Shivaji University, Kolhapur
Bachelor of Computer Applications (BCA)
Draft CBCS Course Structure to be implemented from June 2020
Syllabus

1. Introduction:

Bachelor of Computer Application (3years) program / degree is a specialized program in Computer Applications. It builds the student on studies in applied use of computers and to become competent in the current race and development of new computational era.
The duration of the study is of six semesters, which is completed in three years. The program is based on Choice-based credit system comprising 144 credit points and intake for one batch is not more than 80 students.

2. Objective:

BCA offers the prequalification for professionals heading for smart career in the IT field, which measures up to international standards. On completing this course one can do higher studies such as MCA, MBA etc., in any UGC recognized universities or in any other reputed institution in India or abroad.

3. Eligibility: Candidate should have passed standard XII (10+2) in any stream or government approved equivalent diploma in Engineering/ Technology from any recognized Board or Vocational stream.
A candidate who has completed qualifying qualification from any Foreign Board /University must obtain an equivalence certificate from Association of Indian Universities (AIU).

4. PEO, PO and CO Mappings:

Program Educational Outcomes: After completion of this program, the graduates / students would:

PEO I	Technical Expertise	Implement fundamental domain knowledge of core courses for developing effective computing solutions by incorporating creativity and logical reasoning.
PEO II	Successful Career	Deliver professional services with updated technologies in Computer application based career.
PEO III	Interdisciplinary and Life Long Learning	Develop leadership skills and incorporate ethics, team work with effective communication & time management in the profession. Undergo higher studies, certifications and technology research as per market needs.

Program Outcomes (PO's):- After completion of program Students / graduates will be able to:

PO1: Apply knowledge of ICT in solving business problems.
PO2: Learn various programming languages and custom software.
PO3: Design component, or processes to meet the needs within realistic constraints.
PO4: Identify, formulate, and solve problems using computational temperaments.
PO5: Comprehend professional and ethical responsibility in computing profession.
PO6: Express effective communication skills.
PO7: Recognize the need for interdisciplinary, and an ability to engage in life-long learning.
PO8: Knowledge of contemporary issues and emerging developments in computing profession.
PO9: Utilize the techniques, skills and modern tools, for actual development process.

Course Outcome(s): Every individual course under this program has course outcomes (CO). The course outcomes rationally match with program educational objectives. The mapping of PEO, PO and CO is as illustrated below:

Program Educational Objectives	Thrust Area	Program Outcome	Course Outcome
PEO I	Technical Expertise	PO1,PO2,PO3,PO9	All Core and Lab courses
PEO II	Successful Career	PO4,PO5,PO6	All AEC courses
PEO III	Interdisciplinary and Life Long Learning	PO7,PO8	All Electives

5. Workload (Period/Lectures for each Course): For every semester 60 periods (60 minutes per period) are allotted to complete the syllabus of each Course (Subject).

6. Standard of Passing:

I. A candidate must obtain minimum 40% of the marks in each University, internal examination paper, lab course as well as mini and major project.
II. There shall be a separate head of passing in Theory, Internal, Lab Course and Project examination. However, ATKT rules shall be made applicable in respect of theory and lab courses (University Examination) only.
III. A candidate who fails in any number of subjects during semester – I & II shall admitted to B.C.A.-II (appear for semester –III & Semester IV examination).
IV. However the candidate shall not be admitted to B.C.A- III (Semester-V) unless he/she passed in all the subjects at B.C.A.-I (Semester-I & Semester-II).
V. A candidate who fails in any number of subjects during Semester-III & IV shall be admitted for B.C.A.-III & allowed to appear for Semester –V & VI examinations.
VI. For environmental studies Semester IV the candidate shall have to score 28 marks out of 70 marks theory paper and 12 marks out of 30 for project work.
VII. CCC 108 is noncredit course as per notification of university i.e. Democracy, Elections and Good Governance (Non Credit).

Gradation Chart:

Marks obtained	Numerical Grade (Grade Point)	CGPA	Letter Grade
Absent	0(Zero)		
<40	0 to 4	0.0 to 3.99	Fail
40-50	5	4.00 to 4.99	C
51-60	6	5.00 to 5.99	B
61-70	7	6.00 to 6.99	B+
71-80	8	7.00 to 7.99	A
81-90	9	8.00 to 8.99	A+
91-100	10	9.00 to 10.00	O(outstanding)

Note: i) Marks obtained > = 0.5 shall be rounded off to next higher digit.
ii) The SGPA & CGPA shall be rounded off to 2 decimal points.

Calculation of SGPA & CGPA

1. Semester Grade Point Average (SGPA) SGPA = Course credits x Grade Points obtained of a semester Course credits of respective semester

2. Cumulative Grade Point Average (CGPA) CGPA = Total credits of a semester x SGPA of respective semester of all semesters Total course credits of all semesters

7. Nature of Theory Question paper: Nature of question paper is as follows for University end semester examination

QUESTION PAPER PATTERN FOR ALL SEMESTERS

Duration: 3 Hours Total Marks – 70

Instructions: 1) Que.1 and Que. 6 are compulsory and attempt any three Questions from Que. No.2 to Que. No. 5.
2) Figures to the right indicate marks.

Qu.1)

A. Multiple Choice Questions (10 questions for 1 mark each)	10
B. Give Reasons or Short answer question (Any two out of three)	10
Qu.2) Broad answer question	10
Qu.3) Broad answer question	10
Qu.4) Broad answer question	10
Qu.5) Broad answer question	10
Qu.6) Write notes on (Any Four out of Six)	20

8. Nature of Practical Question Paper:
There will be three questions of 15 Marks each, out of which student have to attempt any two Questions and 10 marks for journal and 10 marks for oral for 2 credit lab course and time duration is two hours.
For four credit lab course there will be four questions of 25 Marks each, out of which student have to attempt three questions and 10 marks for journal and 15 marks for oral and time duration is three hours.

Practical Examination conducted by the University appointed examiner panel of two members. The panel members have more than five years' experience as full time teacher.

9. Medium of Instruction: The medium of instructions shall be in English.

10. Teachers Qualification: As per rules and regulations of Shivaji University, Kolhapur and Govt. of Maharashtra.

11. Internal Marks Distribution:

1 Five Marks for Mid Tests.
2 Ten Marks for presentation or activity based learning or Group exercise(Number of students in Group are not more than six).
3 Five Marks for Assignments.
4 Five Marks for library activity/ designing apps or software or working model/ Field Work/online learning activity etc.
5 Five Marks for Attendance.(75% to 80%- 02 marks, 81% to 85 %- 03 marks, 86% to 90 %- 04 ,marks 91% to 100% - 5 mark)

12. Mini- Project

The Objective of mini project is, to make aware student with current technology to be used in IT industry. The language/platform of the mini-project to be selected from the subject studied in previous and present semester. The Group size of maximum four students can undertake mini project. Project Viva-Voce Examination will be conducted by the University appointed examiner panel of two members. The panel members have more than five years' experience as full time teacher.

13. Major Software Development Project:

The Objective of major project is to design and develop the live application with current technology to be used in various industries. The Group size of maximum three students can undertake major project. Project Viva-Voce Examination will be conducted by the University appointed examiner panel of two members. The panel members have more than five years' experience as full time teacher. The chairman for viva voce committee will be doctorate or faculty having more than ten years experience as full time faculty.

14. Fee Structure: As per University norms.

15. Requirements:

i) Core Faculty:
For First Year Sem I & Sem II - 1 Full Time Faculty and 1 Lab Assistant.
For Second Year Sem III & Sem IV - 1 Full Time Faculty.
For Third Year Sem V & Sem VI - 1 Full Time Faculty and 1 Lab Assistant.
Total – 3 Full Time Faculties and
Two Lab Assistants having qualification BCA/BCS/Diploma in Computer Engineering/PG DCA.

In addition there shall be visiting/CHB faculty drawn from academicians /professionals from different fields for AEC/DSE/GE Courses and AEC/DSE based lab courses.

ii) Non-Teaching Staff: One Clerk and 2 Peons.
iii) Computer Lab: Well-equipped networked Lab with backup facility, Application and system software's as per syllabi and internet facility.
iv) Library: The entire library fees collected from the students shall be invested on

library.

v) Class Room: At least 3 classrooms of seating capacity 80 students with LCD in which at least one Digital Classroom.

16. Structure of Syllabus:

BCA-I (Sem-I)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 101	Fundamentals of Computer	4	30	70	100
CC 102	Introduction to Programming Using C	4	30	70	100
AEC 103	Principles of Management	4	30	70	100
AEC 104	Business Communication	4	30	70	100
AEC 105	Office Automation	4	30	70	100
CCL 106	Lab Course-I Based on CC 102	2	-	50	50
CCL 107	Lab course-II Based on AEC 105	2	-	50	50
CCC 108	Compulsory Civic Course (CCC)	-	-	-	-
		24	150	450	600

BCA-I (Sem-II)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 201	DBMS	4	30	70	100
CC 202	Operating System	4	30	70	100
CC 203	Object Oriented Programming Using C++	4	30	70	100
AEC 204	Financial Accounting with Tally	4	30	70	100
AEC 205	Mathematical Foundations for Computer Applications	4	30	70	100
CCL206	Lab Course-III Based on CC201 and AEC 204	2	-	50	50
CCL207	Lab course-IV Based on CC 203	2	-	50	50
		24	150	450	600

BCA-II (Sem-III)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 301	Web Technology	4	30	70	100
CC 302	Computer Network and Internet	4	30	70	100
CC 303	Data Structure using C	4	30	70	100
AEC 304	Elements of Statistics	4	30	70	100
AEC305	Human Resource Management and Materials Management	4	30	70	100
CCL 306	Lab Course-V Based on CC301	2	-	50	50
CCL 307	Lab Course VI based on CC303 & AEC 304	4	-	50	50
		24	150	450	600

BCA-II (Sem-IV)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 401	RDBMS	4	30	70	100
CC 402	Software Engineering	4	30	70	100
CC 403	DOT NET Technology	4	30	70	100
AEC 404	Entrepreneurship Development	4	30	70	100
CCL 405	PHP	2	50	-	50
CCL 406	Lab Course-VII Based on CC401	2	-	50	50
CCL 407	Lab Course-VIII Based on CC403	2	-	50	50
CCL 408	Mini Project	2	-	50	50
		24	170	430	600

BCA-III (Sem-V)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 501	Java Programming	4	30	70	100
CC 502	Data Warehousing and Data Mining	4	30	70	100
CC 503	IT Security	4	30	70	100
DSE 504	Elective-I 1. Python Programming 2. C# Dot Net 3. Ethical Hacking	4	30	70	100
GE 505	Elective-II 1. Digital Marketing 2. Management Information System 3. Knowledge Management	4	30	70	100
CCL 506	Lab Course-IX Based on CC501	2	-	50	50
CCL 507	Lab Course-X Based on DSE504	2	-	50	50
		24	150	450	600

BCA-III (Sem-VI)

Course Code	Title of Paper	Credit	Internal	External	Total
CC 601	Cloud Computing	4	30	70	100
DSE 602	Elective-I 1. Internet of Things (IoT) 2. Android Programming 3. R Programming	4	30	70	100
GE603	Elective-II 1. IT Management 2. ERP 3. M - Commerce	4	30	70	100
AEC 604	Soft Skills & Personality Development	2	50	-	50
AEC 605	Industrial Visit	1	25	-	25
CCL 606	Lab Course XI Based on DSE 602	4	-	100	100
CCL 607	Major Project	5	25	100	125
		24	190	410	600

Note: Students has to select any one course from the respective electives.
CC- Compulsory Courses **DSE- Domain Specific Electives**
GE- General Electives **AEC- Ability Enhancement Compulsory Courses**
CCL – Compulsory Courses Lab.

Credit Distribution Chart for BCA Program

Sr.	Particulars	Number of Courses	Total Credits	Percentage of Credits
1	CC- Compulsory Courses	29	93	65
2	GE- General Electives	02	08	5
3	DSE- Domain Specific Electives	02	08	5
4	AEC- Ability Enhancement Compulsory Courses	10	35	25
	Total	43	144	100

17. Syllabus:

BCA I (Sem I)

Course Code: CC 101	**Fundamentals of Computer**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will be able to - 1. Understand basic concepts of computer. 2. Describe peripheral devices and number systems. 3. Understand operating environment 4. Demonstrate the use of Linux Operating system commands		

Unit No.	**Descriptions**	**No. of Periods**
I	**Introduction to Computers** Introduction to computer, Characteristics of Computers, Block diagram of computer, History of computers, Generations of computer, Applications of computer, Types of computers and features : Mini, micro, mainframe and super, Types of Programming Languages : Machine Languages, Assembly Languages and High Level Languages.	15
II	**Peripheral Devices and Number Systems** Types of Memory (Primary And Secondary) : RAM, ROM, Secondary Storage Devices (FD, CD, HD, Pen drive) , I/O Devices, Number Systems : Binary,Octal and Hexadecimal, Conversion from one base to another,	15
III	**Introduction to Software & Operating Environment** Introduction to software, Types of software: System, Application and utilities. Introduction to operating system, Types of O.S. , Functions of O.S., Files and Directories , Batch Files Windows Operating Environment, Features of Windows, Control Panel,Taskbar, Desktop, Windows Application, Icons, Windows Accessories : Notepad and Paintbrush	15
IV	**Linux** Introduction Linux, Features, Structure of Linux, File system, Linux Commands , Permission and inodes, I/O redirection, Pipes ,VI Editor .	15
	Books Recommended: 1. Computer fundamentals by Rajaraman 2. Computer fundamentals by P.K.Sinhaand PritiSinha 3. Computer fundamentals, architecture and organisation by B. Ram 4. Computer Today - Basandara	

Course Code: CC 102	Introduction to Programming using 'C'	Credits: 04	Marks : 100
Course Outcomes	After Completion of this course the student will be able to - 1. Able to implement the algorithms and draw flowcharts for solving Mathematical problem. 2. Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage. 3. Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures and file Handling. 4. Develop confidence for self education and ability for life-long learning needed for computer language.		

Unit No.	Descriptions	No. of Periods
I	**Basics of Programming and Ubuntu OS** • Problem definition, problem analysis, Algorithms, flow chart, Debugging, Types of errors in programming, Documentation. • Basics of Linux Operating System(Ubuntu) and 'C' programming language • Introduction to GCC Compiler, • Data Types, Variable Declaration, Input/output Statement, Built-In Standard Library, C Program Structure, Vim Editor, writing the First 'c' Program, Compilation and Execution of C Program, Format Specifies and Escape Sequences. • **Branching Statements -**Introduction, if statement, if-else statement, Nested If-else, Switch case statement.	15
II	**Control Statements and Array** • Definition of Loop. • Types of looping statement. • Difference between while loop and do—while Loop, • Loop control Statement (break, continue),. • Infinite Loop. • Definition and declaration of array. • features of Array • Types of Arrays • Initialization of array • Memory representation of array. • Single Dimensional Array, • Two Dimensional Array, • Predefined String functions.	15
III	**User Defined Functions and Pointer** • Definition, declaration, prototype of function • Local and global variable, • User defined functions • Recursion, Storage classes. • Pointer Definition and Declaration,	15

	• Pointer Initialization, • Pointer arithmetic. • Arrays of Pointers, • Pointers and One and two dimensional Arrays, • Call by value and call by reference • Dynamic Memory Allocation	
IV	**Structures and File Handling** • Definition and declaration of structure, • Nested Structure, Array of structures, structure pointer, • passing structure to function, self- referential structure, • Definition and declaration, of union • Difference between Structure and Union • Concept of File ,Text and binary mode files, Opening and closing files-fopen() and fclose(), • File opening mode- read, write, append ,reading and writing string function gets(),puts()), Formatted input- scanf(), sscanf(), fscanf(), fread(), Formatted output- printf(), sprintf(), fprintf(), fwrite(). • Functions-fseek(), ftell(), fflush(), fclose(), rewind().	15
	Books Recommended: 1. The C Programming Language- By Brian W Kernighan and Dennis Ritchie 2. C Programming by E. Balgurusamy. 3. The GNU C Programming Tutorial -By Mark Burgess 4. Let us C- By Yashwant Kanetkar	

Course Code: ACE 103	**Principles of Management**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will be able to - 1. Understand the influence of historical forces on current practice of management. 2. Understand frameworks in the four functions of management. 3. Understand leadership styles to anticipate the consequences of each leadership style 4. Be able to identify and apply appropriate management techniques for organizations; and 5. Understand social responsibility involved in business situations.		
Unit No.	**Descriptions**		**No. of Periods**
I	**Introduction to Management:** Definition of Management, nature and importance of management, Functions of Management, Levels of management, Role of Manager in Organization, Contribution of F.W. Taylor, Henry Fayol and Max Weber.		15
II	**Functions of Management :** Planning: Meaning, Definition & Nature, Steps in Planning Organising: Meaning, Definition & Classification. (Formal & Informal organization, Virtual organization.), Staffing: Meaning Definition & Functions. Controlling: Meaning, Steps and Types of Control.		15
III	**Leadership and Motivation :**Leadership: Meaning & Definition,		15

	Theories of Leadership, Qualities of Leadership & Types of Leaders Motivation: Meaning, definition & importance of motivation, Theories of motivation –Maslow's Hierarchy Theory, Herzberg's theory & Theory X & Y.	
IV	**Trends in Management** Management Information System: Meaning, Definition & Types of Information Management of Change: Meaning Definition & Forms or Types of Changes,Corporate Social Responsibilities.	15
	Books Recommended: **1.** Principles of Management : T. Ramasamy **2.** Management Concepts and Practices : Dr. Manmohan Prasad **3.** Principles of Management- P. Subba Rao **4.** Management –L.M.Prasad **5.** Essential of Management by Kncotz & O' Donnel.	

Course Code: ACE 104	**Business Communication**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will be able to - 1. Communicate in English in written as well as oral mode 2. Make presentations in English 3. Do effective business correspondence		

Unit No.	**Descriptions**	**No. of Periods**
I	**Communication Skills:** Concept, Objectives, Process of communication, Types of Communication- Verbal, Non verbal Barriers to effective communication, Overcoming the barriers Forms of Communication in an organization-Formal and Informal (Grapevine)	15
II	**Listening Skills:** Importance of listening in business communication, Difference between hearing and listening ,Concept of the listening process Active listening and passive listening,Barriers to effective listening Guidelines for effective listening	15
III	**Business Correspondence:** Business letters Essentials of a business letters, Parts of a business letter, Forms of a business letter,Types of business letters- Tenders, quotations , orders, sales, complaint ,Email correspondence	15
IV	**Presentation Skills :** Business presentations, Seminar presentations ,Strategies for effective presentations, Audio visual aids in presentation Delivery methods for presentations	15

	Books Recommended: 1. Essential Communication Skills, Shalini Agarwal 2. Business Communication , R. K. Madhukar 3. E-Mail: A Write It Well Guide: How to write and Manage E-Mail in the workplace- Janis Fisher Chan 4. The AMA Handbook of Business Letters – Jeffrey L. Seglin; Edward Coleman 5. On the Education of a man of Business- Arthur Helps 6. When Ideas Make Money – Sharmila Ganeshan 7. The Man Who E-mailed the World- Po Bronson, Reader's Digest, November 2000 8. Effective Writing : Improving Scientific, Technical and Business Communication, Christopher Turk; Kirkman **Websites:**1) https://www.pressreader.com/india/the-times-of-india-new-delhi-edition/20070122/281582351154787 **2)** https://www.entrepreneur.com/topic/business-communication	

Course Code: AEC 105	**Office Automation**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will be able to - 1) Understand the components of office automation 2) Perform operations using MS Word and PowerPoint 3) Surf details through Internet 4) Understand and discuss about the use of Office Package and internet in daily life		

Unit No.	**Descriptions**	**No. of Periods**
I	**INTERNET & ADVANCED COMMUNICATION:** Internet and Web Browsers: Definition & History of Internet - Uses of Internet - Definition of WebAddressing-URL-Different types of Internet Connections; Dial up connection, Broad band (ISDN, DSL, Cable), Wireless (Wi-Fi, WiMax, Satellite, Mobile) naming convention, browsers and its types, internet browsing, searching - Search Engines - Portals - Social Networking sites- Blogs - viewing a webpage, downloading and uploading the website; Creating an email-ID, e-mail reading, saving, printing, forwarding and deleting the mails, checking the mails, viewing and running file attachments, addressing with cc and bcc.	15

II	**INTRODUCTION TO MS WORD:**- Working with Documents -Opening & Saving files, Editing text documents, Inserting, Deleting, Cut, Copy, Paste, Undo, Redo, Find, Search, Replace, Formatting page & setting Margins, Converting files to different formats, Importing & Exporting documents, Sending files to others, Using Tool bars, Ruler, Using Icons, using help, Formatting Documents - Setting Font styles, Font selection- style, size, colour etc, Type face - Bold, Italic, Underline, Case settings, Highlighting, Special symbols, Setting Paragraph style, Alignments, Indents, Line Space, Margins, Bullets & Numbering. Setting Page style - Formatting Page, Page tab, Margins, Layout settings, Paper tray, Border & Shading, Columns, Header & footer, Setting Footnotes & end notes – Shortcut Keys; Inserting manual page break, Column break and line break, Creating sections & frames, Anchoring & Wrapping, Setting Document styles, Table of Contents, Index, Page Numbering, date & Time, Author etc., Creating Master Documents, Web page. Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Drawing - Inserting ClipArts, Pictures/Files etc., Tools – Word Completion, Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes.	15
III	**INTRODUCTION TO OPEN OFFICE – WRITER:** What is Writer? The Writer interface, Changing document views, Moving quickly through a document, Working with documents, Using built-in language tools, Working with text, Formatting text, Formatting pages, Adding comments to a document, Creating a table of contents, Creating indexes and bibliographies, Working with graphics, Printing, Using mail merge, Tracking changes to a document, Using fields Linking and cross-referencing within a document, Using master documents, Classifying document contents, Creating fill-in forms	15
IV	**INTRODUCTION TO POWER POINT**: Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation. Formatting a Presentation - Adding style, Colour, gradient fills, Arranging objects, Adding Header & Footer, Slide Background, Slide layout. Adding Graphics to the Presentation- Inserting pictures, movies, tables etc into presentation, Drawing Pictures using Draw. Adding Effects to the Presentation- Setting Animation & transition effect. Printing Handouts, Generating Standalone Presentation viewer. Open Office-Impress - Introduction – Creating Presentation, Saving Presentation Files, Master Templates & Re-usability, Slide Transition, Making Presentation CDs, Printing Handouts – Operating with MS Power Point files / slides	15
	Books Recommended: 1) Microsoft Office 2007 Bible - John 2) Walkenbach,HerbTyson,FaitheWempen,caryN.Prague,MichaelR.groh, PeterG.Aitken, and Lisa a.Bucki -Wiley India pvt.ltd. 3) Introduction to Information Technology - Alexis Leon, Mathews Leon, and Leena Leon, Vijay Nicole Imprints Pvt. Ltd., 2013. 4) A Conceptual Guide to OpenOffice 5) Computer & Internet Basics Step-by-Step - Etc-end the Clutter - Infinity Publishing 6) Open Office Basic: An Introduction **Websites:** 1) http://windows.microsoft.com/en-in/windows/msoffice-basics-all-	

	topics 2) https://wiki.openoffice.org/wiki/Documentation 15. https://documentation.libreoffice.org/assets/Uploads/Documentation/en/GS6.0/GS60-GettingStartedLO.pdf	

Course Code: CCL 106	**Lab Course –I Based on CC102**	**Credits: 02**	**Marks : 50**
Course Outcomes	After completion of this course students will be able to - 1. Understand and trace the execution of programs written in C language. 2. Write the C code for a given algorithm 3. Implement Programs with pointers and arrays, perform pointer arithmetic and file handling.		

	List of Practical's:
Sr. No.	**Description**
1	Write a program to accept 5 subject marks and calculate total marks, percentage and grade of student.
2	Write a program to input a number and find the given number is Odd or Even.
3	Write a program to input the day number and display day of week.
4	Write a program to find the sum of first n natural numbers.
5	Write a program which display following output- A B C D E A B C D A B C A B A
6	Write a program to accept the range and generate Fibonacci Series.
7	Write a program to find given number is Armstrong or not.
8	Write a program to find prime numbers between given range
9	Write a program to sort the numbers in ascending and descending order using array.
10	Write a program to add two Matrices; Use two Dimensional arrays

11	Write a program to find the product of given two matrices.
12	Write a function which adds three number and display output on the screen.
13	Write a function which calculate cube of given number.
14	Write a program which swap two number using a) call by value and b)call by reference.
15	Write a program which create student structure which accept stud rollno ,student name, address ,subject marks ,percentage and display same on screen.
16	Write a program to separate even and odd numbers available in file.
17	Write a program to count the no. of words in a given text file.
18	Write a program to remove blank lines from a file.
19	Write a program to copy content of one file into another file.
20	Write a file handling program which accept student information store it into disk file using binary mode.

Course Code: CCL 107	**Lab Course-II Based on AEC 105**	**Credits: 02**	**Marks : 50**
Course Outcomes	After completion of this course students will be able to - 1) Use internet and internet tools. 2) Perform operations using MS Word and PowerPoint 3) Create business presentations using PowerPoint		
	List of Practical's:		
Sr. No.	**Description**		
1	Searching for a web site / application / text documents viewing and downloading.		
2	Create an E-mail account, Retrieving messages from inbox, replying, attaching files filtering and forwarding		
3	Preparing a Govt. Order / Official Letter / Business Letter / Circular Letter Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc.		
4	Preparing a newsletter: To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout.		
5	Creating and using styles and templates To create a style and apply that style in a document To create a template for the styles created and assemble the styles for the template.		
6	Creating and editing the table To create a table using table menu To create a monthly calendar using cell editing operations like inserting, joining, deleting, splitting and merging cells To create a simple statement for math calculations viz. Totaling the column.		
7	Creating numbered lists and bulleted lists To create numbered list with different formats (with numbers, alphabets, roman letters) To create a bulleted list with different bullet characters.		
8	Printing envelopes and mail merge. To print envelopes with from addresses and to		

	addresses To use mail merge facility for sending a circular letter to many persons To use mail merge facility for printing mailing labels.
9	Using the special features of word To find and replace the text To spell check and correct. To generate table of contents for a document To prepare index for a document
10	Create an advertisement Prepare a resume. Prepare a Corporate Circular letter inviting the share holders to attend the Annual Meeting.
11	Creating a new Presentation based on a template – using Auto content wizard, design template and Plain blank presentation.
12	Creating a Presentation with Slide Transition – Automatic and Manual with different effects.
13	Creating a Presentation applying Custom Animation effects – Applying multiple effects to the same object and changing to a different effect and removing effects.
14	Creating and Printing handouts.

Bachelor of Computer Applications (BCA)
BCA I (Sem II)

Course Code: CC201	Database Management System	Credits: 04	Marks : 100
Course Outcomes	After completion of this course students will be able to - 1) Describe the basic concepts of DBMS and various databases used in real applications 2) Demonstrate the principles behind systematic database design approaches. 3) Design the database structure by applying the concepts of Entity-relational model and Normalization. 4) Learn MS-Access for database creation and handling transactions.		

Unit No.	Descriptions	No. of Periods
I	**Introduction of DBMS** : Basic Concept (Data Vs. Information, Database), Definition of DBMS, Needs and Features of DBMS, Comparison of file processing system with DBMS, functions of DBMS, advantages and disadvantages of DBMS, Structure of DBMS, Architecture of database system, Schema, Subschema, Data abstraction, data independence, , data dictionary, users of databases.	**15**
II	**Data Models**: Introduction, definition, features of data models, DFD, Object based data models- Entity Relationship Model, Cardinality; Record based models- Hierarchical Model, Network Model, Relational Model and Physical Data Models. Keys**:** Primary key, foreign key, candidate key, super key, unique key. **Normalization:** Concept of normalization, advantages, First NF, Second NF, Third NF, examples of normalizations	**15**
III	**Database Management through Ms-Access:** Introduction of Ms-Access, features, database creation, table creation, insert records, queries, forms and report creation. **Case Study:** Normalized database design system for- Library management system, Inventory management system etc. **SQL:** Introduction of SQL, features, SQL data types, DDL commands- create table, describe table, alter table, drop table commands etc., DML-insert, delete, update commands etc, DQL commands- All select commands, aggregate functions, order by clause.	**15**
IV	**Organization of Database System:** Introduction of file, file types, organization of file- heap file organization, serial file organization, sequential, index sequential file, random access file (direct access file), Types of Database System: centralized database system, client-server system, distributed database system.	**15**
	Books Recommended: 1) Database System Concept – Henry korth and A. Silberschatz	

	2) Fundamentals of Database System- Ramez Elmasri, Shamkant B. Navathe(Pearson) 3) Database Management System- Raghu Ramkrishnan, Gehrke (McGraw Hill) 4) SQL, PL/SQL The Programming Language Oracle :- Ivan Bayross, BPB Publication 5) Introduction to SQL by Reck F. van der Lans by Pearson 6) Database Management System- R. Panneerselvam 7) Ms-Office Complete reference	
	Web References: 1) https://www.oreilly.com/library/view/relational-theory- 2) https://en.wikipedia.org/wiki/Database 3) https://hackr.io/blog/dbms-normalization 4) https://en.wikipedia.org/wiki/Database_normalization	

Course Code: CC202	**Operating System**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will be able to - 1) Possess knowledge of Operating Systems and their types. 2) Apply the concept of a process and scheduling algorithms. 3) Realize the concept of deadlock and different ways to handle it. 4) Understand various memory management techniques and file system.		

Unit No.	**Descriptions**	**No. of Periods**
I	**Introduction of Operating System-** Definition, Objectives, Functions, Generations of OS, Types of OS (Batch, Multiprogramming, Time Sharing, Real time, Distributed, Personal, Mobile). OS Structure (Monolithic, Layered, Microkernel, Exokernel, Client-Server).	**15**
II	**Process Management –** Process Management- Introduction to Processes, Process Model, Process creation, Process termination, Process hierarchy, Process states.	**15**
III	**Memory Management-** Memory Management- Introduction to memory management, Requirements (Relocation, Protection, Sharing, Logical organization, Physical organization). Memory partitioning- Fixed partitioning, Dynamic partitioning, Paging, Segmentation. Concept of Virtual memory.	**15**
IV	**File System-** Files & File system, File structure, File types, File access, File attributes, Basic file operations. Directories- Single-level & Hierarchical directory systems, Path names & Directory operations. Differentiate between Windows and Linux OS.	**15**
	Books Recommended: 1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI, 2010. 2. Operating Systems, Achyut S Godbole, 2nd Edition, McGraw Hill Publications.	

	3. Operating Systems, Internals & Design Principles, William Stalling, 6th Edition, .Pearson Publication, 4. Operating System, Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, 2008 Operating System, Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, 7th Edition,2004	

Course Code: CC 203	**Object Oriented Programming Using C++**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will able to - 1) Understand object-oriented programming and advanced C++ concept. 2) Apply the concepts of object, classes and constructor. 3) Design C++ Programs based on object, class, inheritance, abstraction, encapsulation, dynamic binding and polymorphism. 4) Implement concept of polymorphism in program.		

Unit No.	**Descriptions**	**No. of Periods**
I	**INTRODUCTION TO OOP** • Difference between POP & OOP • Structure of C++ Program • Basic Concepts of OOP – Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing • Benefits & Features of OOP • Data types, Keywords and Operators • Control Structure – Conditional and Looping	15
II	**OBJECT, CLASSES & CONSTRUCTOR** • Class Definition, Function Definition and Declaration • Arguments to a Function - Passing Arguments to a Function, Default Arguments • Calling Functions, Inline Functions • Scope Rules of Functions and Variables • Member Function Definition – Inside class and Outside the class using scope Resolution Operator • Accessing Members from Object(S) • Static Class Members - Static Data Member, Static Member Function • Friend Function and Friend Classes • Declaration and Definition of a Constructor & Destructor	15
III	**INHERITANCE** • Concept of Inheritance • Base Class & Derived Class	15

	• Types of Inheritance – Single, Multiple, Hierarchical, Multilevel, Hybrid Inheritance • Dynamic Memory Allocation / Deallocation using New and Delete Operator	
IV	**POLYMORPHISM** • Concept of Polymorphism • Static Polymorphism and Dynamic (Compile time) Polymorphism • this pointer • Pointers to Derived Classes • Virtual Functions • Pure Virtual Function	15
	Books Recommended: 1) The C++ Programming Language, 4th Edition by Bjarne Stroustrup 2) Object Oriented Programming with C++ by E. Balagurusamy 3) Let Us C++ by Yashavant P. Kanetkar 4) C++: The Complete Reference by Herbert Schildt	

Course Code: AEC 204	**Financial Accounting with Tally**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completion of this course students will able to – 1. Use basic accounting terminology, procedures and systems of maintaining accounting records. 2. Understand financial statements 3. Learn to create company, enter accounting voucher entries and also print financial statements, etc. in Tally. 4. Demonstrate MIS reports in Tally ERP.		

Unit No.	**Descriptions**	**No. of Periods**
I	**Introduction to Financial Accounting** Meaning and Definition of Financial Accounting, Objectives of Accounting, Various users of Accounting Information, Accounting Terminologies, Accounting Concepts and Conventions, Double entry system, Types of Accounts and Golden rules of accounting. Books of Prime Entry, Subsidiary Books and Ledger Creation.	**15**
II	**Preparation of Financial Statements** Trial Balance – Meaning, Definition, purpose and features, preparation of Trial Balance. Final Accounts – Introduction, Objectives of Final Accounts, Adjustments before Preparing Final Accounts, Preparation of Trading Account, Profit and Loss Account, Balance Sheet.	**15**
III	**Introduction to Tally** Tally History and Journey, Difference between manual accounting v/s computerised accounting, Tally features, Tally Fundamentals - Company Data – Gateway of Tally, Creating and Maintaining a Company, Loading a Company, F11: Company Features, F12: Configuration. Voucher Entry, Inventory - Stock Groups, Stock Categories, Stock Items, Units of Measurement, Bills of Materials, Batches & Expiry Dates.	**15**

IV	**Report Generation in Tally** Printing – Printing Configuration for vouchers, printing reports – Profit and Loss A/C, Balance Sheet, Inventory, Interest Calculations, Day Book etc. Data Management – Backup & restore, Split a Company, Import Data, Export of Data, E-Capabilities, Tally ODBC. Introduction to GST, Objectives of GST.	**15**
	Books Recommended: **1.** Anthony, RN. and Reece. J.S.: Accounting Principles: Richard Irwin Inc. **2.** Gupta. R.L.and Radhaswamy. M: Financial Accounting; Sultan Chand and Sons, New Delhi. **3.** Shukla. M.C., Grewal T.S., and Gupta, S.C.: Advanced Accounts: S. Chand & Co. New Delhi. **4.** Advance Accountancy:- Maheshwari **5.** Advance Accountancy:- R.L.Gupta **6.** Computerized Financial Accounting Using Tally - Rajan Chougale. **Websites** 1) www.accountingcoach.com 2) www.futureaccountant.com	

Course Code: AEC 205	**Mathematical Foundations For Computer Applications**	**Credits: 04**	**Marks : 100**
Course Outcomes	After completing this course, students should demonstrate competency in the following skills: 1) Basic knowledge of set theory, functions and relations concepts, matrix needed for designing and solving problems. 2) Construct simple mathematical proofs and possess the ability to verify them. 3) Write an argument using logical notation and determine if the argument is valid or is not valid. 4) Use graph algorithms to solve problems.		

Unit No.	**Descriptions**	**No. of Periods**
I	**SETS** 1.1 Introduction. 1.2 Methods of describing of a set: Tabular form, Set builder form. 1.3 Finite set, Infinite set, Empty set, Subset, Universal set, Equal sets, Disjoint sets, Complementary set. 1.4 Operation on Sets: Union of sets, Intersection of sets, Difference of sets, Examples. 1.5 De Morgan's Laws (without proof). 1.6 Venn diagram, Examples. 1.7 Cartesian product of two sets, Examples. 1.8 Idempotent laws, Identity laws, Commutative Laws, Associative laws, Distributive laws, Inverse laws, Involution laws. 1.9 Duality. 1.10 Computer Representation of sets and its operations. 1.11 Relations and Functions: Introduction, Operations on Functions, Injective, surjective and bijective functions	**15**

II	**Logic** 2.1 Introduction. 2.2 Definition: Statement (Proposition). 2.3 Types of Statements: Simple and compound statements. 2.4 Truth values of a statement. 2.5 Truth Tables and construction of truth tables. 2.6 Logical Operations: Negation, Conjunction, Disjunction, Implication, Double Implication. 2.7 Equivalence of Logical statements. 2.8 Converse, Inverse and Contra positive. 2.9 Statement forms: Tautology, Contradiction, and Contingency. 2.10 Duality, Laws of logic: Idempotent laws, Commutative laws, Associative laws, Identity laws, Involution laws, Distributive laws, Complement laws, De Morgan's laws. 2.11 Argument: Valid and Invalid arguments. 2.12 Examples based on above.	**15**
III	**Matrices** 3.1 Introduction. 3.2 Types of matrices: Row matrix, Column matrix, Null matrix, Unit matrix, Square Matrix, Diagonal matrix, Scalar matrix, Symmetric matrix, Skew - symmetric matrix, Transpose of a matrix, 3.3 Definition of Determinants of order 2nd & 3rd and their expansions 3.4 Singular and Non-Singular Matrices 3.5 Algebra of Matrices: Equality of matrices, Scalar Multiplication of matrix, Addition of matrices, Subtraction of matrices, Multiplication of matrices. 3.6 Elementary Row & Column Transformations 3.7 Inverse of Matrix (Using Elementary Transformations) 3.8 Examples based on above.	**15**
IV	**Graphs** 4.1 Introduction 4.2 Simple graph, Multi graph, Pseudo Graph 4.3 Digraph 4.4 Weighted Graph 4.5 Degree of Vertex, Isolated Vertex, Pendant Vertex. 4.6 Walk, Path, Cycle. 4.7 Types of Graph: Complete, Regular, Bi-Partite, Complete Bi-partite. 4.8 Matrix Representation of Graph: Adjacency and Incidence Matrix. 4.9 Operation on Graph: Union, Intersection, Complement. 4.10 Examples based on above.	**15**
	Reference Books: 1. Discrete Mathematics & Structures by Satinder Bal Gupta, University Science Press 2. Fundamental Approach to Discrete Mathematics by D. P. Acharjya, Sreekumar, New Age International Publishers 3. Discrete Mathematical Structures by Kolman, Busby, Ross, Pearson Education Asia 4. Matrices by Shantinarayan, S. Chand & Co. New Delhi 5. Discrete Mathematics by Schaum Series 6. Discrete Mathematics by K D Joshi 7. David Makinson, "Sets, Logic and Maths for Computing", Springer Indian Reprint, 2011. 8. Kenneth H. Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, 4th Edition, 2002. 9. Trembley, J.P. and Manohar, R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill, New Delhi, 2007.	

Course Code: CCL 206	Lab Course-III Based on CC201 and AEC 204	Credits: 02	Marks : 50
Course Outcomes	After completion of this course students will be able to - 1) Use MS-Access DBMS and design database 2) Perform operations on data using MS access features 3) Create company using Tally ERP 4) Perform accounting using Tally ERP		

	List of Practical's:
Sr. No.	**Description**
1	Write procedure for creating database in Ms-Access.
2	Establish relationship between tables and write steps for it.
3	Generate form in Ms-Access and write steps in detail.
4	Create reports using different queries based on multiple tables and write steps in detail for it.
5	Lab assignment based on Case Studies **a)** Library system: **b)** HR Management System **c)** Inventory Management System Design normalized data structures with appropriate constraints. (at least 5 tables for each system), Design forms, Create different query using query wizard, Create at least 3 reports using report wizard (at least 5 records)
6	Practical's based on Tally ERP a) Company creation, features and configuration b) Ledger creation ,group creation c) Creating masters and recording day to day transactions d) Allocation of tracking expenses and income e) Management of purchase, sales and taxes f) Reports

Course Code: CCL 207	Lab Course-IV Based on CC 203	Credits: 02	Marks: 50
Course Outcomes	After completion of this course students will be are able to - 1) Understand the difference between the top-down and bottom-up approach 2) Describe the object-oriented programming approach in connection with C++ 3) Apply the concepts of object-oriented programming 4) Illustrate the process of data file manipulations using C++		

	List of Practical's:
Sr. No.	**Description**
1	Write a simple program (without Class) to use of operators in C++.
2	Illustrating Control Structures.
3	Write a program to create a class and creating an object.
4	Illustrating different Access Specifiers.
5	Write a oop program to demonstrate static data member.
6	Demonstrate arguments to the function.
7	Illustrating inline function.
8	Define Member function-outside the class using Scope Resolution Operator.
9	Illustrating friend class and friend function.
10	Create constructors – default, parameterized, copy.
11	Destructor.

12	Dynamic Initialization of Object.
13	Illustrating Inheritance – single, multiple and multilevel.
14	Perform static and dynamic polymorphism.
15	Demonstrate virtual & pure virtual function.

18. Course Equivalence:

Semester- I

Paper No	Old Syllabi Course Title	Course Code	Revised Syllabi Course Title
101	Fundamentals of Computers	CC 101	Fundamentals of Computer
102	Programming in 'C' Part-I	CC 102	Introduction to Programming Using C
103	Principles of Management	AEC 103	Principles of Management
104	Financial Accounting	AEC 204	Financial Accounting with Tally
105	Office Management And Communications	AEC 104	Business Communication
106	Lab Course Based on Paper-101	CCL 107	Lab course-II Based on AEC 105
107	Lab Course Based on Paper-102	CCL 106	Lab Course-I Based on CC 102

Semester- II

Paper No	Old Syllabi Course Title	Course Code	Revised Syllabi Course Title
201	Software Packages	AEC 105	Office Automation
202	Programming in 'C' Part-II	CC 102	Introduction to Programming Using C
203	Bank Management	-	-
204	Financial Accounting with Tally	AEC 204	Financial Accounting with Tally
205	Principles of Marketing		-
206	Lab Course Based on Paper-201, 204	CCL206	Lab Course-III Based on CC201 and AEC 204
207	Lab Course Based on Paper-202	CCL207	Lab course-IV Based on CC 203

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