M.C.E Society's

Abeda Inamdar Senior College of Arts, Science and Commerce (Autonomous), Pune.

FACULTY OF SCIENCE

B.C.A. (Science) Honours

PROGRAM STRUCTURE

Under NEP 2020

Choice-Based Credit System (CBCS) Under Autonomy

(Semester Pattern)

Bachelor of Computer Application (Science) (2023 Pattern)

With effect from 2023-24

B.C.A. (Science) PROGRAMME STRUCTURE

1) PROGRAMME OVERVIEW:

Introduction:

Bachelor of Computer Application (BCA Science Honours) is a full-time four-year programme offered by Abeda Inamdar Senior College for Arts, Commerce and Science (Autonomous) affiliated to Savitribai Phule Pune University (SPPU). This programme has aim of providing students with a comprehensive and interdisciplinary education in the field of computer applications. The programme emphasises the development of analytical and problem-solving skills, creativity, and innovation, with a focus on practical applications of technology in real-world settings.

The curriculum is designed to prepare students for a range of career opportunities in the rapidly evolving field of computer applications. Through a combination of theoretical and practical coursework, students will gain proficiency in programming, database management, software development, web design, Data Science, Artificial Intelligence, Cloud computing and other relevant areas.

Vision:

To empower and inspire the students with the knowledge, skills, and values needed to drive innovation, solve complex problems, and contribute to the betterment of society.

Mission:

- To provide a transformative learning experience that equips students with the knowledge, skills, and values needed to excel in the field of computer science.
- To foster a culture of innovation, collaboration, and critical thinking that prepares students for the challenges of a rapidly evolving technological landscape.

Program Educational Objectives

PEO1: To prepare the graduates for successful careers in IT industry, by developing their ability to solve computing problems in multidisciplinary environment.

PEO2: To develop ability among the graduates to analyze data and technical concepts for various application development of real-life.

PEO3: To Motivate and provide graduates various opportunities for further studies, team work and successful career in their chosen domain.

PEO4: To motivate and encourage graduates to understand their social, ethical and cultural responsibilities as well with their professional responsibilities.

Program Specific Outcomes

On completion of BCA (Honours) Four Year Degree Programme, the expected programme outcomes are the following:

PSO1: Develop software solutions for real-world problems using appropriate programming languages, algorithms, data structures , recent programming languages and trends like artificial intelligence , data science and cloud computing.

PSO2: Design and implement database systems using modern database management tools and techniques.

PSO3: Analyze and evaluate software development processes to identify areas for improvement and optimize performance using software testing principles.

PSO4: Demonstrate knowledge of basic concepts, principles, and terminologies related to cybersecurity, implement various security controls and measures to protect computer systems, networks, and data tools and manage firewalls, intrusion detection systems.

PSO5: Develop IOT solutions by integrating hardware, software, network components and implement data analytics in IoT Applications.

PSO6: Pursue lifelong learning and professional development by engaging in research, continuing education, and other learning opportunities beyond the classroom.

2) INTRODUCTION:

The B.C.A. (Science) degree programme (2023 pattern) will be introduced in the following order:-

a. First Year B.C.A. Science 2023-2024

b. Second Year B.C.A. Science 2024-2025

c. Third Year B.C.A. Science 2025-2026

d. Fourth Year B.C.A. Science honours Degree 2026-2027

- B.C.A. (Science) Degree programme will consist of Four years divided into eight semesters.
- The first year (Semester I and II), Second Year (Semester III and IV) , Third Year (Semester V and VI) and fourth year (Semester VII and VIII) Choice Based Credit System Examination will be held at the end of each semester.

3) ELIGIBILITY:

a. Any candidate who has passed higher secondary school certificate (10 + 2) in science stream (PCM /PCB/PCMB) from Maharashtra State Board of Secondary and Higher Secondary Education or equivalent Board of Examination, is eligible for admission to the first year of this program **(2023 Pattern)**

OR

b. Any candidate who has passed three year Diploma Course approved by the DTE, Maharashtra State or Equivalent authority.

4) TYPES OF COURSES:

Courses offered as per NEP (2020) Guidelines

1. Major – 50% credits (Minimum)

The candidate will select one of the following as major Computer Applications in Science.

2. Minor – 18+4 =22 credits (Minimum)

The candidate will select one of the following as minor Cyber Security and Internet of Things (IOT).

3. Courses from Six Vertical to be selected from the basket of Courses offered by the college

- VSC (Vocational Skill Course) Hands on training/ skill based practical oriented course-Related to Major and/or Minor
- SEC (Skill enhancement Course) - Any science subject
- CC (Co-curricular courses) -Yoga/ Sports, Cultural, NSS/ NCC, Fine /Performing arts, Health & Wellness, Physical Education, Sports and Yoga.
- VEC (Value education course)-Understanding India,/EVS / Digital Technological solutions/courses
- AEC (Ability Enhancement Course) Languages-English compulsory in First year, second language choice- Hindi/Marathi/Urdu (MIL) AISC/ B.Sc. /CBCS/ NEP 2023-24 onwards
- IKS (Indian Knowledge System)- Subject Specific IKS related to Major + IKS General
- FP (Field Projects)/CEP (Community Engagement Program) / Internships/ OJT (On Job Training) Related to Major subject
- OE (Open Electives) – 2/4 Credit Courses from Arts/Commerce faculty

5) TEACHING HOURS: All courses under the faculty of science will be of 2 credits each. The theory courses will be taught for 30 hours and Practical courses for 60 hours. All the major and minor subjects will have Practical Courses. In addition VSC and SEC may also have practical modules.

6) MEDIUM OF INSTRUCTION:

The Medium of Instruction and Examination (Written and Viva) shall be English except for languages other than English.

7) SCHEME OF CREDITS (Academic/CGPA):

Table 1: Total credits for four year B.C.A. (Science) Programme (2023 pattern)

Sr. No.	Nature of Courses	Semesters(Credits)								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	**Major MAJOR Elective Core (DSC)/Department/ Subject Specific Course**	6	6	8	8	10+4=14	10+4=14	14+4=18	14+4=18	**76+16=92**
2	**Minor**	-	2	4	4	4	4	**4**	-	**18+4=22**
3	**GE/OE or Generic/ Open Elective Course**	4	4	2	2	-	-	-	-	**12**
4	**Vocational Major**	2	2	2	-	2	-	-	-	**8**
5	**Skill Enhancement Course(SEC)**	2	2	-	2	-	-	-	-	**6**
6	**Ability Enhancement Courses(AECC)**	2	2	2	2	-	-	-	-	**8**
7	**IKS**	2	-	-	-	-	-	-	-	**2**
8	**Value Education**	2	2	-	-	-	-	-	-	**4**
9	**Co-curricular Courses**	2	2	2	2	-	-	-	-	**8**
10	**Field Projects/Internship /Projects/Community Engagement/**	-	-	2	2	2	4	-	**4**	**14**
Sub Total		**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**176**

Note : Each Course (Theory /Practical/SEC/VEC/IKS/AEC/VSC/OE) will be of 2 credits except RM,OJT which will be of 4/8 credits per table.

Academic Bank Of Credits (ABC):

The "Academic Bank of Credits" (ABC) is a notional level digital platform created to provide students with increased flexibility and mobility in their educational pursuits, allowing them to accumulate and transfer academic credits across different programs and institutions. The Academic Bank of Credits will facilitate multiple entries and multiple exits for students by storing student credits and transferring credit through a single window after approval of the source and destination academic institution. Students should register for a unique ABC ID through the ABC platform (https://www.abc.gov.in/). Through this platform students can log in to check their earned credits. Students are expected to follow the guidelines issued by the concerned authorities in this regard from time to time.

8) DURATION:

The programme shall be a full-time of Four years. The student has to complete the programme in 06 years, from the year of admission. In case a candidate fails to complete the programme in 06 years of period, then the candidate shall take new admission in F.Y.B.C.A. (Science) for obtaining the degree.

9) ATTENDANCE:

No candidate shall be admitted to the semester end examinations unless he / she has satisfactorily completed 75% of attendance in each course in each semester.

10) COLLEGE TERMS:

The dates for the commencement and conclusion of the first and the second terms shall be as determined by the college authorities. Only duly admitted students can keep the terms. The present relevant ordinances pertaining to grant of terms will be applicable. be applicable**.**

(Reference : शासन निर्णय क्रमांक: एनईपी-2022/प्र.क्र.09/विशि -३/शिकाना)

11) METHODS OF EVALUATION AND PASSING CRITERIA:

a. The course carrying 50 marks shall be evaluated with continuous internal evaluation (CIE) and Semester End Examination mechanism. Continuous internal evaluation shall be of 20 marks and Semester End Examination shall be of 30 marks.

● To pass the theory course of 2 credits having 50 marks, a student has to secure minimum 20 marks provided that he /she should secure minimum 8 marks in CIE and minimum 12 marks in Semester End Examination.

b. The course carrying 50 marks shall be evaluated with continuous internal evaluation (CIE) and Semester End Examination mechanisms. Continuous internal evaluation shall be of 20 marks and Semester End Examination shall be of 30 marks.

● To pass the theory, practical or project course of 2 credits having 50 marks, a student has to secure minimum 20 marks provided that he/she should secure minimum 8 marks in CIE and minimum 12 marks in Semester End Examination.

c. **Evaluation Criteria:**

The evaluation of students will be based on three parameters:-

i. Continuous Internal Evaluation (CIE).

ii. Practical / Project Examination (List of courses having practical is given in sr. no 4).

iii. Semester End Examination.

i. For Continuous Internal Evaluation (CIE): Internal assessment will be as follows:

Table 3: CIE of Theory Examination

Credits:02 Duration:1Hr/Exam Marks:20	
10 Marks	**20 Marks**
Two Assignments	Mid Semester Descriptive Type Examination

Note: 20 Marks exam will be scaled down to 10 Marks

ii. For Practical/Project Examination: Internal assessment will be as follows:

Table 4: CIE of Practical and Project Examination

Practical Credits : 2 Marks:20		**Project Credits :2 Marks:20**		
10 Marks	**10 Marks**	**5 marks**	**5 Marks**	**10 Marks**
Mock Practical	Lab Course Assignment	Synopsis and prerequisite	Analysis and Design	Two Demonstrations

iii. For Semester End Examination:

Criteria for Paper Setting of Internal Assessment and Semester End Examination are as follows:

● Knowledge: 50 %

● Understanding: 25 %

● Applications, Analysis, Problem Solving: 25%

➢**For Theory Examination:**

The Duration of the SEE will be as follows**:**

● Theory Question papers will be set for Thirty Marks (One and Half Hour Duration) for 02 credits course

Table 5: S.E.E. Structure of Theory Paper Course

Credits :02 **Duration 1.5 Hours Marks :30**		
Q1	Q2	Q3
10 Marks	12 Marks	08 Marks
MCQ's - 5 Marks One Mark Questions -5 Marks	Descriptive Answer any Four Out Of Five (each Question carry 3 Marks)	Descriptive/Program/case study/Problem Answer any Two Out Of Three (each Question carry 4 Marks)

➢**For Practical/Project Examination:** Practical Question papers will be set for Thirty Marks (Three Hour Duration) for 02 credits course. Project Examination will be of Three Hour duration

Table 6:S.E.E. Structure of Practical and Project Course

Practical **Credits : 2** **Duration : 03 Hours Marks:30**		**Project** **Credits:2** **Duration : 03 Hours Marks :30**		
Q1	**Q2**	**Viva**	**Project Report**	**Demonstration**
15 Marks	15 Marks	05 Marks	05 Marks	20 Marks

For Value Education / Co-Curricular Courses/ IKS subjects, respective department will conduct semester end examination at department level only.

Co-curricular Courses

 Workshop-based activities / Filed Visits/ Model and Poster Competitions/Poster and

Paper Presentation: Events where students perform relevant activities assigned by teacher will earn 2 Credit for minimum of 30 hours engagement.

 Seminar/ Group Discussion: A minimum of 15 hours of participation in seminar/ Group Discussion activity per credit in a semester is required.

INT/FP/CEP/OJT:

On Job Training (OJT): Credits for Internship (INT)/ Apprentice shall be one credit per one week of internship (or 30 hours of engagement), subject to a maximum of four credits per Semester (120 hours). The internship shall be monitored jointly by the faculty and Industry/Organisation Mentor.

Field-based Learning/ Practices (FP): These are the courses requiring students to participate in generally under the supervision of faculty. A minimum of 30 hours of learning activities per credit in a semester is required.

Community engagement and service (CEP): These are the courses requiring students to participate in field-based learning/projects generally under the supervision of faculty. The curricular component of „community engagement and service" will involve activities that would expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems.

12) STANDARD OF PASSING:

a. A student must obtain minimum 40% marks in Continuous Internal Evaluation (CIE) of theory and practical as well as semester end examination. It means that passing separately in the CIE and Semester End Examination is compulsory.

b. Students who have failed in Continuous Internal Evaluation (CIE) of any semester can reappear for the same subjects in the next upcoming semester only. E.g. Students who failed in 1st semester can reappear in 2nd semester only and students who failed in 2nd semester can appear in 3rd semester only and so on.

13) A.T.K.T. RULES:

a. If a student fails in all the courses of semester I, then that student will be allowed to proceed for semester II. **Students who score a minimum of 22 credits can be admitted to Semester III of S.Y.B.C.A. (Science).**

b. If a student fails in all the courses of semester III, then that student will be allowed to proceed for semester IV. **Students who score 44 credits (100% credits) in F.Y.B.C.A. (Science) and minimum 22 credits in S.Y.B.C.A. (Science) can be admitted to Semester V of T.Y.B.C.A. (Science).**

c. If a candidate fails in all the courses of semester V, then that student will be allowed to proceed for semester VI. **Students who score 88 credits (100% credits) in S.Y.B.C.A. (Science) and minimum 22 credits in T.Y.B.C.A. (Science)can be admitted to VII Semester.**

14) VERIFICATION AND REVALUATION:

a. The candidate may apply for verification and revaluation of result, which will be done by the **COLLEGE** as per ordinance framed on that behalf.

b. There shall be revaluation of answer sheets of semester end examination of theory papers only, but not of internal assessment papers as per ordinance defined by college

c. There shall be no revaluation of CIE and semester end practical examination.

15) STRUCTURE OF TRANSCRIPT:

From Exam Department

- **Calculation of SGPA and CGPA:**

SGPA stands for Semester Grade Point Average. The performance of a student in a particular semester is given by SGPA. It can be calculated by the sum of total grade points divided by credit of total subject.

$$SGPA = \Sigma \frac{\text{Grade point earned X credits for each course}}{TotalCredits}$$

CGPA is the calculation of the cumulative grade point average value obtained by the student in all the subjects. The Grade Points obtained in all the subjects' are calculated along with the total number of credit hours the student has attempted.

$$CGPA = \Sigma \frac{\text{Grade point earned X credits for each course}}{TotalCredits}$$

- **Conversion of Marks into credit(s) and grade(s):**

The following illustrations could be taken as an example for computing SGPA and CGPA from percentage to credits in all MAJOR Electives, for the degree programme in B.C.A (Science). The following formula may be used to convert (%) into Grade Letter.

Table 7: Grades Points and Grade

Sr.No	Grade Letter	Grade Point	Marks
1	O(Outstanding)	10	90<= Marks <=100
2	A+(Excellent)	9	75<= Marks <=89
3	A(Very Good)	8	60<= Marks <=74
4	B+(Good)	7	55<= Marks <=59
5	B(Above Average)	6	50<= Marks <=54
6	C(Average)	5	45<= Marks <=49
7	D(Pass)	4	40<= Marks <=44
8	F(Fail)	0	Marks <40

Table 8: Conversion of CGPA into corresponding percentage

CGPA	Grade	Equation	Percentage
10	O	20*10-100	100
9.75	O	20*9.75-100	95
9.5	O	20*9.5-100	90
9.0	A+	12*9-24	84
8.25	A+	12*8.25-24	75
8.0	A	10*8-7.5	72.5
7.0	A	10*7-7.5	62.5
6.75	A	10*6.75-7.5	60
6.25	B+	5*6.25+26.25	57.5
5.75	B+	5*5.75+26.25	55
5.5	B	10*5.5-2.5	52.5
5.25	B	10*5.25-2.5	50
4.75	C	10*4.75-2.5	45
4.00	C	6.6x4.0+13.6	40

a. A student obtaining Grade F shall be considered failed and will be required to reappear in the examination.

b. For non-credit courses shall be evaluated on the grading system and this will not be counted for the computation of SGPA/CGPA.

16) COURSEWISE COMPLETION OF CREDITS:

- After first year, students will be awarded with a UG certificate in major with 44 credits and additional 4 credits core NSQF Course /internship Or continue with Major and Minor
- After second year ,students will be awarded with UG Diploma in major with 88 credits and additional 4 credits core NSQF Course /internship Or continue with Major and Minor
- After third year students will be awarded a UG degree with 132 credits or continue with Major and Minor
- After Four year UG Honours Degree with Major and Minor with 176 Credits

17) GRADE IMPROVEMENT:

Subject to change as per the NEP 2020 guidelines/notifications issued by UGC/Maharashtra State Government/Savitribai Phule Pune University. शासन निर्णय क्रमांक: एनईपी-2022/प्र.क्र.09/विशि -३/शिकाना)

a. A Candidate will be allowed to re-appear for the examination for improvement of class or grade within a period of 2 years from the date of his/her passing bachelor's degree examination. Only 1 attempt for improvement will be allowed, according to the syllabus in existence at the time of improvement.

b. A Candidate shall have to reappear for minimum 1/3rd and /or maximum all the theory courses (except practical and project) at a time on which the class is awarded.

c. A Candidate who has appeared for improvement of class and fails to improve his/her - class, his/her performance at such reappearance shall be ignored.

d. A Candidate appearing for the improvement of class grade shall not be entitled to be in the list of Rank holders/ Merit holders.

e. Improved candidates will have to surrender the degree, statement of marks, passing certificate in original, after the declaration of their results of the concerned improved class. After surrendering the above documents in original, a new certificate will be issued in due course of time as in the usual process.

18) GLOSSARY:

 Academic Year: The duration of two consecutive (one odd and one even) semesters constitutes one academic year.

 Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (core courses, discipline specific electives, generic elective, ability enhancement compulsory courses, skill enhancement courses mandatory non-CGPA courses etc.).

 Program: An educational program leading to award of a degree.

 Course: Usually referred to, as 'paper' is a component of a program. Each course should define learning objectives and learning outcomes. A course may be designed to comprise lectures, field work, outreach activities, project work, vocational training, viva, seminars, term papers, assignments, presentations, self-study etc. or a combination of some of these.

 Credit(C): A unit by which the course work is measured. It determines the number of hours of teaching/ instruction required per week.

 To earn 1 credit, minimum 15 hours of teaching/ instruction is required.

 A 2 credits theory course requires a minimum duration of 30 hours of teaching in a Semester.

 A 2 credits practical course requires a minimum duration of 60 hours of practical work in a semester.

 Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F. The Letter Grades, Grade Points and scale of UGC are adopted. Grading is done using Letter Grades as qualitative measure of achievement in each Course like: O (Outstanding), A+ (Excellent), A(Very Good), B+ (Good), B (Above Average), C (Average), P (Pass), F (Fail) and Ab(Absent), based on the percentage (%) of marks scored in (CIE+SEE) of the Course and conversion to Grade.

 Grade Point (GP): It is a numerical weight allotted to each letter grade on a 10-pointUGC scale viz. O=10, A+=09, A=08, B+=07, B=06, C=05, P=04, F=00 & Ab=00.

 Credit Point (CP): The numerical value obtained by multiplying the grade point (GP) by the no. of credit(C) of the respective course i.e. CP= GP X C.

 Cumulative Grade Point Average (CGPA): It is a measure of overall cumulative

performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

- **Semester Grade Point Average (SGPA):** It is a measure of performance of work done in a semester. It is ratio of total credit points (CPs) secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- **Semester:** Each semester shall consist of 15-18 weeks of academic work equivalent to 90/100 actual teaching days. The odd semester may be scheduled from June to December and even semester from January to May.
- **Transcript:** Based on the grades earned, a transcript shall be issued to all the registered students after every semester. The transcript shall display the course details (code, title, no. of credits, grades secured) along with SGPA of that semester and CGPA earned till that semester at the end of each academic year. The students hall be issued transcript for each semester and a consolidated transcript indicating the performance in all the semesters at the completion of the program.
- **Absolute Grading:** Under the absolute grading, the marks are converted to grades based on pre-determined class intervals.
- **Continuous Internal Evaluation (CIE)** and **Semester End Examinations (SEE)** are two key assessment methods. For all theory courses/papers, the ratio of CIE & SEE is40:60. Thus a course of 100 Marks shall have 40 CIE + 60 SEE which includes 20marks for Practical Courses.
- **Program Span (PS):** The program's maximum time for completion shall be:

Duration of Program plus additional two 2 years.