MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

BACHELOR OF COMPUTER APPLICATION
(Semester Scheme with Choice Based Credit System)
(Effective from session 2020-23)

1. Duration of the Course
 The Bachelor of Computer Application (B.C.A) which will be known as BCA (Semester Scheme with Choice Based Credit System) course will consist of six semester's duration which will be conducted in three years. Each semester will be approximately 5 months (minimum 90 working days in a semester) duration.

2. Eligibility:
Candidates seeking admission to the first semester of BCA programme must have passed 10+2 examination all faculty (Science, Commerce & Science) with at least 50% marks.

3. **Admissions**: Admissions to the first semester of B.C.A shall be made, through merit conducted by the University. The course will be initially offered only in the university campus under Faculty of Science

4. Medium of Instruction
The medium of instruction and examination shall be English.

5. **No. of Seats**
Total 180 seats on self-finance basis

6. Curriculum
6.1 B.C.A. Programme has a three year, six semester prescribed course structure which in general terms is known as curriculum. It prescribes courses to be studied in each semester as given under courses of study and examination

6.2 B.C.A Programme shall have a curriculum and course contents (syllabi) for the courses recommended by the committee courses in Informatics and Computational Sciences and approved by the academic council of the university.
6.3 The Programme shall follow a credit based semester system. Each academic year is divided in to two semesters as prescribed in 6.1

6.4 Course Credit System/Structure
In general a certain quantum of work measured in terms of credits is laid down as the requirement for a particular degree. A student earns the credits for a particular course by fulfilling the academic requirements viz. attendance and evaluation. The total credits required for completing the B.C.A. program shall be 172. The total number of credits in each semester (I to V semester) shall be 34 and 18 in the VI semester. Number of credits for a course in any semester is calculated as follows.

S. No.	Course	Credits
1	One Lecture or tutorial hr/week	1
2	Two Laboratory hours/week	1
3	Seminar 4hrs/week	2
4	Full semester project	18

Credits are awarded to a student for Theory / Laboratory / Other Courses only if the student satisfies the minimum attendance requirement and the evaluation requirements.

6.5 Seminars

Seminar is a course requirement wherein under the guidance of an internal guide a student is expected to do in depth study of topics allotted to them by doing literature survey, and understanding different aspects of the technology. It is mandatory to give a seminar presentation before a panel constituted for the purpose. 4hrs/week is allotted for seminars, which will be used for seminars by students as well as extension lectures/ seminar by faculty members as well as subject experts from other institutions. Participation in the seminars by the students shall be compulsory. The credits shall be awarded on the basis of the following:

(a) Understanding of the concept and presentation by the student concerned.(50%)
(b) Literature survey & detailed report (25%)
(c) Active participation & attendance in the seminars (25%)

6.6 Project Work

Project work will be offered in the Sixth semester of BCA which shall be typically carried out in the industrial/ Research organization individually by the candidates admitted in the sixth semester. A faculty member will be appointed to guide the students and shall be called the internal guide and the scientist / manager guiding the student (at site) shall be called as external guide. It is mandatory to submit the progress report at every 30 days to the internal guide through the external guide giving number of hours the candidate has worked for the project. During the project period, a student is expected to work at least 36 hrs/week. Thus a candidate who successfully completes the project work can earn 18 credit points. At the end of semester-VI, the student has to submit a formal individual project report in a prescribed format. He is required to submit a certificate of successful completion of the project from his external guide giving total number of hours the candidates has worked toward the project and his conduct during the project work. Evaluation of the project will be carried out by a committee consisting of external examiner and internal examiner by examining the project report, presentation of the project and demonstration of the working model of the project with sufficient data to check the working of the project.

6.7. Earning credits:

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average. Some of the subjects in a course may be marked   as audit course. Grades obtained in the audit courses are not counted for computation of grade point average. However, a pass grade is essential for earning credits from an audit course. A minimum number of earned credits are required in order to qualify for a degree and continuation of registration at any stage.

The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation.

7 REGISTRATIONS:

7.1 Faculty Ad-visor

A student or a group of students is assigned to a faculty ad-visor from the concerned department, who will mentor the student throughout his/her, tenure in the Institute. The students are expected to consult the faculty ad-visor on any matter relating to their academic performance and the courses they may take in various semesters / summer

terms. The faculty ad-visor is assigned to extend guidance to the students enabling them to complete their courses of study for the required degree in a smooth and timely manner. Thus, the role of the faculty ad-visor is of immense importance. The faculty ad-visor is the person to whom the parents/guardians should contact for performance related issues of their ward. In view of the guidance to the students the role of faculty ad-visor is outlined as below

(a) Guidance about the rules and regulations of the courses of study for the   Programme
(b) Pay special attention to weak students.
(c) Guidance and liaison with parents of students for their Performances and other personal problems a student may have.

7.2 Each student shall be required to register for course work on the advice of   the Faculty Ad-visor at commencement of each semester on the day fixed for such registration and notified by the examination section of the university. Registration involved filling up a registration form by stating the theory course / Laboratory / Seminar / Project, etc.

7.3 Each student shall also register for the audit course/ elective courses in consultation and approval of Faculty Ad-visor.

7.4 Only those students will be permitted to register course works that have cleared all dues of the previous year / semester of the department and Hostel.

7.6 Such students who have earned at least 43 credits out of the total 66 credits in I & II semester of BCA will be allowed to register for the next year. The credit, if any, earned from the audit pass course shall not be counted towards the minimum requirement of the credit. The students admitted second year or third year, but have backlog papers, have to earn the credits for backlog courses on self-study basis. They can appear in the End Semester Examination

(ESE) for backlog courses. However if the student appears for end semester examination of backlog course code, the performance of that examination will be considered and his/ her previous performance of End Semester Examination shall be treated as cancelled. The marks obtained by the candidate for Continuous Assessment (CA) shall be carry forwarded and shall be added to ESE marks from backlog papers.

7.7 Such students who have failed to earn   minimum 43 credits out of 66 credits in the academic year will not be allowed to register for next higher class. Such students will have to register for the backlog course codes in the respective next semester, undergo class room/Laboratory instructions and appear for CA   and ESE. Such student will have to pay tuition fees per course code as decided by the university from time to time.

7.8 For the registration of the third year, the student should have passed all the courses of the first year i.e. student must have earned 66 credits of first year and earned minimum 40 credits out of 60 credits in the second year.

7.9 **Course Coordinator**: For each course, Head of the department/Course Director may appoint a course coordinator to assist him in managing the course.

8 ATTENDANCES:

Regular attendance of the student is an important factor in grading system. No grade can be given to a student unless he/she has attended the course regularly.

8.1 Regular 100% attendance is expected of all students for every registered course in theory, laboratory and seminar. Hence attendance is compulsory and shall be monitored in the semester and students will be informed at the end of the month and end of semester.

8.2 A maximum of 25% absence for the attendance may be condoned only on valid grounds such as illness, death in family or other emergency beyond students control and approved by the Head of the Department / Course Director. Sanctions to be taken within a week after joining if on medical grounds.

8.3 For Students participating in Sports / Cultural event/NCC camps during a semester the maximum number of days of absence shall not exceed 8 days. Any waiver in this context shall be on the recommendation of the Dean - Student Welfare and the student will be required to apply in advance for the leave to the Head/Course Director through Faculty Advisor/Course coordinator. This however shall be within the 25% of absence as mentioned in 8.2

8.4 A student having attendance less than 75% in a paper shall be detained by the Course Director and debarred from appearing in the ESE for that paper in that semester and the student will have to re-register for the paper as and when it is offered. However, a course instructor/teacher may detain a candidate by awarding I grade for want of required attendance provided the candidate was regular while he was attending the course but the absence was due to medical or other special circumstances and the overall performance in the internal assessment has been very good (70% or more). Such candidates will be required apply to the Head of the department or course Director within three days from the declaration of I grade by the course instructor/teacher. The Course Director/Head of the Department will constitute a committee and the student will be required to appear before the committee to explain his case. If the committee is convinced with the explanation and find that the candidate has satisfied all the conditions for award of grade I, special classes /tutorials (Not exceeding 10% of maximum lectures/classes held) may be conducted before the end semester examination, provided sufficient time period is left before the end semester examination and the course instructor is available for the additional classes/tutorials. In such cases, the student will be required to deposit a fee decided by the committee mainly to meet out the expenses incurred to conduct the additional lectures/tutorials/practical. If the student fails to convert his I grade, the student shall have to re-register for the course as and when it is offered. In such cases the student is given X grade.

8.5 Leave of Absence

a. If the period of leave is for a short duration (less than a week), prior application for leave shall have to be submitted to the Head/Course Director stating fully the reasons for the leave requested for, along with the supporting document(s). Such leave shall be granted by the Head/Course Director

b. Absence for a period not exceeding one week in a semester due to sickness or any other unavoidable reasons for which prior application could not be made may be condoned by the Head of the Department provided he/she is satisfied with the explanation**.**

c. If the period of absence is likely to exceed one week, a prior application for grant of leave will have to be submitted to the Head /Course Director with supporting documents. In each Case the decision to grant leave shall be taken by a committee constituted by the Head/Course Director. The committee on receipt of an application may decide whether the student be asked to withdraw from the course for that particular semester because of his long absence.

8 TEMPORARY WITHDRAWALS FROM THE PROGRAMME

A student seeking temporary withdrawal is granted permission by the Vice-Chancellor to withdraw from the programme for one semester/year for reasons of ill health or other valid reasons on the recommendations of concerned HOD/Course Director on the following terms:

8.1 The student applies to the Head/Course Director within six weeks of commencement of the term or from within six weeks of his / her last attendance in class whichever is earlier, stating the reasons for such withdrawal with supporting documents and endorsement of his/her parents.

8.2 The fee deposited for the current semester shall not be refunded for the students who apply for withdrawal after two weeks of commencement of the terms.

8.3 Normally, a student shall be permitted to avail of temporary withdrawal only once during the Programme duration at the institute and for a maximum duration of two semesters.

8.4 Such student who has discontinued and re-joins again will be governed by rules and regulations, courses of study, syllabi and fee in force at the time of his re-joining the Department. The joining time shall be the normal commencement of the term.

9 MODES OF ASSESSMENT
The Academic Board will decide from time to time on the system of examinations in each course in each semester. The current practice of Assessment of Theory and Laboratory Courses is as follows

9.1 A student is evaluated for theory courses through Internal Assessment   and End Semester External Examinations. The IA consists of one internal semester examinations (50% weightage), and teacher evaluation (50% weightage) through home assignments, viva/quiz, regularity etc.

9.2 The relative weightage is 25% for IA and 75% for ESE. Minimum marks for passing is calculated by the sum of marks obtained IA and ESE

The IA marks will be awarded by the teacher concerned and will be presented to the following committee for necessary approval. The committee may call for the internal examination answer books, assignment details etc. if necessary

- (a) Head of the Department/Course Director
- (b) Course Co-ordinator
- (c) Nominee of the Vice-Chancellor

The Internal marks awarded will be displayed on the notice board at least one week before the ESE. Grievances, if any, from the student shall be examined by the above committee. The student will be given an opportunity to represent his case to the committee in the presence of his faculty advisor.

9.3 The teacher shall announce the method of teacher evaluation at the beginning of the semester. All IA and ESE are compulsory for all students for award of credits in a course. The marking for all tests, tutorials and examinations will be on absolute basis. The final percentages of marks are calculated in each course as per the weightage indicated above.

9.4 No credits are awarded if the student remains absent in the Internal examinations and ESE or Continuous Assessment. If a candidate fails to attend in one of the two Internal examinations, in special cases and after satisfied by the reason for absence, department may conduct defaulters examination. The candidate will be required to pay prescribed fee for the defaulter's examination to meet the expenditure towards conducting defaulter's examination.

9.5 The laboratory course whether offered as an independent course or as an attached course with a theory course will have continuous assessment for award of Internal Assessment marks.

Most of the laboratory courses contain two parts as follows:

Part I: Assignments and Part II: Mini project based on implementation of Concepts of laboratory course

Continuous Assessment of laboratory courses will be based on ,number of assignments/practical satisfactorily completed, punctuality, turn to turn supervision of student work, quality of work of journals, group discussions, overall understanding of the experiment and viva-voce examination (as per requirement of structure of course) .

Mini Project will be also assessed continuously by the concerned teacher and demonstration and presentation of workable mini project will be conducted at the end of the semester. This mini project can be developed by the group of maximum two students only. In such case the 70 % weightage will be given to completed assignments and 30% weightage will be given to the Mini Project otherwise overall evaluation shall consist of 100 % weightage to completed assignments.

9.6 The teacher shall announce the mode of evaluation and distribution of marks at the beginning of the laboratory course. It is obligatory to maintain and submit laboratory journal, prescribed documentation for the laboratory course, and reports.

9.7 The End-Semester Examination (ESE) shall generally be of three hours duration for each theory course and is held as per the schedule declared. The detail time-table for this is declared by the examination section of the university at least two weeks in advance of the conduction of ESE. The ESE for the laboratory course will be of 4 hrs duration.

9.8 All examinations and evaluations that are conducted are compulsory. Credits for a course will be awarded only if the student satisfies the minimum attendance requirements and acquires the necessary minimum grades for that course. No credits are awarded if the student remains absent in internal examinations or ESE even though he/she has minimum attendance requirements.

9.9 Assessment of Project:
At the end of the sixth semester of study, a student will be examined in the course "Project".

1. Project work must be performed individually.
2. Each Student shall be reporting with the progress in work to the internal guide as well as for guidance in project work.
3. The project Work should be of such a nature that it could prove useful or be relevant from the commercial/management/engineering / scientific angle.
4. The project report should be prepared in a format prescribed by the department which also specifies the contents and methods of presentation.
5. The project work carries 18 credits. The viva shall be conducted by the panel of minimum three examiners out which at least one examiner will be external examiner

10. THE GRADING SYSTEM

10.1 Award of Grade

(a) The academic performance of a student is graded on a ten point scale. The letter grades, the guidelines for conversion of marks to letter grades and their equivalent grade points are as follows:

Sr. No	Grade	Grade points	Marks Range	Grade point Description of Performance
1	A+	10	91-100	Outstanding
2	A	9	81-90	Excellent
3	B+	8	71-80	Very Good
4	B	7	61-70	Good
5	C+	6	51-60	Average
6	C	5	41-50	Below Average
7	D	4	31-40	Marginal
8	E	2	21-30	Poor
9	F	0	0-20	Very Poor
10	I	0		Absent in the Exam but not detained (Incomplete)
	AP	0	36-100	Audit Pass
	AF	0	0-36	Audit Fail
	U	--		Unsatisfactory
	W	--		Withdrawal
	X	--		Continued
	S	--		Satisfactory Completion
	Z	--		Course Continuation

b. Description of the grades

A+ to D

The student shall pass the course if he/she gets any grade in the range "A+" to "D".

E and F grades:

The E and F grades denote poor and very poor performance i. e. failing a course. A student has to repeat all core courses in which he/she obtains either E or F grades until a passing grade is obtained. For the other (elective) courses in which E or F grades have been obtained the student may take the same course or any other courses from the same category. The E and F grades secured in any course stay permanently on the grade card. These grades are not counted in the calculation of the CGPA; however these are counted in the calculation of the SGPA.

I Grade

I grade denotes incomplete performance in any courses. The student is temporarily assigned grade "I", if he/she is not detained by an instructor but fails to appear for end-semester
examination due to valid reason. Such a student will have to appear for the examination as and when conducted.

An I grade also may be awarded by an instructor, if a candidates attendance is below 75% but above 60% and the absence is on medical grounds other special circumstances. The students should complete all requirements as per provisions within 10 days of commencement of End Semester Exams, the request to be made to the Head/Course Director.

(c) A student who has awarded grade E or F in a particular course is considered to be failed in that course and no credits will be awarded for the same the student will have to appear for the examination as and when it is conducted.

10.2 Grade "X"

(a) The grade "X" is assigned to the student if his/her attendance is less than 75% in the Lectures/Tutorial/Laboratory course and/or his/her performance in the semester is not satisfactory and/or he/she fails in the IA of the subject. A student with X grade will not be permitted to take the ESE in that subject. The student will be detained for that subject only and will have to re-register for the subject as and when it is offered and appears as and when it is conducted. However if a student is detained in any of the course he/she, will not be admitted to the next year, unless he/she Re-registers for that course and obtained passing grade

(b) An 'X' grade is treated as equivalent to F for purpose of CGPA calculation, and the following criteria in addition to poor attendance (less than 75% may be considered for the award of X grade: (1) Badly incomplete in semester record (due to non-medical reasons) {for example, in the case of a student who has missed all tests and assignments etc.) (2) Misconduct/use of unfair means in the examination, assignments etc., of a nature serious enough to invite disciplinary action in the opinion of the instructor. (It is emphasized that award of the X grade is in the nature of an immediate action in such cases, and the case may be referred to the Disciplinary Action Committee for consideration of further punishment depending on the seriousness of the offence). The names/roll numbers of students to be awarded the X grade should be communicated to the examination section in advance of the end-semester examination.

 (C) Following rules apply for the course registered in any semester in which a student has acquired grade "X"

(i) He/she shall try to get a passing grade by registration for full examination in the next regular semester whenever it is offered. In this case the earlier performance of a student in all the evaluations will be treated as null and void.
(ii) A student registering for the course (Grade X) shall undergo all evaluations including IA and ESE and is eligible to acquire any grade between "A+" to "D" or "E / F".
10.3: Method of awarding grades:

(a)The ESE will be conducted by the examination section of the university. The question papers will be set by the examiners appointed by the university as per the syllabus, teaching plan and model question paper. University may conduct center evaluation of the answer books by inviting external examiners or the answer books may be sent to the individual examiners for evaluation. After the evaluation of the answer books based on the IA and ESE marks, a semester board will award the grades.

(b) The semester board will consist following
    (i) Convener of the Committee of Courses
    (ii) Head/Course Director
    (iii) Two subject experts

(iv) Nominee of the Vice chancellor

In case semester board feels moderation/re-checking of the answer book is necessary, recommendation with reason will be sent for the consideration of the Result committee of the University. The semester board will maintain strict confidentiality of the marks and results. The result will be declared by the Controller of Examinations.

(c)Evaluated answer papers of IA and ESE should be preserved at least for a minimum period of one semester.

11. **Calculation SGPA and CGPA**

11.1 **Semestre Grade Point Average (SGPA)**

a) The performance of a student in a semester is indicated by the number called SGPA
b) The SGPA is the weighted average of the grade points obtained in all the courses registered by the student during the semester
c) If a numerical grade point equivalent to letter grade obtained by the student for the course with credit Ci then, SPGA for that semester calculated using the formula

$$\text{SPGA} \quad \frac{\sum C_i g_i}{\sum C_i}$$

Where summation is for all the courses registered by a student in that semester. For example, if a student passes five courses in a semester with credits c1,c2,c3,c4,c5 and his grade points in these courses are g1, g2,g3,g4,g5 respectively, then SPGA is equal to

$$\text{SPGA} = \frac{c_1 g_1 + c_2 g_2 + c_3 g_3 + c_4 g_4 + c_5 g_5}{c_1 + c_2 + c_3 + c_4}$$

The SPGA is calculated to two decimal places and rounded off.

d) For the students acquiring "I" grades in any of the courses, SPGA and CPGA calculated only after make-up examination.
e) Since the grades "I" are only temporary grades, they are not taken in the calculation of SPGA. The conversions of letter grades into SPGA and CPGA for the students acquiring "I" grade in any of the courses is suspended till declaration of the grades of make-up examination.

11.2 **Cumulative Grade Point Average (CGPA)**

(a) An up-to- date assessment of the overall performance of a student from the third semester onwards till completion of the programme is obtained by calculating a number called CGPA
(b) The CGPA is weighted average of the grade points obtained in all the courses registered by the student since the beginning of the third semester of the programme

$$\text{CGPA} = \frac{\sum C_i g_i}{\sum C_i}$$

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Where summation is for all the courses registered by a student till that semester. The CGPA is also calculated at the end of every semester from third semester onwards to two decimal places and is rounded off.

(c) The CGPA shall reflect all courses done by the student including courses where he/she has failed.

(d) If a student is awarded with a passing grade for a course in which he/she was awarded previously "E" grade or "F" grade then CGPA is calculated by replacing corresponding C_i and g_i in both numerator and denominator of the above formula. Thus a course is included only once in CGPA calculation. The latest performance of a student in a course is considered for CGPA.

11.3 A candidate admitted to the BCA programme will be required to pass the course within five academic years from the year of admission to the first semester.

12. Examination rules

(a) University will conduct examinations normally after completion of at least 90 working days of instruction in each semester as per examination schedule declared in advance. External examination will be conducted on consecutive working days without any gap.

(b) Each theory paper shall be of 100 marks (80 marks for written examination of 3-hrs duration and 20marks for Continuous Internal Assessment)

(c) Each practical/Project paper shall be of 100 marks (80 marks for semester practical examination of six hours duration and 20 marks for Continuous Internal Assessment).

(d) Marks obtained in the Continuous Internal Assessment and End Semester Examination will be converted in to letter grades as per range of marks obtained by the candidates.

(e) Candidates will be required to obtain a minimum pass grade in Internal Assessment and External Assessment separately. The CGPA and SGPA shall not include the Internal Assessment grades.

(f) In the Programme, the grades obtained in the Audit courses, Skill courses, Extra Credit courses etc. shall not be used for SGPA and CGPA calculation. Only the grades obtained in the Core and Discipline Specific Elective courses shall be used. In the case of Project work, the grades will be counted towards SGPA and CGPA, if it is a Core/DSE courses.

(g) Grace Marks @ one mark/course will be awarded. One mark per course may be granted as a special grace by the Vice-Chancellor in a course. However, total grace marks shall not exceed six marks in a semester for the first attempt and three marks for all the Due/improvement courses in a semester. Grace marks shall not be counted towards merit posit position.

(h) The merit position of a candidate shall be decided on the basis of the absolute marks awarded to the candidate in the Core and Discipline Specific Elective courses at the end of the fourth semester end semester examination in the first attempt. The marks obtained by a candidate in any course through improvement or change of electives shall not be counted towards merit position.

(i) Under Graduate Degree shall be awarded to the candidates whose satisfy following:

    (i) Obtained a minimum pass grade in each course registered except extra credit courses

    (ii) CGPA is minimum 3.60

    (iii) Minimum attendance in each of the course is 75% for the Regular category of students.

(j) The question paper for end semester theory examination shall consist of a total of 16 questions. Part-A shall consist of one compulsory question of 20 marks with ten parts covering the entire syllabus for which answer must be provided with a maximum of 50 words for each. Part-B will consist five long answer questions (which requires answers in maximum 250 words each), one from each unit with internal choice. Each question in the part-B will carry 8 marks each. Part- C will consist five questions , one from each unit, out of which answer must must be given for any two questions using maximum 300 words. Only one answer booklet will be given to the

students for answering all the questions. No supplementary answer books shall be allowed.

(k) The practical examination for End Semester Examination shall be conducted by the Department/College consisting the following:
  (i) Internal Examiner nominated by the Head of the department
  (ii) External examiner from the panel of Examiners approved by the University.

If marks awarded to any candidate is more than 90%, or less than 36% then the justification for the same must be given by the examiner in a prescribed performa along with the award.

All the Colleges and University Departments will inform and get approval of the schedule of practical examination in advance (at least one week before the commencement of examination) to the University. The Faculty Chairman may send an observer to the examination Centre on the day of examination or in advance who will submit a report of the number of experiments as per syllabus available in the college and carried out by each student , maintenance of attendance record etc.

The Faculty chairman will examine the reports received and submit his/her to the university. On the basis of the report received from the Faculty Chairman, the Vice-Chancellor may order for re- conduct of the practical examination. The expenses towards the reconduct of the examination will be borne by the College concerned.

(l) A student who failed in a course will be allowed to re- appear in the End Semester Examination in that paper as and when it is again conducted by the University as per the syllabus of the course applicable for the current students.

(m) A student will also be allowed to improve his credits by appearing in the End Semester Examinations as per university rules. However, improvement shall not be allowed in Practical papers.

(n) A student shall not be eligible to improve his Grades in the Internal Assessment. However, a candidate who obtained Fail grade or X-grade in the Internal Assessment shall be allowed to re-appear in the Internal Assessment by applying to the Department and paying a prescribed fee. On the basis of his/her previous performance in the Assignments and Internal examinations, the student will be required to complete prescribed number of assignments and appear in the internal examination along with the current students.

(h) Minimum passing marks and criteria for promotion to next higher semester
  (i) A candidate will be declared PASS in a Semester if he/ she has minimum Pass Grade in each papers and shall be eligible for registration for the courses in the next semester.

  (ii) A candidate shall be PROMOTED from one semester to next semester if he/she has obtained minimum Pass grade in 50% of the courses registered.

  (iii) A candidate fails to obtain minimum pass grade in 50% of the courses shall be declared FAIL and shall be required to reappear in the External End Semester examinations (as and when conducted by the university) in the courses he/she failed to obtain a minimum pass grade and satisfy conditions for pass or promotion to the next higher semester. However, he/she shall be eligible for admission in the higher semester only when these semesters are offered by the university.

  (iv) A candidate who could not PASS in all the courses in each semester shall be required to re-register for the external examinations in the courses he/she failed to obtain pass grade and shall be required to pass all the due courses within four years from taking admission in the first semester. A candidate will be considered EXIT the course on 1st July of the fourth year from the year of the admission in the first semester.

(i) In case result of a semester is not declared by the university, before the starting of the next higher semester, the students who have appeared in all the courses in the semester will be allowed to attend the classes of the next higher semester at their own risk. Candidates who are not eligible to be promoted shall have to leave that semester.

(j)   Evaluation of the Project will be carried out centrally at the University Departments only by a committee of examiners as given in para.12 (viii)

(k)   Program Span Period: A candidate admitted to the BCA. program will be required to pass the course within four academic years from the year of admission to the first semester. The span period will be decided as on 1st July of an academic session. During the span period candidate is free to apply for cancellation of the grade awarded to him/her and reappear in the same by re-registering for the same or for any other course including elective courses by paying prescribed fee. In the case of new elective course, he/she shall be required to attend classes and undergo internal assessment and satisfy all the regulations for earning credits including Continuous Internal Assessment grades

(l)   University examination rules for CBCS program approved by the Academic council of the University from time to time shall be applicable to students appearing in the Internal and External Examinations and will over ride the rules given above.

12. Courses of Study and Examination

Credit Structure
Distribution of Total Credits & Contact Hours in all Semesters

S.No.	Semester Number	Credits/ Semester	Contact hours/ Week
1	I	34	43
2	II	32	40
3	III	30	43
4	IV	30	39
5	V	28	40
6	VI	18	36
	Total	172	241

BCA Semester – I

Paper	Paper Name	L-T-P	Credits	University Exam.	Internal Assessment	Total
				Max. Marks		
Paper-I (BCA-S101)	Introduction to Information Technology & PC Packages	3-1-0	4	80	20	100
Paper-II (BCA-S102)	Business Communication	3-1-0	4	80	20	100
Paper-II (BCA-S103)	Problem solving through C	3-1-0	4	80	20	100
Paper-IV (BCA-S104)	Computer Organization	3-1-0	4	80	20	100
Paper-V (BCA-S105)	Practical-I C Programming Lab.	0-0-8	4	80	20	100
Paper-VI (BCA-S106)	Practical-II ICT & PC Software Lab.	0-0-8	4	80	20	100
Paper-VII (BCA-S107)	Language Lab	0-0-2	2(AP)		50	50
Paper VIII (BCA-S108)	Seminar	4	2		50	50
Paper IX (BCA-S109)	Extension Activities (Required to choose one activity from the list of activities)	2	2 (AP)		25	25
Paper X (BCA-S110)	Basic Mathematics-I (Only for those have not studied Maths at 10+2 Level)	2-1-0	4(AP)		100	100
	TOTAL		34 (26)	480	345	825

BCA Semester – II

Paper	Paper Name	L-T-P	Credits	University Exam.	Internal Assessment	Total
				Max. Marks		
Paper-I (BCA-S201)	Computer Architecture	3-1-0	4	80	20	100
Paper-II (BCA-S202)	Basic Physics	3-1-0	4	80	20	100
Paper-III (BCA-S203)	Basic Mathematics-II	3-1-0	4	80	20	100
Paper-IV (BCA-S204)	Object oriented programming using C++	3-1-0	4	80	20	100
Paper-V (BCA-S205)	Object oriented Programming Lab.	0-0-8	4	80	20	100
Paper-VI (BCA-S206)	Microprocessor Lab	0-0-8	4	80	20	100
Paper-VII (BCA-S207)	Communication Skill Lab	0-0-4	2(AP)		50	50
Paper-VIII (BCA-S208)	Seminar	4	2		50	50
SBCA 1209	Environment Studies		2	100		100
SBCA 1704	English		2	100		100
			32 (28)	680	220	900

BCA Semester – III

Paper	Paper Name	L-T-P	Credits	University Exam.	Internal Assessment	Total
				Max. Marks		
Paper-I (BCA-S301)	Database Management	3-1-0	4	80	20	100
Paper-II (BCA-S302)	Data Structure	3-1-0	4	80	20	100
Paper-III (BCA-S303)	Computer Communication and Networks	3-0-2	4	80	20	100
Paper-IV (BCA-S304A or BCA -S304B)	Elective(choose one from following) A. 1.Business organization and Management B. 2.Numerical & Statistical Computing	3-1-0	4	80	20	100
Paper-V (BCA-S305)	Data Structure Lab	0-0-8	4	80	20	100
Paper-VI (BCA-S306)	DBMS Lab	0-0-8	4	80	20	100
Paper-VII (BCA -S307A or BCA -S307B)	Practical Elective(choose one from below) A. Web Design B. Desk Top Publishing	0-0-4	2(AP)		50	50
Paper VIII (BCA-S308)	Seminar	4	2		50	50
Paper IX (BCA-S309)	Extension Activities (Required to choose one activity from the list of activities)	2	2 (AP)		25	25
	TOTAL		(30) 26	480	245	725

BCA Semester – IV

Paper	Paper Name	L-T-P	Credits	University Exam.	Internal Assessment	Total
				Max. Marks		
Paper-I (BCA-S401)	System Analysis & Design	3-1-0	4	80	20	100
Paper-II (BCA-S402)	Fundamentals of operating System	3-1-0	4	80	20	100
Paper-III (BCA-S403)	Java Programming	3-0-0	4	80	20	100
Paper-IV (BCA-S404A / S404B)	Elective (Choose one from below) A. Information Systems B. Business Accounting	3-1-0	4	80	20	100
Paper-V (BCA-S405)	Java programming Lab	0-0-8	4	80	20	100
Paper-VI (BCA-S406)	Operating system Lab.	0-0-8	4	80	20	100
Paper-VII (BCA-S407A / S407B)	Practical Elective(Choose one from following) A. Accounting Software Lab B. Networking Lab	0-0-4	2(AP)		50	50
Paper-VIII (BCA-S408)	Seminar	4	2		50	50
SBCA 1705	Hindi		2	100		100
	TOTAL		30 (28)	580	220	800

BCA Semester – V

Paper	Paper Name	L-T-P	Credits	Max. Marks		Total
				University Exam.	Internal Assessment	
Paper-I (BCA-S501)	Software Engineering	3-0-2	4	80	20	100
Paper-II (BCA-S502)	Data mining	3-0-0	4	80	20	100
Paper-III BCA-S503	Web Technology	3-1-0	4	80	20	100
Paper-IV BCA- S504A /S504B	Elective A. Network management & Security B. Client Server Computing	3-1-0	4	80	20	100
Paper-V (BCA-S505)	Practical-I: Data mining Lab	0-0-8	4	80	20	100
Paper-VI (BCA-S506)	Practical-II Minor Project Based on Web technology	0-0-8	4	80	20	100
Paper-VII (BCA-S507A/S507B)	Practical Elective(Choose one from following) A. Web Development Lab B. Advanced Web Tools	0-0-4	2(AP)		50	50
Paper-VIII (BCA-S508)	Seminar	4	2		50	50
	TOTAL		28 (26)	480	220	700

BCA Semester – VI

Paper	Paper Name	Credits	Ma		Total
			University Exam.	Internal Assessment	
Paper-I (BCA-S601)	Project	18	350	100	450
		18			450

Total Credits: 172, 158 credits for calculation of CGPA

BCA Semester –I
BCA- S101: Introduction to Information Technology & PC Packages
UNIT-I
Computer Basics and its generations:
A Simple Model of a Computer, Characteristics and classification of Computers, Generations of Computers. Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory organization and hierarchy, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of ICT.

UNIT-II
Operating Systems:
History and Evolution, Main functions of OS, Multitasking, Multiprocessing, Time Sharing, Real Time OS with Examples, DOS: Introduction, FAT, booting process, DOS system files, DOS commands- internal & external.

Windows Operating System: Introduction, versions, Features, Structure, Utilities, Installation of Hardware & Software, Using Scanner, System Tools, Communication, Sharing Information between computers and programs,

Linux: Introduction, features, Shell, Kernel, basic commands

UNIT-III
Word Processing software:
Understanding Word Processing: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document, Mail Merge, Working with references and Review.

UNIT-IV
Using Spread Sheet and Presentations:
Basics of Spreadsheet: Manipulation of cells; Named Range, Conditional Formatting, Formulas and Functions; Graphs and Charts, Pivot tables, sorting, filters, advanced filters, What if analysis, Protecting sheet and workbook, Views.

Making Small Presentation:
Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.

UNIT- V
Introduction to Internet, WWW and Web Browsers:
Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting, World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website, Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

Recommended Books
1.   P .K. Sinha ,Fundamentals of Computers, BPB Publications
2.   Fundamental of Computers By R. Thareja, Oxford University Press.
3.   Introduction to Information Technology-ITL Education solutions limited, PEARSON.

BCA-S102: Business Communication

UNIT I

Basic language skills and grammar: Phonetics and accent, Features of Indian English, Correction of sentences, structures, Tenses, ambiguity, Idiomatic distortions.

UNIT II

Theories of Communication: Importance of Communication, Communication, Process, Channels of communication, Significance of, Feedback, Barriers to Effective Communication, Ways to overcome the Barriers. Informal conversation Vs Formal expression Verbal and non-Verbal communication, barriers to effective communication, kinesics

UNIT III

Written communication: Differences between spoken and written communication, features of effective writing such as clarity brevity, appropriate tone clarity, balance etc. Précis Writing - expressing the presented ideas in concise and accurate manner

UNIT IV

Business Communication: Business and Technical report writing, types of reports, progress reports, routine reports, Annual reports, format, Analysis of sample reports from industry, Synopsis and thesis writing. Letter writing, format and style, effectiveness, promptness, Analysis of sample letters and emails collected from Business.

UNIT V

Vocabulary and English for businesses: Reading newspapers, business news, magazines to build vocabulary for the business communication. Reading Comprehension, Comprehending notices, advertisements, official documents, booklets, newspapers, instructional manuals and other documents.

Recommended Books
1 Bovee, Courtland, John Thill & Mukesh Chaturvedi. Business Communication Today: Dorling Kindersley, Delhi
2 Kaul, Asha: Business Communication: Prentice-Hall of India, Delhi
3 Monippally, Matthukutty M. Business Communication Strategies. Tata McGraw-Hill Publishing Company Ltd., New Delhi
4 Sharma, Sangeeta and Binod Mishra. Communication Skills for Engineers and Scientists: PHI Learning Pvt. Ltd., New Delhi
5 Essentials of Business Communication, Rajendra Pal, JS Korlahhi: Sultan Chand & Sons, New Delhi.
6 Advanced Communication Skills, V. Prasad, Atma Ram Publications, New Delhi.
7 Raymond V.Lesikav, John D. Pettit Jr.: Business Communication; Theory and Application, All India Traveller Bookseller, New Delhi 51
8 Business Communication, RK Madhukar, Vikas Pulishing House Pvt. Ltd.,
9 KR Lakshiminarayana: English for Technical Communication – vols. 1 and 2, SCITECH Publications (India) Pvt. Ltd., T.Nagar, Chennai 600 017
10 Edmund H weiss: Writing Remedies: Practial Exercises for Technical Writing. Universities Press, Hyderabad.

BCA-S103: Problem Solving through C Programming

UNIT-I

Algorithm and algorithm development:
Definition and properties of algorithm, flow chart symbols, conversion of flow chart to language, example of simple algorithms, Introduction to program design, errors – syntax error, runtime error, logic error.

UNIT-II

Basics of C – Language:
Structure of C program, tokens, Data types, constants, operators and its precedence.

UNIT-III

Control Structure:
Decision Structure: - Simple if, if – else, if – else – if, nested if, switch case;
Loop Control Structure:- while , do while and for; Use of break, goto and continue.

UNIT-IV

Functions: Function definition, declaration and prototypes, Call by Value and Call by Reference, Recursion
Arrays and pointers: One Dimensional array, two dimensional arrays, array handling, passing arrays to functions, arrays and string handling, definition of pointers and its uses, pointer arithmetic

UNIT-V

Storage classes–auto, external, static, register;
Structures – declaring and accessing elements, array of structure,
File Handling - Input/Output, Create, Open, Read, Write, Delete, Close;

Recommended Books
1. The C Programming Language, Brian Kernighan and Dennis Ritchie, PHI Publications.
2. Let us C, Yashavant Kanetkar, BPB Publications.
3. Programming in C, Balaguruswamy, McGraw Hill Education.

BCA -S104: Computer Organization

UNIT-I

Logic families:
TTL, ECL, CMOS Gates, Boolean Algebra, Minimization of Boolean Functions, Flip-flops, Combinational circuits, Sequential circuits.

Representation of Integers :
Octal, Hexadecimal, Decimal, and Binary, 2's complement and 1's complement arithmetic, floating point representation.

UNIT-II

Building blocks of computer system:
Basic building blocks – I/O, Memory, ALU and its components, Control Unit and its functions, Instruction –word, Instruction and Execution cycle, branch, skip, jump and shift instruction, Operation of control registers; Controlling of arithmetic operations.

UNIT-III

Addressing techniques and registers:
Addressing techniques – Direct, Indirect, Immediate, Relative, Indexed addressing and paging. Registers – Indexed, General purpose, Special purpose, overflow, carry, shift, scratch, Memory Buffer register; accumulators; stack pointers; floating point; status information and buffer registers.

UNIT-IV

Memory:
Main memory, RAM, static and dynamic, ROM, EPROM, EEPROM, EAROM, Introduction to Cache memory, cache Coherence, Cache penalty and Virtual memory.

UNIT- V

Interconnecting System components:
Buses, Interfacing buses, Bus formats – address, data and control, Interfacing keyboard, display, auxiliary storage devices and printers. I/O cards in personal computers.

Introduction to Microprocessors and Microcontrollers:
Introduction to 8085 microprocessor, examples of few instructions to understand addressing techniques. Difference between microprocessor and microcontrollers.

Recommended Books
1.   Andrew S. Tanenbaum , Structured Computer Organization, Prentice Hall
2.   William Stallings, Computer Organization and Architecture, Sixth Edition, Pearson.
3.   Digital Design and Computer Organization M. Morris Mano, Pearson Education

PRACTICAL

BCA S105: Practical-I: C programming Lab

LIST OF EXPERIMENTS/EXERCISES
1. Basic/Simple logic building
2. Handling mathematical data
3. Use of selection control structures
4. Use of loop control structure
5. Use of function
6. Use of Array
7. Use of pointers
8. Storage classes, Auto, External, Static, Register
9. String Manipulation
10. Implementing Searching
11. Implementing simple Sorting
12. Use of Structure and Union
13. File handling

BCA S106: Practical-II: ICT & PC Software Lab:

LIST OF EXPERIMENTS/EXERCISES
1. All commands specified using DOS, windows & Linux
2. Introduction to MS-Word: introduction to word processing, its features.
3. MS Word: formatting documents, paragraph formatting, indents.
4. Page formatting, header and footer, bullets and numbering.
5. Ms-Word: tabs, tables, formatting the tables, finding and replacing text, mail merging etc.
6. Introduction to MS-Excel, introduction to electronic spreadsheets, feature of MS-Excel
7. Entering data, entering series, editing data, cell referencing, ranges, formulae, functions, auto sum, copying formula
8. MS Excel: formatting data, creating charts, creating database, sorting data, filtering etc.
9. Introduction to MS PowerPoint, PowerPoint, features of MS-PowerPoint clipping, slide animation, slide shows, formatting etc.
10. Ms-PowerPoint presentation (10-15 slides) on (i) evolution of computers (ii) search engines

BCA S107: Practical-III: Language Laboratory (Audit Course)
1. INTRODUCATION OF PHONETICS: Phonetics Symbols, Part of speech ,word conversations, word formations.
2. FEATURES OF INDIAN ENGLISH: Correction of sentences- structures- Tenses- ambiguity- idiomatic distortions.
3. INFORMAL CONVERSATION Vs FORMAL EXPRESSION: Verbal and non-verbal communication; barriers to effective communication- kinesics.
4. TYPES OF COMMUNICATION: Oral, Writing and Reading- Word- Power- Vocabulary- Jargon- rate of speech; pitch; tone- Clarity of voice.
5. TECHNICAL PRESENTATION: Types of presentation- video conferencing- participation in meetings-chairing sessions.
6. FORMAL AND INFORMAL INTERVIEWS: Ambiance and polemics- interviewing in different settings and for different purposes e.g. eliciting and giving information; recruiting; performance appraisal.
7. WRITTEN COMMUNICATION: Differences between spoken and written communication- features of effective writing such "as clarity; brevity; appropriate tone clarity; balance etc.
7. LETTER-WRITING: Business forma culture-style-effectiveness; promptness- Analysis of sample letters collected from industry- email; fax.

BCA-S108: Seminar:

      Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars

(BCA-S109)
Extension Activities (Required to choose one activity from the list of activities)

1. Study materials and plants distributed among Primary School
2. One-day workshop and Exhibition
3. Rural area Special school visit and conducted classes.
4. Voluntary blood donation
5. Road safety Awareness Programme
6. First Aid Programme
7. Social Awareness Programme
8. Sapling Plantation
9. Temple Cleaning Activity
10. Teaching for School Students
11. Old Age Home Visit
12. Orphanage Visit
13. Plastic Cleaning Campaign
14. Road safety Awareness Programme
15. Computer Literacy Programme

BCA- S110: Basic Mathematics -I
(To be offered as an audit pass course by the candidates not studied mathematics at 10+2 level)

Unit I

Algebraic Expressions : Term and degree

Evaluating Algebraic Expressions: Addition and Subtraction of Algebraic   Expressions, Multiplication & Division of Algebraic Expressions, Rational   Expressions, Operations with Rational Expressions
Factoring : Difference of squares, quadratic trinomials, splitting middle term

Unit II
Linear Equations
Translating algebraic expressions, Solving linear equations: Addition property,   Solving linear equations: Multiplication property, Combining rules, Inequalities   Solving linear inequalities

Graphing Linear Equations
The Cartesian coordinate system, The graph of a linear equation, Solve Linear   equations in two variables by graph

Unit III
Systems of Linear Equations
Solution of Systems of equations in two variables (addition/elimination)

Quadratic equations
Solution by Special methods: by square root, by Factorization of roots, completing the square, The quadratic formula. Nature of roots, Sum and product of roots
Unit IV
Radical expressions and complex numbers
Introduction to roots and radicals
Simplifying radical expressions [No variables]
Operations with radical expressions, rationalizing binomials denominators
Complex numbers [Addition and Subtraction]

Equation of lines
Slope of a line, Parallel & perpendicular line, slope intercept form of equation of line, slope point form, two point form, intercept form

Unit V
Conic Sections: General quadratic equation, conic sections, circles, parabolas, ellipses,   hyperbolas
System of Real Numbers:Natural, whole, integer, rationals, irrationals, graphical representation of real numbers

Recommended Books
1. Discrete Mathematics, Schaum'sOutlines
2. Differential Calculus, Shanti Narayan,P.K.Mittal
3. Integral Calculus, Shanti Narayan,P.K.Mittal
4. Elementary Calculus, Gokhroo & Bhargav.
5. Business Mathematics, Quaji Zameeruddin, V.K.Khanna,S.K.Bhambri
6. Comprehensive Mathematics Class XII Part-A, Parmanand Gupta

BCA Semester II

BCA -S201: Computer Architecture
UNIT I

Overview & Instructions

Store program control concept, Instruction Code, Computer registers, instruction Cycle, Memory reference instruction, Input and output interrupt, Flynn's classification of computers (SISD, MISD, MIMD)

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison);

UNIT II

Arithmetic operations and addressing modes

Floating point arithmetic and addition, subtraction, Multiplication, Division Algorithms,

addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid)

UNIT III

Memory and I/O Systems

Memory hierarchy – Memory technologies – Cache basics – Measuring and improving cache performance – Virtual memory, TLBs – Input/output system, programmed I/O, DMA and interrupts, I/O processors.

UNIT IV

Parallelism

Introduction to Parallel Processing: Pipelining, Characteristics of multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication & synchronization. Implementation scheme –Pipelined data path and control – Handling Data hazards & Control hazards

UNIT-V

Assembly language Programming

Microprocessors (8085 features), bus structure, instruction sets of 8085, Introduction to 8085 Assembly Language Programming, Programming Techniques with Additional Instructions, Counters and Time Delays, Stack and Subroutines

Recommended books

1 Computer System Architecture, M. Morris R. , Mano, PHI
2 Computer Organization and Design, David A. Patterson and John L. Hennessey, Morgan Kauffman.
3 Microprocessor, Architecture, Programming, & Applications with the 8085 6/e (Ramesh Gaonkar) PENRAM INTL.
4 Computer Architecture and Organization, John P. Hayes, TMH.
5 Structured Computer Organization, Andrew S. Tanenbaum and Todd Austin, PHI .
6 Computer Architecture & Organization, M. Murdocca & V. Heuring, WILEY

BCA – S202: Basic Physics

UNIT-I

Basic Concepts: Definition of Science, engineering and technology. Importance of Mathematics and Physics in ICT. Units and Dimensions, MKSA Units, Idea of order of magnitude scale of Mass, time and length with examples. Measurement of length using vernier caliper and screw gauge, Newton's laws of motion, physical quantities as scalars and vectors, vector addition, scalar and vector product of two vector, Brief idea of types of forces in nature, torque, rotational motion and moment of inertia, simple examples of conservation of energy, momentum and angular momentum.

Optical instruments: Electromagnetic spectrum, frequency, wavelength and energy associated with electromagnetic radiation, formation of image by lens, eye, Sensitivity of eye to electromagnetic radiation, defects of vision, Brief understanding of telescope, microscope and eye pieces.

UNIT-II

Electrostatics: Concept of Potential and field due to a charge, Gauss's law; dielectric constant, capacitance of a parallel plate condenser, energy stored in condenser, series and parallel combination of capacitances, types of capacitances used in electronic circuits, rating of capacitances.

Current Electricity: Electric current, Ohm's law, types of resistances and colour codes, Kirchhoff's laws, analysis of simple circuits, Thevenin, Norton and maximum power transfer theorems, principle of potentiometer, magnetic effect of current, field due to circular current loop.

UNIT-III

Transducers: Thermoelectric effect and thermocouples, thermistors, LDRs, piezo electric effect, speakers and mic electro chemical effect, primary and secondary cells, batteries. Electrical rating of cells and batteries
Interaction of magnetic field and current: for ce on current carrying conductor, moving coil galvanometer, conversion of galvanometer into ammeter and voltmeter, multimeter.

UNIT-IV
Electromagnetic induction: self and mutual inductances, chocks coil and transformers.

AC circuits: peak and rms voltage and current, power factor, L-R, C-R and L-C-R curcuits with their phase diagrams, series and parallel resonant circuits.
AC &DC current, understanding electric power distribution in offices and houses, electrical safety,electric fuse, rating of electrical accessories. Importance of good earthing.

Semiconductors: Qualitative description of energy bands, metals, insulators and semiconductors, n and p types of semiconductors, semiconductor p-n junction, metal semiconductor junction, current voltage characteristics of pn junction diode, half wave and full wave rectifiers, Zener diode and voltage regulation, LEDs, photo diode, and solar cell.

UNIT-V

Transistors: Definition, Current in bipolar junction transistor, Amplifier: Brief idea of CE,CC amplifier and its charactersistics, gain indecibels,Frequency vs gain graph, cascading amplifiers, Oscillator: Brief idea about oscillators of different frequency range, Different types of wave forms. Brief introduction to Integrated circuits with scale of integration, Use of MOS and CMOS Transistors.

Lasers: Basic principle, He-Ne and semiconductor lasers, basic concepts of communication using optical fibers.

Brief idea of working and uses of Cathode ray Oscilloscope, Working principle of LCD and plasma devices, UPS, SMPS**.**

Recommended Books:
1 Physics, Part-I Kumar, Mittal; Nageen Publication, Meerut.
2 Concepts Of Physics, Part 1, H C Verma; Bharati Bhawan.
3 Concepts of Physics, Part2, H C Verma; Bharti Bhawam.

BCA- S203:   Basic Mathematics – II

UNIT-I

Sets & Relations : Sets and elements, Equal sets, Universal set & Empty set, Subsets, Venn diagrams, Basic operations on sets, Union & Intersection, Complements, Difference, Symmetric Difference, Finite Sets, Power sets, Cartesian Products of Sets, Relations, Composition of relations, Types of relations, Equivalence Relations, Partial ordering relations.

UNIT-II

Functions: Functions,   Composition Function,   Mathematical Functions , Exponential and Logarithmic Functions, absolute value function,   Limit of function, Evaluation of limits of various types of functions(simple cases)
Trigonometric Functions: Definitions, proofs for any angle θ, signs of ratios, ratios of some standard angles.

UNIT-III

Quadratic Equation: Solution of Quadratic Equations, Nature of Roots.

Co-ordinates and Loci: Cartesian co-ordinate system, Introduction to Polar co-ordinates, distance between two points, Area of triangle
Straight Line: Equation of straight line, parallel and perpendicular lines, slope- intercept form, slope-point form, two-point form.

UNIT-IV

Differential Calculus: Derivative of a Function, Various Formulae-Product and Quotient Rule of Differentiation, Differentiation of   Function of Function(chain rule), Trigonometric functions, Inverse Trigonometric functions, Exponential function, Implicit functions, Differentiation of function w.r.t. another function, Higher Derivatives upto order 3

UNIT-V

Integral Calculus : Anti-Derivatives, Constant of integration, Indefinite integral, Elementary Integration Formulae, Methods of Integration, Integration by Substitution, Integration by parts, Concept of Definite integral.

Recommended books
1. Descrete Mathematics . Schaum's Outlines
2. Differential Calculas By Shanti Narayan, P.K.Mittal
3. Integral Calculas By Shanti Narayan, P.K.Mittal
4. Elementary Calculas By Gokhroo & Bhargav.
5. Business Mathematics By Quaji Zameeruddin, V.K.Khanna, S.K.Bhambri
6. Comprehencive Mathematics Class XII Part-A by Parmanand Gupta

BCA -S204: Object Oriented Programming using C++

UNIT – I

Different paradigms for problem solving, need for OOP, differences between OOP and procedure oriented programming, abstraction, overview of OOP principles- encapsulation, inheritance and data binding polymorphism, abstraction.

C++ basics: structure of a C++ program, data types, declaration of variables, expressions, operators, type conversions, pointers and arrays, strings, structures, references, flow control statement, functions-scope of variables, parameter passing, recursive functions, default arguments, inline functions, dynamic memory allocation and deallocation operators.

UNIT – II

C++ classes and data abstraction: class definition, class structure, class objects, class scope, this pointer, static class members, constant member functions, constructors and destructors, dynamic creation and destruction of objects, friend function and class, static class member.

Overloading: function overloading, operator overloading – unary, binary operators.

UNIT – III

Inheritance: defining a class hierarchy, different forms of inheritance, defining the base and derived classes, access to the base class members, base and derived class construction, destructors, virtual base class.

Polymorphism: static and dynamic bindings, base and derived class virtual functions, dynamic binding through virtual functions, virtual function call mechanism, pure virtual functions, abstract classes, implications of polymorphic use of classes, virtual destructors.

UNIT – IV

Templates - function templates and class templates, overloading of function template, static class member in class template.

Exception handling: benefits of exception handling, throwing an exception, the try block, catching an exception, exception objects, exception specifications, rethrowing an exception, catching all exceptions.

UNIT-V

File handling : stream classes hierarchy, stream I/O, file streams, opening and closing data file, creating a data file, read and write functions, error handling during file operations, formatted I/O, sequential and random file processing.

Standard template library (STL): component of STL, containers, iterartors, algorithms, application of container classes.

Recommended Books
1. Object Oriented Programming with C++ : E. Balagurusamy
2. C++: The Complete Reference, Herbert Schildt,McGraw Hill .
3. Let Us C++ , Yashwant Kanetkar, Bpb Publisher.
4. C C++ C Programming Concepts Black Book, Dasgupta, Chakrabarti, Dreamtech Press

PRACTICAL:

Practical-I: BCA-S205: Object Oriented Programming Lab

LIST OF EXPERIMENTS/EXERCISES
1. Write a program for Basic/Simple logic building in C++
2. Write a program to implement function overloading
3. Write a program to implement the concept of class and object
4. Write a program to implement the concept of friend function
5. Write a program to implement the concept of static data member
6. Write a program using the concept of constructor & destructor
7. Write a program to implement operator overloading
8. Write a program to implement single inheritance
9. Write a program to Implement Multiple inheritance
10. Write a program to Implement Virtual function
11. Write a program to create, read & write sequential file
12. Write a program to create, read & write random access file
13. Write a program to implement function template
14. Write a program to implement class template
15. Write a program for exception handling

Practical-II: BCA-S206: Microprocessor Lab

The laboratory focuses on implementation of sequential and combinational circuits such as adders, Substractor, Decoder, Multiplexers, Flip-flops, counters, Registers etc.
8085 interfacing with basic I/O devices like keypad, LED display, usage of timers and USART peripherals, multi- port device access, stepper motor movement control, DC motor speed control.
Main attention should be given on Arduino and Raspberry Pi based application like sensor (temperature, flex, gyro, etc.), actuator (lcd, dc motor, stepper motor etc.). Set up communication between two or more Arduino. Set up communication between two or more Raspberry Pi. Priority should be given on web based applications. ARM assembly language programming should be done.

Practical-III (Audit course): BCA-S207: Communication Skill Lab

1. **CREATIVE THINKING**: What is creativity; 6 thinking hats; mental blocks; exercises. 1
2. SELF DISCOVERY: Importance of knowing yourself; SWOT analysis; benefits; strengths and weaknesses; exercises.
3. **DEVELOPING POSITIVE ATTITUDE**: Meaning; changing attitudes; power of positive thinking; overcoming negative attitude; exercises.
4. **TIME MANAGEMENT:** Features, time management matrix; tips for time management; effective scheduling; time wasters; time savers; exercises and time bound tasks.
5. **DECISION MAKING**: Definition; models and types; skills and techniques; courses of action; steps involved in decision making; individual decision making and group decision making; exercises

BCA-S208: Seminar: Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars

BCA PAPER 1209
Environmental Studies
Compulsory paper for all stream at UG level

UNIT I

The Multi disciplinary nature of environmental studies and natural resources.
Definition, Scope and importance, Need for public awareness .

a) Renewable and nonrenewable resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
c)Mineral Resources : Use and exploitation, environmental effects of extracting and using minerals resources, case studies.
d)Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
e)Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, Case studies.
f)Land Resources: Land as a resource, Land degradation, man induced landslides, soil erosion and desertification.
Role of an individual in conservation of natural resources
Equitable use of resources for sustainable lifestyles. (10 Lectures)

UNIT II

Ecosystem
Concept. of an ecosystem
Structure and function of an ecosystem
Producers, consumers and decomposers.
Energy flow in the ecosystem.
Ecological succession.
Food Chains, food webs and ecological pyramids .
Introduction, types, characteristic 'features, structure and function of the following ecosystem:-
a Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans estuaries) **(6 lectures) .**

UNIT-III

Biodiversity and its Conservation
- Introduction- Definition: genetic, species and ecosystem diversity .
- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use,social ethical, aesthetic and option values.
- Biodiversity at global, national and local levels.
- India as mega -diversity nation
- Hot -spots of biodiversity
- Threats of biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of bio-diversity : In-situ and Ex-situ conservation of bio-diversity (8 Lectures)

Environmental   Pollution

Definition :

Causes, effects and control measures   of :-

a. Air Pollution

b. Water Pollution;

c. Soil pollution;

d. Marine pollution;

e. Noise pollution

f. Thermal Pollution

g. Nuclear Hazards

Solid Waste Management : Causes,   effects and control measures   of urban   and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.

Disaster management : floods, earthquake,   cyclone and landslides.

UNIT-V

Social Issues and the Environment

– From Unsustainable   to sustainable   development. :

– Urban problems related to energy.

– Water conservation. rain water harvesting, watershed   management.

– Resettlement and rehabilitation of people; its problem and concerns,   Case studies.

– Environmental Ethics : Issues and possible solutions.

– Climatic change,   global warming, acid rain;   ozone layer, depletion, nuclear accidents and holocaust ,Case studies.

– Wasteland   reclamation.

– Consumerism and waste products.

– Environment Protection   Act.   ,

– Air (Prevention and Control of Pollution) Act.

– Water (Prevention and Control of Pollution) Act.

– Wildlife Protection   Act.

– Forest Conservation Act.

– Issues involved in enforcement   of environment   legislation..

– Public Awareness.

– Population   explosion- Family Welfare Program.

– Environment and Human   Health.

– Human   Rights.

– Value   Education

– HIV/AIDS

– Women and Child Welfare

– Role of Information   Technology in Environment and Human   Health.

– Case Studies.   (13 Lectures)

Field Work (For Field experience and Training only.)

– Visit to all local area to document   environmental   assets- river/forest/grassland/hill/mountain.

– Visit to a local polluted site - Urban/Rural/Industrial/Agricultural

– Study of common plants, insects, birds.

– Study of Simple, ecosystems-pond, river, hill slopes, etc. (Field work Equal   to 5 Lecture hours).

BCA PAPER 1704
GENERAL ENGLISH

(Common for Science, Social Sciences and Humanities & Commerce Faculties)   **MM: 50**

(1)   Texts:

The Many Worlds of Literature Edited by Jasbir Jain, Macmillan; India.
George Orwell   :   *Animal Farm*
Or
R.K. Narayan   :   *A Vendor of Sweets*

Distribution of marks:	Marks
(1) Current English for Language skills:	**15**

(1) Current English for Language skills: **15**
(a) Short- answer questions (5 out of 10)
Each carrying 1 mark = 5 marks
(b) General questions   (2 out of 4)
Each carrying 4 mark = 8 marks
(c) Questions on vocabulary =   2 marks

(2)   Animal Farm or A Vendor of Sweets: **10**
(a) Two questions out of 4
Each question carrying 5 marks = 10 marks

(2)   Grammar: **13**

(a)	Tenses	3
(b)	Modal Auxiliaries	2
(c)	Phrasal Verbs	3
(d)	Clause (Nominal, Adjectival, Adverbial)	2
(e)	Use of Non-finite verbs (Gerunds, Participles, and infinitives)	3

(3)   Comprehension and Composition :   **12**

(a)	Précis writing	5
(b)	Essay (about 300 words) on one topic out of four topics	7

Recommended Books

1.   *An Intermediate English Grammar,* Pit Corder
2.   A Practical English Grammar, Thompson and Martinet,(ELBS- Oxford University Press)

BCA Semester III

BCA- S301: Database Management Systems

UNIT-I

Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

ER Model : entities, mapping constrains, keys, E-R diagram, reduction E-R diagrams to tables, specialization, generalization, aggregation, design of an E-R database scheme.

UNIT-II

Relational Model : The catalog, base tables and views. Relational Data Objects - Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.

Relational Data Integrity - Candidate keys and related matters: Candidate keys.

Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

UNIT-III

The SQL Language: Data definition, retrieval and update operations. Table expressions conditional expressions, embedded SQL.

Views: Introduction, what are views for, data definition, data manipulation, SQL support.

UNIT-IV

Network model : Basic concepts, data structure diagrams, DBTG CODASYL model, DBTG data retrieval facility, DBTG update facility, DBTG set processing facility, mapping networks to file, networks system.

Hierarchical model : basic concepts, tree structure diagrams, data retrieval facility, update facility, virtual records, mapping hierarchical to files, hierarchical system.

UNIT-V

File and system structure : overall system structure, file organization, logical and physical file organization, sequential and random, hierarchical, inverted, nullist, indexing and hashing, B-tree index files.

Recommended Books
1. Fundamentals of Database System, Shamkant B. Navathe, Ramez Elmasri, Pearson.
2. Korth, Database Systems Concepts, McGrawHill.
3. Date C.J., Database Systems, AddisionWesley

BCA-S302: Data Structures

UNIT-I

Linear Structure: Arrays, records, stack, operation on stack, implementation of stack as an array, queue, operations on queue, implementation of queue.

UNIT-II

Linked Structure : List representation, operations on linked list - get node and free node operation, implementing the list operation, inserting into an ordered linked list, deleting, circular linked list, doubly linked list.

UNIT-III

Tree Structure : Binary search tree, inserting, deleting and searching into binary search tree, implementing the insert, search and delete algorithms, tree traversals

UNIT-IV

Graph Structure : Graph representation - Adjacency matrix, adjacency list, adjacency multilist representation. Orthogonal representation of graph . Graph traversals - BFS and DFS. Shortest path, all pairs of shortest paths, transitive closure, reflexive transitive closure.

UNIT-V

Searching and sorting : Searching - sequential searching, binary searching, hashing. Sorting - selection sort, bubble sort, quick sort, heap sort, merge sort, and insertion sort, efficiency considerations.

Recommended Books
1. Horowitz E Sartaj Sahni, Fundamentals of Data Structure, Galgotia Publication Private Limited
2. Data Structure Using C & C++, Tannenbaum, PHI
3. Data Structure , Lipschutz, Tata Mcgraw Hill Education Private Limited

BCA-S303 Communications and Networking

UNIT-I

Protocol Architecture: Overview: Communication model, Data, Protocol and protocol architecture, Protocol functions, Design Issues for the layers, interfaces & Services, Connection oriented and connectionless services, service primitives, relationship of services to protocols , OSI Models, TCP/IP Model.
Communication Networking: Networks fundamentals, types of networks (LAN, MAN, WAN, Wireless Networks),
Internetworking and networking devices: Switch/Hub, Bridge, Router, Gateways and firewalls.

UNIT-II

Data Communications: Channel capacity Nyquist bandwidth, Shannon capacity formula,
Transmission media: Coaxial, twisted pair, Comparative study of Categories of cables, Coaxial, Optical Fibers, Wireless transmission: radio, microwave, infrared.
Data Encoding: Encoding Standards (NRZ, Bipolar, ASK, FSK, PSK, PCM, AM, FM, PM), Spread Spectrum, Asynchronous and Synchronous transmission, Full and Half duplex communication.

UNIT-III

LAN Technology: LAN architecture, IEEE 802 standards, Ethernet (CSMA/CD): Medium Access Control, 10Mbps, 100Mbps, Gigabit Ethernet. Brief survey of other LAN systems (Token ring, FDDI, ATM, Fiber channel). Latest trends in LAN technologies

UNIT-IV

Data Link Control: Flow control: Stop and Wait, Sliding window, Error detection: Parity Check, CRC. Error control: Stop and Wait ARQ, Go back-N ARQ, Selective-Reject ARQ, Bit and byte oriented protocols: HDLC and PPP)
Circuit and packet Switching Concepts: Circuit Switching Networks, Space Division switching, Time Division Multiplexing, Brief idea of SS7, Packet switching principles, virtual circuits and datagrams, brief idea of X.25

UNIT-V

IP addressing and subnetting: IP address Classes, subnets, Classful and classless addressing, Introduction to ARP and RARP, header formats of IPv4 IPv6.

Recommended Books
1. Data & Communications, William Stallings,
2. ComputerNetworks, A. S. Tanenbaum
3. Data Communications and Networking, Behrouz A Forouzan, Mcgraw Higher Ed
4. Computer Networking: A Top-Down Approach, James F. kurose, Keith W. Ross, Pearson Education

BCA -S304A: Business Organization and Management

UNIT – I

Business and Management: Business Meaning and Contents, Business as a system, Business Environment. Management Concept and Nature, Management Process, Basic function of Management, Management Level, Role of Manager, Management Principles (Henry fayol's principle of management, Taylor's Scientific Management) .

UNIT – II

Organizational Behavior: Need of Understanding human behavior in organization, Challenges and Opportunities for OB.
Management by Objective (MBO), Decision making process and models, Conflict Management, Strategies & Policies.

UNIT- III

Managing Personnel: HRM- Meaning and Functions, Man Power Planning, Job Analysis and Design, Training, Career Planning & Development.
Motivation Theories & Practices, Leadership Concept theories & Style, Compensation Management.

UNIT- IV

Marketing Management and Finance: Basic Concepts of Marketing, Nature & Scope of Marketing, Sales Promotion, Product Life Cycle, Marketing Information System (MIS) and Marketing Research.
Main Sources of Finance, Concept of Fixed & Working Capital, Introduction of Tax – Income Tax, Service Tax & VAT, Basic Concept of Invoice & Quotations.

UNIT- V

Case Study: IT & BPO Industry, HR & Finance, Case Study of Local Industry with around Hundred Employees,
Industry Visit, Project.

Recommended Books
1. B.P. Singh & T.N. Chabbra, "Business Organization and Management Functions" , Dhanpat Rai & Co. 2000.
2. P.C Tripathi & P. N. Reddy, "Principles of Management", Tata McGraw Hill Publishing Company New Delhi.
3. L.M. Prasad, "Principles and Practices of Management".
4. Stephen P. Robbins, "Organizational Behaviour", (8th Ed.) Prentice Hall of India.
5. K. Aswathappa, "Human Resource Management", Tata McGraw Hill Publishing Company New Delhi.
6. Philip Kotler, "Marketing Management", (9th Ed.) Prentice Hall of India.
7. Ramaswamy. V.S. and Namakumari.S. "Marketing Management: Planning, Control." New Delhi, MacMillan. 1990.
8. Dr. S.N. Maheshwari, "Financial Management – Principles and Practices" (6th revised Ed.) S. Chand & Sons.

BCA- S304B: Numerical and Statistical Methods

UNIT-I

Roots of Equations: Graphical Method -Bisection Method - False-Position Method - Fixed-Point Iteration - Newton-Raphson Method Secant Method - Roots of Polynomials: Conventional Methods - Muller's Method - Bairstow's Method. Algebraic Equations: Gauss Elimination -Gauss-Jordan - LU Decomposition - Matrix Inverse -Gauss-Seidel.

UNIT-II

Numerical Differentiation - Integration: Trapezoidal Rule - Simpson's Rule - Romberg Integration - Differential equations: Taylor's method - Euler's method -Runge-Kutta 2nd and 4th order methods Predictor - corrector methods.

UNIT-III

Diagrammatic and Graphical representation of Numerical Data - Formation of frequency distribution - Histogram, Cumulative Frequency - Polygon and Ogives - Measures of central tendencies - Mean, Median, Mode - Measures of dispersion - Mean deviation, Standard deviation, variance, Quartile deviation and coefficient of variation - Moments (upto 4th) - Measures of Skewness and Kurtosis for grouped and ungrouped data.

UNIT-IV

Sample space - Events - Definition of probability - combinatorial problems - conditional probability and independence - Random variables, distributions and Mathematical expectations - Discrete distributions - Binomial - Poisson - Continuous distributions - Normal and Exponential distributions - Moments and Moment generating functions.

UNIT-V

Correlation and Regression analysis: product moment correlation -coefficient - rank correlation coefficient - simple regression - method of least squares for estimation of regression coefficient. Concept of sampling and Sampling distributions - Sampling from Normal distributions - Standard error - Tests of significance - Large sample test for population mean and proportions - Test for populations means: single - two sample and paired t - test - Chi square tests for goodness of fit and test for independence of attributes in contingency table.

Recommended Books
1. Snedecor G.W. and Cochran W.G. (1989): Statistical methods, 8 ed., Affiliated East West.
2. Trivedi K.S. (1994): Probability and Statistics with Reliability, Queueing and computer Science applications, Prentice Hall of India.
3. Balaguruswamy E. (1988): Computer oriented Statistical and Numerical methods, Macmillan India.
4. S. C. Chopra and R. P.Canale - Numerical Methods for Engineers - Third Edition - McGraw Hill.
5. S. S. Sastri, Introductory Methods of Numerical Analysis, Prentice Hall

PRACTICAL

BCA- S305: Data structure Lab

1. Write a C program for implementation of 2 D Array
2. Write a C program for implementation of stack using array
3. Write a C program for implementation of queue using array
4. Write a C program for implementation of circular queue using array
5. Design, develop and execute a program in C to evaluate a valid postfix expression using stack. Assume that the postfix expression is read as a single line consisting of non-negative single digit operands and binary arithmetic operators. The operators are +(add), -(subtract), *(multiply), /(divide)
6. Design, develop and execute a program in C to read a sparse matrix of integer values and make a transpose of it. Use the triple to represent an element in sparse matrix.
7. Design, develop and execute a program in C to implement singly linked list where each node consist of integers. The program should support following functions. a. Create a singly linked list b. Insert a new node c. Delete a node if it is found, otherwise display appropriate message d. Display the nodes of singly linked list
8. Design, develop and execute a program in C to implement doubly linked list where each node consist of integers. The program should support following functions. a. Create a doubly linked list b. Insert a new node c. Delete a node if it is found, otherwise display appropriate message d. Display the nodes of doubly linked list
9. Using array representation for a polynomial, design, develop and execute a program in C to add two polynomials and then print the resulting polynomial.
10. Write a program in C to construct binary tree and binary tree traversal
11. Design, develop and execute a program in C to perform sorting and searching

BCA-S306: DBMS Lab

LIST OF EXPERIMENTS/EXERCISES
1. Creation of a database and carrying out record addition, deletion, modification, generate queries and reports, and listing records in ascending order
2. Deletion of complete data from the given table, deletion based on a given condition, updating contents of a table, modifying structure, deletion of complete table.
3. Creation of primary key, foreign key, non null and unique constraints; use of check and default constraints; insertion of data in tables created with constraints
4. Creating views from single and multiple tables, drop views and creating index on the table and drop them.
5. Retrieval of data using sub-queries
6. Create the view from the table by combining relation on the basis of various types of joins like equi-join, and retrieval of data with left outer join, right outer join.
7. Create a view from the table, from more than one table and carryout other operations like dropping the view, inserting date into the view and creating index on the table and drop them.

AUDIT COURSE:
BCA- S307A/BCA-S307B: Elective Practical Laboratory for proficiency in any one of the following

A. Web Design
HTML: HTML New Elements, Blocking Content on the Page, Making DOC Type Easier to Work With, Organizing Code Using Blocking Elements, Apply HTML to Make HTML Code Easier to Read, Working

with HTML Forms. All tags of HTML Inserting the Cursor Automatically into a Specified Field, Making an INPUT Field Required, Adding the Placeholder Text. Controlling Data with HTML, Displaying Data in HTML, Storing Data Locally Using Web Storage, New HTML Attributes.

Basic CSS: CSS Introduction, CSS Syntax, Padding, Border, Margin, Text, Font, Text, List, color, background.

Advanced CSS: Classification, Positioning, Dimension, Media Types, Pseudo-class, Pseudo-elements.

Introduction:- The Origin of PHP,PHP is better than Its alternatives, Interfaces to External systems, Hardware and Software requirements, PHP Script

PHP Loop, Array, Functions, Get & Post Variable: Loop, For statement, For each statement, While statement, Do While statement, Arrays ,PHP Functions, Get & Post Variable, Difference between PHP 4 & PHP 5.

String Manipulation:-Formatting String for Presentation, Formatting String for Storage, Joining and Splitting String, Comparing String-matching and replace Substring

Functions:- Introduction, Returning value from function, User-defined functions, Dynamic function calls Variable scope, Accessing variable with the global statement , Function calls with the static statement, Setting default values for arguments, Passing arguments to a function by value, Passing arguments to a function by reference, Testing for function existence Arrays, type of Dimensional Arrays, Getting the size of an array, Looping through an array, Looping through an associative array, Examining arrays, merging arrays, Sorting arrays, Sorting an associative arrays,

Working with Forms:- Forms, Super global variables, Super global array, A script to acquire user input Importing user input, Accessing user input, Combine HTML and PHP code, Using hidden fields, Redirecting the user, File upload and scripts. Delete a File

Working with Regular Expressions: The basic regular expressions, matching patterns, finding matches, replace patterns

PHP Project:-Project Discussion, Requirements analysis of Project

B. Desk Top Publishing
- MS Paint
- Photoshop
- PageMaker
- Coral Draw

BCA-S308: Seminar

Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars

BCA Semester IV

BCA-S401: System Analysis and Design

UNIT-I

Introduction: System Concept and the need for system approach, Definition of system and system analysis, Factoring into subsystems, Black box system, Introduction to the basic elements of the system, Different types and behavior of the system.

UNIT-II

The System Development Life Cycle and System Analyst: Source and inspiration of a new system development, Recognition and need, Linear approach and prototype approach, Different phases in SDLC, Role of System Analyst.

UNIT-III

System Analysis: Importance of planning and control, Information Gathering: Various Methods, Tools of Structured Analysis: DFD, Decision Tree, Structured English, Decision Tables, Data Dictionary, Feasibility study. System Design: The Process of Design: Logical and Physical design, Methodologies: Structured, Form-Driven, IPO Charts etc., Input Output Form Design, File Organization: Sequential Indexed, inverted list, Database Design, Logical and Physical View of Data.

UNIT-IV

System Implementation: Need of Testing, Test Plan, Quality Assurance, Trends in Testing, Audit Trail, Post Implementation Review, Project Scheduling, Selection of Hardware and Software

UNIT-V

Security and Recovery in System Development: System Security: Definition, Threats to system security, Control measures, Disaster/ Recovery Planning, Ethics in System Development. Case Study.

Recommended books
1. System Analysis and Design -E.M.Awad
2. System Analysis and Design - Dennis Wixom

BCA-S402: Fundamentals of Operating Systems

UNIT-I

Introduction: What is an operating system? Mainframe, desktop, multiprocessor, distributed, clustered, real-time and handheld systems.
Operating System Structures: System components, operating system services, system calls, systems programs, system structure, virtual machines.

UNIT-II

Process: Process concept, process scheduling, operations on processes, cooperating processes. Inter process communication.
CPU Scheduling: Basic concepts, scheduling criteria, scheduling algorithms, algorithm evaluation.

UNIT-III

Process Synchronization: The critical section problem, semaphores, classical problems
of synchronization.
Deadlocks: Deadlock characterization, methods for handling deadlocks. Deadlock prevention, avoidance and detection. Recovery from deadlocks.

UNIT-IV

Memory Management: Swapping, contiguous memory allocation, paging, segmentation, segmentation with paging.

Virtual Memory: Demand paging, page replacement, allocation of frames, thrasing.

UNIT-V

Linux: History, design principles, kernel modules, process management, scheduling, memory management, file systems, input and output, inter process communication, network structure, security.

Recommended Books
1. Silberschatz G.G., Operating System Concepts, John Wiley & SonsInc.
2. Modern Operating Systems, Andrew S. Tanenbaum, Pearson Prentice Hall,
3. Advanced Concepts in Operating Systems Distributed, Database, and Multiprocessor Operating Systems, Mukesh Singhal and Niranjan G. Shivaratri, Tata McGraw-Hill
4. Operating Systems: A Concept-based Approach, Dhananjay M. Dhamdhere, Tata McGraw-Hill Education,

BCA-S403: JAVA Programming

UNIT-I

Introduction to Java: Bytecode, features of Java, data types, variables and arrays, operators, control statements.
Objects & Classes: Object Oriented Programming, defining classes, static fields and methods, object construction

UNIT-II

Inheritance: Basics, using super, method overriding, using abstract classes, using final with inheritance.
Packages and Interfaces: Defining a package, importing package, defining an interface, implementing and applying interfaces.

UNIT-III

Exception Handling: Fundamentals, exception types, using try and cache.
Multithreaded Programming: Creating a single and multiple threads, thread priorities, synchronization.

UNIT-IV

Applets: Applets basics, applets architecture, applets skeleton, the html applet tag, passing parameters in applets.
Event Handling: Event classes and event listener interfaces.

UNIT-V

Graphic Programming Introduction to swings.

Recommended Books:
1. The complete reference Java 2, H. Schildt, Tata Mc-Graw Hill.
2. Programming with JAVA - A Primer,E. Balaguruswamy,McGraw-Hill
3. Head First Java: A Brain-Friendly Guide,Kathy Sierra, Bert Bates,"O'Reilly Media.
4. Thinking in Java,Bruce Eckel,Prentice Hall Professional
5. Learning Java: A Bestselling Hands-On Java Tutorial, Patrick Niemeyer, Daniel Leuck,"O'Reilly Media,
6. How to program in Java, Deitel and Dietel

BCA-S404A: Information Systems

UNIT I

Information:
Definition, Attributes of Information, Classification of Information Perspectives on Information System: What is an information system?, Dimensions of information system, Contemporary Approaches to information system : Technical approach, behavioral approach and socio technical approach .
Organizations and Information System: Impact of Information system on organizations: Economic Impact , Organizational and Behavioral Impact, Impact of IT on management

UNIT II

Management Information System:
Introduction, MIS Vs data processing Structure of MIS, System concepts in management information system Planning and Control Process, Management control through reporting MIS Design Approaches: Prototype model or prototyping Life-cycle approach, Project management

UNIT III

Decision Making System and Modeling:
Concepts of decision making, Decision making procedure, Decision making process or phases, Decision support system, Difference between MIS and DSS , Modeling process, Decision making models

UNIT IV

Executive Information and System Support:
Executive information system, Characteristics of executive information systems, Use of EIS in an organization, Hardware and software needs of an executive information system, Integrate DSS and EIS, EIS implementation

UNIT V

Application of Information system:
Electronic Commerce- An Overview, Electronic Commerce – Cutting edge, Electronic Commerce Framework, Evolution of E-commerce, Roadmap of e-commerce in India
e-Commerce Process Models: Introduction, Business Models, E-business Models Based on the Relationship of Transaction Parties, e-commerce Sales Life Cycle (ESLC) Model

Recommended Books :
1. Tripathy PC And Reddy PN, "Principles of Management", Tata McGraw-Hill
2. B. P. Singh and T. N. Chabra , Management Concepts and Practices , Dhanpat Rai
3. W. S. Jawedkar: Management Information Systems, Tata McGraw-Hill
4. K. C. Laudon and J. P. Laudon, Management Information Systems, PHI

BCA-S404B: BUSINESS ACCOUNTING

UNIT-I

Introduction:
Financial Accounting-Definition and scope, objectives of financial accounting, Accounting vs book keeping. Terms used in accounting, users of accounting, information and limitations of Financial Accounting
Conceptual Framework: Accounting Concepts, principles and conventions, accounting standards-concept, objectives, benefits, brief review of accounting standards in India. Accounting policies, Accounting as a measurement discipline, variation principles, accounting estimates.

UNIT-II

Recording of transactions:
Voucher system, Accounting process, journals, subsidiary books, ledger, cash book, Bank reconciliation statement, trial balance. Depreciation: Meaning, need and importance of depreciation, methods of charging depreciation

UNIT-III

Preparation of final accounts:
Preparation of trading and profit &Loss Account and Balance sheet of sole proprietary business

UNIT-IV

Introduction to Company Final Accounts:
Important provisions of companies Act 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a company.

UNIT-V

Computerized Accounting:
Computers and financial application, Accounting software pacakages, an overview of computerized accounting system. Salient features and significance, concept of grouping of accounts. Codification of accounts, maintaining hierarchy of ledger. Generating accounting reports.

PRACTICAL

Paper V: BCA- S405 Java programming Lab

1. Write a program that creates and initializes a four-element int array. Calculate and display the average of its values.
2. Write a program to swap two values using object reference. Your program should have a swap function
3. Write an application that accepts two doubles as its command line arguments, multiple these together and display the product.
4. Write an application that accepts one command line argument; display the line of reporting if number is even or odd.
5. Write an application that accepts radius of a circle as its command line argument display the area.
6. WAP that describes a class person. It should have instance variables to record name, age and salary.
7. Create a person object. Set and display its instance variables.
8. Write a program that uses length property for displaying any number of command line arguments.
9. WAP to display the use of this keyword.
10. Write a program that can count the number of instances created for the class.
11. WAP that implements method overloading.
12. WAP that shows passing object as parameter.
13. WAP that illustrates method overriding
14. Write a program to show that the value of non static variable is not visible to all the instances, and therefore cannot be used to count the number of instances.
15. WAP to illustrate simple inheritance
16. WAP illustrating a super class variable a referencing as sub class object.
17. WAP illustrating all uses of super keywords.
18. Create an abstract class shape. Let rectangle and triangle inherit this shape class. Add necessary functions.
19. Write an application that creates a package p1. Add some classes in it.
20. Write an application that uses the package p1 created in the program 21.
21. Write an application to illustrate Interface Inheritance.
22. Write an application that shows the usage of try, catch, throws and finally.
23. Write an application that shows how to create a user-defined exception.
24. Write an application that shows thread synchronization.
25. Write an application that displays deadlock between threads.
26. Write an application that shows thread priorities.
27. Write a program that displays the life cycle of an Applet.
28. Write an Applet displaying line, rectangle, rounded rectangle, filled rectangle, filled rounded rectangle, circle, ellipse, arc, filled arc and polygon, all in different colors
29. Write an Applet that displays a counter in the middle of applet.
30. Write an Applet that displays a counter in the middle of applet. The counter starts from zero and keeps on incrementing after every second.
31. Write an Applet that draws a dot at a random location in its display area every 200ms. Any existing dots are not erased. Therefore dots accumulate as the applet executes.
32. Write an Applet that illustrates how to process mouse click, enter, exit, press and release events. The background color changes when the mouse is entered, clicked, pressed, released or exited.
33. Write an Applet that displays your name whenever the mouse is clicked.

34. Use adapter classes to write an Applet those changes to cyan while the mouse is being dragged. At all other times the applet should be white.
35. Use inner classes to write an Applet those changes to cyan while the mouse is being dragged. At all other times the applet should be white.
36. Use anonymous classes to write an Applet those changes to cyan while the mouse is being dragged. At all other times the applet should be white.
37. Write programs of database connectivity using JDBC-ODBC drivers.

Paper VI: BCA- S406 Operating System Lab

Concepts of I/O programming, page removal algorithms & analysis, simulation of a traffic controller of a process scheduler, paging, segmentation, algorithms for 'N' process Synchronization (critical section, semaphores). Algorithms for deadlock Detection & recovery, producer-consumer algorithm, UNIX shell programming.
Familiarization with UNIX system calls for process management and inter-process communication, Experiments on process scheduling and other operating system tasks through simulation/implementation under a simulated environment (like Nachos).

Paper VII: BCA- 407A/407B Practical Electives (Choose One)
BCA 407A: ACCOUNTING SOFTWARE Lab

Basics Concepts of Accounts:-Types of Accounts, Golden Rules of Accounting, Accounting Principles, Concepts and Conventions, Double Entry System of Book Keeping, Mode of Accounting, Financial Statements, Transactions, Recording Transactions
Fundamentals of Tally.ERP 9:- Getting Functional with Tally.ERP 9, Creation / Setting up of Company in Tally.ERP 9, Journal Entries
Accounting Masters in Tally.ERP 9:- F11: Features, F12: Configurations. Setting up Account Heads
Inventory in Tally.ERP 9:- Stock Groups, Stock Categories, Godowns / Locations, Units of Measure
Stock Items, Creating Inventory Masters for National Traders
Voucher Entry in Tally.ERP 9:- Accounting Vouchers, Inventory Vouchers, Invoicing
Advanced Accounting in Tally,.ERP 9:-Bill-wise Details, Cost Centres and Cost Categories, Voucher Class and Cost Centre Class, Bank Reconciliation, Interest Calculations, Budgets & Controls, Scenario Management
Accounting Voucher:- Contra Vouchers, Payment Vouchers, Receipt Vouchers, Sales Vouchers, Purchase Vouchers, Journal Vouchers
Technological Advantages of Tally.ERP 9:-Tally Vault, Debit and Credit Notes, Debit Note Returns with Examples, Credit Note Returns with Examples, Security Control, Tally Audit, Backup and Restore, Split Company Data
Goods and Services Tax (GST):-About Goods and Service(GST),Activating Tally in GST, Setting Up GST (Company Level, Ledger Level or Inventory, Level),GST Taxes & Invoices, Understanding SGST, CGST & IGST, Creating GST Masters in Tally
Voucher with GST:-Purchase Voucher with GST, Sales Voucher with GST, GST Reports and Returns, GSTR 1 in Tally GSTR 1 Return Filing, GSTR 1 Return Filing

BCA 407B: Networking Lab

TCP/IP protocol architecture, user datagram protocol (UDP), multicasting, transmission control protocol (TCP), standard Internet services, and protocol usage by common Internet applications, Sockets programming, client/server, peer-to-peer, Internet addressing, TCP sockets, UDP sockets, raw sockets,

Multithreading and exception handling. Finger, DNS, HTTP, Ping clients and servers, Routers and architectures, routing protocols.

BCA-S408: Seminar

Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars

PAPER CODE 1705

सामान्य हिन्दी

पाठ्य पुस्तकें:

1. गद्य–वीथी– संपादक : डॉ. ओम प्रकाश शर्मा, प्रकाशकः माया प्रकाशन मदिंर
2. कथा दषक – संपादक : डॉ. परमानंद पांचाल, प्रकाशकः राजस्थान प्रकाशन
3. हिन्दी भाषा ज्ञान – संपादकः डॉ. हरिचरण शर्मा, प्रकाशकः अनुभा प्रकाशन

पाठ्य विषय : पाँच इकाइयों में विभक्त होगा।

इकाई–1

– गद्य–वीथी पुस्तक से संक्षेपण एवं कथादषक पुस्तक से पल्लवन संबंधी ज्ञान।
– दोनो पुस्तकों से सामान्य तथ्यात्मक प्रश्नों का ज्ञान।

इकाई–2

– शब्द ज्ञान ।
– शब्द पर्याय और विलोम शब्दो का ज्ञान ।
– अनेकार्थी एवं समश्रुत शब्दों का ज्ञान ।

इकाई–3

– पत्र लेखन और पत्रो के प्रकार सम्बन्धी ज्ञान ।
– अंग्रेजी से हिन्दी अनुवाद का ज्ञान ।
– हिन्दी में पद नाम संबंधी ज्ञान (अग्रेंजी से हिन्दी पदनाम) ।

इकाई–4

– मुहावरे – लोकोक्तियाँ ।
– शब्द–शुद्धि और वाक्य शुद्धि ।
– पारिभाषिक शब्दावली ।
– अनेक शब्दों के लिए एक शब्द ।

इकाई–5

– देवनागरी लिपि की विशेषताएँ ।
– देवनागरी लिपि एवं वर्तनी का मानक रूप ।
– कम्प्यूटर में हिन्दी का अनुप्रयोग : प्रारंभिक परिचय ।

BCA V Semester
BCA-S501: Software Engineering

UNIT-I

Software Engineering Fundamentals: Definition of Software, Software characteristics, Software Applications.

Software Process: Software Process Models - Waterfall model, prototyping model, spiral model, incremental model, concurrent development model.

Project management Concepts: The Management Spectrum - The People , The Product , The Process , The Project.

UNIT-II

Software Process and Project Metrics: Measures, Metrics and Indicators, Software measurement: Size - Oriented Metrics, Function - Oriented Metrics, Extended Function point metrics

Software Project Planning: Project Planning Objectives, Software Project Estimation, and Decomposition Techniques - Problem Based Estimation, Process Based Estimation, Empirical Estimation Models- The COCOMO Model

Risk Analysis and Management: Software risks, Risk identification, Risk Projection, Risk Refinement, Risk Mitigation, Monitoring and Management.

UNIT-III

Software Quality Assurance: Basic concepts- Quality, Quality Control, Quality Assurance, Cost of Quality, Software Quality Assurance (SQA), Formal Technical Review

Software Configuration Management: Baselines, Software Configuration Items, the SCM Process, Version Control, Change Control, Configuration Audit, Status Reporting.

Analysis Concepts and Principles: Requirements Elicitation for Software**, Analysis** Principles **-** The Information Domain, Modeling, Partitioning, Essential and Implementation Views, Specification: Specification Principles, Representation, The Software Requirement Specification (SRS)

UNIT-IV

Design Concepts and Principles: Design Principles, Design Concepts – Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structural Partitioning, Data Structure, Software Procedure, Information Hiding, Effective Modular Design- Cohesion, Coupling

Software Testing: Testing Objectives & principles, Unit Testing, Integration Testing (Top Down Integration , Bottom Up Integration , Regression Testing, Smoke Testing), Validation Testing (Alpha and Beta Testing), System Testing (Recovery Testing, Security Testing, Stress Testing, Performance Testing).

UNIT-V

Reengineering: Software Reengineering, Reverse Engineering, Restructuring, Forward Engineering

CASE Tools: What is CASE, Building Blocks of CASE, A Taxonomy of CASE Tools, Integrated CASE Environments, The Integration Architecture and The CASE Repository.

Recommended Books
1. R. Pressman: Software Engineering, McGraw-Hill.
2. K.K. Agrawal and Y. Sing: Software Engineering, New Age International.
3. P. Jalote: Software Project Management in Practice, Pearson.

BCA-S502: Data Mining

UNIT-I

Introduction to data mining
Introduction: Data mining, Functionalities, Classification, Introduction to Data Warehousing, Data Preprocessing: Preprocessing the Data, Data cleaning, Data Integration and Transformation, Data reduction.

UNIT-II

Data Mining, Primitives, Languages and System Architecture: Data Mining Primitives, Data Mining Query Language, Various Architectures of Data mining Systems, Concept Description, Characterization and Comparison, Data Generalization and summarization, Mining Class Comparison.

UNIT-III

Mining Association Rules: Basics Concepts, Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases, Multi dimension Association Rules from Relational Database and Data Warehouses.

UNIT-IV

Classification and Prediction: Introduction, Issues, Decision Tree Induction, Bayesian Classification, Classification based on Concepts from Association Rule Mining, Other Methods. Prediction , Introduction, Classifier Accuracy.

UNIT-V

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, GRID Based Method, Model based Clustering Method.

Recommended books
1. I.J.Han and M. Kamber,2001,Data Mining Concepts and Techniques, Harcourt India Pvt. Ltd - New Delhi.
2. K.P. Soman, Shyam Diwakar, V.Ajay, 2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.

BCA-S503: Web Technology

UNIT- I

HTML
Introduction, Basic structure of an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags, Elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT- II

CSS
Creating Style Sheet, CSS Properties, CSS Styling(Background, Text Format, Controlling Fonts),Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model(Introduction, Border properties, Padding Properties, Margin properties) , Introduction to Web Publishing or Hosting

UNIT- III

JavaScript
Variable, Naming Rules Data Types, Expressions and Operators, Flow Control, Objects and Arrays Functions and Methods Pattern Matching with Regular Expressions Managing Web Page Styles using JavaScript and CSS Introduction to Ajax

UNIT –IV

Understanding XML: SGML, XML, XML and HTML, Modeling XML Data, Styling XML with XSL, XHTML Request and Response Objects, Cookies, Working with Data - OLEDB connection class, command class, transaction class, data adaptor class, data set class.

UNIT- V

Current trends and Issues - Email, Application Issues, Working with IIS and page Directives, Error handling. Security - Authentication, IP Address, Secure by SSL & Client Certificates.

Recommended Books
1. Harvey M. Dietel, Paul Dietel & Tem R. Nieto, ",Internet & World Wide Web How to Program", Pearson, 2011.
2. Ivan Bayross. "Web enabled commercial application development using HTML, DHTML, JavaScript, PERL-CGI", BPB Publications, 2010
3. Mobile Communications, Jochen Schiller, Addison Wesley Pearson education

BCA-504A: Network Management and Information Security

UNIT – I

Security and Cryptographic algorithm: Need for security, principle of security, types of attacks.
Cryptographic techniques: cryptography terminology, substitution techniques, transposition techniques, Symmetric and asymmetric key algorithm, possible types of attack, key range, steganography. Symmetric vs asymmetric, algorithm types and modes, DES, double and triple DES, AES, comparison of various cryptographic algorithms and requirement of good cryptographic algorithm.

UNIT – II

Asymmetric cryptographic algorithm and Message Authentication: Public key cryptography principles and algorithms, RSA algorithm, Diffie-Hellman key exchange. One way hash functions, message digest, MD5, SHA1, message authentication code, Digital envelope and Digital signatures.

UNIT – III

Network Management: Management Standards and Models, configuration management, configuration database and reports, fault management, identification and isolation, protecting sensitive information, host and user authentication, structure of management information, Standard management information base, SNPv1 protocol, accounting management, performance management, network usage, matrices and quotas.

UNIT – IV

Network security: Overview of IPV4: OSI model, maximum transfer unit, IP, TCP, UDP, ICMP, ARP, RARP and DNS, ping, traceroute. Network attacks: Buffer overflow, IP scheduling, TCP session hijacking, sequence guessing. Network scanning: ICMP, TCP sweeps, basic port scans. Denial of service attacks: SYN flood, teardrop attacks, land, smurf attacks. Visual and private network topology: tunneling, IPSEC. Traffic protocols: authentication headers, ESP internet key exchange, security association PPTP, L2TP.

UNIT – V

Firewalls: Firewall characteristics & design principles, types of firewalls, packet filtering router, application level gateway or proxy, content filters, bastion host. Firewall architectures: dual homed host, screening router, screened host, screened suvnet. Firewall logs.

Instruction detection system: component of an IDS, placement of IDS components, types of IDS:network based IDS, file integrity checkers, host based IDS, IDS evaluation parameters.

Recommended books
1. Network Security, Private Communication in a public world, Kaufman, c., Perlman, R., and Speciner, M., Prentice Hall.
2 Cryptography and Network Security: Principles and Practice, . Stallings, W. Prentice Hall PTR.
3. Fundamentals of Computer Security, Pieprzyk Josef, Springer-Verlag,

BCA-504B: Client Server Computing

UNIT-I

Overview: definition, history, myths, transition to client server computing, database architectures, advantages and disadvantages of client server architecture.
Components : client, server, network, role and services of client-server, selection of operating system as client & server, types of client & servers, connectivity, peer-to-peer communication
Middle-ware : definition, role, 2 tier v/s 3 tiers, network file system, network operating system, API, RPC model & implementation

UNIT-II

Communication in client-server: Using OSI layer, TCP/IP networks.
Client/Server processing and application development: transaction processing, remote processing, distributed processing, distributed databases, development tools

UNIT-III

Distributed Objects: CORBA architecture and services, COM, DCOM, Java-RMI
Database Drivers: ODBC driver, JDBC driver.
Linking and Embedding: OLE and DDE

UNIT-IV

Data warehousing: operational data & analytical data, characteristics, architecture, Data warehouse options.
Oracle as database server: Memory architecture, Process architecture
Introduction to PL/SQL Programming: Data types, Control statements, cursors, triggers, exception handling, procedure and functions

UNIT-V

Managing C/S Applications: network management, database backup, database recovery, Data integrity, Data security.
Latest technology and tools used for Client Server Computing

Recommended Books
1. Client server Computing: Patrick Smith
2. Client Server survival guide, 3 rd Edition: Robert Orfali
3. Client server unleashed

PRACTICAL

BCA -S505: Data Mining Lab
List of Reference Experiments:

1. Introduction to Weka Explorer interface.
2. Introductory assignments of different data-set.
3. Assignment on the basis of nominal and numerical data set.
4. Practical assignment on the basis of classifications algorithm.
5. Practical assignment on the basis of Association algorithm

BCA- S506: Minor project

Teacher can take exercise based on Web Technology BCAS-503

BCA- S507: Practical on any one of the following

BCA-S507A Web Development Lab
BCA-S507B Advanced Web Tools

BCA-S508: Seminar

Seminar topics to be allotted in the beginning of the course by issuing schedule of seminars including faculty seminars

BCA VI Semester

BCA-S601: PROJECT

In house project must be done by each student on simple applications using any computer language/ RDBMS/ Web design/visual programming etc.

The total work must be of minimum 180 hours per student. The internal guide must schedule the work & evaluate internally from time to time.

The project report must be prepared for the external examination. Monthly report of the students must be taken to monitor progress and must be placed for evaluation by external examiner. Projects submitted by the students shall be evaluated during external evaluation to ensure independent contribution and proficiency acquired by the students.

Note: Students must be allotted projects in the beginning of the session. Candidates submitting readymade projects/copied/ projects developed by professionals in the market etc shall be awarded zero marks.

Two copies of the project report and the software developed must be submitted to the external examiner. One copy of the project shall be returned to the student with the signature of external examiner.