pointer, inline functions, type conversion, basic C++ programs, new, delete operators- basic use and dynamic memory allocation for arrays.

**UNIT – II**

**No. of Hours: 11**      **Chapter/Book Reference: TB1 [Chapters 10, 11], TB2 [Chapters 5, 6]**

**Classes and Objects:** C++ class declaration, access specifiers, member functions, arrays within a class, array of objects, memory allocation of objects, passing objects as arguments, returning objects from functions, function overloading, static data and member functions, friend function and friend class, this pointer

**Constructors & Destructors:** Introduction to constructor and destructor, parameterized constructor, constructor with default arguments, multiple constructors in a class, copy constructor.

**UNIT – III**

**No. of Hours: 12**      **Chapter/Book Reference: TB1 [Chapters 13, 14, 15], TB2 [Chapters 7, 8, 9]**

**Inheritance:** Types of inheritance, derivation – public, private & protected, ambiguity resolution (function overriding), aggregation, composition v/s classification, virtual base class, constructor and destructor in derived classes.

**Polymorphism:** Types of polymorphism, early v/s late binding, **Virtual Functions:** Need for virtual functions, pointer to derived class objects, pure virtual functions, abstract classes.

**Operator Overloading:** Overloading unary operators, nameless objects, overloading binary operators, overloading with friend functions, conversion between basic types and user-defined types.

#### UNIT – IV

**No. of Hours: 11**

**Chapter/Book Reference: TB1 [Chapters 16, 17, 18, 19], TB2 [Chapters 11, 12, 13]**

**Parametric polymorphism:** Generic Programming with Templates, Introduction, function templates/generic functions, characteristics, overloading of template functions, class templates, template arguments.

**Exception Handling:** Exception-handling model, types of exception, catching and handling exceptions, generic catch, rethrowing an exception, specifying exceptions for a function.

**Streams & Files:** C++ Streams, basic stream classes, C++ predefined streams, I/O operations, unformatted console I/O operations, manipulators, opening and closing a file- different modes and methods, error handling during file operations, file pointers and their manipulations, sequential access to file, random input and output operations, persistent objects, command line arguments.

#### TEXT BOOKS:

**TB1.** K.R. Venugopal, Rajkumar, T. Ravishanker, “Mastering C++”, TMH

**TB2.** E. Balagurusamy, “Object Oriented Programming with C++”, McGraw-Hill Education

#### REFERENCE BOOKS:

**RB1.** Ashok N. Kamthane, “Object-Oriented Programming with ANSI And Turbo C++”, Pearson Education.

**RB2.** Schildt Herbert, “C++: The Complete Reference”, Tata McGraw Hill.

**RB3.** R. Lafore, “Object Oriented Programming using C++”, Galgotia Publications.

**Course Code: BCA 207**

**Course Name: Human Values and Ethics**

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**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. To distinguish between values and skills, and understand the significance of values in personal and professional life
2. To understand harmony at all the levels of human living, and live accordingly.
3. To understand the role of a human being in ensuring harmony in society and nature.
4. To apply the understanding of harmony in existence in their profession and lead an ethical life

**PRE-REQUISITES:**

None

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Identify and evaluate personal ethical values and their implications in various social situations	BTL1	PO10
CO2	Recognize the multiple ethical interests at stake in a real-world situation	BTL2	PO10
CO3	Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research	BTL3	PO10
CO4	Instill Moral and Social Values and Loyalty and appreciate the rights of others	BTL4	PO10
CO5	Comprehend the concept of harmony at all the levels of society and readiness to contribute towards harmony at all levels.	BTL5	PO10

### UNIT – I

**No. of Hours: 10**                      **Chapter/Book Reference: TB1 [Chapters-1, 2], TB2 [Chapters-1]**

**Introduction to human values:**

- Understanding the need, basic guidelines, process of value education
- Understanding the thought provoking issues- continuous happiness and prosperity
- Right understanding- relationship and physical facilities, choice making- choosing, cherishing and Acting
- Understanding values- Personal Values, Social values, Moral values and spiritual values, Self-Exploration and Awareness leading to Self-Satisfaction; Tools for Self-Exploration.

### UNIT-II

**No. of Hours: 10**                      **Chapter/Book Reference: TB2 [Chapters 5-10]**

**Harmony and role of values in family, society and human relations**

- Understanding harmony in the Family- the basic unit of human interaction; Understanding values in human-human relationship; Understanding harmony in the society-human relations.
- Interconnectedness and mutual fulfilment; Coexistence in nature.
- Holistic perception of harmony at all levels of existence-universal harmonious order in society. Visualizing a universal harmonium order in society- undivided society (Akhand Samaj), universal order (Sarvabhaum Vyawastha)- from family to world family.

### UNIT-III

**No. of Hours: 11**                      **Chapter/Book Reference: TB1 [Chapters-2, 3]**

**Coexistence and role of Indian Ethos:**

- Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self-regulation in nature
- Ethos of Vedanta; Application of Indian Ethos in organizations in management; Relevance of Ethics and Values in organizations in current times.

### UNIT-IV

**No. of Hours: 11**                      **Chapter/Book Reference: TB1 [Chapters-4, 5], TB2 [Chapters-12, 13]**

**Professional ethics**

- Understanding about Professional Integrity, respect and equality, Privacy, Building Trusting relationships, Co-operation, respecting the competence of other profession.
  - Understanding about taking initiative, promoting the culture of openness, depicting loyalty towards goals and objectives.
  - Ethics at the workplace: - cybercrime, plagiarism, sexual misconduct, fraudulent use of institutional resources, etc.;
- Ability to utilize the professional competence for augmenting universal human order.

**TEXT BOOKS:**

- TB1.** A Textbook on Professional Ethics and Human Values by R S Naagarazan.  
**TB2.** A Foundation Course in Human Values and Professional Ethics by R.R. Gaur, R. Sangal, G.P. Bagaria.  
**TB3.** Indian Ethos and Modern Management by B L Bajpai New Royal Book Co., Lucknow., 2004, Reprinted 2008.

**REFERENCE BOOKS:**

- RB1.** A N Tripathy, 2003, Human Values, New Age International Publishers  
**RB2.** Human Values and Professional Ethics by Vaishali R Khosla, Kavita Bhagat  
**RB3.** I.C. Sharma. Ethical Philosophy of India Nagin & co Julundhar



**Course Code: BCAT 211**  
**Course Name: Basics of Python Programming**

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### INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
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In this course, the learners will be able to develop expertise related to the following: -

1. To understand Python programming fundamentals
2. To define the structure and components of a Python program.
3. To apply fundamental problem-solving techniques using Python
4. To design and program applications using Python.

### PRE-REQUISITES:

1. **Computer Fundamentals**

### COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Demonstrate knowledge of basic programming constructs in python.	BTL2	PO1, PO2, PO3, PO7
CO2	Illustrates string handling methods and user-defined functions in python	BTL3	PO1, PO2, PO3, PO7, PO10
CO3	Applying data structures primitives like List, Dictionary and tuples.	BTL2	PO1, PO2, PO3, PO4
CO4	Identify the commonly used operations involved in file handling	BTL3	PO1, PO2, PO3, PO4, PO7
CO5	To understand how python can be used for application development	BTL2	PO1, PO2, PO3, PO4, PO11

### UNIT-I

**No. of Hours: 11**

**Chapter/Book Reference: TB1[Chapters 1, 2], TB2[Chapters 1, 3, 6]**

**Basic Introduction:** Origin, Need of Python Programming, Features, program structure, identifiers, reserved words, escape sequences, IDLE-Python Interpreter

**Python Programming Introduction:** Variables and assignment statements, data types, **Operators:** Assignment, Unary, Binary, Arithmetic, Relational, Logical, Bitwise Operator and membership operator

**Control Structures:** if-conditional statements, if –else condition, if-elif-else condition, nested if-elif-else condition, Iteration (for Loop and while loop), Nested Loops, break and continue statement.

**Strings:** Slicing, Membership, Built in functions (count, find, capitalize, title, lower, upper and swap case, replace, join, isspace (), isdigit(), split(), startswith(), endswith()).

### UNIT-II

**No. of Hours: 11**

**Chapter/Book Reference: TB1[Chapter 3], TB2[Chapters 7, 12]**

Mutable and Immutable objects: List: creating, initializing, accessing, slicing, and traversing List. List operations: length, concatenation, repetition, in, not in, max, min, sum, all, any. List methods: append, extend, count, remove, index, pop, insert, sort, reverse.

Tuples: creating tuples, Tuple operations: length, concatenation, repetition, membership, maximum, minimum, tuple methods: count, index.

Dictionary: creating, accessing values, adding, modifying and deleting items in dictionary, Dictionary methods: len, str, clear, copy, get, update, copy. Difference between list and dictionary

#### UNIT-III

**No. of Hours: 11**      **Chapter/Book Reference: TB1 [Chapters 5], TB2[Chapters 2, 8]**

**Concept of Functions:** Functions: Defining, Calling and Types of Functions, Arguments and Return Values, Formal vs. Actual Arguments, Scope and Lifetime, Keyword Arguments, Default Arguments, Recursion.

**Modules:** importing Modules, Math and Random Module, creating your own modules, and concept of Packages

#### UNIT-IV

**No. of Hours: 11**      **Chapter/Book Reference: TB2[Chapter 9], TB1[ Chapters 5, 7]**

**NumPy Library:** introduction to NumPy, Creation of One-Dimensional Arrays, Re-shaping of an Array, Element-wise Operations, Aggregate Operations, Array indexing, Array Slicing, insert Row/Columns, Append Row/Columns, Array Manipulation Operations.

**Introduction to matplotlib:** Bar Graphs , pie charts

**File handling:** Types of Files (Text file, Binary Files, CSV file), Creation, writing, appending, Insertion, deletion, updating, modification of Data in into the files.

#### TEXTBOOKS:

**TB1.** Programming in Python 3: A Complete Introduction to the Python Language (2nd Edition), Mark Summerfield.

**TB2.** Python Programming: A Modular Approach by TanejaSheetal, Kumar Naveen, Eleventh Impression, Pearson India Education Services Pvt. Ltd.

**TB3.** Agile tools for real world data: Python for Data Analysis by Wes McKinney, O'Reilly

#### REFERENCE BOOKS:

**RB1.** Let Us Python 2Nd Ed: Python Is Future, Embrace It Fast (Second Edition): YashvantKanetkar.

**RB2.** Programming Python, 4th Edition by Mark Lutz Released December 2010 Publisher(s): O'Reilly Media, Inc.

**RB3.** Python: The Complete Reference by Martin Brown.

**Course Code: BCAP 211**

**Course Name: Basics of Python Programming**

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**This is the associated practical paper. The learning outcomes are same as the corresponding theory paper.**

#### List of Practicals

S.No.	Problem Statement	Mapping to CO #
<b>Implement Minimum 10 out of 15 Practicals</b>		
1	Write a program to enter two integers, two floating numbers and then perform all arithmetic operations on them.	CO1
2	Write a program to check whether a number is an Armstrong number or not.	CO1
3	Write a program to print the sum of all the primes between two ranges.	CO1
4	Write a program to swap two strings.	CO1
5	Write a menu driven program to accept two strings from the user and perform the various functions using user defined functions.	CO1, CO2
6	Write a program to find smallest and largest number in a list	CO2, CO3
7	Create a dictionary whose keys are month names and whose values are the number of days in the corresponding months. <ul style="list-style-type: none"> <li>Ask the user to enter a month name and use the dictionary to tell them how many days are in the month.</li> <li>Print out all keys in the alphabetically order</li> <li>Print out all the months with 31 days</li> </ul>	CO2, CO3

	<ul style="list-style-type: none"> <li>• Print out the key value pairs sorted by number of days in each month</li> </ul>	
8	<p>Make a list of first 10 letters of the alphabet, then use the slicing to do the following operations:</p> <ul style="list-style-type: none"> <li>• Print the first 3 letters of the list</li> <li>• Print any 3 letters from the middle</li> </ul> <p>Print the letter from any particular index to the end of the list</p>	CO2, CO3
9	Write a program that scans an email address and forms a tuple of user name and domain.	CO2, CO3
10	Write a program that uses a user defined function that accepts name and gender (as M for Male, F for Female) and prefixes Mr./Ms. on the basis of the gender.	CO2, CO3
11	Write a program to display Bar graphs or Pie chart using Matplotlib.	CO2, CO3
12	Write a program that defines a function large in a module which will be used to find larger of two values and called from code in another module	CO2, CO3
13	<p>Write a program to know the cursor position and print the text according to specifications given below:</p> <ul style="list-style-type: none"> <li>• Print the initial position</li> <li>• Move the cursor to 4th position</li> <li>• Display next 5 characters</li> <li>• Move the cursor to the next 10 characters</li> <li>• Print the current cursor position</li> <li>• Print next 10 characters from the current cursor position</li> </ul>	CO2, CO3
14	<p>Create a binary file with roll number, name and marks. Input a roll number and perform the following operations:</p> <ul style="list-style-type: none"> <li>• update the marks.</li> <li>• Delete the record</li> <li>• Display the record</li> <li>• Append the record</li> <li>• Search the record</li> </ul>	CO4
15	Write a program to Create a CSV file by entering user-id and password, read and search the password for given user id	CO5
<p><b>Note: 1. In total 10 practicals to be implemented.</b>  <b>2. This is a suggestive list of practicals. However, the instructor may add or change any other database for executing queries as per the requirement.</b></p>		

**Course Code: BCAT 213**  
**Course Name: Cyber Security**

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### INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

1. Students will be able to understand and learn the concept, layers of Cyber Security.
2. Students will be able to learn about cybercrime and types of attack.
3. Students will be able to learn about how many tools and methods available of cybercrime.
4. To study about cybercrime real life examples and cases.
5. Students will be able to understand and learn about Ethical Hacking.
6. Students will be able to understand and learn about Cyber Forensics.

### PRE-REQUISITES:

1. Fundamentals of Information Technology

### COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Define the basic concept of Cyber Security, Cybercrime and Cybercriminals. Identify and understand about Cyber Threats.	BTL1 BTL2	PO1,PO2,PO3, PO7
CO2	Describe briefly types of criminal attack and classification of Cybercrimes. Describe Steganography.	BTL2	PO1,PO3, PO7
CO3	Identify and apply the Cybercrime Tools and Methods. Identify and apply the underlying concepts of Symmetric-key and Asymmetric-key Cryptography along with Digital Signature.	BTL1, BTL2, BTL3	PO1,PO3,PO6, PO8
CO4	Implement security for HTTP applications, Emails. Apply Firewall in your system.	BTL4	PO1,PO3,PO5, PO7
CO5	Implement, evaluate Keyloggers. Implement and evaluate different cyber security algorithms with the help of program.	BTL3, BTL5	PO1, PO4, PO6, PO7, PO8
CO6	Design and create security mechanisms to protect computer systems.	BTL6	PO1, PO4, PO6, PO7, PO8

### UNIT – I

**No. of Hours: 12**      **Chapter/Book Reference: TB1 [Chapters – 1, 2], TB2[Chapters - 1, 2]**

Introduction to Cyber Security: Basic Cyber Security Concepts, Layers of Cyber Security, Cybercrimes, Cybercriminals, Cyberspace, Cyber threats, Cyberwarfare, Classification of Cybercrimes, Categories of Cyber Crime, Types of criminal attack, cyberstalking, botnet, cybercrime and cloud computing.

### UNIT – II

**No. of Hours: 10**      **Chapter/Book Reference: TB1 [Chapters – 2, 3], TB2 [Chapter - 3, 4, 11]**

Cybercrime attacks on Mobile/Cell Phones, Introduction to Cybercrime Tools and Methods: phishing and its working, password cracking and its types, Keyloggers and its types, viruses, Trojan horse and backdoor, steganography, DoS & DDoS attack,

### UNIT – III

**No. of Hours: 10**      **Chapter/Book Reference: TB1 [Chapter – 4], TB3 [Chapter - 2, 21]**

Cryptography: Introduction to Cryptography, Symmetric-key Cryptography, Asymmetric-key Cryptography, User Authentication, Password Authentication, Message Authentication, Digital Signature.

Securing Web Application, Services: Introduction, Basic security for HTTP Applications, Email Security, Backup issues, Identity Management and Web Services, Authorization Patterns, Firewall

### UNIT – IV

**No. of Hours: 12**      **Chapter/Book Reference: TB1 [Chapter – 6], TB2 [Chapter - 7]**

Introduction to Cyber Forensics: Need of Cyber Forensics, Digital Evidence and its rules, RFC2822, Life cycle of Digital Forensics, process of Digital Forensics, Phases of Computer Forensics/Digital Forensics, Computer Forensics Investigation, Computer Forensics and Steganography, OSI 7-layer model to Computer Forensics.

### TEXT BOOKS:

**TB1.** Supriya Madan and Rajan Gupta, “Security in Cyber Space and its Legal Perspective”, 1<sup>st</sup> Edition, AGPH Books.

**TB2.** Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley.

**TB3.** Kevin Beaver, Hacking for Dummies Wiley Publishing, Inc.

**TB4.** Stallings and Brown, Computer Security: Principles and Practice, Fourth Edition, Publisher: Pearson, 2018.

### REFERENCE BOOKS:

**RB1.** Cyber Security Essentials, James Graham, Richard Howar and Ryan Otson, CRC Press.

**RB2.** Introduction to Cyber Security: Jeetendra Pande.

**RB3.** Certified Ethical Hacker STUDY GUIDE Kimberly Graves Sybex.

**Course Code: BCAP 213**

**Course Name: Cyber Security**

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<b>0</b>	<b>2</b>	<b>1</b>

**This is the associated practical paper. The learning outcomes are same as the corresponding theory paper.**

### List of Practicals

S.No.	Problem Statement	Mapping to CO #
1	Install and configure any Antivirus software on System	CO1
2	Implement prevention mechanisms to protect PC from Cyber Attack	CO1
3	Implement Steganography Algorithms	CO2
4	Implement and install the keyloggers to understand their working.	CO5
5	Implement hiding of Data in image using tools.	CO3
6	Apply security to Files/ Folder/ Application using access permissions	CO4
7	Study of System threat attacks - Denial of Services.	CO4

8	Study of Techniques uses for Web Based Password Capturing.	CO5
9	Study of Anti-Intrusion Technique – Honey pot.	CO6
10	Study of Sniffing and Spoofing attacks.	CO6
<b>Note:</b> <b>1. In total 10 practicals to be implemented.</b> <b>2. This is a suggestive list of practicals. However, the instructor may add or change any other database for executing queries as per the requirement.</b>		

**Course Code: BCA 221**  
**Course Name: Principles of Management & Organizational Behaviour**

**L T C**  
**3 1 4**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

**LEARNING OBJECTIVES:**

In this course, the learners will be able to develop expertise related to the following:

1. To get the knowledge about the important management concepts and their applications.
2. To help the students to develop cognizance of the importance of management principles.
3. To have an insight of various functional departments in an organization.
4. To help the organization in understanding Organizational culture.

**PRE-REQUISITES:**

None

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Develop basic knowledge about management, management process, managerial roles, skills and functions and management theories.	BTL2,1	PO1, PO2
CO2	To give knowledge about planning and decision making process. To describe about staffing and directing.	BTL2,4	PO2, PO1
CO3	To learn about the motivation theories and Leadership styles. To discuss about the Organizational behaviour and its application.	BTL4,6	PO3
CO4	To give basic knowledge people management, their personality and perception. To describe about the Organisational culture and its effects.	BTL5,2	PO3

**UNIT – I**

**No. of Hours: 12**      **Chapter/Book Reference: TB1 [Chapters – 1, 2, 4]**

**Management:** Meaning & concept, Management principles (Fayol & Taylor), Management process (in brief), Managerial levels, Skills, Roles and Functions of a manager, Management Theories (Classical, Neo classical, Behavioral, Systems & Contingency).

**UNIT – II**

**No. of Hours: 10**      **Chapter/Book Reference: TB1 [Chapters – 7, 8, 10, 16, 17, 27, 28]**

**Planning:** Meaning, Purpose & process, Decision making: Concept & process, Organizing: Process, Departmentation, Authority & Responsibility relationships, Decentralization.

**Staffing:** Concept, nature & importance of staffing and Directing.

**UNIT – III**

**No. of Hours: 12**      **Chapter/Book Reference: TB1 [Chapters – 13, 18, 32, 33]**

**Motivation:** concept & theories (Maslow's, Herzberg Two factor, McGregor's theory X & Y), Leadership: Concepts & styles. Controlling: Nature, Importance, significance & Process of control.

**Organizational Behavior:** concept and Nature of Organisational Behaviour, Importance, Challenges and Opportunities. Organizational culture: Meaning, importance and characteristics of organization culture.

#### UNIT – IV

**No. of Hours: 10**                      **Chapter/Book Reference: TB1 [Chapters –34, 35, 36, 40, 41]**

**Managing People** - Meaning, Need of understanding human behavior in organization, Models of OB, Major concepts in OB (elementary) - Personality, Learning, concept of perception & perception theories, Attitude Building and Leadership.

#### TEXT BOOKS:

**TB1.** Dr. C.B Gupta “Management concepts & practices” S.Chand & Sons, 2009.

#### REFERENCES BOOKS:

**RB.** Stoner, Freeman & Gilbert, “Management” 6th Edition, Pearson International.

**RB2.** Ankur Chhabra, “Organisational Behaviour”, Sun India Publications, 2009

**RB3.** Robbins, Stephen P, “Organisational Behaviour”. PHI, 2010



**Course Code: BCA-239**  
**Course Name: Cyber Ethics**

**L T/P C**  
**2 0 2**

**INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
  2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
  3. Examiners are requested to go through the Course Outcomes(CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy(BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.
2. Students will learn about impacting issues, laws, and developments that will help shape their future within the business community through technology
  3. To facilitate students to grow and develop professionally and morally through readings, class participation, and course activities.

**PRE-REQUISITES:**

None

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Define cyber ethics and recognize cyber ethic issues	BTL1	PO10
CO2	Identify how security issues in cyberspace raise ethical concerns.	BTL3 BTL5	PO10
CO3	Recognize various types of cybercrime and its impact	BTL3 BTL5	PO10
CO4	Discuss ethical issues associated with the use of social networks and social media	BTL3 BTL5	PO10
CO5	Survey recent whistle-blowing cases focusing on associated ethical issues	BTL5	PO10

**UNIT – I**

**No. of Hours: 05**      **Chapter/Book Reference: TB1 [Chapters – 1, 2,3]**

Emergence of cyber space. Cyber Jurisprudence, Cyber Ethics, Ethics for IT Workers and IT Users, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions The Importance of Cyber Law, Significance of cyber Ethics, Need for Cyber regulations and Ethics.

**UNIT – II**

**No. of Hours: 05**      **Chapter/Book Reference: TB1 [Chapters – 1, 2,3]**

Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access. Cyberattacks and Cybersecurity, Privacy\_Issues

**UNIT – III**

**No. of Hours: 05**      **Chapter/Book Reference: TB1 [Chapters – 4,5,6]**

Freedom of Expression, Intellectual Property Issues, Ethical Decisions in Software Development,

Social Media Ethical issues

Ethical Issues in AI and core Principles, Introduction to Block chain Ethics.

**UNIT – IV**

**No. of Hours: 08**

**Chapter/Book Reference: TB1 / Online articles / News and legal case**

Discussion on articles, companies, or legal cases that deal with an ethical issue. Students are required to analyze and present at least one multinational company and investigate its ethical policies and practices. These policies can normally be found using any search engine.

**TEXT BOOKS:**

**TB1.** Cyber Ethics 4.0 Serving Humanity with Values Editors Christoph Stückelberger / Pavan Duggal e-book by Globalethics.net available for download from <https://repository.globethics.net/handle/20.500.12424/169317>

**REFERENCE BOOKS:**

The students may refer free e-books or online latest articles, news and legal cases dealing cyber ethical issues for understanding the importance of cyber ethics.

**Course Code: BCA 271**  
**Course Name: Practical – VII C++ Lab**

**L T/P C**  
**0 4 2**

**LEARNING OBJECTIVES:**

In this course, the learners will be able to:

1. Develop concepts related to Object Oriented Programming
2. Construct object oriented solutions in real world scenarios

**PRE-REQUISITES:**

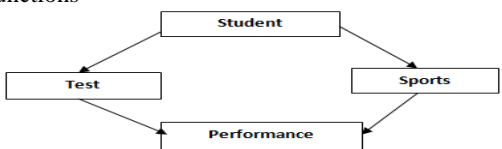
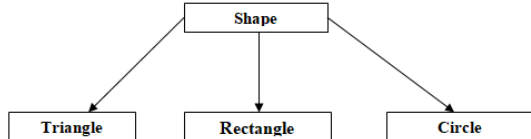
1. Knowledge of C programming
2. Basics of Programming

**COURSE OUTCOMES (COs):**

After completion of this course, the learners will be able to: -

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Implement basic concepts of Object Oriented Programming	BTL 3	PO3
CO2	Implement the concept of Classes and Objects	BTL 3	PO2
CO3	Analyse and apply various polymorphism techniques to solve real life problems	BTL 4	PO2, PO4
CO4	Implement Generic Classes, Exception Handling and various file operations	BTL 4	PO4

List of Practicals		
S. No.	Detailed Statement	Mapping to CO #
<b>Core Practicals (Implement minimum 8 out of 10 practicals)</b>		
1	WAP to implement ' <i>Inline function</i> '	CO1
2	WAP to implement call by reference and return by reference using class. [Hint. Assume necessary functions]	CO1
3	WAP to implement friend function by taking some real life example	CO2
4	WAP to implement ' <i>Function Overloading</i> '	CO3
5	WAP to implement <i>Parameterized Constructor, Copy Constructor</i> and <i>Destructor</i>	CO2
6	WAP to show the usage of constructor in base and derived classes, in multiple inheritance	CO3
7	WAP to show the implementation of ' <i>containership</i> '	CO3
8	WAP to show swapping using template function (Generic)	CO4
9	WAP to implement ' <i>Exception Handling</i> '	CO4
10	WAP to read and write values through object using file handling	CO4

Application Based Practicals (Implement minimum 5 out of 10 practicals)		
11	Create a class employee which have name, age and address of employee, include functions getdata() and showdata(), getdata() takes the input from the user, showdata() display the data in following format: <i>Name:</i> <i>Age:</i> <i>Address:</i>	CO2
12	Write a class called <b>CAccount</b> which contains two private data elements, an integer <b>accountNumber</b> and a floating point <b>accountBalance</b> , and three member functions: <ul style="list-style-type: none"> <li>A constructor that allows the user to set initial values for <b>accountNumber</b> and <b>accountBalance</b> and a default constructor that prompts for the input of the values for the above data numbers.</li> <li>A function called <b>inputTransaction</b>, which reads a character value for <b>transactionType</b>('D' for deposit and 'W' for withdrawal), and a floating point value for <b>transactionAmount</b>, which updates <b>accountBalance</b>.</li> </ul> A function called <b>printBalance</b> , which prints on the screen the <b>accountNumber</b> and <b>accountBalance</b> .	CO2
13	Define a class <i>Counter</i> which contains an int variable <i>count</i> defined as static and a static function Display () to display the value of <i>count</i> . Whenever an object of this class is created <i>count</i> is incremented by 1. Use this class in main to create multiple objects of this class and display value of count each time	CO2
14	WAP to add and subtract two complex numbers using classes	CO2
15	Write program to overload Binary + to add two similar types of objects. (Both with and without using friend functions)	CO3
16	WAP to implement += and = operator	CO3
17	Implement the following class hierarchy considering appropriate data members and member functions  <pre> graph TD     Student --&gt; Test     Student --&gt; Sports     Test --&gt; Performance     Sports --&gt; Performance </pre>	CO3
18	Implement the following hierarchy considering appropriate data members and member functions (use Virtual functions).  <pre> graph TD     Shape --&gt; Triangle     Shape --&gt; Rectangle     Shape --&gt; Circle </pre>	CO3
19	WAP to convert meter to centimeter and vice versa, using data conversions and operator overloading	CO3
20	WAP to count digits, alphabets and spaces, stored in a text file, using streams	CO4
<b>Note:</b> <b>1. In total 15 practical to be implemented. 2 additional practical may be given by the course instructor.</b> <b>2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.</b>		