

Sant Gadge Baba Amravati University, Amravati**Faculty of Science and Technology, Programme: BCA**

POs of B.C.A. Programme:

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 but also in common, organization and management.
- PSO-4 Learn applications, packages, programming languages and modern techniques of IT
- 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 and hence 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 to be 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 of computers in almost all fields of computer application. The main emphasis of the Programme is an applied computer use in various fields. Companies who want, to take benefit of the new information technologies and communication systems need expert professionals, who can apply computer science principles to solve problems produced by the 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 areas of computer applications including the latest developments in the industry. The programme imparts comprehensive knowledge with equal emphasis on theory and practice in 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)**

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Scheme of Teaching, Learning, Examination and Evaluation

APPENDIX - A I (B.C.A. Part-I) (Semester-I)

L: Lecture, T: Tutorial, P: Practical

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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

Scheme of Teaching, Learning, Examination and Evaluation

APPENDIX - A I (B.C.A. Part-I) (Semester-II)

Sr . No	Subjec t	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credit s				Maximum Marks					Minimum Passing		
			L	T	P	Total Marks	Theory / Tutoria l	Practica l	Total		Theory + M.C.Q Ext.	Skill Enhancemen t Module (SEM)Int.	SEM Credi t	Practical	Int.	Ext.	Total Mark s	Mark s
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) Fundamentals 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	Subjec t	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs.	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credit s				Maximum Marks					Minimum Passing		
			L	T	P	Total Marks	Theory / Tutoria l	Practica l	Total		Theory + M.C.Q Ext.	Skill Enhancemen t Module (SEM) Int.	SEM Credit	Practical	Int.	Ext.	Total Mark s	Marks
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 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

Sr . No	Subjec t	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme								
			Teaching Period Perweek				Credit s				Maximum Marks					Minimum Passing			
			L	T	P	Total Marks	Theory / Tutoria l	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancemen t Module (SEM)Int.	SEM Credit	Practical	Int.	Ext.	Total Mark s	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

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

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- 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.)

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 Technology Programme: 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:	
<ol style="list-style-type: none"> 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 	
**Activities	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 perform the 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 of database, 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 TCL commands, 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 discussion or any other innovative practice/activity

COs:	<ol style="list-style-type: none"> 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 the queries 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 and trigger.
**Activities	<p>1. Performing Simple queries 2. Operations on various objects 3. Execution of Function 4. Execution of Stored objects</p> <p style="text-align: right;">(4 Hours)</p>

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 Feuerstein, 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 numerical methods.**
4. Understand regression and curve fitting with the help of least squares method.
- 5. execute programs of various Numerical Methods and Statistical Techniques for solving 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 and counting, Combinatorial argument, Principle of inclusion and exclusion. Set Theory: Types of sets, Basic Set Operations, Infinite sets and accountability, Properties of countable sets.	(11 Periods)
Unit V	Graph Theory(a): Definition, Types of Graphs, Isomorphism, Adjacency and 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)
<p>*SEM Assignment, Class test, Attendance, Seminar, Study tour, Industrial visit, Fieldwork, Group discussion or any other innovative practice/activity</p> <p>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</p>		
**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=QqhSmdkqgiQ>
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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
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- 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, 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)
2BCALA B1	LAB-1	4 Periods per Batch

Cos:

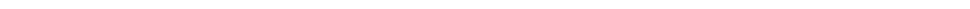
Upon successful completion of the course, students would be able to

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, 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)
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:	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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=irqbmMNz2Bo>
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:	
	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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", Addison Wesley
2. Denieal Amor, " The E-Business Revolution", Addison 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_em14/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_laboratory

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

1. <https://www.youtube.com/watch?v=OnqFpeAqr3M&list=PLbWX42QoZL5vhNjqqfyzLgbvUezv72ocC>
 2. <https://www.youtube.com/watch?v=tAN56LK9APw>
 3. <https://www.youtube.com/watch?v=Zzs6kLlkAUQ>
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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 . N o	Subjec t	Subject Code	Teaching & Learning Scheme							Duratio n of Exams in Hrs	Examination & Evaluation Scheme								
			Teaching Period Per week			Credit s			Total Marks	Theory / Tutoria l	Practical	Total	Theory + M.C.Q Ext.	Skill Enhancemen t Module (SEM)Int.	SEM Credit	Maximum Marks		Minimum Passing	
			L	T	P										Int.	Ext.	Total Mark s	Marks Grade	
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									
	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)

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)

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	Subjec t	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme							
			Teaching Period Perweek				Credit s				Maximum Marks					Minimum Passing		
			L	T	P	Total Marks	Theory / Tutoria l	Practical	Total		Theory + M.C.Q Ext.	Skill Enhancemen t Module (SEM)Int.	SEM Credit	Practical		Total Mark s	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

(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)

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 . N o	Subjec t	Subject Code	Teaching & Learning Scheme							Duration of Exams in Hrs	Examination & Evaluation Scheme								
			Teaching Period Per week			Credit s			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.	Ext.	Total Marks	Marks	Grade
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