



**Graphic Era**  
Deemed to be University

# **Program Curriculum**

## **Bachelor of Computer Applications Degree Program**

**Program Code: OBC**

**Directorate of Distance and Online Education**

**Batch 2023-2026**

## University's Vision, Mission, and Core Values

**Vision:** We visualize Graphic Era (Deemed to be University) as an internationally recognized, equity-driven, ethically engaged, diverse community whose members work collaboratively for positive transformation in the world, through leadership in teaching, research, and social action.

**Mission:** The mission of the university is to promote learning in true spirit and offering knowledge and skills in order to succeed as professionals. The university aims to distinguish itself as a diverse, socially responsible learning community with a high-quality scholarship and academic rigor

### Core Values:

- Continuous learning and improvement
- Simplicity
- Integrity and trust
- Ethics

## Program Curriculum: Bachelor of Computer Applications

1. **Title of the Degree:** Bachelor of Computer Applications (BCA)
2. **Mode of Study:** Fully Online
3. **Program Curriculum will be Effective From:** The Academic Year 2023-2024
4. **Rationale for the Programme:**

Computers, computer networks, and mobile computing have catalyzed the disruption of digital evolution. In the recent past, fast-growing information and communication technology (ICT) is the backbone of strategic planning in most business houses, government organizations, and educational institutes globally. Organizations that seek to leverage the latest technologies and communication tools require expert professionals who can apply the principles of computer science and information technology to solve their problems effectively.

Graphic Era Deemed to be University's BCA is a three-year, six-semester, undergraduate programme. The program is designed to function as the runway from the university to the vast expanse of the professional career space. The curriculum of the BCA program is designed to meet the growing demand for qualified professionals in the field of ICT. It is designed to provide a potent blend of theoretical knowledge and practical skills in core ICT areas like database management, computer networks, data structures, and numerous programming languages. The curriculum also gives exposure to advanced topics such as cyber security and mobile application development. Further, it includes courses that prepare the student in financial accounting and professional skills paving the way for career success in the field of computer applications.

Career opportunities for BCA graduates are infinite. The program enables the graduates to pursue multi-faceted, lucrative, global careers as system analysts, system managers, project managers, database administrators, system designers, applications developers, and programmers in corporate houses, government organizations, and educational institutes.

## 5. Program Educational Objectives (PEOs)

The objectives of the BCA Programme are to:

**PEO-1.** To produce students employable towards building a successful career based on a sound understanding of theoretical and applied aspects as well as methodology to solve multidisciplinary real-life problems.

**PEO-2.** To produce professional graduates ready to work with a sense of responsibility, and ethics and enable them to work efficiently individually and as a team.

**PEO-3.** To impart competency in students so that they can pursue higher studies and research in areas of engineering and other professionally related fields.

**PEO-4.** To inculcate the ability to adapt to changing technology through continuous learning.

## 6. Programme Outcomes (POs)

Serial Number	Graduate Attribute Theme	The Complete PO Statement
		After the successful completion of the BCA program, the graduates will be able to:
PO-1.	Knowledge Application	Apply the knowledge of mathematics, management, and computer applications to the solution of complex real-world problems.
PO-2.	Problem Analysis	Identify, formulate, review, and analyze complex problems reaching substantiated conclusions using principles of mathematics, management sciences, and computer applications.
PO-3.	Design And Development of Solutions	Design solutions for complex real-world problems and design system components or processes that meet the specified needs with appropriate consideration for health and safety, and cultural, societal, and environmental considerations.
PO-4.	Modern Tool Usage	Create, select, and apply appropriate techniques, resources, and modern computer software and IT tools including prediction and modeling to complex software engineering activities with an understanding of the limitations.
PO-5.	Environment And Sustainability	Understand the impact of professional software engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO-6.	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the development practice.
PO-7.	Individual and Teamwork	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

<b>PO-8.</b>	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO-9.</b>	Project Management and Finance	Demonstrate knowledge and understanding of the software engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO-10.</b>	Life-Long Learning	Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## 7. Programme Specific Outcomes (PSOs)

At the end of the BCA program, the graduate will be able to:

- PSO-1.** Ability to analyze, design, implement and test software systems based on requirement specifications and development methodologies of software systems.
- PSO-2.** Develop the applications to solve computational tasks and model real-world problems using appropriate programming language, data structure, and algorithms.
- PSO-3.** Ability to explore application-based technological advancements in various domains, evaluate their merits and identify research gaps to provide solutions to new ideas and innovations.

## 8. Program Structure:

Semester 1				
Sl. No.	Course Type*	Course Code	Course Title	Credits
1	DSC	23OBC101	Computational Thinking and Fundamentals of IT	3
2	DSC	23OBC102	Foundations of Computer Programming	4
3	DSC	23OBC103	Mathematical Foundations of Computer Science	3
4	AEC	23OBC104	Professional English Skills	3
5	GE	<b>General Elective - 1</b>		3
		23OBC105A	Principles and Practices of Management	
		23OBC105B	Introduction to Business Accounting	
6	DSC	23OBC106	C Programming Laboratory	2
7	SEC	23OBC107	Digital Productivity Tools for Modern Workplaces	2
8	SEC	23OBC108	Seminar - 1	1
9	VAC	23OBC109	General Proficiency/NCC/Sports/Yoga/Healthy Living and Fitness	1
<b>Total Credits Over the Semester</b>				<b>22</b>
*DSC: Discipline-Specific Core Course AEC: Ability Enhancement Course		DSE: Discipline-Specific Elective Course SEC: Skill-Enhancement Course		GE: General Elective Course VAC: Value Addition Course

Semester 2				
Sl. No.	Course Type	Course Code	Course Title	Credits
1	DSC	23OBC201	Data Structures and File Organization	4
2	DSC	23OBC202	Introduction to Object-Oriented Programming	3
3	DSC	23OBC203	Introduction to Operating Systems	3
4	DSC	23OBC204	Discrete Mathematics	3
5	GE	<b>General Elective - 2</b>		2
		23OBC205A	Indian Culture	
		23OBC205B	Fine and Performing Arts	
6	VAC	23OBC206	Indian Constitution	0
7	AEC	23OBC207	Environmental Science	2
8	DSC	23OBC208	Data Structures Laboratory	2
9	DSC	23OBC209	Object-Oriented Programming Laboratory	2
10	VAC	23OBC210	General Proficiency/NCC/Sports/Yoga/Seminar/Science of Happiness	1
<b>Total Credits Over the Semester</b>				<b>22</b>

Semester 3				
Sl. No.	Course Type	Course Code	Course Title	Credits
1	DSC	23OBC301	Web Application Development	3
2	DSC	23OBC302	Introductions to Database Management Systems	3
3	DSC	23OBC303	Digital Logic Design	3
4	DSC	23OBC304	Python Programming	3
5	DSE	<b>Discipline-Specific Elective - 1</b>		3
		23OBC305A	Probability and Statistics	
		23OBC305B	R Programming	
		23OBC305C	Principles of Programming Languages	
6	AEC	23OBC306	Skills for Career Success - 1	1
7	DSC	23OBC307	Database Management Systems Laboratory	2
8	DSC	23OBC308	Web Application Development Laboratory	2
9	SEC	23OBC309	Mini Project - 1	2
<b>Total Credits Over the Semester</b>				<b>22</b>

Semester 4				
Sl. No.	Course Type	Course Code	Course Title	Credits
1	DSC	23OBC401	Introduction to Design and Analysis of Algorithms	3
2	DSC	23OBC402	Introduction to Software Engineering	3
3	DSC	23OBC403	Computer Organization	3
4	DSC	23OBC404	Data Communications and Computer Networks	3
5	DSE	<b>Discipline-Specific Elective - 2</b>		3
		23OBC405A	Big Data Analytics	
		23OBC405B	Introduction to UNIX	
		23OBC405C	Management Information Systems	
6	SEC	23OBC406	Skills for Career Success - 2	1
7	DSC	23OBC407	Design and Analysis of Algorithms Laboratory	2
8	DSC	23OBC408	Data Communications and Computer Networks Laboratory	2
9	SEC	23OBC409	Mini Project - 2	2
<b>Total Credits Over the Semester</b>				<b>22</b>

Semester 5				
Sl. No.	Course Type	Course Code	Course Title	Credits
1	DSC	23OBC501	Introduction to Java	3
2	DSC	23OBC502	Introduction to Artificial Intelligence	3
3	DSC	23OBC503	Introduction to Microcontrollers	3
4	GE	<b>General Elective - 3</b>		3
		23OBC504A	Community Engagement and Social Responsibility	
		23OBC504B	Gardening and Horticulture	
5	DSE	<b>Discipline-Specific Elective - 3</b>		2
		23OBC505A	UI-UX Design Fundamentals	
		23OBC505B	Object-Oriented Analysis and Design	
		23OBC505C	Introduction to .NET Programming	
6	SEC	23OBC506	Skills for Career Success - 3	1
7	DSC	23OBC507	Artificial Intelligence Laboratory	2
8	DSC	23OBC508	Java Programming Laboratory	2
9	SEC	23OBC509	Mini Project - 3	3
<b>Total Credits Over the Semester</b>				<b>22</b>

Semester 6				
Sl. No.	Course Type	Course Code	Course Title	Credits
1	DSC	23OBC601	Introduction to Machine Learning	4
2	DSC	23OBC602	Introduction to Mobile Application Development	3
3		<b>Discipline-Specific Elective - 4</b>		3
		23OBC603A	Cryptography	
		23OBC603B	Network Security	
		23OBC603C	Cybersecurity	
4		<b>Discipline-Specific Elective - 5</b>		3
		23OBC604A	Computer Graphics	
		23OBC604B	Mobile Communication	
		23OBC604C	University-Approved MOOC or Certification	
5		23OBC605	Mobile Application Development Laboratory	2
6		23OBC606	Machine Learning Laboratory	2
7		23OBC607	Capstone Project	5
<b>Total Credits Over the Semester</b>				<b>22</b>
<b>Total Program Credits</b>				<b>132</b>

## 9. Programme Articulation Matrix (Course-PO-PSO Map)

Sem.	Course Title	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
1	Computational Thinking and Fundamentals of IT													
1	Foundations of Computer Programming													
1	Mathematical Foundations of Computer Science													
1	Professional English Skills													
1	Principles and Practices of Management													
1	Introduction to Business Accounting													
1	C Programming Laboratory													
1	Digital Productivity Tools for Modern Workplaces													
1	Seminar - 1													
1	General Proficiency/NCC/Sports/Yoga/Healthy Living and Fitness													
2	Data Structures and File Organization													
2	Introduction to Object-Oriented Programming													
2	Introduction to Operating Systems													
2	Discrete Mathematics													
2	Indian Culture													
2	Fine and Performing Arts													
2	Indian Constitution													
2	Environmental Science													
2	Data Structures Laboratory													
2	Object-Oriented Programming Laboratory													
2	General Proficiency/NCC/Sports/Yoga/Seminar/Science of Happiness													
3	Web Application Development													
3	Introductions to Database Management Systems													
3	Digital Logic Design													
3	Python Programming													
3	Probability and Statistics													
3	R Programming													
3	Principles of Programming Languages													
3	Skills for Career Success - 1													
3	Database Management Systems Laboratory													
3	Web Application Development Laboratory													
3	Mini Project - 1													
4	Introduction to Design and Analysis of Algorithms													
4	Introduction to Software Engineering													
4	Computer Organization													
4	Data Communications and Computer Networks													
4	Big Data Analytics													
4	Introduction to UNIX													
4	Management Information Systems													
4	Skills for Career Success - 2													
4	Design and Analysis of Algorithms Laboratory													
4	Data Communications and Computer Networks Laboratory													
4	Mini Project - 2													



Sem.	Course Title	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
5	Introduction to Java													
5	Introduction to Artificial Intelligence													
5	Introduction to Microcontrollers													
5	Community Engagement and Social Responsibility													
5	Gardening and Horticulture													
5	Discipline-Specific Elective - 3													
5	UI-UX Design Fundamentals													
5	Object-Oriented Analysis and Design													
5	Introduction to .NET Programming													
5	Skills for Career Success - 3													
5	Artificial Intelligence Laboratory													
5	Java Programming Laboratory													
5	Mini Project - 3													
6	Introduction to Machine Learning													
6	Introduction to Mobile Application Development													
6	Cryptography													
6	Network Security													
6	Cybersecurity													
6	Computer Graphics													
6	Mobile Communication													
6	University-Approved MOOC or Certification*													
6	Mobile Application Development Laboratory													
6	Machine Learning Laboratory													
6	Capstone Project													
*The CO-PO-PSO mapping depends on the course/certification chosen by the student.														

**10. Programme Regulations:** The regulations guiding this programme are available in the Program Guide.

# 22BCGNDST101 - Computational Thinking and Fundamentals of IT

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	Computational Thinking and Fundamentals of IT
<b>Course Code</b>	22BCGNDST101
<b>Course Credits</b>	3
<b>Course Type</b>	Core Course

## 1. Course Summary

The aim of this course is to familiarize students with the fundamental concepts and principles of computational thinking and information technology. The course emphasizes the pillars of computational thinking, including problem-solving strategies and algorithmic thinking. Additionally, the course covers the basic components of computer systems, including hardware and software, operating systems, data communication, and programming languages. Overall, the course provides an overview of the field of computational thinking and information technology. By the end of the course, students will be able to develop algorithms to solve real-world problems.

## 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- CO-1.** Recall the fundamental concepts of computational thinking and problem-solving strategies. [L-1]
- CO-2.** Explain the importance of algorithmic thinking and develop basic algorithms. [L-2]
- CO-3.** Analyze the functional units of a computer. [L-3]
- CO-4.** Evaluate the different types of computer storage and software. [L-4]
- CO-5.** Synthesize the knowledge of number systems and data communication. [L-5]

## 3. Course Contents

<b>Sr. No</b>	<b>Units</b>
1	<b>Unit 1: Introduction to Computational Thinking and Problem Solving</b> <ul style="list-style-type: none"><li>• What is Computational Thinking</li><li>• How is computational thinking used</li><li>• Information and Data: Converting Information into Data</li><li>• Data Types:<ul style="list-style-type: none"><li>○ Numbers</li><li>○ Text</li><li>○ Colors</li><li>○ Pictures</li><li>○ Sound</li></ul></li><li>• Classic Puzzle Solving</li><li>• General Problem Solving Techniques</li><li>• Pseudocode</li></ul>

2	<b>Unit 2: Algorithmic Thinking</b> <ul style="list-style-type: none"> <li>• Flowchart <ul style="list-style-type: none"> <li>○ Definition of Flowchart</li> <li>○ Advantages of flowchart</li> <li>○ Flowchart symbols</li> <li>○ Examples of flowchart (Sequential, branching, looping)</li> </ul> </li> <li>• Algorithms <ul style="list-style-type: none"> <li>○ Definition of Algorithm</li> <li>○ Characteristics of an Algorithm</li> <li>○ Examples of Algorithm (sequencing, selection, iteration)</li> </ul> </li> </ul>
3	<b>Unit 3: Introduction to Computers and Basic Computer Organization</b> <ul style="list-style-type: none"> <li>• Definition of a computer</li> <li>• Characteristics of a computer</li> <li>• Evolution of computers</li> <li>• Functional Units of a computer</li> <li>• Generations of computers</li> <li>• Classification Of computers</li> <li>• Applications of computers</li> <li>• Capabilities and limitations of a computer</li> <li>• Role of I/O devices in a computer system</li> <li>• Input Units <ul style="list-style-type: none"> <li>○ Keyboard</li> <li>○ Mouse</li> <li>○ Joystick</li> <li>○ Scanner</li> <li>○ Microphone</li> <li>○ Webcam</li> <li>○ Voice Recognition System</li> <li>○ Touch Screen</li> </ul> </li> <li>• Output Units <ul style="list-style-type: none"> <li>○ Monitors and its types</li> <li>○ Printers and its types</li> <li>○ Speakers</li> <li>○ Plotters</li> <li>○ Projectors</li> <li>○ Sound cards</li> </ul> </li> </ul>
4	<b>Unit 4: Computer Storage and Software</b> <ul style="list-style-type: none"> <li>• Data storage and retrieval methods</li> <li>• Primary Storage <ul style="list-style-type: none"> <li>○ RAM</li> <li>○ ROM</li> <li>○ PROM</li> <li>○ EPROM</li> <li>○ EEPROM</li> </ul> </li> <li>• Secondary Storage <ul style="list-style-type: none"> <li>○ Magnetic Tapes</li> <li>○ Magnetic Disks</li> <li>○ Cartridge tapes</li> <li>○ Hard disks</li> <li>○ Floppy disks</li> <li>○ Optical Disks</li> <li>○ Compact Disks</li> <li>○ Zip Drive</li> <li>○ Flash Drives</li> <li>○ Solid State Drives</li> </ul> </li> <li>• Software and its needs</li> </ul>

	<ul style="list-style-type: none"> <li>• System Software <ul style="list-style-type: none"> <li>○ Operating System</li> <li>○ Utility Programs</li> </ul> </li> <li>• Operating System <ul style="list-style-type: none"> <li>○ Objectives and functions</li> <li>○ Assemblers</li> <li>○ Compilers and Interpreters</li> <li>○ Multiprogramming</li> <li>○ Multitasking</li> <li>○ Multiprocessing</li> <li>○ Time Sharing</li> <li>○ DOS</li> <li>○ Windows</li> <li>○ Unix/Linux</li> </ul> </li> <li>• Application Software <ul style="list-style-type: none"> <li>○ Word Processing</li> <li>○ Spreadsheets</li> <li>○ Presentation</li> <li>○ Graphics</li> <li>○ DBMS Software</li> </ul> </li> <li>• Programming Languages <ul style="list-style-type: none"> <li>○ Machine Language</li> <li>○ Assembly Language</li> <li>○ High-Level Language</li> </ul> </li> </ul>
5	<p><b>Unit 5: Number System and Data Communication</b></p> <ul style="list-style-type: none"> <li>• Decimal number system</li> <li>• Binary number system</li> <li>• Octal number system</li> <li>• Hexadecimal number system</li> <li>• Conversions <ul style="list-style-type: none"> <li>○ Binary ↔ Decimal</li> <li>○ Binary ↔ Octal</li> <li>○ Binary ↔ Hexadecimal</li> <li>○ Octal ↔ Decimal</li> <li>○ Hexadecimal ↔ Decimal</li> <li>○ Octal ↔ Hexadecimal</li> </ul> </li> <li>• Complement <ul style="list-style-type: none"> <li>○ 1's Complement</li> <li>○ 2's Complement</li> </ul> </li> <li>• Signed and Unsigned numbers</li> <li>• Binary Coded Decimal (BCD)</li> <li>• Gray code</li> <li>• Data communication <ul style="list-style-type: none"> <li>○ Definition of data communication</li> <li>○ Components of data communication</li> </ul> </li> <li>• Types of data communication</li> <li>• Types of Networks <ul style="list-style-type: none"> <li>○ Local Area Networks (LANs)</li> <li>○ Metropolitan Area Networks (MANs)</li> <li>○ Wide Area Networks (WANs)</li> <li>○ Wireless</li> </ul> </li> <li>• Introduction to network protocols</li> </ul>

#### 4. Course Articulation Matrix (CO-PO-PSO Map)

	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
CO-1	3		2	3				1		1	2	3	
CO-2	3	2	3	1				2		1	2	3	2
CO-3	3	3	3	2				2		1	3	3	2
CO-4	3	2	3	2				2		1	3	2	2
CO-5	3	3	3	2				2		2	3	3	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

## 5. Course Resources

### a. Essential Reading

1. Norton, P., & Peter, C. (2017). Introduction to computers (8th ed.). McGraw-Hill.
2. Riley, D., & Hunt, K. (2014). Computational thinking for the modern problem solver. Chapman & Hall/CRC.
3. Spraul, V. A. (2012). Think like a programmer: An introduction to creative problem solving. No Starch Press.

### b. Recommended Reading

1. Leon, A., & Leon, M. (2021). Introduction to computers (8th ed.). Vikas Publishing.
2. Sinha, P. K., & Sinha, P. (2021). Computer fundamentals (6th ed.). BPB.
3. Xu, Z., & Zhang, J. (2021). Computational thinking: A perspective on computer science (1st ed.). Springer.
4. Zingaro, D. (2020). Algorithmic thinking: A problem-based introduction (1st ed.). No Starch Press.

### c. Magazines and Journals

1. IEEE Transactions on Computers
2. Journal of Computational Thinking Education, Springer

### d. Websites

1. <https://www.coursera.org/learn/computational-thinking-problem-solving>
2. [https://onlinecourses.swayam2.ac.in/cec19\\_cs06/preview](https://onlinecourses.swayam2.ac.in/cec19_cs06/preview)

### e. Other Electronic Resources

1. <https://scratch.mit.edu/>
2. <https://academy.cs.cmu.edu/>

## 22BCGNDST102 – Foundations of Computer Programming

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	Foundations of Computer Programming
<b>Course Code</b>	22BCGNDST102
<b>Course Credits</b>	4
<b>Course Type</b>	Core Course

## 1. Course Summary

The aim of this course is to create a strong foundation in C programming. The students are taught the basic components of C programming language and the process of their implementation. The students are taught algorithms, flowcharts, different C programming constructs, built-in and derived data structures, operators, and functions. This course also emphasizes dynamic memory allocation using pointers and various file-handling functions. Students are trained to employ the principles of C programming to develop suitable computer programs for the given problem.

## 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

**CO-1.** Explain the basics of C programming language [L-1]

**CO-2.** Demonstrate the concept of arrays, structures, unions, and pointers [L-2]

**CO-3.** Apply control and looping structures to solve problems [L-3]

**CO-4.** Analyze a solution to large world problem using library and user-defined functions [L-4]

**CO-5.** Create C programs with file manipulation functions for applications with large amounts of data. [L-6]

## 3. Course Contents

Sr. No	Units
1	<b>Unit 1: Introduction to Programming in C</b> <ul style="list-style-type: none"><li>• History of C, Structure of a C Program</li><li>• printf(), scanf(), Hello World Program, Format Specifiers, Single Character input/output, Formatted input/output Functions, commenting and documentation, indentation and formatting guidelines</li><li>• Constants and variables, Types of Constants, Keywords, Rules for identifiers, The character set</li><li>• Built-in data types: int, float, char, double, long, void</li><li>• Operators: Arithmetic Operators, Increment and Decrement Operators, Relational Operators, Logical Operators, Bitwise Operators, Conditional Operators, Type Conversions, and expressions, Precedence, and associativity of operators</li></ul>
2	<b>Unit 2: Control Flow and Branching</b> <ul style="list-style-type: none"><li>• Simple if, if-else, nested if-else, the if-else ladder</li><li>• Unconditional branching using the goto statement</li><li>• break and continue</li><li>• the switch statement</li><li>• for, while, and do-while loop</li><li>• Importance of Programming Style for readability and maintainability, Code organization</li><li>• Debugging importance, tools common errors: syntax, logic and runtime errors, debugging, and Testing C Programs</li></ul>
3	<b>Unit 3: Functions, Pointers</b> <ul style="list-style-type: none"><li>• Library Functions</li><li>• User Defined Functions, Function Prototype, Function Definition, and Function Call, Types of User-Defined Functions</li><li>• Passing and returning parameters to and from Function</li><li>• Storage classes: automatic, static, register, external</li><li>• Need of Pointers, Pointer Variables, Address, and dereferencing Operators</li><li>• Pointer Arithmetic</li></ul>

	<ul style="list-style-type: none"> <li>• Dynamic Memory Allocation, Comparison of static and dynamic memory allocation, malloc () and free () Functions</li> <li>• Pointers and Strings</li> </ul>
4	<b>Unit 4: Arrays, Strings</b> <ul style="list-style-type: none"> <li>• One-dimensional arrays: Declaration, initialization, Operations on a one-dimensional array, lists, searching, sorting</li> <li>• Multi-dimensional arrays: Declaration, initialization, Examples of Matrix Operations using Two-dimensional arrays.</li> <li>• Declaring and Initializing Strings, String Input/Output gets(), puts(), fgets(), fputs() , and String Handling Functions</li> </ul>
5	<b>Unit 5: Structures, Unions, and File Handling</b> <ul style="list-style-type: none"> <li>• Define Structure, Declaration, and Initialization</li> <li>• Structure Variables, Array of Structures, and Use of typedef</li> <li>• Passing Structures to Functions</li> <li>• Define union, Declaration, and Initialization</li> <li>• Passing structures to functions</li> <li>• Opening and Closing a Data File</li> <li>• File Modes and Operations</li> <li>• File Input, and Output, Functions related to Data File Manipulations</li> </ul>
6	<b>Unit 6: Preprocessor, Recursion</b> <ul style="list-style-type: none"> <li>• Preprocessor Definition</li> <li>• Macro Substitution directives</li> <li>• File Inclusion Directives</li> <li>• Command Line Arguments</li> <li>• Recursion: Definition, Need of Recursion</li> <li>• Applications of Recursion in Real World</li> <li>• Examples: Factorial, Fibonacci Series</li> </ul>

#### 4. Course Articulation Matrix (CO-PO-PSO Map)

	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
CO-1	3	3	3	2		1	1	1	2	2	3	2	2
CO-2	3	3	3	2		1	2	2	2	2	3	2	3
CO-3	2	3	3	3		2	2	2	2	2	3	2	2
CO-4	2	3	3	2	1	2	2	2	3	2	3	2	3
CO-5	3	3	3	3	1	2	2	3	3	2	3	3	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

#### 5. Course Resources

##### a. Essential Reading

1. E. Balaguruswamy, 2019, Programming in ANSI C, 8<sup>th</sup> Edition, McGraw Hill Education, ISBN: 978-93-5316-513-0

##### b. Recommended Reading

1. Byron S Gottfried, 2018, Programming with C, 4<sup>th</sup> Edition, Schaum Outlines
2. Herbert Schildt, 2000, C: The Complete Reference, 4<sup>th</sup> Edition, Tata McGraw-Hill Education Pvt. Ltd.
3. Yashavant P. Kanetkar, 2019, Let Us C, 16<sup>th</sup> Edition, BPB Publications, ISBN: 978-93- 8728-449-4.

**c. Magazines and Journals**

1. Code Journal
2. CS Bits and Bytes

**d. Websites**

1. <https://www.coursera.org/specializations/c-programming> 2.  
<https://nptel.ac.in/courses/106104128>

**e. Other Electronic Resources**

1. <https://www.learn-c.org/>
2. <https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/>

## 22BCGNDST103 - Mathematical Foundations of Computer Science

<b>Programme</b>	Bachelor of Computer Applications
<b>Semester</b>	I
<b>Course Title</b>	Mathematical Foundations of Computer Science
<b>Course Code</b>	22BCGNDST103
<b>Course Credit</b>	3
<b>Course Type</b>	Core Theory Course

### 1. Course Summary

Computer Applications features a significant course known as Mathematical Foundations of Computer Science. This course imparts foundational mathematical concepts relevant to computer applications. It entails a comprehensive exploration of set theory, including advanced topics. Additionally, number theory principles are introduced to the students. The course equips them with the skills to define and utilize relations and functions. The learners are also trained to apply mathematical induction for the purpose of theorem proving. Students are trained to calculate determinants. The learners are exposed to the properties of matrix addition and multiplication.

### 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

CO-1. Define and identify the basic concepts of set theory, relations and number theory. [L-1]

CO-2. Interpret Venn-Euler diagrams, relations, functions, matrices and determinants. [L-2]

CO-3. Use mathematical induction to prove mathematical statements. [L-3]

CO-4. Analyze the properties of integers using the Euclidean algorithm and prime factorization. [L-4]

### 3. Course Contents

Sr. No	Units
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1	<p><b>Unit 1: Set Theory</b></p> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Set and its Elements <ul style="list-style-type: none"> <li>➤ Elements of a Set</li> <li>➤ Standard Sets and Symbols</li> </ul> </li> <li>▪ Set Description <ul style="list-style-type: none"> <li>➤ Roster Method</li> <li>➤ Set Builder Method</li> </ul> </li> <li>▪ Cardinal Number (Dimension or Order) of a Set</li> <li>▪ Types of Sets</li> <li>▪ Venn-Euler Diagrams</li> <li>▪ Set Operations and Laws of Set Theory <ul style="list-style-type: none"> <li>➤ Union of Sets</li> <li>➤ Intersection of Sets</li> <li>➤ Disjoint Sets</li> <li>➤ Difference of Two Sets</li> <li>➤ Complement of a Set</li> <li>➤ Distributive Laws</li> <li>➤ Symmetric Difference of Sets</li> </ul> </li> <li>▪ Fundamental Products</li> <li>▪ Index and Indexed Sets</li> <li>▪ Partitions of Sets</li> <li>▪ Minsets</li> <li>▪ Countable and Uncountable Sets</li> <li>▪ Algebra of Sets and Duality</li> <li>▪ Computer Representation of Sets</li> <li>▪ The Inclusion and Exclusion Principle</li> </ul>
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2	<p><b>Unit 2: Relations and Functions</b></p> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Cartesian Product of Sets <ul style="list-style-type: none"> <li>➤ The Cartesian Product of n Sets</li> <li>➤ Important Results on Cartesian Product</li> </ul> </li> <li>▪ Binary Relations <ul style="list-style-type: none"> <li>➤ Binary Relation Defined in a Set</li> <li>➤ Domain and Range of a Relation</li> </ul> </li> <li>▪ Set Operations on Relations</li> <li>▪ Types of Relations <ul style="list-style-type: none"> <li>➤ Properties of Relations</li> </ul> </li> <li>▪ Partial Order Relations</li> <li>▪ Equivalence Relation</li> <li>▪ Functions: Introduction</li> <li>▪ Definition and Notation of a Function <ul style="list-style-type: none"> <li>➤ Range and Domain of a Function</li> <li>➤ Function as Sets of Ordered Pairs</li> <li>➤ Difference between Relation and Function</li> <li>➤ Difference between a Function and its Value</li> </ul> </li> <li>▪ Types of Functions</li> <li>▪ Invertible Functions</li> <li>▪ Composition of Functions <ul style="list-style-type: none"> <li>➤ Important Results on Composition of Functions</li> </ul> </li> <li>▪ Identity Function</li> <li>▪ Functions for Computer Science <ul style="list-style-type: none"> <li>➤ Floor and Ceiling Functions</li> <li>➤ Fibonacci Sequence</li> <li>➤ Ackermann's Function</li> <li>➤ Characteristic Function</li> <li>➤ Mod Functions</li> <li>➤ Time-complexity Function</li> </ul> </li> </ul>
3	<p><b>Unit 3: Number Theory</b></p> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Basic Properties of Integers</li> <li>▪ Properties of Integers</li> <li>▪ Division Theorem (or Algorithm)</li> <li>▪ Greatest Common Divisor <ul style="list-style-type: none"> <li>➤ Basic Properties of the Greatest Common Divisor</li> </ul> </li> <li>▪ Euclidean Algorithm <ul style="list-style-type: none"> <li>➤ Basic Properties of Prime Factors</li> </ul> </li> <li>▪ Least Common Multiple</li> <li>▪ Testing for Prime Number</li> </ul>

4	<b>Unit 4: Mathematical Induction, Recursion and Fundamentals of Probability Theory</b> <ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Principle of Mathematical Induction</li> <li>▪ Recursive Definitions and Structural Induction</li> <li>▪ Recursive Algorithms</li> <li>▪ Introduction to Probability Theory</li> <li>▪ Concepts of Probability <ul style="list-style-type: none"> <li>➤ Random Experiment</li> <li>➤ Sample Space</li> <li>➤ Types of Events</li> </ul> </li> </ul>
5	<b>Unit 5: Determinants and Matrices</b> <ul style="list-style-type: none"> <li>▪ Introduction to Determinant</li> <li>▪ Determinant as Eliminant</li> <li>▪ Minor</li> <li>▪ Cofactor</li> <li>▪ Rules of Sarrus</li> <li>▪ Properties of Determinants</li> <li>▪ Introduction to Matrices</li> <li>▪ Types of matrices</li> <li>▪ Addition of Matrices</li> <li>▪ Properties of Matrix Addition</li> <li>▪ Subtraction of Matrices</li> <li>▪ Scalar Multiple of a Matrix</li> <li>▪ Matrix Multiplication</li> <li>▪ Properties of Matrix Multiplication</li> </ul>

#### 4. Course Articulation Matrix (CO-PO-PSO Map)

	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
<b>CO-1</b>	2	3	2							2	2	2	1
<b>CO-2</b>	3	3	3							2	2	2	2
<b>CO-3</b>	3	3	2							2	1	1	
<b>CO-4</b>	2	3	2							1	1	1	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

#### 5. Course Resources

##### 1. Essential Reading

- a. J. K. Sharma., 2005, Discrete Mathematics, 4<sup>th</sup> Ed., Trinity Press.
- b. H. K. Dass., 2012, Advanced Engineering Mathematics, 21<sup>st</sup> Ed., S. Chand and Company Ltd.

##### 2. Recommended Reading

- a. Kenneth. H. Rosen., 2012, Discrete Mathematics and its Applications, 7<sup>th</sup> Ed., McGraw Hill.

- b. Gremaldi, Ramana., 2006, Discrete and Combinatorial Mathematics, 5<sup>th</sup> Ed., Pearson Publishers.

## 22BCGNAET104 – Professional English Skills

<b>Program</b>	BCA
<b>Semester</b>	1
<b>Course Title</b>	Professional English Skills
<b>Course Code</b>	BCA 104 (22BCGNAET104)
<b>Course Credit</b>	3
<b>Course Type</b>	Core Theory

### 1. Course Summary

Profound Communication skills are an essential part of professional life. This course aims to provide comprehensive input on business communication and help the students know how to overcome various communication barriers in their work life. Students are taught several business letters writing techniques, including digital communication that can be applied in their work settings. Focus is also given to employability skills required to get into the right job. This course is structured in a way in which the students can learn how to present themselves in front of the public.

### 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- CO-1.** Understand the importance of business communication.[L-1]
- CO-2.** Identify the areas and ways to improve the effectiveness of communication skills.[L-2][L-3]
- CO-3.** Application of proper writing techniques in business documents. [L-3]
- CO-4.** Analyze the efficacy of different communication mediums.[L-4]
- CO-5.** Assess the impact of internal and external communication.[L-5]
- CO-6.** Evaluate the strengths and importance of workplace etiquette and manners.[L-5]

### 3. Course Contents

Sr. No	Units
1	<b>Unit 1: Introduction to Business Communication, Process and Barriers:</b> <ul style="list-style-type: none"><li>• Introduction</li><li>• Definitions</li><li>• Nature of Business Communication</li><li>• Scope of Business Communication</li><li>• Objectives Business Communication</li><li>• Need for Business Communication</li><li>• Communication Process</li><li>• 7 Cs of Communication</li><li>• Barriers to Business Communication</li><li>• Ways to Overcome the Barriers</li></ul>
2	<b>Unit 2: Importance &amp; Types of Communication:</b> <ul style="list-style-type: none"><li>• Introduction</li><li>• Role of Communication in Management</li><li>• Flow of Communication</li><li>• Grapevine Communication</li><li>• Methods of communication:</li></ul>

	<ul style="list-style-type: none"> <li>○ <i>Formal and Informal Communication</i></li> <li>○ <i>Verbal and non-verbal communication</i></li> <li>○ <i>Internal and External Communication</i></li> <li>● Facing today's Communication Challenges</li> </ul>
3	<p><b>Unit 3: Written Communication - Business Letter Writing and Other Forms of Written Communication - Electronic Communication and PowerPoint Presentations</b></p> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Soft Skills</li> <li>● Written Communication</li> <li>● Essentials of Good Writing</li> <li>● Improving Writing Techniques</li> <li>● Ethics in Writing</li> <li>● Meaning of Business Letter</li> <li>● Principles of Business Letter Writing</li> <li>● Components of Business Letter</li> <li>● The layout of Business Letters</li> <li>● Cover letter</li> <li>● Offer Letter</li> <li>● Acceptance letter</li> <li>● Business Messages and Goodwill Messages</li> <li>● Writing Memorandum</li> <li>● Notice and Circular Writing</li> <li>● Agenda and Minutes of the Meeting</li> <li>● Business Report</li> <li>● Courteous Phrases</li> <li>● Proofreading</li> <li>● Email Writing</li> <li>● Importance of Digital Communication</li> <li>● Tools of social media like What's App, Zoom, Teams</li> <li>● Importance and Styles PowerPoint Presentation</li> <li>● Delivering Presentations Effectively (Introduction to Kinesics)</li> </ul>
4	<p><b>Unit 4: Effective Handling of Issues, Public Speaking and Group Communication:</b></p> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Handling Complaints Effectively</li> <li>● Giving and Receiving Feedback</li> <li>● Negative News Handling</li> <li>● Listening Skills</li> <li>● Techniques of Public Speaking</li> <li>● Importance of Public Speaking</li> <li>● Modes of public speaking</li> <li>● Ways to Reduce Stage Fright</li> <li>● Types of Meetings</li> <li>● Seminars and Conferences.</li> <li>● Group Discussions-Do's and Don'ts</li> </ul>
5	<p><b>Unit 5: Resume Writing, Interviews and Business Etiquette:</b></p> <ul style="list-style-type: none"> <li>● Introduction</li> <li>● Format of Resume writing</li> <li>● Professional Resume</li> <li>● Job Application</li> <li>● Definition</li> <li>● Preparation</li> <li>● Types</li> <li>● Do's and Don'ts</li> <li>● Mock Interviews</li> </ul>

	<ul style="list-style-type: none"> <li>• Introduction to Business Etiquette</li> <li>• Power Dressing</li> <li>• Telephonic Etiquette</li> <li>• Table Etiquette</li> </ul>
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#### 4. Course Articulation Matrix (CO-PO-PSO Map)

-	Program Outcomes (POs)								Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO-1	PSO-2	PSO-3
<b>CO1</b>	3	3	3	2	3	-	1	2	1	2	3
<b>CO2</b>	3	3	2	2	3	-	1	1	2	2	1
<b>CO3</b>	3	2	2	2	3	-	2	1	-	2	3
<b>CO4</b>	3	3	3	3	3	-	1	1	1	2	-
<b>CO5</b>	2	2	3	3	2	1	2	1	3	2	-
<b>CO6</b>	2	2	2	2	2	2	1	3	-	2	3
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											

#### 5. Course Resources

##### a) Essential Readings:

1. Self-Learning Material.
2. Raymond, V. L., Marie, E. Flatley., Rentz, K. & Pande, N. (2009). Business Communication: Making Connections in a Digital World (13/ed.). TMH. New Delhi.
3. Meenakshi Raman and Prakash Singh. (2012). Business Communication. (2ed.). Oxford University Press.
4. Urmila Rai and S.M. Rai.(2020). Business Communication. (9/ed). Himalaya Publishing house.

##### b) Recommended Reading:

1. Hudson R.H. and Selzler B.J. (2006). Business Communication Concepts and Applications in an Electronic Age. (5/ed.). Jaico Reprint, Jaico, New Delhi.
2. Booher, D. (2001). E-Writing: 21st Century Tools for Effective Communication. New York: Pocket Books, Division of Simon & Schuster, Inc.
3. Sinha, k.k (2017). Business Communication. (Fourth Revised Edition). Taxman.
4. C.C. Pattensheti. Business Communication. Chand and Company Publishers. New Delhi.
5. Herta A. Murphy., and Charles E. Peck. Effective Business Communication. Tata McGraw Hill Publishing Company Limited. New Delhi.
6. Peter Hartley., and Clive, G. Bruckmann. (2002). Business Communication. Routledge. London.

##### c) Other Electronic Resources: Course Video Lectures

## 22BCGNAET105- Principles and Practices of Management

<b>Programme</b>	<b>Bachelor's in Computer Application</b>
<b>Semester</b>	<b>I</b>
<b>Course Title</b>	Principles and Practices of Management
<b>Course Code</b>	BCA
<b>Course Credits</b>	3
<b>Course Type</b>	Core Theory Course

### 1. Course Summary

Principles and Practices of Management is an introductory course that provides students with an overview of the management process from a manager's perspective. The course seeks to help students acquire the knowledge, skills, and abilities needed to successfully manage organizations. Throughout the course, students will examine the logic and workings of organizations and learn about the major functions of management. The main objective of this course is to help students become familiar with a variety of management principles and practices. By the end of the course, students will have acquired the necessary knowledge, skills, and abilities to effectively manage organizations in a variety of settings.

### 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- CO-1.** Describe theoretical aspects , process and principles, scope of management and its application to modern management practice.[L-1]
- CO-2.** Define the roles and responsibilities of a manager in the organization. [L-2]
- CO-3** Illustrate the importance of planning, organizing, staffing ,directing and controlling in decision making .[L-3]
- CO-4.** Interpret the ability of communication, leadership, directing and controlling skills.[L-3]
- CO-5.** Evaluate the contemporary issues and challenges in management.[L-5]

### 3. Course Contents

<b>Unit 1: Introduction to Management</b>
<ul style="list-style-type: none"><li>• Definition of Management</li><li>• Meaning of Management,</li><li>• Significance of Management</li><li>• Nature and Purpose of Management</li></ul>

- The Evolution of Management Thoughts
- Roles of Manager
- The Function of Manager: Planning, Organising, Staffing, Leading and Controlling: an overview.
- Coordination: The Essence of Management
- Management and Administration

## **Unit 2: Planning**

- Meaning of Planning
- Nature of Planning
- Importance of Planning
- Types of Plans
- Steps in Planning
- Management by Objectives
- Barriers to Effective Planning

## **Unit 3: Organising**

- Meaning of Organising
- Nature of Organising
- Departmentalisation
- Organisation Levels
- Span of Management
- Organizational Structure
- Process of Organising
- Principles of Organising
- Decentralisation of Authority
- Delegation of Authority

## **Unit 4: Staffing**

- Definition of Staffing
- Process of Staffing Function
- Importance of Staffing
- Manpower Planning
- The System Approach to Human Resource Management
- Recruitment
- Selection
- Performance Appraisal.

## **Unit 5: Leading and Controlling**

- Introduction to Motivation
- McGregor Theory of X and Y
- Maslow Hierarchy of Needs Theory
- Herzberg's Motivation-Hygiene Theory
- Meaning of Leadership
- Traits and Qualities of a good leader
- Leadership Styles
- Importance of Leadership
- Communication Definition
- Process of Communication
- Barriers of Effective Communication
- Importance of Communication
- Communication Types.



- Controlling Definition
- Controlling Process,
- Controlling as a Feed Back System
- Importance of Controlling
- Major Controlling Techniques.

#### 4. Course Articulation Matrix (CO-PO-PSO)

		Programme Outcomes (POs)									Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO-1	PSO-2	PSO-3
CO1	3	2	-	-	-	1	3	3	2	1	3	2	2
CO2	2	-	-	-	-	2	3	3	1	2	3	2	-
CO3	3	2		-	-	2	3	2	-	1	2	1	-
CO4	1	1	-	-	-	2	2	3	1	-	3	-	-
CO5	1	-	1	-	-	2	2	2	1	1	2	2	-
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

#### 5. Course Resources

##### a. Essential Reading

1. Course Self-Learning Material
2. T.N Chhabra, Principles and Practice of Management, 9<sup>th</sup> Ed., Dhanpat Rai & Co. (P) Ltd., New Delhi

##### b. Recommended Reading

1. Dr. L.M. Prasad, Principles & Practice of Management, 10<sup>th</sup> Ed., Sultan Chand & Sons - New Delhi
2. P.C. Tripathi and Reddy, Principles of Management, 4<sup>th</sup> Ed., Tata McGraw Hill, New Delhi

##### c. Websites

1. <http://nptel.ac.in/>

##### d. Other Electronic Resources

Course Video Lectures on Bright space

## Introduction to Business Accounting

<b>Program</b>	Bachelor of Computer Application
<b>Semester</b>	1
<b>Course Title</b>	Introduction to Business Accounting
<b>Course Code</b>	
<b>Course Credit</b>	3
<b>Course Type</b>	Core Theory Course

### 1. Course Summary

The aim of this course is to create a foundation of Financial Accounting. The students are taught the basic concepts of accounting and the process for implementation. The students are also taught the mechanics of preparation of Journal, Ledger, Trial Balance, and interpretation of Financial Statements. The students will be able to analyze the Cash flow and Fund Flow Statements. This course also emphasizes the students to analyze the reasons for the difference in cash book and passbook balance by preparing the Bank Reconciliation Statement.

### 2. Course Outcomes (COs)

After the successful completion of this course, the student will be able to:

- CO-1.** Identify the basic terms and summarize the fundamental concepts of Accounting [L-1]
- CO-2.** Describe the regulatory framework of the operations of the accounting activities [L-2]
- CO-3.** Apply the conceptual knowledge in the process of recording the transactions in various books of accounts [L-3]
- CO-4.** Classify the various accounts and analyze the need for preparing financial statements [L-4]
- CO-5.** Analyze and evaluate the financial performance of business entities [L-5]

### 3. Course Contents

<b>Sl. No.</b>	<b>Units</b>	<b>Unit Objectives</b>
1	<b>Unit 1: Introduction to Accounting</b> <ul style="list-style-type: none"><li>• Meaning</li><li>• Nature and scope of Financial Accounting</li><li>• Branches of Accounting</li><li>• Functions of Accounting</li><li>• Users of financial information</li></ul>	<ol style="list-style-type: none"><li>1. Define Accounting.</li><li>2. Explain the nature and scope of accounting.</li><li>3. Identify the various users of accounting information.</li></ol>
2	<b>Unit 2: Accounting Principles</b> <ul style="list-style-type: none"><li>• Accounting Concepts</li><li>• Accounting conventions</li><li>• Accounting Equations and illustrations</li></ul>	<ol style="list-style-type: none"><li>1. Discuss the basic principles, concepts, and conventions.</li><li>2. Explain the accounting equation.</li></ol>

3	<b>Unit-3: Accounting Standards in India</b> <ul style="list-style-type: none"> <li>• Accounting Concepts</li> <li>• Accounting Conventions</li> <li>• Benefits of Accounting Standards</li> <li>• Procedure for issuing accounting standards in India</li> </ul>	<ol style="list-style-type: none"> <li>1. List the concept and benefits of accounting standards.</li> <li>2. Acquire knowledge about the Indian accounting standards.</li> </ol>
4	<b>Unit 4: Double Entry System</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Classification of accounting transactions and accounts</li> <li>• Golden Rules of Accounting.</li> <li>• Importance of Double entry system</li> <li>• Simple illustrations</li> </ul>	<ol style="list-style-type: none"> <li>1. Learn the double entry system.</li> <li>2. Know the importance of double entry</li> <li>3. Learn the rules of debit and credit.</li> </ol>
5	<b>Unit 5: Financial Accounting Process</b> <ul style="list-style-type: none"> <li>• Journal</li> <li>• Ledger accounts</li> <li>• Simple problems</li> </ul>	<ol style="list-style-type: none"> <li>1. Explain the accounting process.</li> <li>2. Demonstrate how the entries are passed through the accounting cycle.</li> </ol>
6	<b>Unit 6: Trial Balance</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Features</li> <li>• Objectives</li> <li>• Methods</li> <li>• Steps in locating errors disclosed by trial balance and suspense account</li> </ul>	<ol style="list-style-type: none"> <li>1. Summarizes the accounts.</li> <li>2. Listing the errors disclosed by the trial balance by preparing suspense account.</li> </ol>
7	<b>Unit 7: Subsidiary Books</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Significance</li> <li>• Types of subsidiary books- Purchases Book, Sales Book, Purchase Returns Book, Sales Returns Book</li> </ul>	<ol style="list-style-type: none"> <li>1. Recognize the types of subsidiary books.</li> <li>2. Acquire skills in recording transactions in subsidiary books.</li> </ol>
8	<b>Unit 8: Final Accounts</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Objectives of Final Accounts</li> <li>• Importance of Final Accounts</li> <li>• Preparation of Trading Account &amp; Profit and loss a/c</li> <li>• Preparation of Balance Sheet.</li> <li>• Simple Illustrations</li> </ul>	<ol style="list-style-type: none"> <li>1. Describe the importance of final accounts</li> <li>2. Develop the skill in the preparation of Final accounts.</li> </ol>
9	<b>Unit 9: Final Accounts with Adjustments</b> <ul style="list-style-type: none"> <li>• Adjustments</li> <li>• Closing stock</li> <li>• Outstanding expenses</li> <li>• Prepaid expenses</li> <li>• Depreciation</li> <li>• Provision for bad debts</li> </ul>	<ol style="list-style-type: none"> <li>1. Analyze the entries that need adjustments.</li> <li>2. Compute by adjusting post-balance sheet date entries affecting final accounts.</li> </ol>
10	<b>Unit 10: Cash Flow Statement</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Importance of Cash Flow Statement,</li> <li>• Preparation of Cash Flow Statement as per AS 3</li> </ul>	<ol style="list-style-type: none"> <li>1. Apply the knowledge for the preparation of cash flow statement.</li> </ol>

	• Illustrations.	
11	<b>Unit 11: Fund Flow Statement</b> <ul style="list-style-type: none"> <li>• Meaning</li> <li>• Importance of Fund Flow Statement</li> <li>• Preparation of Fund Flow Statement</li> <li>• Illustrations.</li> </ul>	1. Recognize and apply the knowledge for the preparation of fund flow statement.
12	<b>Unit 12: Bank Reconciliation Statement (BRS)</b> <ul style="list-style-type: none"> <li>• Introduction</li> <li>• Importance of Bank Reconciliation Statement (BRS)</li> <li>• Ascertaining the causes of differences of Bank Balance in Bank Column of the Cash- Book and in Pass- Book.</li> <li>• Procedure for Reconciling the Cash- Book Balance with the Passbook balance.</li> <li>• Simple illustrations</li> </ul>	1. Examine the differences of cash book and passbook balances. 2. Analyze the reasons for difference between cash book and passbook balance

#### 4. Course Articulation Matrix (CO-PO-PSO Map)

	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
CO-1	2	2	1	-	-	-	1	-	1	1	-	-	-
CO-2	1	1	1	-	-	-	2	-	1	1	-	-	-
CO-3	2	1	-	2	-	-	1	1	1	1	-	2	1
CO-4	-	2	1	2	1	2	1	2	2	2	1	2	1
CO-5	-	2	1	1	1	-	1	-	-	-	1	2	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

#### 5. Course Resources

##### a. Essential Reading

1. Course Self-Learning Material
2. Raman, B.S., 2018, Financial Accounting (Vol.1), United Publishers.

##### b. Recommended Reading

1. Jain, S.P., Narang, K.L., 2019, Advanced Accountancy (Vol. 1), 22<sup>nd</sup> edition, Kalyani Publishers.
2. Charles T. Horngren and Donna Philbrick, 2001, Introduction to Financial Accounting, Pearson Education.
3. Ashish Bhattacharya, K., 2012, Essentials of Financial Accountancy, 3<sup>rd</sup> Ed., PHI.
4. Monga, J.R., 2007, Financial Accounting: Concepts and Applications. Mayur PaperBacks.
5. Tulsian, P.C., 2009, Financial Accounting, 4<sup>th</sup> Ed., Pearson Education.
6. Shukla, S.M., 2009, Financial Accounting, 4<sup>th</sup> Ed., Sahitya Bhawan Publications.

**c. Websites**

1. <https://www.coursera.org/>
2. <http://nptel.ac.in/>

**d. Other Electronic Resources**

1. Course Video Lectures on Bright Space

## **22BCGNDSP106 – C Programming Laboratory**

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	C Programming Laboratory
<b>Course Code</b>	22BCGNDSP106
<b>Course Credits</b>	2
<b>Course Type</b>	Core Theory Course

### **1. Course Summary**

The aim of this course is to analyze, design and develop C programs. The students are taught to develop C Programs using different data types, operators, control structures, and looping statements. The students are taught library and user-defined functions for solving large problems using a modular approach. This course emphasizes structured programming using C programming language with features of dynamic memory allocation and file-handling functions. Students are trained to create, debug, and test C programs.

### **2. Course Outcomes (COs)**

After the successful completion of this course, the student will be able to:

- CO-1.** Demonstrate the use of a C compiler to develop, debug, and execute C programs with suitable test cases [L-1]
- CO-2.** Illustrate different data types, operators, control structures, and loops to solve a problem [L-2]
- CO-3.** Implement C programs using arrays, structures, and pointers [L-3]
- CO-4.** Apply user-defined and library functions to solve complex problems [L-4]
- CO-5.** Develop C programs using file-based functions, dynamic memory allocation, and string-related functions [L-5]

### **3. List of Experiments**

<b>Sr. No</b>	<b>Name of Experiment</b>	<b>Learning Outcomes</b> After the successful completion of the unit, the learner should be able to:

1	Write a C program to exchange the values of two integer variables.	1. Implement a C program using built-in data types. 2. Illustrate the use of printf () and scanf () functions.
2	Write a C program to find the roots of quadratic equations.	1. Illustrate the use of if-else structures. 2. Apply library functions.
3	Write a C program to check whether the entered integer is a palindrome.	1. Apply looping structures. 2. Illustrate data types and operators.
4	Write a C program to sort the elements of an array in ascending order.	1. Illustrate the use of arrays.
5	Write a C program to search for an element in an array. Display the position of the element.	1. Demonstrate the use of arrays data structures, if-else, and loops.
6	Consider two matrices of the size m and n. Implement matrix multiplication operation and display results using functions. Write three functions 1) Read matrix elements 2) Matrix Multiplication 3) Print matrix elements	1. Demonstrate multi-dimensional arrays and user-defined functions.
7	Consider two strings S1 and S2. Develop a C Program for the following operations. a) Display a concatenated output of S1 and S2 b) Count the number of characters and empty spaces in S1 and S2.	1. Illustrate string-based functions and arrays.
8	Consider details of a bank account with the fields account number, account holder's name, and balance. Write a program to read 10 people's details and display the record with the highest bank balance.	1. Demonstrate an array of structures.
9	Write a C program to demonstrate the use of & and * operators using pointers. Create and free a memory location for an integer. Display the address and data stored at the location.	1. Illustrate pointers, malloc (), and free () functions.
10	Write a program to create a file called student.txt and store information about a student in terms of roll no, age, and marks.	1. Illustrate the file pointers, file-related functions, and file modes.

#### 4. Course Articulation Matrix (CO-PO-PSO Map)

	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
CO-1	2	2	2	2			1	1	2	1	3	3	1
CO-2	3	3	3	3		2	2	2	2	1	3	3	2
CO-3	3	3	3	3	1	1	2	2	1	1	3	3	1

<b>CO-4</b>	3	3	3	2		1	3	2	2	2	3	3	2
<b>CO-5</b>	3	3	3	2	1		2	3	3	2	3	3	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

## 5. Course Resources

### a. Essential Reading

1. Course Self-Learning Material
2. E. Balaguruswamy, 2019, Programming in ANSI C, 8<sup>th</sup> Edition, McGraw Hill Education, ISBN: 978-93-5316-513-0

### b. Recommended Reading

1. Kernighan B.W and Dennis M. Ritchie, 2015, The C Programming Language, 2<sup>nd</sup> Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9
2. Yashavant P. Kanetkar, 2019, Let Us C, 16<sup>th</sup> Edition, BPB Publications, ISBN: 978-93-8728-449-4.
3. Herbert Schildt, 2000, C: The Complete Reference, 4<sup>th</sup> Edition, Tata McGraw-Hill Education Pvt. Ltd.
4. B.A.Forouzan and R.F. Gilberg, 2007, Computer Science: A Structured Programming Approach Using C, 3<sup>rd</sup> Edition, Cengage Learning

### c. Magazines and Journals

1. Code Journal
2. CS Bits and Bytes

### d. Websites

1. <https://www.coursera.org/>
2. <http://nptel.ac.in/>

### e. Other Electronic Resources

1. Course Video Lectures on Brightspace LMS
2. <https://ocw.mit.edu/index.htm>
3. <https://www.geeksforgeeks.org/c-programming-language/>
4. [https://www.onlinegdb.com/online\\_c\\_compiler](https://www.onlinegdb.com/online_c_compiler)

## 22BCGNDSP107 -Digital Productivity Tools for Modern Workplaces

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	Digital Productivity Tools for Modern Workplaces
<b>Course Code</b>	22BCGNSET107
<b>Course Credits</b>	2
<b>Course Type</b>	Core Course

## **1. Course Summary**

This course is aimed at giving students hands-on exposure to managing an office with the help of computers and office productivity tools.

Students are exposed to the MS Windows computer and trained to perform various file and folder management tasks including opening, modifying, relocating, and deleting files and folders. The students are then trained in crafting professional Word documents, Excel spreadsheets, and PowerPoint presentations using the Microsoft Office suite of productivity tools. The course would enable the student to use digital computers effectively for documentation, spreadsheet computation, visualization, and slide presentation.

## **2. Course Outcomes (COs)**

After the successful completion of this course, the student will be able to:

- CO 1.** Manage the daily administration of a modern office with the help of digital computers and office productivity tools.
- CO 2.** Craft professional Word documents that include figures, tables, and mathematical equations.
- CO 3.** Create Excel worksheets with different types of data visualization elements.
- CO 4.** Prepare contemporary presentation slides with different types of animation and transition effects.

## **3. Course Contents**

- Unit 1.** MS Windows Computers: File and folder management; Types of files, and how to open them; downloading and installing necessary applications.
- Unit 2.** MS Word: Creating documents, font and paragraph attributes, multi-column documents, insertion and formatting equations, tables, and figures; page numbers, headers, and footers; mail merging; document design and layouts, drawing tools.
- Unit 3.** MS Excel: Preliminaries: Gridlines, Format Cells, Summation, auto-fill, Formatting Text; Calculations, Cell Referencing, Formulae in Excel: average, standard deviation, Charts, bars, and other visualization tools, Renaming and Inserting worksheets, Hyperlinking, Count function; Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting.
- Unit 4.** PowerPoint Orientation, Slide Layouts, Inserting text, Word art, Formatting text, Bullets and Numbering, Auto Shapes, Lines and Arrows; Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables, and Charts; Master layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes, etc.), Inserting Background, textures, Design templates, Hidden slides; Auto content wizard; Slide transition, Custom animation, Auto rehearsing

## **4. Course Articulation Matrix (CO-PO-PSO Map)**



	Programme Outcomes (POs)										Programme Specific Outcomes (PSOs)		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
CO-1	3	2	1	3	1	1	2	2		1	2	1	
CO-2	2			3	1		1	2		1			
CO-3	2			3	1		1	2		1			
CO-4	2			3	1		1	2		1			
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution													

## 5. Course Resources

### a. Essential Reading

1. Mark Edward Soper (2018) Easy Windows 10. Pearson Education.
2. Gupta, V., (2005) Comdex Information Technology Course Kit. Wiley Dreamtech Press.

### b. Recommended Reading

1. Ed Bott, Carl Siechert, and Craig Stinson (2010). Windows 7: Inside Out. Microsoft Press.

## 22BCGNSET108 - Seminar

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	Seminar
<b>Course Code</b>	22BCGNSET108
<b>Course Credits</b>	1
<b>Course Type</b>	Skill Enhancement Course

## 1. Course Summary

This course is aimed at giving students hands-on practice in the independent critical reading of scientific articles from journals and other sources. The student is required to choose a topic of interest, access resources for the survey and collection of data, analyze and interpret the data, and draw meaningful conclusions.

Students will be expected to familiarize themselves with the technical advances in computer applications.

## 2. Course Outcomes (COs)

**CO 1.** Identify a topic in Computer Applications and conduct a thorough literature review independently.

**CO 2.** Discuss the importance of the selected topic with respect to research, relevance, and its applications in the global and local context.

**CO 3.** Justify the importance of the selected topic.

**CO 4.** Prepare a detailed report on the selected topic and defend the conclusions drawn in a visual presentation.

**Unit 1.** Identification of a topic for the seminar in consultation with the course instructor/seminar guide

**Unit 2.** Conducting a literature review on the selected topic, collecting relevant data, and critically analyzing the collected data

**Unit 3.** Making meaningful conclusions based on the literature review and data analysis.

**Unit 4.** Preparation of a detailed report on the selected topic to bring out the important concepts in the selected area, relevance, and applications of the topic.

**Unit 5.** Preparation of a presentation of the summary of the report and presenting it to a panel of examiners.

	<b>Programme Outcomes (POs)</b>										<b>Programme Specific Outcomes (PSOs)</b>		
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PSO-1	PSO-2	PSO-3
<b>CO-1</b>		2											
<b>CO-2</b>	2	3									2		
<b>CO-3</b>	2	3									2		
<b>CO-4</b>	3	3		3	3	3	3	3	3	3	3		3

3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution
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## 5. Course Resources

### a. Essential Reading

1. Bright, S. (2020). Microsoft PowerPoint: Creating a Presentation, Tips for Creating and Delivering an Effective Presentation, and Marketing Your Brand Through PowerPoint Presentation. United Kingdom: Lulu.com.

### b. Recommended Reading

1. The seminar guide shall recommend the resources based on the elected topics.

## Healthy Living and Fitness

<b>Program</b>	Bachelor of Computer Applications
<b>Semester</b>	1
<b>Course Title</b>	Healthy Living and Fitness
<b>Course Code</b>	
<b>Course Credits</b>	1
<b>Course Type</b>	Value Addition Course

<b>Course Outcome</b>	<ul style="list-style-type: none"><li>• The benefits of healthy lifestyle</li><li>• Importance of balanced food and proper diet in daily</li><li>• Problems related to addiction and benefits of yoga</li><li>• Basic first aid procedures.</li></ul>
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### Details of the Course:

Sl. No.	Contents	Contact Hours
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1	<b>Human Body</b> Awareness of important body organs, their location and broad functions.  <b>Diet and Health</b> Importance of breakfast, fruits, whole grains Knowledge about constituents of diet, proteins, fats, carbohydrate, vitamins and minerals. Importance of fiber.	2
2	<b>Life style Diseases</b>  Harmful effects of junk/ processed foods. Dangers of obesity Diseases ensuing because of lifestyle eg. Diabetes, heart diseases etc.	3
3	<b>Exercise</b> Benefits of exercise and yoga.  <b>Addictions</b> Chewing/ unhealthy harmful products Drinking Smoking	3
4	<b>Importance of Mental Health</b>  Stress management Anxiety and depression  Awareness of commonly encountered diseases/ailments	3
5	<b>First Aid</b> First aid in commonly encountered emergency	1
	<b>Total</b>	<b>12</b>

10.	<b>Mode of Evaluation</b>	Test / Quiz / Assignment / End Term Exam
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