Sant Gadge Baba Amravati University, Amravati

Faculty of Science and Technology, Programme: BCA

POs of B.C.A. Programmme:

The under-graduate students, after completing their study of B.C.A. programme would acquire following characteristics attributes of science graduate.

PO-1 Scientific Knowledge and Experimental Skills : The graduates must be able to demonstrate fundamental concepts in computer science and apply it in relative specialized areas like research & development, teaching and government, social or public services.

PO-2 Communication skills : The graduates must be able to transmit complex technical information in clear and concise manner relating to computer hardware, software and its applications.

PO-3 Critical Thinking & Problem Solving Ability: The graduates must be able to employ critical thinking and problem solving skills to find appropriate solutions for the given problems in the fields of computer technology.

PO-4 Team leading and working capability: The graduates must be capable to work independently as well as a team leader or a member.

PO-5 Project Management: The graduates must be able to identify need, scope and beneficiaries to develop a project by observing responsible & ethical conduct and also with cyber security and safety.

PO-6 Digital Proficiency to use Modern Digital Tools: The graduates must be capable to learn and use modern technology like data mining, handling & management, robotics and artificial intelligence.

PO-7 Environmental and Societal Consciousness: The graduates must be aware about the environmental & the societal problems and must be capable to use and demonstrate the acquired knowledge to address these problems and to find appropriate solutions thereof.

PO-8 Ethics and Human values: The graduates must be capable to think and behave rationally on the ethical issues they come across at their work place. Also, the graduates should adopt human values to keep harmony with individuals and with human beings.

PO-9 National perspective: The graduates must be able to develop national perspective for their career in the chosen field so that they could play a vital role in contributing in national development.

PO-10 Lifelong Learning: The graduates should adopt lifelong learning to keep pace with emerging trends in technology and research.

PSOs   of   B.C.A.   Programme:

The student graduating with the Degree BCA should be able to

PSO-1   Focus on preparing student for roles pertaining to computer applications and IT industry

PSO-2   develop programming skills, networking skills, learn applications, packages, programming languages and modern techniques of IT

PSO-3   Get skill and information not only about computer and information technology butalso in common, organization and management.

PSO-4   Learn applications, packages, programming languages and modern techniques ofIT

PSO-5   work as software programmer, system, database and network administrator, web designer, Application developer, faculty for computer science and computer applications, Web Designer, Network Analyst, Test Engineer, DBA, Technical Support Engineer, Quality Assurance, data analyst, data Scientist, researcher etc.

PSO-6   get information about various computer applications, latest development in IT and communication Technology in current era.

PSO-7   use knowledge of the networking, computer graphics, web development, trouble shooting, and hardware and software skills.

PSO-8   use knowledge in various domains to identify research gaps andhence to provide solution to new ideas and innovations

PSO-9   assess the hardware and software aspects of computer systems, structure and development methodologies of software systems.

PSO-10   apply mathematical methodologies to solve computation task, model real world problem using appropriate data structure and suitable algorithm.

Employability Potential of the Programme:

B.C.A. programme will be full-time 3 years bachelor's degree course of computer application. This course is designed specifically to cater the need of skilled software developers. The programme is recognized by M.S.Govt. And Affiliated to Sant Gadge Baba Amravati University. The Course develops high degree of technical skill in the Students, so that they can face the challenges of the industries. The Computers/ Computer Knowledge has become as indispensable in today's world as food, shelter, and clothing. The service sector in the worked is experiencing a boom and India has emerged as world leader. The BCA course covers the technical as well as managerial aspects of the computer applications. It offers advanced study into the conceptual basis of information systems as a discipline and introduces students to research methods and current developments.

Computers have become an integral part of our life. Almost every individual wants tobe a computer professional. The craze for the courses is increasing due to growing job prospects that it has. B.C.A. forms the base of a computer professional versatile is use ofcomputersinalmostallfieldofcomputerapplication.ThemainemphasisoftheProgramme is an applied computer use in various fields. Companies who wants, to take benefit of the new information technologies and communication systems need expert professionals, who can apply computer science principles to solve problems produced bythe interface between business and technology. B.C.A. Programme is an undergraduate program with Choice Based Credit System(CBCS) scheme where students are exposed to various areasof computer applications including the latest developments in the industry. Theprogrammeimpartscomprehensiveknowledgewithequalemphasisontheoryandpracticein the field of information technology.

The Indian economy is on an extremely positive note; growth is across sectors, both in traditional industries and new sectors. In such an environment, corporate India will need young and talented youth to actively participate, manage, design, develop and lead several IT initiatives. It has not been better than this for aspirants of BCA education.

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   **APPENDIX - A I (B.C.A. Part-I) (Semester-I)**

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme						
			Teaching Period Per week				Credits				Maximum Marks						Minimum Passing
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
1	Communication Skill	1BCAE1	3		-	3	3	-	3	2	40		1	-	-	50	20	P
2	Communication Skill in English (AEC)	1BCAE2		1	-	1		1	1	--		10	1	25	-	25	10	P
3	DSC-1 (T) Fundamentals of Computers	1BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC-2(T)Structured Programming Paradigms	1BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC-3(T)Data Structure	1BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4(T)Fundamentals of Electronics in Computer	1BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC-1(P) Computer Hardware Software Troubleshooting	1BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC-2(P)Data Structure	1BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC-3 (P)Fundamentals of Computer Electronics	1BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	DSC- 1 (P)Generic Open Elective I(GOEC) 1-Computer Fundamentals 2-IT and BDP	1BCAG	2	-	-	2	2	-	2	2	College Level Exam.					50	20	p.
11	**Induction Programme***	BCAIP				30 hrs (beginning of 1 Semester classes) 1*		1										P
	Total		25	1	12	38	25	7	33				6			675		
	BCA-Sem-1 Total Credit		39			**Total Marks**		675										

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   APPENDIX - A I (B.C.A. Part-I) (Semester-II)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							Minimum Passing	
			Teaching Period Perweek				Credits				Maximum Marks								
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
1	Communication Skill	2BCAE1	3		-	3	3	-	3	2	40		1	-	-	50	20	P
2	Communication Skill in English (AEC)	2BCAE2		1	-	1		1	1	--		10	1	25	-	25	10	P
3	DSC- 1(T) Computer System and Interface	2BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Data Base Managemant System	2BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Object Oriented Programming	2BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Fundaentals of Computational Mathematics	2BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Computer Interfacing	2BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) DBMS	2BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) CPP	2BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Generic Open Elective I(GOEC) 1-Fund. Of C Programming 2-e-Commerce	2BCAG	2	-	-	2	2	-	2	2	College Level Exam.					50	20	p.
	Total		25	1	12	38	25	7	32				6			675		
	BCA-Sem-2 Total Credit		38		Total Marks		675											

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   **APPENDIX - A I (B.C.A. Part-I) (Semester-III)**

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs.	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credits				Maximum Marks							Minimum Passing	
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
3	DSC- 1 (T) Operating System	3BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Core Java Programming	3BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Fundamentals of Open Source Software	3BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T)Pythan Programmin	3BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Operating System	3BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) Java Programming	3BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) Python Programming	3BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Environmental Studies (AEC)	3BCAENV	2	-	-	2	2	-	2	2								
	Total		**22**	**0**	**12**	**34**	**22**	**6**	**28**				**4**			**550**		
	BCA-Sem-3 Total Credit		**32**		**Total Marks**		**550**											

L: Lecture, T: Tutorial, P: Practical
Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.
- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   **APPENDIX - A I (B.C.A. Part-I) (Semester-IV)**

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credits				Maximum Marks							Minimum Passing
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
3	DSC- 1 (T) Data Communication Network	4BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Web Technologies	4BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Adv Java Programming	4BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Fundamentals of Data Science	4BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Web Technologies	4BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) Adv Java Programming	4BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) Data Science using Python	4BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Environmental Studies (AEC)	4BCAENV	2	-	-	2	1	-	1	3	70	30	1	-	-	100	40	P
	Total		**22**	**0**	**12**	**34**	**21**	**6**	**27**				**5**			**650**		
	BCA-Sem-4 Total Credit		**32**		**Total Marks**		**650**											

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Part B

Semester 1

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCA1	Fundamentals of Computers	60

Course Pre-requisites:

1. The student should have the basic knowledge of mathematics.
2. The student should be able to do computations.
3. The students should pose the logical thinking ability.

Course Objectives:

Upon successful completion of the course, students would be able to

1. acquire the basic knowledge about computer system functions.

2. learn the basic knowledge about various components, capabilities and limitations of computer.

3. understand the various hardware and software components of computer.

Unit	Contents
Unit I	**Computer Basics:** Definition of Computer, Applications. Characteristics of Computer, block diagram of computer, Types of Computer. **Memory** : Primary Memory : RAM , ROM , PROM , EPROM,EEPROM and Cache memory **Input Devices:** Keyboard, Mouse, Joystick, Scanner, Mic, Display Devices (LED & Touch Screen). **Output Devices:** Speaker, Plotter, Printer, Types of Printer. **Secondary storage**: Hard disk, SSD, PD, and other types of secondary storage devices. (12 Hours)
Unit II	**Operating System**: Definition, Functions of OS, Types of OS. **Windows:** Introduction Features of windows, Customizing Desktop, Creating shortcuts, moving, deleting icons. **Windows Explorer**: Copy, Rename, Move, Print, Delete, Zip, Unzip operations on files and folder, file properties. **Standard Folders**: My computer, My documents, Control Panel, Recycle bin. **Windows Accessories**: Paint, Notepad, Calculator. (11 Hours)
Unit III	**Computer Network and Internet:** Introduction to computer Network, Types Of Networks: LAN, WAN, MAN, Network topologies, Advantage of Network. **Internet:** Introduction, The World Wide Web, Internet Application. Types of Internet connections: Direct, dial-up, Broadband, ISDN Connection. Protocols: TCP/IP, FTP, HTTP, Search Engines, Browsers. (11 Hours)
Unit IV	**Word Processing** : Page setup, views, Text formatting using Font Colour, Styles, Autocorrect , Spell- check, Grammar, Table, Tabs, Indentation, Hyperlink, Bullet and Numbering, Mail Merge, Print Preview , Printing of Document,. **Power point:** Create, Modify, Delete Presentations, Inserting Image, Sound, Clips, Charts, Animation Effects and Transition, and Slide Show. (11 Hours)
Unit V	**Spread Sheets:** Introduction, Features, Creating and Formatting Worksheets, Inserting Functions, Formula and Charts. Autofill, Conditional Formatting, Sorting, Searching, Validating and Filtering Data, Macros, Grouping and Sub-Totals, Pivot Table. (11 Hours)

*SEM: Assignment, Class test, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity	
<u>**Cos:**</u> 1. To be able to draw upon foundational knowledge, learn, adapt and successfully bring to bear analytical and computational approaches on changing societal and technological challenges 2. To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion/Seminar/Mini Project, Study Tour	
**Activities	1.writing algorithms 2.Drawing flowcharts 3.writing and debugging programs **(4 hours)**

Course Material/Learning Resources:

Text Books :

1. Fundamentals of Computer: V. Rajaraman (Prentice Hall Pub.)
2. Learning to use the Internet and introduction with Example and Exercises: Ackermann (BPB Pub.)
3. Microsoft office 365: A complete guide to word, excel and power point 365 for beginners and pro. By Matt Vic

Reference Books:
1. Introduction to Computers: Roger Hunt and John Shelly

2. The Internet Complete Reference: Harley Hahn (Tata Mc-Graw Hill Pub.)

Weblink to Equivalent MOOC on SWAYAM if relevant:
1. https://www.onlinecoursereport.com/free/computer-science/
2. https://www.classcentral.com/course/swayam-computer-fundamentals-13950
3. https://www.coursera.org/courses?query=computer%20fundamentals
4. https://www.edx.org/learn/computer-programming
5. https://onlinecourses.swayam2.ac.in/cec19_cs06/preview

Weblink to Equivalent Virtual Lab if relevant:
1. https://www.bestcolleges.com/blog/platforms-for-online-courses/
2. https://library.educause.edu/topics/teaching-and-learning/massive-open-online-course-mooc

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
1. https://www.youtube.com/watch?v=tIfRDPekybU
2. https://www.youtube.com/watch?v=jj2iHreoCVk
3. https://www.youtube.com/watch?v=W5JM7FntM94

Sant Gadge Baba Amravati University, Amravati

Part A

Faculty:- Science and Technology

Programme:- Bachelor of Computer Application

Part B

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Semester I

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCA2	Structured Programming Paradigms	60

Course Outcomes (COs)

Upon successful completion of the course, students would be able to

1. Formulate simple algorithms for arithmetic and logical problems
2. Translate the algorithms to programs (in C language)
3. build the basic skills of programming.
4. acquire the importance of C programming using various methodologies.
5. learn the advance concepts of programming like structure, string handling, file handling.

Unit	Content
Unit I	**The Basics Of Programming –** Problem Solving Through Programs- Instructions and Programs, Designing Algorithms/Pseudo Code, Flowchart, Programming Languages and Their Types, Assemblers, Compilers, Interpreters, Program Design, Coding, Compilation, Execution, Testing, Debugging, Documentation; Programming Paradigms : Imperative, Declarative, Procedural, Object Oriented, Advantages and Disadvantages; Programming Approaches – Top Down, Bottom Up, Structured Programming, Features **(11 Periods)**
Unit II	**C Programming** – Character set, Tokens- Data Types, Identifiers, Variables, Constants; Input / Output Statements, format specifiers and Escape sequences; Operators and their types, Precedence and Associativity of Operators, Type Conversions- Implicit and Explicit. **Control structures:** if, if-else, nested if, if-elseif-else, Switch statement, for, while, do-while, nested loops, break, continue, goto. **(12 Periods)**
Unit III	**Arrays, Functions and Pointers using C:** Arrays, dimensions of arrays, Character and String arrays; Modular Programming with Functions- Functions and Parameters, Defining and calling functions, Function calls by Value and Reference, Return statement, Recursion; Pointer variables, address and indirection operators, Pointer assignment, Pointer Arithmetic, Pointer asargument, Pointer as return values, Using pointers for array processing **(11 Periods)**
Unit IV	**Strings, Structures and Unions, Memory Allocation in C:** String literals, variables, Reading and writing strings, operations on strings. **Structures:** prototype, Array of structures, Passing Structures to functions, nested Structure; Union, Dynamic Memory Allocation, Deallocation **(11 Periods)**
Unit V	**The Preprocessor and File Handling in C** The Preprocessor, Preprocessor Directives, Macro definitions, general properties of macros, #define; **File Handling** : Introduction to Files, File opening modes, file operations, command line arguments, Random access files, File pointer, Input/Output Functions. **(11 Periods)**
*SEM : Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity	

	COs: 1. To be able to comprehend foundational knowledge, learn, adapt and successfully apply analytical and computational approaches on changing societal and technological challenges 2. To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion/Seminar/Mini Project, Study Tour
**Activities	1. Drawing flowcharts for algorithms 2. Writing C programs using control structures **3.** Writing and debugging programs **(4 hours)**

Course Material/Learning ResourcesText books:

1. Brian W. Kernighan, Dennis M. Ritchie ,C Programming Language, 2nd Edition Prentice Hall;

   2 edition (April 1, 1988)

2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Reference Books:

1. Yashwant Kanetkar, Let us C, 2nd edition, BPB publication, ,New Delhi, India, (1995).

2, K.R.Venugopal, S.R. Prasad, Mastering C, Tata Mc Graw- Hill ,New Delhi, India, (2008).

3. D. Ravichandran, Programming with C, First Edition,New Age Inetrnational Publication

   Limited, New Delhi, 2006

4.Sudhir Dawra, Mastering Graphics Programming in C, First Edition,Firewall Media-

   Laxmi Publications Private Limited, New Delhi, 2004.

5. H.M.Deitel, P.J.Deitel, C How to Program, Seventh Edition, 2011, Pearson

   Publication Limited, New Delhi, 2011.

Weblink to Equivalent MOOC on SWAYAM if relevant:

- https://www.classcentral.com/course/swayam-introduction-to-programming-in-c-2486
- https://swayamprabha.gov.in/asset/new_team/images/course_files/R12-
  Introduction%20to%20Programming%20in%20C%20.pdf

Weblink to Equivalent Virtual Lab if relevant:

- https://www.programiz.com/c-programming/online-compiler/
- https://www.onlinegdb.com/online_c_compiler
- https://www.tutorialspoint.com/compile_c_online.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

Sant Gadge Baba Amravati University, Amravati

Faculty: Science and Technology

Programme: Bachelor of Computer Application

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application

Semester I : Data Structure

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCA3	**Data Structure**	**60**

Course Learning Outcomes (Cos)

Upon successful completion of the course, students would be able to

1. Describe how arrays, linked structures, stacks, queues, and trees are represented in memory and design and implementation with the help of algorithms.
2. Design common applications for arrays, linked structures, stacks, queues and trees.
3. Prepare programs that use arrays, linked structures, stacks, queues, trees.
4. Demonstrate different methods for traversing trees.
5. Compare alternative implementations of data structures with respect to performance.
6. Describe the concept of recursion, give examples of its use, describe how it can be implemented using a stack.
7. Analyze the computational efficiency of the principal algorithms for sorting and searching.

Unit	Content
Unit I	**Introduction of Data structure:** Introduction, Definition, Types of data Structure, Data Structure Operations, Algorithms: Algorithmic notations, Control Structures, Complexity, time-space tradeoffs. **Arrays:** Introduction, Representation of linear array in memory, Multidimensional Arrays, operations on linear array: Traversing, Insert, Delete. **(12 periods)**
Unit II	**Stack:** Introduction of stack, Representation of Stack: Using arrays and Linked Lists, Operations on stack: push, pop, Stack applications, Infix to Postfix conversion of expression, Expression evaluation, Recursion. **Queues:** Introduction, Insert and Delete operations, Queue implementationusing array, Types –Priority Queue, Circular queue, Dequeue, Queue applications**.** **(11 periods)**
Unit III	**Linked list:** Introduction, Memory representation of linked list, free storage list, operations on linked list: traversing, searching, insertion and deletion, Header linked list, Two-Way list, Stacks and Queues as Linked Lists. **(11 periods)**
Unit IV	**Trees:** Introduction and Tree terminologies, Types of Binary tree, Representation of Trees: Using arrays and Linked Lists, Types of Traversal: Preorder, Inorder, Postorder, Applications of Binary trees, Binary Search Tree (BST): Introduction and definition, Expression tree. **(11 periods)**
Unit V	Searching, Concept and need, Techniques, Linear search, Binary search,Indexed sequential search, Sorting, Concept and Need, Performance criteria, Bubble sort, Insertion Sort, Selection Sort, Shell Sort, Quick Sort, Heap Sort, Merge Sort. **(11 periods)**
*SEM: Assignment, Class test, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity	

COs:	1 To be able to use foundational knowledge, learn, adapt and successfully apply analytical and computational approaches on changing societal and technological challenges.	
**Activities	1. writing algorithms 2. Implementation of Algorithms **3.** writing and debugging programs	**(4 hours)**

Course Material/Learning Resources

Text books:

1) Data Structures by Seymour Lipschutz. Schaum's Series

Reference Books:

1) Fundamentals of Computer Algorithm : Horowite & Sahani
2) Data structures and Algorithms in C++ : B.R. Weiss Pearsons.
3) Introduction to Data Structure in C: Kamthane (Pearson)
4) Introduction to Data Structure : Bhagat Singh, Nops
5) Data Structure by Trampley and Sorcnson.
6) Data Structure by Horowite & Sahani.

Weblink to Equivalent MOOC on SWAYAM if relevant:

Weblink to Equivalent Virtual Lab if relevant:

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

Sant Gadge Baba Amravati University, Amravati

Faculty:- Science and Technology

Programme:- Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester I

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCA4	Fundamentals of Electronics in Computer Sciences	60

Course Outcomes (COs)

Upon successful completion of the course, students would be able to

1. learn the binary numbers used in computer system.
2. understand how logic circuit works inside microprocessor.
3. understand concepts of digital systems.
4. understand how microprocessor works inside computer system.
5. use the concepts of assembly language programming.

Unit	Content
Unit I	**Number systems**: Decimal, Binary, Octal and Hexadecimal, Binary arithmetic Operation: addition, subtraction, multiplication and division, Compliments: 1's and 2's compliments, subtraction by 1's and 2's compliment method, Conversion: Binary to decimal, octal, hexadecimal conversion and vice versa. Octal to decimal, hexadecimal, binary conversion and vice-versa, hexadecimal to octal, decimal, Binary and vice versa. **(12 Periods)**
Unit II	**Logic operation and logic gates:** OR, AND, NOT, NAND, NOR, and EX-OR, EX-NOR gates and their truth table. **Combinational Logic Circuits:** Half Adder, full adder, half Subtractor and full Subtractor. **(11 Periods)**
Unit III	**Boolean Algebra**: DeMorgan's Theorem, Boolean Laws, Reduction of Equation using Boolean Laws. K-Map: reduction of equation using K-Map, Multiplexer and De-multiplexer . **(11 Periods)**
Unit IV	**Sequential Logic Circuits:** Construction, working and Truth Table of R-Clocked R-S, JK, D and T- type, JKMS Flip Flop, Concept of preset and clear terminals, Race around Condition in JK FF. **(11 Periods)**
Unit V	**Registers:** SISO,SIPO,PISO,PIPO. Counters-4 bit Binary Up and Down Counter. 3 bit Binary Up-Down counter. **(11 Periods)**
*SEM Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity	
COs: 1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics. 2. To understand and examine the structure of various number systems and it application in digital design. 3. The ability to understand, analyze and design various combinational and sequential Circuits.	
**Activities	1. Inter-conversions of number systems 2. Design and Verification of logic gates 3. Assembly language programming - 8085 microprocessor 4. Assembly language programming - 8086 microprocessor **(4 Hours)**

Course Material/Learning ResourcesText Books:

1. R. P. Jain :Modern Digital Electronics:4 Th edition Tata Mc-Graw Hill(2010)

2. A. Anand Kumar :Fundamental of Digital Circuits:2 nd edition (PHI)(2003)

3. A. P. Malvino, D. P. Leach: Digital principles and applications 4th edition: McGraw Hill (1975)

4. B .Ram: Fundamental of Microprocessor and Microcomputer 6 th edition:Dhanpatrai Publication(2006)

5. Atul P.Godse/Mrs.Deepali A.Godse-Microprocessor and Interfacing 1st edition :Techinal publication pune (2009)

6. James L.Antonakos,The Pentium Microprocessor 1 st edition:Prentice hall(1997)

References Books:

1. M.B.Matsagar,V.S.Kale: Principles of digital Electronics, Vision publication

2. Floyd,Jain : Digital fundamentals, Pearson

3. S.P.Bali, Y.N.Bapat :Electronic circuits and systems Analog and digital, Tata McGraw Hill

4. B.S.Nair :Digital electronics and logic design, Prentice hall

5. Malvino,Brown :Digital computer electronics, Tata McGraw Hill

6. C.V.Dhuley and V. M. Ghodki :Fundamentals of Digital Electronics

7.Barry B. Brey: The Intel Microprocessors 6Th edition:Prentice hall(2007)

8.Douglus V Hall: Microprocessor and Interfacing 2nd edition :Glencoe(1992)

9.K.M.Bhurchundi and A.K.Ray:Advanced Microprocessors & Peripherals 3rd edition:Tata Mcgraw hill(2013)

Weblink to Equivalent MOOC on SWAYAM if relevant:

https://onlinecourses.nptel.ac.in/noc20_mm02/preview

https://onlinecourses.nptel.ac.in/noc21_mm03/preview

Weblink to Equivalent Virtual Lab if relevant:

https://www.programiz.com/c-programming/online-compiler/
https://www.onlinegdb.com/online_c_compiler
https://www.tutorialspoint.com/compile_c_online.php

Any   pertinent   media   (recorded   lectures,   YouTube,   etc.)   if   relevant:

https://www.youtube.com/results?search_query=fundamentals+of+electronics

https://www.youtube.com/watch?v=Hq_8zewfMpY

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

Faculty: Science & TechnologyProgramme:-

Communication Skills in English

Semester 1

Course Learning Outcome /CO

At the end of the Course, student would be able to:

CO1 understand communicative skills of English Language.

CO2. apply the four skills of language in his daily inter-personal communications.

CO3. formulate/ compose his own sentences and able to speak English Language.

CO4. develop communicative competence in students.

CO5. converse with other students in English.

CO6. communicate their ideas, thoughts and concepts properly in English.

B. C. A. I Semester I Communication Skills in English

Course Title	Communication Skills in English
Course Code	1BCAE1
Course Category:	Theory
Type of Course:	Theory + Practical
No. of Credits:	Theory - 03 + Tutorial – 01(Each batch of 16 students)
No. of Lectures:	Theory - 50 + Tutorial -12
Course Assessment:	End Term: 40 Marks (University level exam) SEM (Internal): 10 Marks (College level evaluation) AEC (Internal) : 25 Marks (College level evaluation)
Course Objective:	To train and prepare the students to seek and find employment in various field. To develop communicative competence in students To impart knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English language as well as the application areas of English Communication. To expose the students to the employment opportunities, challenges and job roles.
Course Outcomes:	At end of the course students would be able to CO1 understand communication skills of English language CO2. apply the four skills of language in his daily routine. CO3. formulate/ compose his own sentences and able to speak English Language.CO4. collaborate with others students in English. CO5. communicate properly their ideas and concepts in English.

Syllabus for B.C.A. Part-I **Semester – I**

Subject: Communication Skills in English

Code :   Lecture

Unit I :   *11*

1) Articles
2) Prepositions
3) Tenses
4) Subject – Verb Agreement

Unit II :   *11*

1) Meeting People
2) Exchanging Greetings and Taking Leave
3) Introducing Yourself

Unit III : Prose   11

1) The Home Coming – Rabindranath Tagore
2) A Lesson My Father Taught Me – APJ Abdul Kalam
3) How I Became a Public Speaker – George Bernard Shaw

Unit IV : Poetry   11

1) The quality of Mercy – William Shakespeare
2) The Mountain and the Squirrel – R.W. Emerson
3) Where the Mind is Without Fear – Rabindranath Tagore

Skill Enhancement Module   `   06

1) Spot Visit and preparing a report – Visit to Super Market, Bus Stand, Railway Station, Bank, Medical Shop, Bakery etc.
2) Interview of a dignitary and writing a report in dialogue form
   (Skill Enhancement module will be of 25 marks. This module will be internally assessed flexibly on the basis of Class tests, assignments, seminar, reading material, project, survey, group discussion, Study tour, MCQ, Open Book exam (OBE), etc.)

Internal Assessment:

a) Class Test   5 Marks
b) Viva-Voce   5 Marks

(For internal assessment the subject teacher shall be the sole examiner.)

Text Book Prescribed :

Pathmaker: A Textbook for College Students [ISBN 989354421778] Edited by Board of Editors, Sant Gadge Baba Amravati University, Amravati. Publisher : Orient BlackSwan Pvt Ltd

B. Sc. I Semester II Communication Skills in English

Course Title	**Communication Skill**
Course Code	
Course Category:	
Type of Course:	Theory + Practical
No. of Credits:	Theory - 04 + Tutorial – 01(Each batch of 16 students)
No. of Lectures:	Theory - 60 + Tutorial -15
Course Assessment:	End Term: 40 Marks (University level exam) SEM (Internal): 10 Marks (College level evaluation) AEC (Internal) : 25 Marks (College level evaluation)
Course Objective:	To train and prepare the students to seek and find employment in various field. To develop communicative competence in students To impart knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English language as well as the application areas of English Communication. To expose the students to the employment opportunities, challenges and job roles.
Course Outcomes:	➤ At end of the course students would be able to CO1 Understand the paragraph, prose, poetry and communication skills CO2. Apply the four skills of language in his daily routine. CO3. Formulate/ compose his own sentences and able to speak English Language. CO4. Collaborate with others students in English. CO5. Communicate properly their ideas and concepts in English.

Syllabus for B.C.A. Part-I **Semester II**

Subject: Communication Skills in English

Text Book Prescribed : *Pathmaker: A Textbook for College Students* **[ISBN 989354421778] Edited by Board of Editors, Sant Gadge Baba Amravati University, Amravati**

Publisher : Orient BlackSwan Pvt Ltd

Code :

Unit I :

1) Question Tags
2) Synonyms and Antonyms
3) Prefixes, Suffixes, Zero Suffix and Infix

Unit II :

1) Making Requests and Responding to Requests

2) Thanking Someone and Responding to Thanks
3) Developing a Thoughts

Unit III : Prose

1) On the Rule of the Road – A.G. Gardiner
2) A Simple Philosophy – Seathl
3) The Thief – Ruskin Bond

Unit IV : Poetry

1) The World is Too Much With Us – William Wordsworth
2) Love's Philosophy – P.B.Shelley
3) Success is Counted Sweetest – Emily Dickinson

Unit V: Skill Enhancement Module   15

4) Blog Writing
5) Presentation on a topic from prescribed prose/poem
(Skill Enhancement module will be of 25 marks. This module will be internally assessed flexibly on the basis of Class tests, assignments, seminar, reading material, project, survey, group discussion, Study tour, MCQ, Open Book exam (OBE), etc.)

Internal Assessment:

a) Class Test   5 Marks
b) Viva-Voce   5 Marks

(For internal assessment the subject teacher shall be the sole examiner.)

Sant Gadge Baba Amravati University, Amravati
Syllabus Prescribed for 3 Year BCA UG Programme
Programme: Bachelor of Computer Application (BCA)
Semester 1 : LAB 1

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
1BCALAB1	LAB-1 Computer Hardware Software Troubleshooting	4 periods per batch

COs

Upon successful completion of the course, students would be able to

1. get Knowledge of Computer Hardware
2. Identify computer hardware Issues/Problems
3. determine faulty Computer hardware
4. Know Basic computer troubleshooting tips
5. get Knowledge of Operating System and device Drivers
6. Identify hardware Peripherals
7. Understand basic knowledge of safeguarding   hardware
8. Apply the knowledge to repair/maintain a computer.

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program/ Experiment
1	Check Front panel indicators & switches and Front side & rear side Connectors.
2	Assembling of Computer hardware
3	Familiarize the computer system Layout: Marking positions of SMPS, Motherboard,SSD, HDD, and add on cards.
4	Configure BIOS setup program and troubleshoot the typical problems using BIOSutility.
5	Formatting Hard Disk
6	Partition of Hard Disk
7	Installation of Hard Disk and configure to the Pc's
8	Installation of Operating System.
9	Installation Audio, Video and Network Drivers
10	Printer Installation and Servicing and troubleshoot
11	Install and configure Scanner, Web cam, Cell phone and bio-metric device withsystem and troubleshoot the problems
12	Assemble a system with add on cards and check the working condition of the systemand install OS.
13	Install and Configure Dual OS Installation
14	Assembling and Disassembling of Laptop to identify the parts and to install OS andconfigure it.
15	Check Basic system requirements for software Installation.
16	Download a software and install and uninstall the software on the system.
17	Identify the various problems while installing the software.
18	Installation of sharing software (Any-Desk and Team viewer)
19	Installation of Anti-viruses

20	Installation of Modem, Router

Sant Gadge Baba Amravati University, AmravatiSyllabus Prescribed

for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application

Semester I

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
1BCALAB2	**LAB-2 Data Structures Using C**	**4 periods per batch**

COs

Upon successful completion of the course, students would be able to demonstrate

1. design and analyze the time and space efficiency of the data structure.

2. identity the appropriate data structure for given problem.

3. Have practical knowledge on the applications of data structures

4. implement linear and non-linear data structure operations using C programs

5. solve problems implementing appropriate data structures

6. implement sorting and searching algorithms using relevant data structures

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program / Experiment
1	Design Program to find sum of N number
2	Design Program to find factorial of N
3	Design Program to find greatest amongst three given number
4	Implementation of traversing technique in array
5	Implementation of insertion technique in array
6	Implementation of deletion technique in array
7	Implementation of PUSH and POP operations on stack.
8	Implementation of insertion and deletion technique in queue
9	Implementation of List data structure using i) array ii) singly linked list.
10	Implementation of recursive technique for finding factorial of an integer.
11	Implement stack using i) array ii) singly linked list
12	Implement Queue using i) array ii) singly linked list
13	Implementation of data insertion in Binary Search trees.
14	Implementation of data deletion in Binary Search trees.
15	Implementation of search in Binary Search trees.
16	Implementation of Linear search
17	Implementation of Binary Search using arrays.
18	Implementation of Bubble sort
19	Implementation of Selection sort
20	Implementation of Insertion sort

Sant Gadge Baba Amravati University, Amravati

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester I :LAB3

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
1BCALAB3	**LAB-3 Fundamentals of Computer Electronics**	**4 periods per Batch**

COs

Upon successful completion of the course, students would be able to

1. design and verify truth table of logic gates.
2. design and verify truth table of flip flops.
3. design programs of 8085.
4. design programs of 8086.

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program / Experiment
1	Conversion of Decimal to Binary
2	Conversion of Decimal to Octal
3	Conversion of Decimal to Hexa -Decimal
4	Conversion of Binary to Decimal
5	Conversion of Binary to Octal
6	Conversion of Binary to Hex-Decimal
7	Demonstration of DeMorgan's Theorem
8	Design and verification of truth table of NAND gate.
9	Design and verification of truth table of OR gate.
10	Design and verification of truth table of NOT gate.
11	Design and verification of truth table of NOR gate.
12	Design and verification of truth table of NAND gate.
13	Design and verification of truth table of Ex-OR gate.
14	Design and verification of truth table of Ex-NOR gate.
15	Design and verification of truth table of RSFF.
16	Design and verification of truth table of DFF
17	Design and verification of truth table of JKFF
18	Design and verification of truth table of JKMS
19	Design and verification of truth table of Half Adder
20	Design and verification of truth table of Full Adder

Sant Gadge Baba Amravati University, Amravati

Faculty: Science and TechnologyProgramme: BCA

Generic Open Elective: Information Technology & Business Data Processing

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Part B

Syllabus Prescribed for 3 Year BCA UG Programme Open Elective 1

Programme: BCA Semester I

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCAOE1	Information Technology & Business Data Processing	**60**

COs:

Upon successful completion of the course, students would be able to

Co 1: understand Concept of Information Technology
Co 2: understand Concept of Computerized Accounting and relevant software
Co 3: Work in Tally

Unit	Content
Unit I	Information – Concept, Characteristics, Data v/s Information, Uses of Information within the Organisation and outside the Organisation, Information Technology: Introduction, Definition of IT, Uses of IT in Business and Various Fields. **(12 periods)**
Unit II	Computerised Accounting Package: Computerised Accounting: Concept, Advantages and Limitation of Computer Accounting, Manual Vs Computerised Accounting. **(12 periods)**
Unit III	Accounting Software Tally 9.0 / Higher: Introduction, Features, Company info, Menu, Gateway of Tally Menu, Button Bar, Status Bar, Calculator. **(12 periods)**
Unit IV	Working in Tally Company Creation: Accounts only and Accounts with inventory. Groups: Concept, Predefined Groups, Creation of New Single Group, Display, Alteration and Deletion of Group. Ledgers: Concept, Single ledger Creation, Display,Alternation & Deletion. Vouchers: Concept, Types of Vouchers, Features andConfiguration of Accounting Vouchers, Transaction: Accounting Voucher, Inventory Vouchers. **(12 periods)**
Unit V	Reports and Advanced Features in Tally: Reports Display and Printing: Balance Sheet, Profit & Loss Account, Ratio Analysis, Stock Summary, Trial Balance, Day Book and Account. **(12 periods)**

Course Material/Learning Resources

Books

1. Data Export & Import: ODBC; Outward and Inward Connectivity, Data Import and
2. Export, Email, Upload, Backup, Restore.
3. Indian Tax System: TDS, TCS, GST: computation of GST

Book Recommendation-

1. Akash Gupta Computer and Financial Accounting with Tally 9.0, Published bydreamTech.
2. Pradeep Sinha and Priti Sinha: Fundamentals of Computing.

Sant Gadge Baba Amravati University, Amravati

Faculty: Science and Technology

Programme: Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester:

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
	Computer Fundamentals	60 Periods

COs:

Upon successful completion of the course, students would be able to

1. Familiarize with the general concept of Computers.
2. Learn the concept operating systems
3. Understand different types and structures of operating systems
4. Familiarize with MS-Office

Unit	Content
Unit I	Introduction to computer : History characteristics, classification of computer, block diagram of computer, Generations of computer, types of computer : Micro, mini, main and super. **(12 periods)**
Unit II	Input/Output Devices : Input Devices : Keyboard, MICR, OCR, Bar coding, mouse. Output Devices : Printers, types of printers, dot matrix printer, laser printer, inkjet printer, VDU (CRT,LCD). **(11 periods)**
Unit III	Memory : Memory cell, primary memory, secondary memory. Primary Memories : RAM, Cache, ROM family; Secondary Memories : CD, DVD, Flash Memory. **(11 periods)**
Unit IV	Operating System: Definition, Features of Operating System, Functions of Operating System. Types of Operating System: Single User, Multiuser, Multitasking, Time Sharing **(11 periods)**
Unit V	Basics of MS-Office: Creating and editing documents in MS-Word, Preparing tables, Preparing Presentations in MS-Powerpoint, Appling Slide Transitions, Preparing Worksheets in MS-Excel, Preparing Charts. **(11 periods)**
COs:	1. Familiarization with the terms like Operating System 2. Skill to work with MS-Word, Excel and PowerPoint. 3. Initiation into the process of writing business letters or job applications, tabulating data, preparing PPTs, etc. using MS-Office.
**Activities	1. Preparing MS-Word Document 2. Preparing MS-Powerpoint Presentations **3.**Preparing Charts in MS-Excel **(4 periods)**

Course Material/Learning Resources

Text books:
1. Operating System Concepts: Silberschatz, Galvin and Gagne.
2. Computer Fundamental : B.Ram, Nas Age Publi.

Reference Books:
1. Operating Systems: Design and Implementation: Andrew S. Tanenbaum.
2. Fundamentals of Operating Systems: A.M. Lister, R.D. Eager
3. Fundamentals of Computer : V.Rajaraman, PHI Publi.
4. Computer Fundamentals : Preeti Sinha, BPB Publi.
5. Computer Fundamentals and C. Program : Dhamdhere.

Weblink to Equivalent MOOC on SWAYAM if relevant:
1. https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
2. https://www.classcentral.com/course/swayam-computer-fundamentals-13950

Weblink to Equivalent Virtual Lab if relevant:
1. https://www.vlab.co.in/broad-area-computer-science-and-engineering
2. http://vlabs.iitb.ac.in/vlabs-dev/labs_local/computer-networks/labs/explist.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
1. https://www.youtube.com/watch?v=eEo_aacpwCw
2. https://www.youtube.com/watch?v=-AP1nNK3bRs&list=PLWPirh4EWFpF_2T13UeEgZWZHc8nHBuXp

Sant Gadge Baba Amravati University, Amravati
Faculty: Science and Technology
Programme: Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme Programme:

Semester:

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
1BCAOE2	Computer Fundamentals	60 Periods

COs:

Upon successful completion of the course, students would be able to

1. Familiarize with the general concept of Computers.
2. Learn the concept operating systems
3. Understand different types and structures of operating systems
4. Familiarize with MS-Office

Unit	Content
Unit I	Introduction to computer : History characteristics, classification of computer, block diagram of computer, Generations of computer, types of computer : Micro, mini, main and super. **(12 periods)**
Unit II	Input/Output Devices : Input Devices : Keyboard, MICR, OCR, Bar coding, mouse. Output Devices : Printers, types of printers, dot matrix printer, laser printer, inkjet printer, VDU (CRT,LCD). **(11 periods)**
Unit III	Memory : Memory cell, primary memory, secondary memory. Primary Memories : RAM, Cache, ROM family; Secondary Memories : CD, DVD, Flash Memory. **(11 periods)**
Unit IV	Operating System: Definition, Features of Operating System, Functions of Operating System. Types of Operating System: Single User, Multiuser, Multitasking, Time Sharing **(11 periods)**
Unit V	Basics of MS-Office: Creating and editing documents in MS-Word, Preparing tables, Preparing Presentations in MS-Powerpoint, Appling Slide Transitions, Preparing Worksheets in MS-Excel, Preparing Charts. **(11 periods)**
COs:	1. Familiarization with the terms like Operating System 2. Skill to work with MS-Word, Excel and PowerPoint. 3. Initiation into the process of writing business letters or job applications, tabulating data, preparing PPTs, etc. using MS-Office.
**Activities	1. Preparing MS-Word Document 2. Preparing MS-Powerpoint Presentations **3.**Preparing Charts in MS-Excel **(4 periods)**

Course Material/Learning Resources

Text books:
1. Operating System Concepts: Silberschatz, Galvin and Gagne.
2. Computer Fundamental : B.Ram, Nas Age Publi.

Reference Books:
1. Operating Systems: Design and Implementation: Andrew S. Tanenbaum.
2. Fundamentals of Operating Systems: A.M. Lister, R.D. Eager
3. Fundamentals of Computer : V.Rajaraman, PHI Publi.
4. Computer Fundamentals : Preeti Sinha, BPB Publi.
5. Computer Fundamentals and C. Program : Dhamdhere.

Weblink to Equivalent MOOC on SWAYAM if relevant:
1. https://onlinecourses.swayam2.ac.in/cec19_cs06/preview
2. https://www.classcentral.com/course/swayam-computer-fundamentals-13950

Weblink to Equivalent Virtual Lab if relevant:
1. https://www.vlab.co.in/broad-area-computer-science-and-engineering
2. http://vlabs.iitb.ac.in/vlabs-dev/labs_local/computer-networks/labs/explist.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
1. https://www.youtube.com/watch?v=eEo_aacpwCw
2. https://www.youtube.com/watch?v=-AP1nNK3bRs&list=PLWPirh4EWFpF_2T13UeEgZWZHc8nHBuXp

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Sant Gadge Baba Amravati University, Amravati

Part A

Faculty: Science and TechnologyProgramme: BCA

Pre-requisites

Data Structures and Object Oriented Design

Syllabus Prescribed for 3 Year BCA UG Programme
Programme: BCA
Semester II

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
2BCA1	Computer System and Interfaces	60

COs:

Upon successful completion of the course, students would be able to

1. Translate bit strings to numbers using unsigned, 2's complement, and IEEEstandard floating point representation systems.
2. Reverse engineer machine code and assembly code to a behavioral (high-level)descriptions.
3. Experiment to determine efficient storage (specifically heap memory)allocation strategies.

Unit	Content
Unit I	**8085 Microprocessor:** Architecture, Pin out Diagram, Pin configuration, opcode, operand, instruction word size, Instruction set, Classification of Instruction set. **(12 periods)**
Unit II	Addressing Modes of 8085, Assembly Language programming of 8 bits: Addition, Subtraction, Multiplication, Division, 1's and 2's Compliments, Logical and Relational operations. **(11 Periods)**
Unit III	**8086 Microprocessor**: Architecture, Pin out Diagram, Pin configuration, Registers, Instruction set, and Classification of Instruction set. **(11 Periods)**
Unit IV	**Interfacing:** Definition of interface. Types of interfaces. Keyboard and DisplayInterface (LED), Memory Controller(RAM & Cache), VGA Interface (RS232), USB for peripheral devices and Graphical User Interface. **(11 Periods)**
Unit V	Digital Camera Interface, Tactile Interface. Optical Reader Interface, Radio Frequency Interface, Blue tooth devices Interfacing. **(11 Periods)**
*SEM: Assignment, Class test, Seminar, Study tour, Industrial visit, Field work, Groupdiscussion or any other innovative practice/activity	
COs:	1. Understand the architecture of 8085. 2. Understand the architecture of 8086. 3. Understand the Interfacing of various devices. 4. Understand the role of interfacing
****Activi ties	1. Performing Simple Program of 8085 2. Operations on various data 3. Connect devices to Computer **(4 Periods)**

Course Material/Learning Resources

Text books:

1. Fundamentals of Microprocessor and Microcomputer
   By: B Ram. Publisher- Dhanpat Rai
2. Fundamentals of Computers
   By: V Rajaraman, Publisher-PHI

Reference Books:

Weblink to Equivalent MOOC on SWAYAM if relevant:

https://onlinecourses.swayam2.ac.in/cec20_cs11/preview

https://onlinecourses.nptel.ac.in/noc22_cs16/preview

https://www.classcentral.com/course/swayam-design-implementation-of-human-computer-interfaces-91655

Weblink to Equivalent Virtual Lab if relevant: http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

https://www.youtube.com/watch?v=qfUZBKDh9BY

https://www.youtube.com/watch?v=8UyJMiYqvs4

https://www.youtube.com/watch?v=ExxFxD4OSZ0

Sant Gadge Baba Amravati University, Amravati

Faculty:Science

Programme: BCA

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: BCA

Semester II

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
2BCA2	Database Management System	60 periods

COs

Upon successful completion of the course, students would be able to

1. Understand the fundamental concepts of Database.
2. implement Normalization.
3. Understand the role and responsibility of Database Administrator,
4. Be Familiar with SQL, a basic language of database and enhance the skill to performthe queries by using functions.
5. Create and use of store procedure and functions with the help of PL/SQL.
6. understand, design and implement Cursor, procedure , functionand trigger.

Unit	Content
Unit I	**Introduction to Database:** Data, Information, Characteristics of Database, Need ofdatabase, and Relational Model. **Architecture of DBMS, DBA** and its Role, **Normalization:** 1NF, 2NF, 3NF. **(12 Hours)**
Unit II	**Structured Query Language (SQL):** Introduction, features, characteristics, advantages, data types, operators, Components of SQL: DDL, DML, DCL and TCLcommands, Select statement with Clauses(Order By, Group By, Having, Where) **(11 Hours)**
Unit III	**Constraint:** Data constraints and its type. Operations on Table with constraints. **Snapshot**, **Views:** Need, advantage & types. **Index:** Need, types and advantages, Joins and Union of Tables and its types. **In-built Functions:** Character Functions, Number Functions, Date Functions, Group Functions, and Conversion Functions, Use of alias, Null, NVL, sub queries. **(11 Hours)**
Unit IV	**Pl/SQL:** Introduction, data types**,** Block structure of PL/SQL, Exception handling **Cursor:** Types of cursor, attributes of Cursor, Life cycle of Cursor **(11 Hours)**
Unit V	**Procedure, Functions, Triggers:** Introduction, importance, types advantages & disadvantages. Creation of Procedure, Functions. **Backup and Recovery:** Introduction,Archive (Transaction) Logs, and Importance of Backups, Database Recovery, and Transaction Control. **(11 Hours)**
*SEM: Assignment, Class test, Seminar, Study tour, Industrial visit, Field work, Group discussionor any other innovative practice/activity	

COs:	
	1. Understand the fundamental concepts of Database.
	2. Knowledge and ability to implement Normalization.
	3. Understand the role and responsibility of Database Administrator,
	4. Familiar with SQL, a basic language of database and enhance the skill to perform thequeries by using functions.
	5. Creation and use of store procedure and functions with the help of PL/SQL.
	6. Ability to understand, design and implementation of Cursor, procedure , function andtrigger.
**Activities	1. Performing Simple queries 2. Operations on various objects 3. Execution of Function **4.** Execution of Stored objects **(4 Hours)**

Course Material/Learning Resources

Text books:

1. SQL, PL/SQL Programming – Ivan Bayross (BPB)

2. **SQL A Complete Reference, Alexis Leon, Mathews Leon (Tata McGraw Hill)**

Reference Books:

1. **Database Management System 3ʳᵈ Ed. by Raghu Ramakrishnan and Johannes Gehrke**
2. Oracle PL/SQL Language Pocket Reference, 5E: A Guide to Oracle's Pl/SQL Language Fundamentals. by Steven Feurstein, Bill Pribyl and Chip Dawes (O'REILLY)

3.

Weblink to Equivalent MOOC on SWAYAM if relevant:
https://onlinecourses.swayam2.ac.in/cec19_cs05/preview
https://onlinecourses.nptel.ac.in/noc19_cs46/preview
https://onlinecourses.nptel.ac.in/noc20_cs60/preview

Weblink to Equivalent Virtual Lab if relevant: http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
https://www.youtube.com/watch?v=3EJlovevfcA https://www.youtube.com/watch?v=U2T_LCdO14Y
https://www.youtube.com/watch?v=7wj7UEdLI6U

Sant Gadge Baba Amravati University, Amravati

Syllabus Prescribed for 3 Year UG Programme
Programme: BCA

Semester: II

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
2BCA3	Object Oriented Programming Paradigms	60 periods

COs:

Upon successful completion of the course, students would be able to

1. Learn evolution of programming paradigms
2. Understand the concepts of object-oriented paradigm
3. Apply object-oriented concepts in programming
4. Use object-oriented thinking in problem-solving

Unit	Content
Unit I	Software Evolution, Programming Paradigm Evolution - Imperative Programming, Declarative Programming, **OOP Paradigm**: Basic Concepts, Features, Advantages, Applications of OOP, Structured Vs OOP, Trending OOP Languages. **(11 Periods)**
Unit II	**OOP Concepts**- Data Abstraction and Encapsulation: Classes and Objects Introduction, Defining a Class, Function Prototype, Inline Function, Default Argument, Function Overloading, Constructors, Types of Constructors: Default, Parameterized and Copy Constructor, Access Specifiers, Memory Allocation for Objects, Objects as Function Arguments, Returning Objects From Functions. **(12 Periods)**
Unit III	**Inheritance:** Definition, Types of Inheritance: Single, Multiple, Hierarchical, Multilevel, Hybrid, Visibility Modes, Constructor and Destructor, Calling Sequence, Type Casting, Upcasting and Downcasting. **(11 Periods)**
Unit IV	**Polymorphism:** Compile Time, Run Time, Virtual Base Classes, Virtual Functions, Pure Virtual Functions, Early Binding and Late Binding. Function Overriding, Operator Overloading, Overloading Unary and Binary Operator, Rules for Overloading. **(11 Periods)**
Unit V	Static Data Members, Static Member Functions, Templates Functions, Template Classes, Abstract Base Class - Need, Design and Implementation, Object-Oriented Exception Handling- Errors as Objects, Classification of Errors, Introduction to Object-Oriented Analysis and Design - Studying Problem Domain, Finding Objects, Describing Objects, Finding Associations, Building Object Model, Open-Closed Principle. **(11 Periods)**
*SEM : Assignment, Class test, Seminar, Study tour, Industrial visit, Field work, Group discussion or any other innovative practice/activity	

COs: 1. Students are able to understand concept Object Oriented Programming
        2. Students will execute simple programs of Object Oriented using Inheritance.
        3. Students will execute simple programs of Object Oriented using Polymorphism.	

**Activities	1. Performing Simple Object Oriented program 2. Operations on various objects 3. Execution of Function 4. Implementation of Polymorphism, Inheritance **(4 Hours)**

Course Material/Learning Resources

Text books:

1. Object oriented programming with C++: E.Balagurusamy

Reference Books:
1. The Object-Oriented Thought Process, 5th Edition by Matt Weisfeld
2. An Introduction to Object-Oriented Programming: Timothy Budd
3. The C++ programming language: Bjarne Stroustrup
4. Programming principles and Practice using C++: Bjarne Stroustrup

Weblink to Equivalent MOOC on SWAYAM if relevant:
https://onlinecourses.nptel.ac.in/noc20_cs59/preview
https://onlinecourses.nptel.ac.in/noc19_cs48/preview
https://www.classcentral.com/course/swayam-programming-in-c-6704
https://www.naukri.com/learning/articles/oops-concepts-in-c-plus-plus/

Weblink to Equivalent Virtual Lab if relevant:
http://vlabs.iitb.ac.in/vlabs-dev/labs/oops/labs/exp1/index.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

Sant Gadge Baba Amravati University, Amravati

Faculty:- Science and Technology

Programme:- Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester II

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Hours)
2BCA4	Fundamentals of Computational Mathematics	60

Course Objectives (Cos)

Upon successful completion of the course, students would be able to

1. **Apply appropriate numerical methods to obtain approximate solutions to difficult mathematical problems.**
2. Understand relationship between variables using the method of Correlation and TrendFit Analysis.
3. **Develop formal reasoning among students using different techniques in numericalmethods.**
4. Understand regression and curve fitting with the help of least squares method.
5. **execute programs of various Numerical Methods and Statistical Techniques forsolving mathematical problems.**
6. write programs to draw various graphs.

Unit	Content
Unit I	**Introduction**: A simple mathematical model, Numerical data, Analog and digital computing, process of numerical computing, characteristics of numerical computing. **Roots of Equation :**Bracketing Methods – Graphical methods, Bisection method and numerical problems. Open Methods – Simple fixed point method, Newton-Raphson, method & its limitations and numerical problems. **(12 Periods)**
Unit II	**Solution of Linear Equations**: Existence of solution, solution by elimination, Basic Gauss elimination method, Gauss elimination with pivoting, Gauss- Jordan method. **Curve Fitting:** Linear regression, polynomial, regression, multiple linear regression. Linear Least Squares, non-linear regression, fitting of transcendental equations **(11 Periods)**
Unit III	**Interpolation:** Polynomial forms, linear interpolation, Newton's divided difference, interpolation polynomials, Lagrange's interpolating polynomials, interpolation with equidistance points. **Numerical Integration:** Meaning of numerical integration, general quadrature formula, trapezoidal rule, Simpson's 1/3 Rule, Simpson's 3/8 rule. **(11 Periods)**
Unit IV	**Functions and Relations:** Elementary counting principle, Function andcounting, Combinatorial argument, Principle of inclusion and exclusion. **Set Theory:** Types of sets, Basic Set Operations, Infinite sets andaccountability, Properties of countable sets. **(11 Periods)**
Unit V	**Graph Theory(a):** Definition, Types of Graphs, Isomorphism, Adjacencyand incidence matrix, Sub graphs, induced sub graphs, Complement of a graph, Union, intersection, ring-sum of two graphs. **Graph Theory (b) :** Edge sequences, Trail, path, circuit's definitions and elementary results, Isthmus, cut vertex, Vertex and edge connectivity, Dijkstra's shortest path algorithm **(11 Periods)**

*SEM Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Fieldwork, Group discussion or any other innovative practice/activity

COs: 1. To be able to draw upon foundational knowledge, learn, adapt and successfully bring to bear analytical and computational approaches on changing societal and technological challenges

COs: 2. To assess the curricular skills acquired by students at college level through Assignments, Unit test, Internal Test, Group Discussion/Seminar/Mini Project, Study Tour

**Activities	1. Finding root of equations with the help of online tools(ex. Online equationsolver) 2. Solving examples based on Gauss Elimination, Gauss-Jordan , etc. methods. **3.** Drawing graph with the help of C Program **(4 Periods)**

Course Material/Learning Resources

Text books:
1. Numerical Analysis by S. S. Shastri.
2. **Graph Theory with Applications to Computer Science and Engineering by Narsinghs Deo.**

Reference Books:
1. **Numerical Methods : E. Balguruswamy Publication-Tata Mc-Graw Hill.**
2. Elements of Discrete Mathematics by C. L. Liu

Weblink to Equivalent MOOC on SWAYAM if relevant:
1. https://onlinecourses.nptel.ac.in/noc20_ma33/preview
2. https://onlinecourses.swayam2.ac.in/cec20_ma11/preview
3. https://onlinecourses.nptel.ac.in/noc19_ma21/preview

Weblink to Equivalent Virtual Lab if relevant:
1. https://www.bestcolleges.com/blog/platforms-for-online-courses/

2. https://library.educause.edu/topics/teaching-and-learning/massive-open-online- course-mooc

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
1. https://www.youtube.com/watch?v=O3U8fomrAug
2. https://www.youtube.com/watch?v=FET0SW991MQ
3. https://www.youtube.com/watch?v=QqhSmdkqgjQ

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI

Faculty: Science & Technology

Programme:-

B. Sc. I Semester II Communication Skills in English

Course Title	**Communication Skill**
Course Code	2BCAE1
Course Category:	Theory
Type of Course:	Theory + Practical
No. of Credits:	Theory - 03 + Tutorial – 01(Each batch of 16 students)
No. of Lectures:	Theory - 50 + Tutorial -10
Course Assessment:	End Term: 40 Marks (University level exam) SEM (Internal): 10 Marks (College level evaluation) AEC (Internal) : 25 Marks (College level evaluation)
Course Objective:	To train and prepare the students to seek and find employment in various field. To develop communicative competence in students To impart knowledge, ideas and concepts in the technicalities of proper pronunciation, structure, appropriate use and style of the English language as well as the application areas of English Communication. To expose the students to the employment opportunities, challenges and job roles.
Course Outcomes:	Upon successful completion of the course, students would be able to ➤ CO1 Understand the paragraph, prose, poetry and communication skills CO2. Apply the four skills of language in his daily routine. CO3. Formulate/ compose his own sentences and able to speak English Language. CO4. Collaborate with others students in English. CO5. Communicate properly their ideas and concepts in English.

Syllabus for B.C.A. Part-I **Semester II**

Subject: Communication Skills in English

Code :

Unit I :

1) Question Tags

2) Synonyms and Antonyms
3) Prefixes, Suffixes, Zero Suffix and Infix

Unit II :

1) Making Requests and Responding to Requests
2) Thanking Someone and Responding to Thanks
3) Developing a Thoughts

Unit III : Prose

1) On the Rule of the Road – A.G. Gardiner
2) A Simple Philosophy – Seathl
3) The Thief – Ruskin Bond

Unit IV : Poetry

1) The World is Too Much With Us – William Wordsworth
2) Love's Philosophy – P.B.Shelley
3) Success is Counted Sweetest – Emily Dickinson

Skill Enhancement Module   15

4) Blog Writing
5) Presentation on a topic from prescribed prose/poem
   (Skill Enhancement module will be of 25 marks. This module will be internally assessed flexibly on the basis of Class tests, assignments, seminar, reading material, project, survey, group discussion, Study tour, MCQ, Open Book exam (OBE), etc.)

Internal Assessment:

a) Class Test   5 Marks
b) Viva-Voce   5 Marks

(For internal assessment the subject teacher shall be the sole examiner.)

Text Book Prescribed :

Pathmaker: A Textbook for College Students **[ISBN 989354421778] Edited by Board of Editors, Sant Gadge Baba Amravati University, Amravati. Publisher : Orient BlackSwan Pvt Ltd**

Sant Gadge Baba Amravati University, AmravatiSyllabus Prescribed
for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester II

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
2BCALA B1	**LAB-1**	**4 Periods per Batch**

Cos:

Upon successful completion of the course, students would be able to

1. Write ALP for 8085

2. Understand interfacing concepts

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program/ Experiment
1	Write an ALP for addition of 8 bit numbers
2	Write an ALP for Subtraction of 8 bit numbers
3	Write an ALP for Multiplication of 8 bit numbers
4	Write an ALP for Division of 8 bit numbers
5	Write an ALP for addition of 16 bit numbers
6	Write an ALP for Subtraction of 16 bit numbers
7	Write an ALP for Multiplication of 16 bit numbers
8	Write an ALP for Division of 16 bit numbers
9	Write an ALP for 1's compliment of 8 bit numbers
10	Write an ALP for 2's compliment of 8 bit numbers
11	Write an ALP for 1's compliment of 16 bit numbers
12	Write an ALP for 2's compliment of 16 bit numbers
13	Write an ALP for Right shifting of 8 bit numbers
14	Write an ALP for Left Shifting of 8 bit numbers
15	Write an ALP for addition of Real 8 bit Number.
16	Implementation of
17	
18	
19	
20	

Sant Gadge Baba Amravati University, AmravatiSyllabus Prescribed
for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester II

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
2BCALA B2	LAB 2	4 periods per Batch

Cos :

 Upon successful completion of the course, students would be able to

1. Perform SQL commands

2. Perform PL/SQL program

3. Understand Database concept

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program/ Experiment
1	Execute the Queries using SELECT commands.(Order By, Group By and Having Clause.)
2	Execute the DML commands in RDBMS.
3	Create a Base Table.
4	Perform like, Between, in operator on Base Table.
5	Perform logical and Relational operators on Base Table.
6	Perform Character functions on Base Table.
7	Perform Numeric functions on Base Table.
8	Perform Date functions on Base Table.
9	Perform Aggregate functions on Base Table.
10	Perform Conversion functions on Base Table.
11	To modify an existing database object. Alter the structure of the database.
12	Perform Views from Base Table and use it.
13	Create Tables (with Constraints).
14	Inserting/Updating/Deleting Records in a Table, Saving (Commit) and Undoing (rollback)
15	Write PL/SQL Code to create simple program
16	Write PL/SQL Code to illustrate control structures.
17	Write PL/SQL Code to create simple procedure/ function.
18	Write PL/SQL Code to illustrate exception handling
19	Write PL/SQL Code to illustrate cursor handling
20	Write PL/SQL Code to illustrate Trigger handling

Sant Gadge Baba Amravati University, Amravati
Syllabus Prescribed for 3 Year BCA UG Programme
Programme: Bachelor of Computer Application (BCA)Semester II

Code of the Course/Subject	Title of the Course/Subject (Laboratory/Practical/practicum/hands-on/Activity)	(No. of Periods/Week)
2BCALAB3	LAB-3	4 Periods per Batch

Cos :

Upon successful completion of the course, students would be able to

1. **Perform programs on OOPs**
2. Perform programs on functions, constructor and destructor.
3. **Understand and implement concept of Inheritance.**

* List of Practical/Laboratory Experiments/Activities etc.

Sr.No.	Name of Program/ Experiment
1	Write a program in C++ to demonstrate Class and Object.
2	Write a program in C++ to demonstrate constructor and destructor.
3	Write a program in C++ to demonstrate Inline function.
4	Write a program in C++ to demonstrate the use of friend function.
5	Write a program in C++ for default argument.
6	Write a program in C++ for unary operator overloading.
7	Write a program in C++ for Binary operator overloading.
8	Write a program in C++ for function overloading.
9	Write a program in C++ for virtual base class.
10	Write a program in C++ to implement single Inheritance.
11	Write a program in C++ to implement multiple Inheritance.
12	Write a program in C++ to implement multilevel Inheritance.
13	Write a program in C++ to implement hybrid Inheritance.
14	Write a program in C++ to implement hierarchical Inheritance.
15	Write a program in C++ for constructor overloading.
16	Write a program in C++ to implement parametrised constructor
17	Write a program in C++ to implement copy constructor
18	Write a program in C++ to implement abstract base classes
19	Write a program in C++ to implement 'this' pointer
20	Write a program in C++ for implement array of object

Sant Gadge Baba Amravati University, Amravati
Faculty: Science and Technology

Programme: Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme

Programme: Bachelor of Computer Application (BCA)

Semester:

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
2BCAOEL3	**Fundamentals of C Programming**	**60 Periods**

COs:

Upon successful completion of the course, students would be able to

1. **use C Programming Language**
2. Understand different data types in C Language
3. apply the techniques to write program in C Language.
4. describe the use of control structures, loops in C Language.

Unit	Content
Unit I	**Fundamentals of C Language:** Important points about C, Why Use C, Applications of C, C Language and English Language, Features of C. **(8 periods)**
Unit II	**Overview of C Language:** History of C, First Program in C Hello World, Basic Structure of C Programming, Tokens in C, Keywords in C, Identifiers in C, Format Specifiers, Format Specifiers Examples **(12 periods)**
Unit III	**Data Types in C Language:** Introduction to Data Types in C,- int, float, double char **Variable in C Language:** Introduction, Declaration and Initialization, Variable types and Scope in C, Local Variable in C, static Variable in C, Global variables in C, Storage Class in C **(12 periods)**
Unit IV	**Constant in C Language:** Constants in C, Operators and Enums in C Language, Introduction to Operator, Arithmetic Operators, Relational Operators in C, Bitwise Operators, Logical Operators, Assignment Operators, Conditional Operator, sizeof() Operator, Operator Precedence **(12 periods)**
Unit V	**Decision Making in C:** Introduction, if Statement, if-else Statement, Nested if Statement, if else if Ladder, switch case **Loop control in C Language:** Introduction, while loop, do while Loop, for Loop **Control Flow in C Programming**: break Statement, continue Statement, goto Statement **Array in C Language:** Introduction, Single Dimensional Array, Multi-Dimensional Array **(12 periods)**
COs:	1. Able to Write, compile and debug programs in C language. 2. Able to use different data types in a computer program. 3. Design programs involving decision structures, loops, and arrays.
**Activities	1. Executing simple C Program 2. Using Data Types in C Program **3.** Using decision making statements in C program **(4 periods)**

Course Material/Learning Resources

Text books:

1. **The C Programming Language by Brian Kernighan and Dennis Ritchie 2nd edition**

Reference Books:

1. **Let Us C Yashavant kanetkar BPB.**
2. Absolute beginner's guide to C, Greg M. Perry, Edition 2, Publisher: Sams Pub.,1994.
3. **Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.**

Weblink to Equivalent MOOC on SWAYAM if relevant:
1. https://onlinecourses.nptel.ac.in/noc19_cs42/preview
2. https://onlinecourses.nptel.ac.in/noc22_cs40/preview
3. https://onlinecourses.swayam2.ac.in/cec20_cs02/preview

Weblink to Equivalent Virtual Lab if relevant:
1. https://www.vlab.co.in/broad-area-computer-science-and-engineering
2. https://cse02-iiith.vlabs.ac.in/
3. http://vlabs.iitb.ac.in/vlabs-dev/labs/oops/labs/exp1/index.php

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:
1. https://www.youtube.com/watch?v=irqbmMNs2Bo
2. https://www.youtube.com/watch?v=8PopR3x-VMY

Sant Gadge Baba Amravati University, Amravati

Faculty: Science and Technology

Programme: Bachelor of Computer Application (BCA)

Syllabus Prescribed for 3 Year BCA UG Programme

Semester:

Code of the Course/Subject	Title of the Course/Subject	(Total Number of Periods)
2BCAOEL4	e-Commerce	60 Periods

COs:

Upon successful completion of the course, students would be able to

1. understand information systems for business and management.
2. Understand organizational and managerial foundations of systems, the technical foundation for understanding information systems

Unit	Content
Unit I	**Introduction:** What is E-Commerce, Forces behind E-Commerce Industry Framework, Brief history of E-Commerce, Inter Organizational E-Commerce Intra Organizational E-Commerce, and Consumer, to Business Electronic Commerce, Architectural framework **(12 periods)**
Unit II	**Network Infrastructure for E-Commerce:** Introduction, Market forces behind I Way, Component of I way, Access Equipment, Global Information Distribution Network, Broad band Telecommunication. **(11 periods)**

Unit III	**Mobile Commerce:** Introduction to Mobile Commerce, Mobile Computing Application, Wireless Application, Protocols, WAP Technology, Mobile Information Devices, Web Security, Introduction to Web security, Firewalls & Transaction Security, Client Server Network, Emerging Client Server Security Threats, firewalls & Network Security. **(11 periods)**
Unit IV	**Electronic Payments:** Overview of Electronics payments, Digital Token based Electronics payment System, Smart, Cards, Credit Card I Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking **(11 periods)**
Unit V	**Net Commerce:** EDA, EDI Application in Business, Legal requirement in E - Commerce, Introduction to supply Chain Management, CRM, issues in Customer Relationship Management. **(11 periods)**
COs:	1. Identify and apply relevant problem solving methodologies 2. Design components, systems and/or processes to meet required specifications for a web presence 3. Demonstrate research skills 4. Understand the basic concepts and technologies used in the field of management information systems.
**Activities	1. Visit to various e-commerce sites. 2. Place an order on e-Commerce site. **3.** Using Payment Gateway **(4 periods)**

Course Material/Learning Resources

Text books:

1. Operating System Concepts: Silberschatz, Galvin and Gagne.

Reference Books:

1. Ravi Kalakota, Andrew Whinston, "Frontiers of Electronic Commerce", Addision Wesley

2. Denieal Amor, " The E-Business Revolution", Addision Wesley

3. Diwan, Sharma, "E-Commerce" Excel

4. Bajaj & Nag, "E-Commerce: The Cutting Edge of Business", TMH

Weblink to Equivalent MOOC on SWAYAM if relevant:

1. https://onlinecourses.swayam2.ac.in/nou21_cm14/preview
2. https://onlinecourses.swayam2.ac.in/cec19_cm01/preview
3. https://www.classcentral.com/course/swayam-e-commerce-technologies-14019

Weblink to Equivalent Virtual Lab if relevant:

1. https://www.vlab.co.in/
2. https://dl.acm.org/doi/abs/10.1145/1734263.1734295
3.
   https://www.researchgate.net/publication/221538163_Electronic_commerce_virtual_la
   borat ory

Any pertinent media (recorded lectures, YouTube, etc.) if relevant:

1. https://www.youtube.com/watch?v=OnqFpeAqr3M&list=PLbWX42QoZL5vhNjqqfyzL
   gbv Uezv72ocC
2. https://www.youtube.com/watch?v=taN56LK9APw
3. https://www.youtube.com/watch?v=Zzs6kLlkAUQ

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   APPENDIX - A I (B.C.A. Part-I) (Semester-I)

Sr. No	Subject	Subject Code	L	T	P	Total Marks	Theory / Tutorial	Practical	Total	Duration of Exams in Hrs	Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical Int.	Practical Ext.	Total Marks	Marks	Grade
			Teaching Period Per week				Credits				Maximum Marks						Minimum Passing	
1	Communication Skill	1BCAE1	3		-	3	3	-	3	2	40		1	-	-	50	20	P
2	Communication Skill in English (AEC)	1BCAE2		1	-	1		1	1	--		10	1	25	-	25	10	P
3	DSC-1 (T) Fundamentals of Computers	1BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC-2(T)Structured Programming Paradigms	1BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC-3(T)Data Structure	1BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4(T)Fundamentals of Electronics in Computer	1BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC-1(P) Computer Hardware Software Troubleshooting	1BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC-2(P)Data Structure	1BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC-3 (P)Fundamentals of Computer Electronics	1BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	DSC- 1 (P)Generic Open Elective I(GOEC) 1-Computer Fundamentals 2-IT and BDP	1BCAG	2	-	-	2	2	-	2	2	College Level Exam.					50	20	p.
11	**Induction Programme***	BCAIP				30 hrs (beginning of 1 Semester classes) 1*			1									P
	Total		25	1	12	38	25	7	33				6			675		

BCA-Sem-1 Total Credit	39	Total Marks	675	

L: Lecture, T: Tutorial, P: Practical
Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.
- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   APPENDIX - A I (B.C.A. Part-I) (Semester-II)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							Minimum Passing	
			Teaching Period Perweek				Credits				Maximum Marks								
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
1	Communication Skill	2BCAE1	3		-	3	3	-	3	2	40		1	-	-	50	20	P
2	Communication Skill in English (AEC)	2BCAE2		1	-	1		1	1	--		10	1	25	-	25	10	P
3	DSC- 1(T) Computer System and Interface	2BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Data Base Managemant System	2BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Object Oriented Programming	2BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Fundaentals of Computational Mathematics	2BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Computer Interfacing	2BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) DBMS	2BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) CPP	2BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Generic Open Elective I(GOEC) 1-Fund. Of C Programming 2-e-Commerce	2BCAG	2	-	-	2	2	-	2	2	College Level Exam.					50	20	p.
	Total		25	1	12	38	25	7	32				6			675		
	BCA-Sem-2 Total Credit		38		**Total Marks**			675										

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

	Examinations leading to the Degree of Bachelor of Science
	(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
	Scheme of Teaching, Learning, Examination and Evaluation · · · · · · · APPENDIX - A I (B.C.A. Part-I) (Semester-III)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration ofExams in Hrs.	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credits				Maximum Marks						Minimum Passing	
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
														Int.	Ext.			
3	DSC- 1 (T) Operating System	3BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Core Java Programming	3BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Fundamentals of Open Source Software	3BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T)Python Programming	3BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Operating System	3BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) Java Programming	3BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) Python Programming	3BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Environmental Studies (AEC)	3BCAENV	2	-	-	2	2	-	2	2								
	Total		22	0	12	34	22	6	28				4			550		
	BCA-Sem-3 Total Credit		32		Total Marks		550											

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation — APPENDIX - A I (B.C.A. Part-I) (Semester-IV)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credits				Maximum Marks							Minimum Passing
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical Int.	Practical Ext.	Total Marks	Marks	Grade
3	DSC- 1 (T) Data Communication Network	4BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Web Technologies	4BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Adv Java Programming	4BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Fundamentals of Data Science	4BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Web Technologies	4BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) Adv Java Programming	4BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) Data Science using Python	4BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Environmental Studies (AEC)	4BCAENV	2	-	-	2	1	-	1	3	70	30	1	-	-	100	40	P
	Total		22	0	12	34	21	6	27				5			650		
	BCA-Sem-4 Total Credit		32	Total Marks			650											

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

	Examinations leading to the Degree of Bachelor of Science																	

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   **APPENDIX - A I (B.C.A. Part-I) (Semester-V)**

Sr.No	Subject	Subject Code	Teaching Period Perweek L	T	P	Total Marks	Credits Theory/Tutorial	Practical	Total	Duration of Exams in Hrs	Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical Int.	Ext.	Total Marks	Marks	Grade
3	DSC- 1 (T) Computer Graphics	5BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) Android Application Development	5BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Dot Net Technologies with C#	5BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Software Engineering	5BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) Graphic Programming	5BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) Android Programming	5BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) C# Programming	5BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	*Open Elective (OE1) Elective 1-Blockcain Technology 2-Cyber Security 3-Power BI	5BCAOE	5	-	-	5	5	-	5	3	100	-	-	-	-	100	40	P
	Total		25	0	12	37	25	6	31				4			650		
	BCA-Sem-5 Total Credit		35		**Total Marks**		650											

L: Lecture, T: Tutorial, P: Practical

Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.

- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report

Examinations leading to the Degree of Bachelor of Science
(Three Years Six Semesters Degree Programme) (Choice Based Credit System)
Scheme of Teaching, Learning, Examination and Evaluation   APPENDIX - A I (B.C.A. Part-I) (Semester-VI)

Sr. No	Subject	Subject Code	Teaching & Learning Scheme								Duration of Exams in Hrs	Examination & Evaluation Scheme								
			Teaching Period Per week				Credits					Maximum Marks							Minimum Passing	
			L	T	P	Total Marks	Theory / Tutorial	Practical	Total			Theory + M.C.Q Ext.	Skill Enhancement Module (SEM)Int.	SEM Credit	Practical		Total Marks	Marks	Grade
															Int.	Ext.			
3	DSC- 1 (T) R-Programming	6BCA1	5		--	5	5	-	5	3	80	20	1	-	-	100	40	P
4	DSC- 2 (T) PHP Programming	6BCA2	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
5	DSC- 3 (T) Fundamentals of Cloud Computing	6BCA3	5		-	5	5	-	5	3	80	20	1	-	-	100	40	P
6	DSC-4 (T) Network Security	6BCA4	5		---	5	5	-	5	3	80	20	1	-	-	100	40	P
7	DSC- 1 (P) R Programming	6BCALAB1	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
8	DSC- 2 (P) PHP Programming	6BCALAB2	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
9	DSC- 3 (P) Based on Cloud Computing	6BCALAB3	-	-	4	4	-	2	2	4	-	-		-	50	50	25	P
10	Internship / Project	6BCAIP	-	-	2	2	-	2	2	4	-	-	-	25	25	50	25	P
	Total		**20**	**0**	**14**	**34**	**20**	**8**	**28**				**4**			**600**		
	BCA-Sem-6 Total Credit		**32**		**Total Marks**		**600**											

L: Lecture, T: Tutorial, P: Practical
Note : Internship /Field Work / Work Experience will be conducted after I semester till Vth semester in vacations for minimum 150 hrs. It's credits and grades will be reflected in final semester IV credit grade report.
- OEC (Optional) can be studied during semester I to VI, Its credits and grades will be reflected in final semester VI credit grade report