

Important

Academic Rules

Scheme of

Studies & Syllabus



Bachelor of Computer Application (1st Year)
(Effective from 2010-2011)



**LINGAYA'S
UNIVERSITY**
choose to know

(u/s 3 of UGC Act 1956)

CONTENTS

Sr. No.	Description	Page No.
1	Abbreviations/Definitions	1
2	Code of Conduct and Ethics for Students	2
3	Important Academic Rules	3
4	Degree Objective	16
5	Scheme of Studies	17
6	Important Notes	20
7	Detailed Syllabus	21

ABBREVIATIONS/DEFINITIONS

- "AC" means, Academic Council of the University.
- "BOM" means, the Board of Management of the University.
- "BOS" means, the Board of Studies of the Department.
- "CAU/AUC-option" CAU/AUC means change from Credit to Audit option / change from Audit to Credit option
- "Class/Course Committee" means, the Class/Course Committee of a class/course.
- "Course" means, a specific subject usually identified by its course-number and course-title, with a specified syllabus/course-description, a set of references, taught by some teacher(s)/course- instructor(s) to a specific class (group of students) during a specific academic-term/semester/year.
- "COE" means, the Controller of Examinations
- "Course Instructor" means, the teacher or the Course Instructor of a Course.
- "Curriculum" means the set of Course-Structure and Course-Contents.
- "DAA" means, the Dean of Academic Affairs.
- "DAAB" means Departmental Academic Appeals Board.
- "DEC/PEC" means Dissertation Evaluation Committee/Project Evaluation committee.
- "Department" means a group in the University devoted to a specific discipline also called a School. Department and School are used interchangeably.
- "DSA" means, Dean Student Affairs.
- "Faculty Advisor/Class Counsellor" means, the Faculty Advisor or the Panel of Faculty Advisors, in a Parent Department, for a group (admission-batch) of students. Also known as Class Counsellor.
- "DRPC" means Doctoral Research Programme Committee
- "Grade Card" means the detailed performance record in a term/semester/year/ programme.
- "He" means both genders "he" and "she"; similarly "his" and/or "him" includes "her" as well, in all the cases.
- "HOD" means, the Head of the Department.
- "MET" means Make-up End Term
- "MES" means Make-up End semester
- "MEY" means Make-up End Year
- "MLC" means Mandatory Learning Course.
- "Parent Department" or "Degree Awarding Department" means, the department that offers the degree programme that a student undergoes.
- "Project Guide" means, the faculty who guides the Major Project of the student.
- "RB" means Research Board
- "RPAC" means Research Progress Assessment Committee
- "Regulations" means, set of Academic Regulations.
- "TEC" means Thesis Evaluation Committee
- "University" means, Lingaya's University, Faridabad (LU)
- "VC" means, the Vice Chancellor, Lingaya's University, Faridabad.

CODE OF CONDUCT AND ETHICS FOR STUDENTS

1. Wear decent dress respecting his/her modesty as well as that of others.
2. Expected to respect and show regard for teachers, staff and fellow students.
3. Inculcate civic sense and sensitivity for environment protection.
4. Not to resort to collection of funds for any use without written permission of VC.
5. To exhibit exemplary behaviour, discipline, diligences, and good conduct and are a role model to other students.
6. Not to indulge in offences of cognizable nature.
7. Not to practice casteism, communalism.
8. Not to indulge in any other conduct unbecoming of a professional student of the University.
9. Not to outrage the status, dignity and honour of any person.
10. Not to get involved in physical assault or threat, and use of physical force against any body.
11. Not to expose fellow students to ridicule and contempt that may affect their self esteem.
12. Not to form any kind of student's Union, etc.
13. Not to take active or passive part in any form of strikes/protests.
14. To observe all safety precautions while working.
15. Not to disfigure/damage the University property, building, furniture, machinery, library books, fixtures, fittings, etc. (Damage / loss caused shall have to be made good by the students).
16. Use of mobile/video camera phones is strictly prohibited inside the examination halls, class rooms, laboratories and other working places. LU has the right to confiscate the mobile phones in case of any violation.
17. Not to indulge in ragging/teasing, smoking, gambling, use of drugs or intoxicants, drinking alcohol, rude behavior, and use of abusive language.
18. Not to resort to violence, unruly travel in buses, bullying, threatening and coercing others for undesirable act, such as preventing from attending classes, writing exam. / tests, etc etc.
19. All the students of the LU shall be under the disciplinary control of the VC.
20. Students are deemed to be under the care and guidance of parents. It is obligatory for the former to appraise their progress (given by the CC) to the parents.
21. Fine, if ever imposed, is only to improve discipline and shall be paid promptly.
22. While on campus, students have to take care of their belongings and no responsibility for any loss or damage can be held by the University.
23. Every student shall produce the I-Card on demand, and if lost, get a duplicate issued.
24. The students must attend all lectures, tutorials and practical classes in a course punctually (The attendance will be counted course-wise).
25. To abide by the rules and regulations of the University stipulated from time to time.

IMPORTANT ACADEMIC RULES

BCA Degree Programme

GENERAL

- The Regulations may evolve and get revised/refined or updated or amended or modified or changed through approvals from the Academic Council from time to time, and shall be binding on all parties concerned, including the Students, Faculty, Staff, Departments, University Authorities and officers. Further, any legal disputes shall be limited to the legal jurisdiction determined by the location of the University and not that of any other parties.
- If, at any time after admission, it is found that a candidate had not in fact fulfilled all the requirements stipulated in the offer of admission, in any form whatsoever, including possible misinformation etc., the matter will be reported to the AC, recommending revoking the admission of the candidate.
- The LU reserves the right to cancel the admission of any student at any stage of his study programme in the University on the grounds of unsatisfactory academic performance or indiscipline or any misconduct.
- Medium of Instruction shall be English.

PROGRAMME

- For full-time students, the duration of study shall be a minimum of Nine terms and a maximum of SIX years.
 - There is only one type of student status in the BCA Degree Programme, namely, full time
 - The course content for an. B.C.A Degree Programme will typically consist of the following components:
 - (a) Two-Letter Grade Courses
 - (i) Programme Core Courses
 - (ii) Elective Courses*
 - (iii) Major Project
 - (b) Non-Two-Letter Grade Courses
 - (i) Minor Project
 - (ii) Mandatory Learning Courses
- * Some electives may be pre-requisite for another elective course.
Note: A student has to register for the above courses at the appropriate time decided by BOS.
- The exact credits offered for the programme for the above components, the term-wise distribution among them, as well as the syllabi of all postgraduate courses offered by the department are given in the 'Scheme of Studies and Syllabus'.
 - The Minimum Credit Requirement for the B.C.A. Degree is 130.

MAJOR PROJECT

- The Major Project carries 12 credits and is to be completed during 9th term. The progress of the major project shall be monitored by the guide.
- Under special circumstances, a student can be allowed to undertake dissertation work in industry/research lab/other institute. The place of such work has to be approved by AC.
- A candidate shall submit 3 copies of the Dissertation to the HOD on or before the specified date. The Report shall be in the format prescribed by the University.
- The earliest date for the submission of Report shall be THREE weeks before the closure of the term in which the dissertation work credits have been registered for, and is expected to be completed, or as announced by the DAA.
- Extension of time beyond the announced last date for submission of the Dissertation may be granted by the DAA on the recommendation from the HOD.

NON TWO-LETTER GRADE COURSES

- These are courses that must be completed by the student at appropriate time as suggested by the Faculty Advisor. The 'S' grade is awarded for satisfactory completion of the course and 'N' grade is awarded for non-completion of the course. In case 'N' grade is awarded, the student has to re-register for the same course wherein he has no alternative options. However, he can opt for other courses if he has been provided with multiple options. The 'S' and 'N' grades do not carry grade-points and hence not included in the TGPS, CGPS computations.

ASSOCIATION

- Every BCA student of the University shall be associated with the Parent Department, throughout his study period.
- The schedule of academic activities for a term, including the dates of registration, mid-term examinations, end-term examination, inter-term vacation, etc. shall be referred to as the Academic Calendar of the term, and announced at least two weeks before the closing date of the previous term.

PRE-REGISTRATION

- In order to facilitate proper planning of the academic activities of a term, it is essential for the students to declare their intent to register for a course well in advance, before the actual start of the academic session, through the process of Pre-Registration, which is mandatory for all those students of second or subsequent term who propose to deviate from recommended scheme of studies.
- Pre-registration is an expression of intention of a student to pursue particular course(s) in the next term. It is an information for planning for next term. Every effort will be made to arrange for a course opted by the

student. However, it is not obligatory on the part of the university to offer the course(s) and no course may be offered if the number of students opting for the course is less than 15 or 25 percent of the admission strength whichever is less.

- If a student fails to pre-register it will be presumed that he will follow suggested normal scheme of studies provided that he is progressing at a normal pace. For remaining students the HOD of the parent department will plan for courses as per the convenience of the department.

REGISTRATION TO COURSES

- Every Student after consulting his Faculty-Advisor is required to register for the approved courses with the HOD of parent department at the commencement of each term on the days fixed for such registration as notified in the academic calendar.
- A student shall register for courses from amongst the courses being offered in the term keeping in mind the minimum and maximum credits allowed for a degree and other requirements i.e. pre-requisite, if any, TGPA & CGPA after consulting the Faculty Advisor. No registration will be valid without the consent of HOD of the parent department.
- A student will be permitted to register in the next term as per the suggested normal scheme only if he fulfills the following Conditions:
 - (a) Satisfied all the Academic Requirements to continue with the programme of studies without termination.
 - (b) Cleared all university, library and hostel dues and fines (if any) of the previous term.
 - (c) Paid all required advance payments of the university and hostel for the current term.
 - (d) Not been debarred from registering on any specific ground by the university.
- The students will be permitted to register for course(s) being offered in a term other than his normal suggested scheme provided that the time table permits.
- The registration in the critical cases will be done as per the priority given below:
 - (a) Fulfillment of minimum credit requirement for continuation,
 - (b) The completion of programme in minimum period needed for degree, (Those who need to improve TGPA/CGPA)
 - (c) The fulfillment of pre-requisite requirement of courses.
- Students who do not register on the day announced for the purpose may be permitted LATE REGISTRATION up to the notified day in academic calendar on payment of late fee.
- REGISTRATION IN ABSENTIA will be allowed only in exceptional cases with the approval of the DAA after the recommendation of HOD through the guardian of the student.
- Credits will be awarded in registered courses only.

REGISTRATION- REVISION

- A student has the option to ADD courses for registration till the date specified for late registration in the Academic Calendar.
- On recommendation of the Teaching Department as well as the Parent Department, a student has the option to DROP courses from registration until two weeks after the commencement of the classes in the term, as indicated in the Academic Calendar.
- A student can register for auditing a course, or a course can be converted from credit to audit or from audit to credit, with the consent of the Faculty Advisor and Course Instructor within two weeks after the commencement of the classes in the term as indicated in the Academic Calendar. However, CORE Courses shall not be available for audit.

ATTENDANCE REQUIREMENTS

- LU academic programmes are based primarily on the formal teaching-learning process. Attendance in classes, participating in classroom discussions and participating in the continuous evaluation process are the most essential requirements of any academic programme.
- Attendance will be counted for each course scheduled teaching days as per the academic calendar.
- The attendance requirement for appearing in end term examination shall be a minimum of 75% of the classes scheduled in each course.

LEAVE OF ABSENCE

- The leave of absence must be authorized as per regulations.
- A student short of attendance in a course (less than needed after leave of absence and condonation by VC) will be awarded 'FF' grade in the course.
- All students must attend all lecture, tutorial and practical classes in a course. The attendance will be counted course wise.
- To account for approved leave of absence e.g. representing the University in sports, games or athletics; professional society activities, placement activities, NCC/NSS activities, etc. and/or any other such contingencies like medical emergencies, etc., the attendance requirement shall be a minimum of 75% of the classes scheduled in each course to appear in the examination.
- A student with less attendance in a course during a trimester, in lectures, tutorials and practicals taken together as applicable, shall be awarded 'FF' grade in that course, irrespective of his academic performance, and irrespective of the nature of absence.
- If the period of leave is more than three days and less than two weeks, prior application for leave shall have to be submitted to the HOD concerned, with the recommendation of the Faculty-Advisor, stating fully the reasons for the leave requested, along with supporting documents.
- If the period of leave is two weeks or more, prior application for leave shall have to be made to the DAA with the recommendations of the Faculty-Advisor, HOD concerned stating fully the reasons for the leave

requested, along with the supporting documents. The DAA may, on receipt of such application, grant leave or decide whether the student be asked to withdraw from the course for that particular term because of long absence.

- If a student fails to apply and get sanction for absence as in two cases above, his parent/guardian may apply to the VC with reasons duly recommended by the faculty advisor, HOD and DAA and explain in person to the VC the reasons for not applying in time. The VC will consider on merit and decide to grant the leave or withdrawal from the course for that particular term subject to any condition that he may like to impose. The decision of the VC shall be final and binding.

ABSENCE DURING EXAMINATIONS

- A student who has been absent during Mid-term Examination due to illness and/or any exigencies may give a request for make-up examination within one week after the Mid-term Examination to the HOD with necessary supporting documents in person. The HOD may consider such requests depending on the merits of the case, and after consultation with the course instructor, may permit the Make-up examination for the Student concerned. However, no makeup examination will be permitted if the attendance in the course is less than 60% till the date of examination.
- In case of absence from End-term Examination of a course(s) on Medical ground and/or other special circumstances, the student can apply for award of 'I' grade in the course(s) with necessary supporting documents and certifications by an authorized person to the HOD within one week after the End-term Examination. The HOD may consider the request, depending on the merit of the case, and after consultation with the Course(s) Instructor(s)/ faculty advisor permit the MET Examination for the student concerned. The student may subsequently complete all course requirements within the date stipulated by BOS (which may possibly be extended till first week of trimester under special circumstances) and 'I' grade will then be converted to an appropriate Double-letter grade, as per Clause No: G5.9. All the details of such a decision with date of finalizing the grade shall be communicated to DAA. If such an application for the 'I' grade is not made by the student then a double-letter grade will be awarded based on his term performance.

COURSE CREDIT ASSIGNMENT

- Every Course comprises of specific Lecture-Tutorial-Practical (L-T-P) Schedule. The credits for various courses are shown in the Schemes of Studies & syllabus.
- The Academic Performance Evaluation of a Student shall be according to a Letter Grading System, based on the Class Performance Distribution.
- The double-letter grade (AA, AB, BB, BC, CC, CD, DD, FF) indicates the level of academic achievement, assessed on a decimal (0-10) scale.

Letter-Grades and Grade-Points:

LETTER-GRADE	GRADE-POINTS	REMARKS
AA	10	
AB	9	
BB	8	
BC	7	
CC	6	
CD	5	
DD	4	
FF	0	
I	-	Incomplete
U	-	Audited
W	-	Withdrawal
S	-	Satisfactory
N	-	Unsatisfactory

DESCRIPTION OF GRADES

- An 'AA' grade stands for outstanding performance, relative to the class which may include performance with previous batches. The Course Instructor is supposed to take utmost care in awarding of this highest double-letter grade.
- The 'DD' grade stands for marginal performance and is the minimum passing double-letter grade.
- The 'FF' grade denotes very poor performance, i.e. failure in a course, and the Course Instructor is supposed to take utmost care while awarding this lowest double-letter grade.
- A student, who obtains 'FF' grade in a core course, has to repeat (re-register) that core course, in subsequent trimesters/sessions whenever the course is offered, until a passing grade is obtained. However, for an elective course in which 'FF' grade has been obtained, the student may either repeat the same course, or register for any other elective course.
- An 'I' grade denotes incomplete performance in any course due to absence at the end term examination (see also Clause No: G7.4). When the 'I' grade is converted to a regular double letter grade, a penalty of ONE Grade-Point is imposed, by awarding the double-letter grade that is immediately below the one that the student would have otherwise received except when the student has 95% attendance record in the subject concerned. For example, if on the basis of the performance including MET Examination, a student gets AB grade, he will be awarded BB grade if not under exception rule.
- 'U' grade is awarded in a course that the student opts to register for audit. It is not mandatory for the student to go through the entire regular process of evaluation in an audit course. However, the student has to go through some process of minimal level of evaluation and also the minimum attendance requirement, as stipulated by the Course Instructor and approved by the corresponding BOS, for getting the 'U' grade awarded in a

- course, failing which that course will not be listed in the Grade Card.
- A 'W' grade is awarded when the student withdraws from the course. Withdrawal from a course is permitted only under extremely exceptional circumstances (like medical emergencies, family tragedies and/or other unavoidable contingencies) and has to be recommended by the HOD and approved by the DAA. However, no withdrawal is permitted after the finalization of the grades in the term.
 - 'S'/'N' these grades are awarded for the Mandatory Learning Courses. The 'S' grade denotes satisfactory performance and completion of a course. The 'N' grade is awarded for non-completion of course requirements and the student will have to register for the course until he obtains the 'S' grade.

FEEDBACK TO STUDENTS

- A student requires feedback on the progress of his learning. For this purpose, the Instructor will conduct at least two quizzes for a theory course in a term-one before Mid-term Examination and the other there after. The quizzes will form a component of class work, the other components being tutorials, home assignments or any other mode.
- For a laboratory course, the continuous assessment's feedback will be given through the laboratory records which are required to be submitted after performing the experiment in the next laboratory class.

EVALUATION

- The double-letter grade awarded to a student in a course other than a practical course i.e. 0-0-P course for which he has registered, shall be based on his performance in quizzes, tutorials, assignments etc., as applicable, in addition to one mid-term examination and end-term examination. The weightage of these components of continuous evaluation may be as follows:

End-term Examination	:	50%
Mid-term Examination	:	30%
Quizzes, Tutorials, Assignments, etc. (Several over the term)	:	20%
Total	:	100%

- The double letter grade awarded to the student in a practical course i.e. 0-0-P course will be based on his performance in regular conduct of experiments, viva voce, laboratory report, quizzes etc., in addition, to term practical examination. The weightage of the components of continuous evaluation may be as follows:

Conduct of Experiments (as per syllabus)	:	40%
Lab Record	:	10%
Quizzes/Viva Voice	:	20%
End-term Examination	:	30%
Total	:	100%

- The University shall conduct the End-term examination for all theory courses being taught in the term.
- The answer books of all Mid-term Examination and End-term Examination will be shown to the students within three days of the last paper. It is the responsibility of the student to check this evaluation and affix his signature in confirmation.
- If the student finds some discrepancy, he should bring it to the notice of the Course Coordinator. The Course Coordinator will look into the complaint and remove the doubts of the student and proceed with the work of grading.
- If a student is not satisfied with the award of the grade after the announcement of the grades, he may appeal on a Grievance Form duly filled in along with the fee receipt for this purpose to the HOD of the parent department within one week of the following term. The HOD will forward the form along with his recommendation based on the records of the case to DAAB within the date specified in the Academic Calendar.

SCHEME OF EXAMINATION

- The duration of examinations for a theory course will be 3 hours for end-term examination 1½ hours for mid-term examination.
- The pattern of question paper/examination will be as under:
- **Theory Courses:**

The University shall conduct the End-term examination for all theory courses being taught in the term.

 - (a) There will be eight questions in all distributed over all the units in a course syllabus. The question paper will be in three parts with weightage 20 percent, 40 percent and 40 percent respectively.
 - (b) Part-A will be short answer type with multiple parts covering all the units in the syllabus, which will be compulsory.
 - (c) Part-B will have three questions from any three units, which will have long answers of derivation/descriptive type. Two questions are to be answered from this part.
 - (d) Part-C will consist of four questions from the remaining four units and they will be of problem solving type in order to measure ability on comprehension/analysis/synthesis/application. The relevant data will be made available. The student is required to solve two questions. However, for Part-C, the external examiner may select the questions from the question bank supplied by LU.
- Students are allowed in the examination the use of single memory, non-programmable calculator. However, sharing of calculator is not permitted.
- **Laboratory Courses:**
 - (a) The End-term Examination in laboratory course will be conducted jointly by an external examiner (other than the instructor) and an internal examiner (the coordinator / instructor) jointly.

- (b) The student will be given randomly an experiment to perform from within the list of experiments in the course.
 - (c) No change in the experiment will be permitted after the draw, if the student had performed the same in the class.
- **Mid-Term Examination:**
Question 1 is compulsory covering all topics taught till then. Question 2 and 3 will be essay type, out of which student will answer any one. Question 4 and 5 will be to measure to ability of analysis / comprehension / synthesis / application. The student will answer any one.

TRANSPARENCY

- The answer books of all Mid-term Examination and End-term Examination will be shown to the students within three days of the last paper. It is the responsibility of the student to check this evaluation and affix his signature in confirmation.
- If the student finds some discrepancy, he should bring it to the notice of the Course Coordinator. The Course Coordinator will look into the complaint and remove the doubts of the student and proceed with the work of grading.
- The entire process of evaluation shall be transparent, and the course instructor shall explain to a student the marks he is awarded in various components of evaluation.

RESULT

- The final marks shall be displayed on the notice board for ONE day, (the date of which will be indicated in the academic calendar). A student can approach the concerned course instructor(s) for any clarification within Two days of display. The process of evaluation shall be transparent and the students shall be made aware of all the factors included in the evaluation. In case of any correction, the course instructor shall have to incorporate the same before finalization of the grades.
- The Student's Grade Card shall contain the Letter-Grade for each registered course; along with the TGPA at the end of the term, and the CGPA at the completion of the programme.

APPEAL FOR REVIEW OF GRADE

- The entire process of evaluation shall be transparent, and the course instructor shall explain to a student the marks he is awarded in various components of evaluation.
- In case of any grievance about the grades, the student may appeal for review of grades to the Departmental Academic Appeals Board (DAAB) before the date specified in Academic Calendar.
- The fee for such an appeal will be decided from time to time. If the appeal is upheld by DAAB, then the fee amount will be refunded to the student without interest.

- VC shall have power to quash the result of a candidate after it has been declared, if
 - (a) he is disqualified for using malpractice in the examination;
 - (b) a mistake is found in his result;
 - (c) he is found ineligible to appear in the examination

AWARD OF DIVISIONS

- The overall performance of a student will be indicated by two indices:
 - (i) **TGPA** which is the Term Grade Point Average
 - (ii) **CGPA** which is the Cumulative Grade Point Average

TGPA for a Term is computed as follows:

$$TGPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where,

C_i denotes credits assigned to i^{th} course with double-letter grade, and G_i denotes the grade point equivalent to the letter grade obtained by the student in i^{th} course with double-letter grade, including all 'FF' grades in that term.

CGPA is computed as follows:

$$CGPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where,

C_i denotes credits assigned to i^{th} course with double-letter grade, and G_i denotes the grade point equivalent to the letter grade obtained by the student in i^{th} course for all courses with double-letter grades, including all 'FF' grades in all terms at the end of the programme.

For CGPA calculation, the following grades are to be counted:

- (i) Grades in all core courses,
 - (ii) The best grades in the remaining eligible courses to fulfill the minimum credits requirement for a programme.
- The degree will be awarded only upon compliance of all the laid down requirements for programme as under:
 - (i) There shall be University requirement of earning a minimum credits for a degree, satisfactory completion of mandatory learning courses and other activities as per the course structure.
 - (ii) There shall be a minimum earned credit requirement on all Departmental core courses, Elective course and Major Project as specified by BOS.
 - (iii) There shall be a maximum duration for complying to the degree requirement.
 - (iv) The candidate will be placed in First Division with Honours / First Division with Distinction/First Division/Second Division which will be mentioned on the degree certificate as under:

DIVISION	CONDITIONS TO BE FULFILLED
First Division with Honours	CGPA \geq 8.5, minimum 125 credits and no 'FF', N or W grade in any course during the programme.
First Division with Distinction	CGPA \geq 8.5
First Division	CGPA \geq 6.75
Second Division	CGPA \geq 5.0 but $<$ 6.75

Note:

Although, there is no direct conversion from grades to marks, however, for comparison purposes percentage of marks may be assumed to be CGPA multiplied by nine.

DEGREE REQUIREMENTS

- The requirements for the BCA Degree Programme are as follows:
 - (a) **University Requirements:**
 - (i) Minimum Earned Credit Requirement for Degree is 130.
 - (ii) Securing a CGPA of at least 5.50 in the Course Work.
 - (iii) Satisfactory completion of Project/Seminars
 - (b) **Programme Requirements:**
Minimum Earned Credit Requirements on all Core Courses, Elective Courses and dissertation as specified by the BOS and conforming to Course Structure given above.
 - (c) The maximum duration for a student for complying with the degree requirement from the date of registration for his first term, is SIX years.
 - (d) However, for First Division with Honours 135 credits are needed.

GRADE IMPROVEMENT

- A student may be allowed to improved CGPA in an appropriate term if his CGPA falls below 5.50

TERMINATION FROM THE PROGRAMME

- A student shall be required to leave the University without the award of the Degree, under the following circumstances:
 - (a) If a student fails to earn the minimum credits specified below:

Check Point	Credit Threshold**
End of FIRST year	25*
End of SECOND year	60*

Note -1

- * A student may be given one more chance to cover the shortfall in the threshold during the following summer term as follows:
 - (i) if a student earns 16 credits or more but less then 25 in first year.
 - (ii) if a student earns 52 or more credits but less then 60 at the

end of Second Year.

In case he fails to clear the threshold even after the summer term he has to leave the programme.

** If at any stage, a student fails to cross the threshold with a minimum of 5.0 TGPA in any term, he will be treated as critical case and will be advised to improve the grades.

Note 2: The period of temporary withdrawal is not to be counted for the above Credit Threshold.

- (b) If a student is absent for more than 4 (four) weeks in a term without sanctioned leave.
- (c) Based on disciplinary action to this effect approved by the AC, on the recommendation of the appropriate committee.
- Under any circumstances of termination, the conditions specified in Permanent Withdrawal shall also apply.

WITHDRAWAL FROM PROGRAMME

Temporary:

- A student who has been admitted to a degree programme of the University may be permitted to withdraw temporarily, for a period of one term or more, on the grounds of prolonged illness or grave calamity in the family, etc., provided:
 - (i) He applies to the LU stating fully the reasons for withdrawal together with supporting documents and endorsement from his parent / guardian
 - (ii) There are no outstanding dues or demands, from the Departments / LU / Hostels / Library and any other centres.
 - (iii) Scholarship holders are bound by the appropriate Rules applicable to them.
 - (iv) The decision of the VC of the LU regarding withdrawal of a student is final and binding.
- Normally, a student will be permitted only one such temporary withdrawal during his tenure as a student and this withdrawal will not be counted for computing the duration of study.

Permanent:

- Any student who withdraws permanently admission before the closing date of admission for the Academic Session is eligible for the refund of fee as per the University rules. Once the admission for the year is closed, the following conditions govern withdrawal of admission:
- A student who wants to leave the LU for good, will be permitted to do so (and take Transfer Certificate from the LU, if needed), only after clearing all the dues for the remaining duration of the course.
- A student who has received any scholarship, stipend or other form of assistance from the LU shall repay all such amounts, in addition, to those mentioned in Clause No. G8.2 (a) above.
- The decision of the VC regarding all aspects of withdrawal of a student shall be final and binding.

Department of Computer Applications BCA Degree Programme

DEGREE OBJECTIVE

BCA will prepare the students for jobs in Software industry and IT Enabled services as well as in pursuing higher studies in Computer Applications and Management e.g. doing MCA through lateral entry.

The course structure for the BCA programme has been developed keeping in mind the current trends in software development and management.

Some of the computer science related courses covered in BCA include Computer Fundamentals, Data Structures using 'C', Network Security, Rapid Application Development, Data Base Management System and Computer Architecture.

SCHEME OF STUDIES BCA Degree Programme

1st Year

TERM – I

THEORY							
Course No.	Course Name	Periods	Evaluation Scheme				Cr
			Components of Evaluation with Weightage (%)				
		L-T-P	Class Work	MTE (1½ Hrs)	ETE (3 Hrs)	Total	
CS-101	Computer Programming	5-1-0	20	30	50	100	4
MA-1104	Mathematics – I	5-1-0	20	30	50	100	4
EN-1101	Technical Communication	5-0-0	20	30	50	100	3
PH-1104	Basics of Physics	5-0-0	20	30	50	100	3

PRACTICAL/DRAWING/DESIGN								
Course No.	Course Name	Periods	Evaluation Scheme				Cr	
			Components of Evaluation with Weightage (%)					
		L-T-P	EXPT.	Lab Record	MTE Quizzes/ Viva-voce	ETE (2 Hrs)		Total
CS-151	Computer Programming Lab	0-0-2	40	10	20	30	100	1
CA-1151	PC Software Lab	0-0-2	40	10	20	30	100	1
PD-192/ PD-193/ PD-151	Personality Skills**/ Enterpreneurial & Professional Skills/ Basics of Computer Fundamentals	0-0-2	40	10	20	30	100	1
PD-191	Co-curricular Activities	-	-	-	-	-	-	1*

TOTAL CONTACT HOURS	TOTAL CREDITS
20-2-6 (28)	17

FINAL EVALUATION IN GRADES

(L-T-P-Cr) – Lectures-Tutorials-Practicals-Credits

CW – Class Work

MTE – Mid-Term Exam

ETE – End-Term Exam

* One credit to be earned in Term-III through Co-curricular Activities outside contact hours.

However, a student is to register for this course in all the three terms of first year.

** PD-192 is a Mandatory Learning Course.

SCHEME OF STUDIES BCA Degree Programme

1st Year

TERM – II

THEORY							
Course No.	Course Name	Periods	Evaluation Scheme				Cr
			Components of Evaluation with Weightage (%)				
		L-T-P	Class Work	MTE (1½ Hrs)	ETE (3 Hrs)	Total	
MA-1105	Mathematics-II	5-1-0	20	30	50	100	4
BA-1113	Accounting & Financial Management	5-1-0	20	30	50	100	4
CA-1102	Data Structures Using C	5-0-0	20	30	50	100	3
CA-1103	Database Management System	5-0-0	20	30	50	100	3

PRACTICAL/DRAWING/DESIGN								
Course No.	Course Name	Periods	Evaluation Scheme				Cr	
			Components of Evaluation with Weightage (%)					
		L-T-P	EXPT.	Lab Record	MTE Quizzes/ Viva-voce	ETE (2 Hrs)		Total
CA-1152	Data Structures Using C Lab	0-0-2	40	10	20	30	100	1
CA-1153	Database Management System Lab	0-0-2	40	10	20	30	100	1
PD-192/ PD-193/ PD-151	Personality Skills**/ Enterpreneural & Professional Skills/ Basics of Computer Fundamentals	0-0-2	40	10	20	30	100	1
PD-191	Co-curricular Activities	-	-	-	-	-	-	1*

TOTAL CONTACT HOURS	TOTAL CREDITS
20-2-6 (28)	17

FINAL EVALUATION IN GRADES

(L-T-P-Cr) – Lectures-Tutorials-Practicals-Credits

CW – Class Work

MTE – Mid-Term Exam

ETE – End-Term Exam

* One credit to be earned in Term-III through Co-curricular Activities outside contact hours.

However, a student is to register for this course in all the three terms of first year.

** PD-192 is a Mandatory Learning Course.

SCHEME OF STUDIES BCA Degree Programme

1st Year

TERM – III

THEORY

Course No.	Course Name	Periods	Evaluation Scheme				Cr
			Components of Evaluation with Weightage (%)				
		L-T-P	Class Work	MTE (1½ Hrs)	ETE (3 Hrs)	Total	
EC-1101	Basics of Digital Electronics	5-1-0	20	30	50	100	4
CA-1104	Object Oriented Programming Systems	5-1-0	20	30	50	100	4
CA-1105	Front End Design Tools	5-0-0	20	30	50	100	3
CE-101	Environmental Science & Ecology**	5-0-0	20	30	50	100	3

PRACTICAL/DRAWING/DESIGN

Course No.	Course Name	Periods	Evaluation Scheme				Cr	
			Components of Evaluation with Weightage (%)					
		L-T-P	EXPT.	Lab Record	MTE Quizzes/ Viva-voce	ETE (2 Hrs)		Total
CA-1154	Object Oriented Programming Systems Lab	0-0-2	40	10	20	30	100	1
CA-1155	Front End Design Tools Lab	0-0-2	40	10	20	30	100	1
PD-192/ PD-193/ PD-151	Personality Skills**/ Enterpreneural & Professional Skills/ Basics of Computer Fundamentals	0-0-2	40	10	20	30	100	1
PD-191	Co-curricular Activities	-	-	-	-	-	-	1*

TOTAL CONTACT HOURS	TOTAL CREDITS
20-2-6 (28)	17+1*

FINAL EVALUATION IN GRADES

(L-T-P-Cr) – Lectures-Tutorials-Practicals-Credits

CW – Class Work

MTE – Mid-Term Exam

ETE – End-Term Exam

* One credit to be earned in Term-III through Co-curricular Activities outside contact hours. However, a student is to register for this course in all the three terms of first year.

** CE-101 and PD-192 are Mandatory Learning Courses.

IMPORTANT NOTES

1. Laboratory Courses are being offered as distinct courses (0-0-2) without being mixed with lecture components.
2. Conduct of Lab Courses:
 - a. At least ten experiments/programs/exercises are to be performed in a term.
 - b. It is expected that more experiments/programs/exercises are designed and set as per the scope of the syllabus, which may be added to the above list.
 - c. One or more than one experiments/programs/exercises may be performed in one lab period in order to utilize the time properly.
 - d. The scheme of operation is to be approved by HOD.
3. Students are allowed in the examination the use of single memory, non-programmable calculator. However, sharing of calculator is not permitted.

DETAILED SYLLABUS

BA-1113	ACCOUNTING AND FINANCIAL MANAGEMENT	L-T-P	Cr
		5-1-0	4

OBJECTIVE

To equip students with computer based accounting and other financial skills.

1. **ACCOUNTING:** Principles; concepts; conventions; double entry system of accounting; introduction of basic books of accounts ledgers.
2. **PREPARATION OF TRIAL BALANCE:** Final accounts- company final accounts.
3. **FINANCIAL MANAGEMENT:** Meaning and scope; role; objectives of time value of money- over vitalization- under capitalization- profit maximization- EPS maximization.
4. **RATIO ANALYSIS:** Advantages; limitations; fund flow analysis- meaning; importance; preparation and interpretation of funds flow and cash flow statements- statement of changes in working capital.
5. **COSTING:** Nature and importance and basic principles; absorption costing vs. marginal costing- financial accounting vs. cost accounting vs. management accounting.
6. **MARGINAL COSTING AND BREAK- EVEN ANALYSIS:** Nature; scope and importance- practical applications of marginal costing; limitations and importance of cost- volume; profit analysis.
7. **STANDARD COSTING AND BUDGETING:** Nature; scope; computation and analysis- materials variance; labor variance and sales variance- budgeting- cash budget; sales budget- flexible Budgets; master budgets.

TEXT BOOK

Maheshwari S. N., "Financial Accounting", Sultan Chand & Company.

REFERENCE BOOK

Van Horne, James, "Financial Management and Policy", 12th Ed, Pearson Education

CA-1102	DATA STRUCTURES USING C	L-T-P	Cr
		5-0-0	3

OBJECTIVE

To relay the theoretical and practical fundamental knowledge of most commonly used algorithms.

PRE-REQUISITES

Knowledge of basic computer programming

1. **INTRODUCTION TO DATA STRUCTURES:** Definition of data structures and abstract data types; linear vs. non-linear data types; primitive vs. non-primitive data types; Static and Dynamic implementations; Arrays; 2; 3 and multi-dimensional arrays.
2. **RUNNING TIME:** Time Complexity; Big – Oh - notation; Running Times; Best Case; Worst Case; Average Case; Introduction to Recursion; Divide and Conquer Algorithm; Evaluating time Complexity.
3. **STACKS AND QUEUES:** The Stacks: Definition; Array based implementation of stacks; Linked List based implementation of stacks; Examples: Infix; postfix; prefix representation; Conversions; definition of Queues; Array based implementation of Queues.
4. **LINKED LISTS:** Lists; Linked List implementation of stacks and queues; Circular implementation of Queues and Singly linked Lists; Straight / circular implementation of doubly linked Queues; Priority Queues.
5. **TREES:** Definition of trees and Binary trees; Properties of Binary trees and Implementation; Binary Traversal pre-order; post order; In- order traversal; Binary Search Trees.
6. **GRAPHS:** Definition of Undirected and Directed Graphs and Networks; The Array based implementation of graphs; Adjacency matrix; path matrix implementation; The Linked List representation of graphs; Shortest path Algorithm; Graph Traversal – Breadth first Traversal; Depth first Traversal.
7. **SORTING AND SEARCHING ALGORITHMS:** Introduction; Sorting by exchange; selection; insertions; bubble sort; Straight selection sort; Merge sort; Quick sort; Heap sort; Searching Algorithms: Straight Sequential Search; Binary Search (recursive & non-recursive Algorithms).

TEXT BOOK

Aho, A.V, Hopcroft, J. E., Ullman, T. D., "Data Structures and Algorithms", Original Edition, Addison-Wesley, Low Priced Edition, 1999

REFERENCE BOOKS

1. A. M. Tenenbaum, Langsam, Moshe J. Augentem, "Data Structures using C", Prentice Hall of India
2. Ellis, Horowitz, Sartaj Sahni, "Fundamentals of Data Structures", Addison-Wesley Pub, 1983
3. Mark Allen Weiss, "Data Structures and Algorithms Analysis in C", Pearson Education, 2000
4. Cormen, T. H., et al., "Introduction to Algorithms", 2nd Edition, Prentice Hall of India, 2001.

WEB REFERENCES

1. http://www.cs.auckland.ac.nz/software/AlgAnim/ds_ToC.html
2. http://en.wikipedia.org/wiki/Data_structure
3. <http://www.itl.nist.gov/div897/sqg/dads/>
4. <http://www.brpreiss.com/books/opus4/html/book.html>

CA-1103	DATABASE MANAGEMENT SYSTEM	L-T-P	Cr
		5-0-0	3

OBJECTIVE

To provide knowledge about various organizations and management information systems, keeping in view the aspects of shareability, availability, evolvability and integrity

1. **INTRODUCTION:** Purpose of database system; characteristics of database approach; advantages of using DBMS; database concept and architecture; data abstraction, data models; instances and schema; data independence; schema architecture; database languages; database manager; database administrator; database users.
2. **DATA MODELING:** Entity sets attributes and keys; relationships (ER); database modeling using entity; type role and structural constraints; weak and strong entity types; entity-relationship diagram; design of an E-R database schema; data models: Hierarchical models - basic concepts; tree structure; network model ; relational Model: relational model -basic concepts; enforcing data integrity constraints; relational-algebra operations.
3. **DATABASE DESIGN:** Database design process; relational database design; relation schema; anomalies in a database; functional dependencies; 1NF, 2NF, 3NF and BCNF.
4. **QUERY LANGUAGES:** Introduction to SQL; basic queries in SQL; advanced queries in SQL; functions in SQL; basic data retrieval; updates in SQLs, views in SQL.
5. **FILE ORGANIZATION:** indexing and hashing; overview of file organization techniques; secondary storage devices; operations in files; heap files and sorted files; indexing and hashing; ordered indices; single level ordered index; multi-level index.
6. **TRANSACTION PROCESSING & QUERY PROCESSING:** Desirable properties of transactions; implementation of atomicity and durability; schedules and recoverability; serializability of schedules; concurrency control.
7. **DEADLOCK HANDLING:** Detection and resolution, query processing, recovery & security.

TEXT BOOK

Elmasri R. and Navathe S. B., "Fundamentals of Database Systems", 3rd edition, Addison-Wesley, Low Priced Edition, 2000

REFERENCE BOOKS

1. Silberschatz A., Korth H. F. and Sudarshan S., "Database System Concepts", 3rd edition, McGraw-Hill, International Edition, 1997
2. Date C. J., "An Introduction to Database Systems", 7th edition, Addison-Wesley, Low Priced Edition, 2000

3. Desai Bipin, "Introduction to Database Management System", Galgotia Publications, 1991

WEB REFERENCES

1. http://www.quackit.com/database/tutorial/database_management_systems.cfm
2. <http://myweb.brooklyn.liu.edu/gnarra/database/sqltutorial.aspx>
3. <http://www.developers.net/tsearch?searchkeys=database+management+system+tutorial>
4. <http://www.databasejournal.com/>

CA-1104	OBJECT ORIENTED PROGRAMMING SYSTEMS	L-T-P	Cr
		5-1-0	4

OBJECTIVE

Providing a sound conceptual understanding of the fundamental concepts of computing hardware, software, networking and services; build programming logic and thereby developing skills in problem solving using C++ programming language; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

1. **INTRODUCTION TO C++:** C++ standard library; basics of a typical C++ environment; pre-processors directives; illustrative simple C++ programs; header files and namespaces; library files.
2. **OBJECT ORIENTED CONCEPTS:** Introduction to objects and object oriented programming; encapsulation (information hiding); access modifiers: controlling access to a class; method; or variable (public; protected; private; package); other modifiers; Polymorphism: overloading; inheritance; overriding methods; abstract classes; reusability; class behaviours.
3. **CLASSES AND DATA ABSTRACTION:** Introduction; structure definitions; accessing members of structures; class scope and accessing class members; separating interface from implementation; controlling access function and utility functions; initializing class objects: constructors; using default arguments with constructors; using destructors; classes : const(constant) object and const member functions; object as member of classes; friend function and friend classes; using this pointer; dynamic memory allocation with new and delete; static class members; container classes and integrators; function overloading.
4. **OPERATOR OVERLOADING:** Introduction; fundamentals of operator overloading; restrictions on operators overloading; operator functions as class members vs. as friend functions; overloading; <<, >> overloading unary operators; overloading binary operators.

5. **INHERITANCE; VIRTUAL FUNCTIONS AND POLYMORPHISM:** Introduction; inheritance: base classes and derived classes; protected members; casting base-class pointers to derived-class pointers; using member functions; overriding base-class members in a derived class; public; protected and private inheritance; using constructors and destructors in derived classes.
6. **FILES AND I/O STREAMS:** Files and streams; creating a sequential access file; reading data from a sequential access file; updating sequential access files; random access files; creating a random access file; writing data randomly to a random access file; reading data sequentially from a random access file;.
7. **TEMPLATES & EXCEPTION HANDLING:** Function templates; overloading template functions; class template; templates and inheritance; templates and friends; templates and static members; basics of C++ exception handling: try; throw; catch; throwing an exception; catching an exception.

TEXT BOOK

Balagurusamy, E., "Object Oriented Programming with C++", Prentice Hall of India, 2008.

REFERENCE BOOKS

1. Kamthane, "Object Oriented Programming with ANSI and Turbo C++", Pearson Education
2. Lafore, Robert, "Object Oriented Programming in Turbo C++", The WAITE Group Press, 1994
3. Schildt, Herbert "C++: The Complete Reference", Tata McGraw Hill, 3rd Ed, 2008
4. Bhawe, "Object Oriented Programming with C++", Pearson Education.

CA-1105	FRONT END DESIGN TOOLS	L-T-P	Cr
		5-0-0	3

OBJECTIVE

Providing a sound conceptual understanding of the fundamental concepts of front-end tools like Visual Basic.

1. **VISUAL BASIC:** Variable Names; Data Types; Assignment; If-then; If-then-else; if then-else; ifelse; expression; print statement; arrays; variable declaration; built-in & User defined types.
2. **SUBROUTINES AND FUNCTIONS:** Boolean Operators; Arithmetic Operator; For- .next; do loop; while-wend; procedure/Public; Private and Static & Dim Statement.
3. **STRUCTURE OF VB PROGRAM:** Forms & built in controls; Properties and events; Code Module; Scale Modes; Printer Object (Printing text;

setting Fonts; graphics); Common dialog Boxes; picture controls; image-controls; send keys; MS-Common Controls; Error Handling; Classes; Control Arrays; MDI; SDI. File Handling – Text and Binary Files; Files System Orbit Object.

4. **DATABASE INTERFACE:** Review of ANSI SQL; ODBC; Pass through ODBC; DAO; MS-Jet Engine; DB-Engine; Workspaces; Databases; record sets.
5. **DATA BOUND CONTROLS:** ActiveX controls; ADO; Active X Data controls; RDO Data view Window; Data Environment Designer; Crystal Report and Data Report Utility Using Visual Basic (VB) for Transaction Management; Concurrency Control; Interfacing with RDBMS; Backend Stored procedure Usage.
6. **HELP WRITING:** Building a help; System; Building & Topics File; Labeling the topics; Creating a help project; primary & secondary help window; linking to internet; Adding Multimedia; Using HTML help workshop; content sensitive help; help file.
7. **OVERVIEW OF COM/DCOM:** Using Windows API Functions; MAPI interface; VB Script.

TEXT BOOK

Perry, Greg, "Teach Yourself Visual Basic 6 in 21 Days", Techmedia, 1998.

REFERENCES

1. Petroustos, E., "Mastering Visual Basic 6.0", BPB Publications, 1998.
2. Petroustos, E., "Mastering Database Programming with Visual Basic 6", BPB Publications, 2000
3. Norton, Peter, "Peter Norton's Guide to Visual Basic 6", Techmedia, 1998.

CA-1151	PC SOFTWARE LAB	L-T-P	Cr
		0-0-2	1

LIST OF EXPERIMENTS/EXERCISES

M.S. WORD:

1. Explain the command Find and Replace in MS-Word.
2. Invite your 10 friends to a Seminar using the facility of Mail-merge.

M.S. PRESENTATION:

1. Make a 2-minute presentation informing people of your favourite activity.
2. Include at least 6 slides.
3. Must include at least 2 pictures and animation/movie.
4. Background that enhances your presentation
5. Use slide transition.
6. custom slide show
7. Reasons on why it is your favourite activity

8. Why should people be encouraged to do this activity?
9. At the end add a summary slide.

M.S. EXCEL:

1. Make a table of a student Result which contain the following Fields:
 - Roll Number
 - Subjects
 - Marks
2. Refer to the above table; perform the function of Auto filter and Advanced Filter.

CA-1152	DATA STRUCTURES USING C LAB	L-T-P	Cr
		0-0-2	1

LIST OF EXPERIMENTS/EXERCISES

1. Write a program to search an element in an array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on matrices using functions only
 - a) Addition
 - b) Subtraction
 - c) Multiplication
 - d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string and copy of a string to another.
6. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
7. Write a program to implement binary search tree. (Insertion and Deletion in Binary Search Tree)
8. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
9. Write the program for implementation of a file and performing operations such as insert, delete and update a record in the file.
10. Create a linked list and perform the following operations on it
 - a) add a node
 - b) Delete a node
11. Write a program which simulates the various tree traversal algorithms.

CA-1153	DATABASE MANAGEMENT SYSTEM LAB	L-T-P	Cr
		0-0-2	1

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. Finding unique names of all salesmen, deletion of the structure of a table, use of delete command with conditions, updating records of a table with conditions, altering structure of a table and changing size of existing column in the table
6. Retrieval of data using sub-queries
7. 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.
8. 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.
9. Transaction processing and query processing.
10. Deadlock handling

CA-1154	OBJECT ORIENTED PROGRAMMING SYSTEMS LAB	L-T-P	Cr
		0-0-2	1

LIST OF EXPERIMENTS/EXERCISES

1. Basic/Simple logic building
2. Handling mathematical data
3. Use of control structures and functions
4. Implementing operator overloading
5. Implementing inheritance, virtual functions and polymorphism
6. File handling
7. Array & Pointer
8. String Manipulation
9. Templates and exception handling
10. Multi-file programming

CA-1155	FRONT END DESIGN TOOLS LAB	L-T-P	Cr
		0-0-2	1

LIST OF EXPERIMENTS/EXERCISES

1. Program to create 3 forms and perform the following tasks:
 - a. Calculate addition of 5 numbers
 - b. Calculate factorial of a number
 - c. Find whether a given number is even or odd
2. Program to create an employee registration form.
3. Program to create a form and perform the following array operations:
 - a. Sorting of elements of array
 - b. Searching a number in an array
 - c. Merging of 2 given arrays
4. Program to show error handling mechanism in vb.
5. Program to show common dialog control and menu based operations.
6. Program to show functioning of a calculator.
7. Program to create an employee registration form and save the employee records in random files.
8. Program to show employee record and department records using ado control.
9. Program to create data reports in VB
 - a. Data report showing employee records stored in database.
 - b. Data report showing employee list according to their respective departments.
10. Program to create a data report in VB to show the salary details of the employee whose id is entered.

CE-101	ENVIRONMENTAL SCIENCE AND ECOLOGY	L T P	Cr
		5 0 0	3

OBJECTIVE

Environmental Studies is a multidisciplinary area, the issues of which every one should know. The aim of the course is to make everyone aware of environmental issues like continuing problems of pollution, loss of forest, solid waste disposal, and degradation of environment. Issues like economic productivity and national security, global warming, the depletion of ozone layer and loss of biodiversity are other serious concerns before the mankind.

1. **THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES:** Basic definitions related to environment; Scope, vis-à-vis environmental science and environmental engineering; Causes of environmental degradation, atmospheric composition and associated spheres, habitat and climate; objective, goals and principles involved in environmental education, environmental awareness, environmental ethics, environmental organization and their involvement.

2. **NATURAL RESOURCES:** Renewable and non-renewable resources; forest resources, over-exploitation, and deforestation / afforestation; water resources, impact of over-utilization of surface and ground water, floods, drought, conflicts over water, dams; mineral resources: dereliction of mines, environmental effects of extracting and using mineral resources; Food resources, modern agriculture and its impact, problem associated with fertilizer and pesticide, water logging, salinity ; energy resources, renewable, non-renewable energy sources, solar energy, wind energy, hydro energy, biomass energy, geothermal energy, nuclear energy and its associated hazards; land as a resource, land degradation, man induced landslides, soil erosion and desertification.
3. **ECOSYSTEMS:** 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; characteristic features, structure and function of the following ecosystem -forest ecosystem, grassland ecosystem desert ecosystem and aquatic ecosystems.
4. **BIODIVERSITY AND ITS CONSERVATION:** Bio-geographical classification of India; biodiversity at global, national and local levels, India as a mega-diversity nation, hot-spots of biodiversity; value of biodiversity-consumptive use, productive use, social, ethical aesthetic and option values; threats to biodiversity; conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.
5. **ENVIRONMENTAL POLLUTION:** Causes, effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, solid waste management, e-waste management; disaster management – floods, earthquake, cyclone and landslides.
6. **SOCIAL ISSUES AND THE ENVIRONMENT:** Water conservation, rain water harvesting, watershed management; climate change, global warming, acid rain, ozone layer depletion; Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.
7. **HUMAN POPULATION AND THE ENVIRONMENT:** Population growth, population explosion – family welfare programmes; role of information technology in environment and human health; case studies, Chipko movement, Saradar Sarovar dam, mining and quarrying in Udaipur, salinity and water logging in Punjab, Haryana and Rajasthan, Bhopal gas tragedy, Chernobyl nuclear disaster, arsenic pollution in ground water.

TEXT BOOK

Kaushik, Anubha, and Kaushik, C.P., "Perspectives in Environmental Studies", New Age International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K. C., "Environmental Biology", Nidhi Publ. Ltd., Bikaner, 2001
2. Bharucha Erach, "The Biodiversity of India", Mapin Publishing Pvt. Ltd., 2006
3. Brunner R. C., "Hazardous Waste Incineration", McGraw Hill Inc., 1989.

4. Clark R.S., "Marine Pollution", Clarendon Press Oxford, 1989
5. Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., "Environmental Encyclopedia", Jaico Publ. House, 2001.
6. De A. K., "Environmental Chemistry", 2nd Edition, Wiley Eastern, 1989
7. Jadhav, H. and Bhosale, V.M., "Environmental Protection and Laws", Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schoel. R.M., "Environmental Science Systems & Solutions", Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K., "Waste Water Treatment", Oxford & IBH Publ. Co., 1987.
10. Sharma B.K., "Environmental Chemistry", Goel Publ. House, Meerut, 2001
11. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", Techno-Science Publications, 1996

CS-101	COMPUTER PROGRAMMING	L T P	Cr
		5 1 0	4

OBJECTIVE

To provide sound conceptual understanding of the fundamental concepts of computing hardware, software, networking and services; build programming logic and developing skills in problem solving using C/C++; Introduce the concept of object orientation and on how to handle data in different forms; Emphasize the concepts and constructs rather than on language features.

1. **AN OVERVIEW OF COMPUTER SYSTEM:** Anatomy of a digital computer; memory units; main and auxiliary storage devices; input devices; output devices; classification of computers; computer hardware; computer software; data representation – bits and bytes and operations of data; radix number system – decimal, binary, octal, hexadecimal numbers and their inter-conversions; representation of information inside the computers.
2. **OPERATING SYSTEM BASICS:** The user interface; running programs; managing files; introduction to PC operating systems: Unix/Linux, DOS, MacOS and Windows, file system; file formats.
3. **INTERNET BASICS:** Introduction to computer networks; what is internet and WWW; basic WWW concepts; surfing the web; web multimedia; internet applications and features.
4. **PROGRAMMING LANGUAGES:** Machine level language; assembly level language; high level language; system software: assembler, compiler, interpreters, linker and loader, and their inter-relationship, debuggers, IDE; programming fundamentals – problem definition, algorithms, flow charts and their symbols.
5. **C PROGRAMMING LANGUAGE CONSTRUCTS:** An overview of C; expressions – data types, identifiers names, variables, type qualifiers, storage class specifiers, operators, type conversion in expression, type casting; console I/O: I/O functions; the C standard library; problem solving process algorithm: pseudo code and flowchart; statements – true and false

in C, selection statements, iteration statements, jump statements, expression statements and block statements; arrays – single dimensions arrays, generating a pointer to an array, passing 1D array to functions; string: 2D arrays, multidimensional array, indexing pointers, array initialization, variable-length array

6. **DATA HANDLING:** Pointers – Pointer variables, pointer operators, pointer expressions, pointers and arrays, multiple indirection, initializing pointers, C's dynamic allocation functions, restrict-qualified pointers, problems with pointers; functions: the general form of a function, scope of a function, function arguments, argc and argv — arguments to main(), the return statement, purpose of main(), recursion, function prototypes, the "implicit int" rule; structures, unions, enumerations, and typedef – structures, arrays of structures, passing structures to functions, structure pointers, arrays and structures within structures, unions, bit-fields, enumerations, using sizeof to ensure portability, typedef; important differences between C and C++.
7. **ADVANCED DATA HANDLING:** Basic file I/O – C vs. C++ File I/O, standard C Vs. Unix file I/O streams and files, file system basics, fread() and fwrite(), fseek() and random-access, fprintf() and fscanf(); the preprocessor and comments – the preprocessor, conditional compilation directives, using defined, the # and ## preprocessor operators, predefined macro names, comments.

TEXT BOOK

Schildt, Herbert "The Complete Reference C", 4th Edition, Tata McGraw Hill, 2004.

REFERENCE BOOKS

1. Balagurusamy, E., "Computing Fundamentals and C Programming", Tata McGraw Hill, 5th Edition, 2010.
2. Dennis, P. Curtin, Foley Kim, Sen Kunal and Morin Cathleen, "Information Technology", Tata McGraw Hill, 17 Edition, 2005.
3. Dennis, M. Ritchie and Brian, W. Kernigham, "The C Programming Language, Prentice Hall of India, 1988.
4. Nabajyoti, Barkakati, "Object Oriented Programming in C++", Prentice Hall of India, 3rd Edition, 1995.
5. Jack, B. Rochester, "Using Computers and Information", Prentice Hall of India, 1996.
6. Byron, C. Gottfried, "Theory and Problem of Programming with C", Tata McGraw Hill
7. Press, Barry and Press, Marcia, "Teach Yourself all About Computers", IDG Books India, 2000.
8. Schildt, Herbert, "C++: The Complete Reference", Tata McGraw Hill, 4th Edition, 2003
9. Liberty, Jesse, "Programming C#", O'Reilly, 4th Edition, 2005.

WEB REFERENCES

1. http://www.physics.drexel.edu/courses/Comp_Phys/General/C_basics/c_tutorial.html
2. <http://www.eskimo.com/~scs/cclass/notes/top.html>
3. <http://www.lysator.liu.se/c/bwk-tutor.html>

CS-151	COMPUTER PROGRAMMING LAB	L T P	Cr
		0 0 2	1

LIST OF EXPERIMENTS/EXERCISES

1. Basic/Simple logic building
2. Handling mathematical data
3. Use of control structures
4. Use of Function
5. Handling mathematical problems
6. Array and Pointer
7. Searching and Sorting
8. String Manipulation
9. Use of Structure and Union
10. File handling

REFERENCE BOOKS

1. Dennis, M. Ritchie and Brian, W. Kernighan, "The C Programming Language", Prentice Hall of India, 1988.
2. Byron, C. Gottfried, "Theory and Problem of Programming with C", Tata McGraw Hill
3. Barkakati, Nabajyoti, "Object Oriented Programming in C++", Prentice Hall of India, 2001.
4. Schildt, Herbert, "C++: The Complete Reference", Tata McGraw Hill, 4th Edition, 2003

EC-1101	BASICS OF DIGITAL ELECTRONICS	L-T-P	Cr
		5-1-0	4

OBJECTIVE

To provide basic knowledge of Boolean algebra, arithmetic circuits, Flip-Flops & counters.

1. **BOOLEAN ALGEBRA:** Basics Laws of Boolean Algebra; Logic Gates; Simplifications of Boolean equations using K-maps; Code Conversion; (Binary; Octal; Hexadecimal); Overview of Gray codes and Excess – 3 codes.
2. **ARITHMETIC CIRCUITS:** Adder; Subtractor; Parallel binary adder/subtractor; binary multiplier and divider.

3. **COMBINATIONAL CIRCUITS:** Multiplexers; De-Multiplexers; decoders; encoders; Design of code converters.
4. **FLIP-FLOPS:** S-R; D; J-K; T; Clocked Flip-flop; Race around condition; Master slave Flip-Flop; Realization of one flip-flop using other flip-flop.
5. **SHIFT REGISTERS:** Serial-in-serial-out; serial-in-parallel-out; parallel-in-serial-out and parallel-in-parallel-out; Bi-directional shift register.
6. **COUNTERS:** Ripple counter; Synchronous Counter; Modulo Counters; Ring Counter; Twisted Ring Counter.
7. **MEMORY DEVICES:** RAM; ROM; PAL & PLA.

TEXT BOOK

Mano, Moris, "Digital Logic and Computer Design", Prentice Hall of India Publications, 2002

REFERENCE BOOKS

1. Jain, R. P., "Modern Digital Electronics", Tata McGraw Hill, 3rd Edition, 2003.
2. Salivahanan, S., & Ariviyghan, S., "Digital circuits and design", Vikas Publication, 2001.
3. Malvino, Leach, "Digital Principles and Application", Tata McGraw Hill, 1999.

EN-1101	TECHNICAL COMMUNICATION	L-T-P	Cr
		5-0-0	3

OBJECTIVE

To make students understand the concepts related to language development communication skills.

1. **FEATURES OF INDIAN ENGLISH:** Correction of sentences- structures- Tenses- ambiguity- idiomatic distortions.
2. **INFORMAL CONVERSATION Vs FORMAL EXPRESSION:** Verbal and non-verbal communication; barriers to effective communication- kinesics.
3. **TYPES OF COMMUNICATION:** Oral, Writing and Reading- Word-Power- Vocabulary- Jargon- rate of speech; pitch; tone- Clarity of voice.
4. **TECHNICAL PRESENTATION:** Types of presentation- video conferencing- participation in meetings- chairing sessions.
5. **FORMAL AND INFORMAL INTERVIEWS:** Ambiance and polemics- interviewing in different settings and for different purposes e.g. eliciting and giving information; recruiting; performance appraisal.
6. **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.

TEXT BOOK

Pal Rajendra, Korlaha, Hi, J,S., "Essentials of Business Communication", Sultan Chand & Sons

REFERENCE BOOKS

1. Rutherford, Andrea, J., "Basic Communication Skills for Technology", Pearson Education Asia.
2. Prasad, V., "Advanced Communication Skills", Atma Ram Publications, New Delhi.
3. Madhukar, R., K, "Business Communication", Vikas Publishing House Pvt. Ltd.

MA-1104	MATHEMATICS- I	L-T-P	Cr
		5-1-0	4

OBJECTIVE

To lay mathematical foundation for the fundamentals of various computational structures such as algebra and Calculus.

1. **DETERMINANTS:** Definition; Minors; Cofactors; Properties of Determinants.
2. **MATRICES:** Definition; Types of Matrices; Addition; Subtraction; Scalar Multiplication and Multiplication of Matrices; Adjoint; Inverse; Cramers Rule; Rank of Matrix Dependence of Vectors; Eigen Vectors of a Matrix; Caley-Hamilton Theorem (without proof).
3. **LIMITS & CONTINUITY:** Limit at a Point; Properties of Limit; Computation of Limits of Various Types of Functions; Continuity at a Point; Continuity Over an Interval; Intermediate Value Theorem; Type of Discontinuities.
4. **DIFFERENTIATION:** Derivative; Derivatives of Sum; Differences; Product & Quotients; Chain Rule; Derivatives of Composite Functions; Logarithmic Differentiation; Rolle's Theorem; Mean Value Theorem.
5. **EXPANSION OF FUNCTIONS:** Maclaurin's & Taylor's; Indeterminate Forms; L' Hospitals Rule; Maxima & Minima; Asymptote; Singular Points; Curve Tracing; Successive Differentiation.
6. **INTEGRATION:** Integral as Limit of Sum; Fundamental Theorem of Calculus; Indefinite Integrals; Methods of Integration Substitution; By Parts; Partial Fractions; Integration of Algebraic and Transcendental Functions.
7. **VECTOR ALGEBRA:** Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and their Applications.

TEXT BOOK

Kresyig E, "Advanced Engineering Mathematics", 5th Edition, John Wiley & Sons, 1999.

REFERENCE BOOKS

1. B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.
3. Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999
4. Shanti Narayan, "Differential Calculus", S.Chand & Company, 1998

MA-1105	MATHEMATICS- II	L-T-P	Cr
		5-1-0	4

OBJECTIVE

To make students understand the concepts related to Set theory, relations, functions & 2D, 3D Coordinate Geometry.

1. **SETS:** Sets; Subsets; Equal Sets Universal Sets; Finite and Infinite Sets; Operation on Sets; Union; Intersection and Complements of Sets; Cartesian product; Cardinality of Set; Simple Applications.
2. **RELATIONS AND FUNCTIONS:** Properties of Relations; Equivalence Relation; Partial Order Relation Function: Domain and Range; Onto; Into and One to One Functions; Composite and Inverse Functions; Introduction of Trigonometric; Logarithmic and Exponential Functions.
3. **PARTIAL ORDER RELATIONS AND LATTICES:** Partial Order Sets; Representation of POSETS using Hasse diagram; Chains; Maximal and Minimal Point; Glb; Lub.
4. **FUNCTIONS OF SEVERAL VARIABLES:** Partial Differentiation; Change of Variables; Chain Rule; Extrema of Functions of 2 Variables; Euler's Theorem.
5. **REVIEW OF 2D COORDINATE GEOMETRY:** Equations of Straight Lines; Circle; Ellipse; Parabola; Hyperbola.
6. **3D COORDINATE GEOMETRY:** Coordinates in Space; Direction Cosines; Angle Between Two Lines; Projection of Join of Two Points on a Plane; Equations of Plane; Straight Lines; Conditions for a line to lie on a plane; Conditions for Two Lines to be Coplanar; Shortest Distance Between Two Lines; Equations of Sphere; Tangent plane at a point on the sphere.
7. **MULTIPLE INTEGRATION:** Double Integral in Cartesian and Polar Coordinates to find Area; Change of Order of Integration; Triple Integral to Find Volume of Simple Shapes in Cartesian Coordinates.

TEXT BOOK

Kolman, Busby and Ross, "Discrete Mathematical Structure", Prentice Hall of India, 1996.

REFERENCE BOOKS

1. Dass, H.K., "Advanced Engineering Mathematics", S.Chand & Co., 9th Revised Ed., 2001.

2. Sarkar, S.K., "Discrete Maths", S. Chand & Co., 2000

PD-151	BASICS OF COMPUTER FUNDAMENTALS	L T P	Cr
		0 0 2	1

OBJECTIVE

To understand fundamentals of computer applications, networking and building projects.

1. **MS-WORD:** Introduction to MS-Word: Menus, toolbars, ruler, scroll bars, creating, saving, importing, exporting and inserting files, formation, indents/out dents, lists, tabs, styles, working with frames, columns, pictures, chart/graphs, forms, tools, equations and macros.
2. **MS-EXCEL:** Worksheet overview: rows, columns, cell, menus, creating worksheets; opening and saving worksheet; formatting, printing, charts, window, establishing worksheet links, macros, database, tables, using files with other programs.
3. **MS-POWERPOINT:** Overview of MS-PowerPoint, creating slides and presentations, rehearsing presentation, insert, tools, format, slide-show, Window options.
4. **MS-PROJECT:** Starting a Project, Starting Microsoft Project 2000, planning a project, defining the project scope, outlining and task relationships, outlining the project, developing the schedule, changing task relationships and constraints, adding and assigning resources, developing the project calendar, assigning project resources, determining project costs, adjusting project resources and timelines, analyzing the project, using different views and reports, displaying project data, organizing project information, sorting and filtering project data, creating custom filters.
5. **NETWORKING:** Basics of networking, study of topology: LAN, WAN, MAN, Connecting devices: passive hub, repeater, active hub, bridges, two layer switches, routers, three layer switches, gateway, network attack and defense: most common attacks.
6. **TROUBLESHOOTING:** Ping command, TRACERT or TRACEOUT, IP configuration, NETSTAT, NET, recovery commands DISKPART etc., setting up local security policies, installation of servers.
7. **FUNDAMENTALS OF CYBER LAW:** Overview of computer and web technology, access control: operating system access controls, group and roles, access control lists, Unix operating system security, Windows NT, capabilities, added features in Windows 2000, granularity, sandboxing and proof-carrying code, hardware protection, other technical attacks.

REFERENCE BOOKS:

1. Habraken, "MS-Office 2000 8 in 1", Prentice Hall
2. Taxali R. K., "PC Software for Windows Made Simple", Tata McGraw
3. Sandler, "Teach Yourself MS Office", BPB Publications
4. Bangia R., "Learning MS Office 2000", Khanna Book Co

5. Wang W. and Parker R. C., "MS Office 2000 Windows for Dummies", IDG Books India (P) Ltd
6. Peter Dyson, "Undertaking PC Tools", Sybex / Tech Asian Edition Tech Publications.
7. Bansal S. K., "Cyber Crime"
8. Ahmand Tabrez, "Cyber law , E-commerce & M-Commerce"
9. Carl Chatfield and Timothy Johnson, "Microsoft Office Project 2007 Step by Step"

PD-191	CO-CURRICULAR ACTIVITIES	L T P	Cr
			1

OBJECTIVE

To help the students in their all round growth and acquire attributes like team spirit, organizational ability, leadership qualities, etc.

OPERATION

The students are to take part in Co-curricular activities outside contact hours through clubs/ societies spread over all the three terms of the year. They are required to register for this course in each term and their performance will be evaluated in last term of the year.

PD-192	PERSONALITY SKILLS	L T P	Cr
		0 0 2	1

OBJECTIVE

To equip the students with the understanding of human behavior, develop time management skills, and enhance personality.

1. **TRANSACTIONAL ANALYSIS:** Winners and losers; ego states; OK states; positive and negative strokes; life scripts; exercises.
2. **CREATIVE THINKING:** What is creativity; 6 thinking hats; mental blocks; exercises.
3. **SELF DISCOVERY:** Importance of knowing yourself; SWOT analysis; benefits; strengths and weaknesses; exercises.
4. **DEVELOPING POSITIVE ATTITUDE:** Meaning; changing attitudes; power of positive thinking; overcoming negative attitude; exercises.
5. **TIME MANAGEMENT:** Features, time management matrix; tips for time management; effective scheduling; time wasters; time savers; exercises and time bound tasks.
6. **STRESS MANAGEMENT:** What is stress; causes; positive and negative stress; effects; signs; tips to overcome stress; stress busters; exercises
7. **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

REFERENCE BOOKS

1. Muriel, James and Jongeward, Dorothy, "Born to Win", Signet Publishers, 1978
2. Harris, Thomas Anthony, "I'm OK, You're OK", Galahad Books, 2004
3. Dr. Alex, K., "Soft Skills", 2009, S. Chand, 2009
4. Adams Scott, "Positive Attitude", Andrews Mcbeel Publishing, 2004
5. Newton Tim, "Managing Stress – Emotion and Power at Work", Sage Publications Ltd., 1995
6. Koch Richard, "The 80/20 Principle :The Secret to Success by Achieving with Less", Broadway Business, 1999
7. Covey Stephen R., "The 7 Habits of Highly Effective People", Simon & Schuster UK, 2004

NOTE: One trainer per lecture and two trainers per practical session. Classroom with board/projector for PPT and video clips will be required.

PD-193	ENTREPRENEURIAL & PROFESSIONAL SKILLS	L T P	Cr
		0 0 2	1

OBJECTIVE

To empower the students with entrepreneurial skills, behaviour, grooming and effective interaction at the work place.

1. **GOAL SETTING:** Types of goals; setting smart goals; personal goal setting; business goal setting; goal setting techniques.
2. **ENTREPRENEURIAL SKILLS:** Meaning; entrepreneurial competencies; advantages; risks involved, avenues and opportunities; support from Govt.; basic and significant personality traits; venture project planning and entrepreneurship cycles; planning the project; entrepreneurship in daily life; case studies in entrepreneurship; exercises.
3. **CORPORATE DRESSING:** The corporate fit; corporate culture; dress codes; dressing for interviews; clothing do's and don'ts.
4. **CORPORATE GROOMING:** Making a good impression at work; grooming check list; accessories, do's and don'ts for men and women; hygiene and skin care; hands and feet; make up and hair accessories.
5. **ETIQUETTE & MANNERS:** Social etiquette; dining etiquette; party and wedding etiquette; sensitivity towards diverse cultures; respecting religions and traditions.
6. **BUSINESS ETIQUETTE:** Dealing with people at work place (peers, subordinates and superiors); international business; etiquette at meetings and conferences.
7. **COMMUNICATION MEDIA ETIQUETTE:** Telephone etiquette; email etiquette; media etiquette.

REFERENCE BOOKS

1. Miner, B. John, "The 4 Routes to Entrepreneurial Success", Berrett-Koehler, 1996
2. Ellis, Keith, "The Magic Lamp", Three Rivers Press, 1998
3. Blair, Gary Ryan, "The Ten Commandments of Goal Setting", Goalsguy Learning Skills Inc., 2005
4. Gupta, Seema, "Correct Manners and Etiquette", Pustak Mahal, 1992
5. Soundararaj, Francis, "Speaking and Writing for Effective Business Communication", MacMillan, 1995

NOTE: One trainer per lecture and two trainers per practical session. Classroom with board/projector for PPT and video clips will be required.

PH-1104	BASICS OF PHYSICS	L-T-P	Cr
		5-0-0	3

OBJECTIVE

Providing a sound conceptual understanding of the fundamental concepts of physics like work, energy & power.

1. **LAW OF MOTION:** Force and Inertia; The law of inertia or Newton's first law of motion; Newton's Second law of Motion; Newton's third law of Motion Equilibrium of concurrent forces.
2. **WORK, ENERGY & POWER:** Work; Kinetic Energy; Potential Energy; Power; Collisions; Different Forms of Energy; conservation of Energy .
3. **ELECTRICITY:** Electric Forces; charges & Fields: Frictional electricity; properties of electric charge; conductors and insulators; coulomb's law; electric field; lines of force.
4. **ELECTROSTATICS:** Gauss's theorem; applications ; electrostatic potential; potential energy; electrostatics of conductors; capacitors and capacitance; effect of dielectrics in capacitors.
5. **CURRENT ELECTRICITY:** Current; voltage; resistance; ohm's law and resistivity of materials; electrical circuits & Kirchoff's rule; measurement of voltages; currents and resistance.
6. **THERMAL AND CHEMICAL EFFECTS OF CURRENT:** Heating effects; Thermo Electricity; Chemical effects; Magnetic effects of currents; Oersted's discovery; Magnetic field due to current forces on current and the Lorentz force. Ampere's circuital law; Solenoid.
7. **ELECTROMAGNETIC INDUCTION:** Faraday's experiments; Faraday's Law; Lenz's Law and conservation of energy; discussion of Faraday's Law; Electromagnetic induction and Lorentz force; Semiconductors and their property.

TEXT BOOK

Gupta, S., K., "Modern ABC of Physics", Vol. I & II, Modern Publishers, 2002.

REFERENCE BOOKS

1. Pradeep, "Fundamental Physics", Class XI, XII, 2000.
2. Kumar Mittal, "Physics, Part – I", Published by Nageen Publications, Meerut.
3. Kumar Mittal, "Physics, Part - II", Published, By Nageen Publications, Meerut.

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- **Lingaya's Lalita Devi Institute of Management & Sciences, New Delhi (I.P. University)**
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CAMPUS

Nachauli, Old Faridabad - Jasana Road, Faridabad-121002

Ph: 91-129-3064500-505, Fax: 91-129-2202615

ADMIN. OFFICE

C-72, Shivalik, Malviya Nagar, New Delhi-110017

Ph: 91-11-40719000, Fax: 91-11-40719023

E-mail: lu@lingayasuniversity.edu.in

Website: lingayasuniversity.edu.in