Important

Academic Rules

Scheme of

Studies & Syllabus

B.Tech. Degree Programme
1st Year (Common to all Disciplines)
(Effective from 2011-12)

LINGAYA'S UNIVERSITY
choose to know

(u/s 3 of UGC Act 1956)

CONTENTS

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-semester / term.
- “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.
- “ETE” means End Term Examination.
- "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**.**
- “Grade Card” means the detailed performance record in a term/ 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.
- “MLC” means Mandatory Learning Course.
- “MTE” means Mid Term Examination.
- "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.
- "Regulations" means, set of Academic Regulations.
- "University" or “LU” means, Lingaya’s University, Faridabad
- "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.
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 & 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
B.Tech. Degree Programme (Regular)

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 University 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

- The normal duration of the programme leading to B.Tech degree will be four years comprising twelve trimesters (or terms).
- The B.Tech. Degree programme consists of two modes i.e. (a) Project Mode and (b) with Internship.
- The total course package for a Regular B.Tech Degree Programme with Project Mode will typically consist of the following components.
  (i) General courses
  (ii) Basic Science and Mathematics
  (iii) Engineering Science and Technical Arts
  (iv) Core Courses
  (v) Elective Courses
  An Elective Course can be any of the following:
  a) Departmental Elective
  b) Open Elective
  (vi) Project/Internship (Supervised)
  (vii) Major Project/Internship (Supervised)
  (viii) Industrial Training
  (ix) Mandatory Learning Courses
- The Regular B. Tech. Degree Programme with internship will typically consist of all the components of the Regular Project Mode as above, however with different weightage to industrial training and core courses.
- The student has to opt for the Internship Scheme in the ninth term which will not be revoked in any circumstances. In the absence of exercising the option, it will be presumed that option is for Project Mode.

- A student having registered for internship scheme of a programme cannot opt out of that scheme.
- The minimum credit requirement for the B.Tech. Degree programme is 190. However, considering a case for award of honours the minimum credits will be 195.
- The project will be assigned in tenth term. It may be extended to Major Project. The Major Project shall comprise of Phase-I and Phase-II, spread over eleventh and twelfth terms. Appropriate double-letter grade is awarded as per the evaluation scheme which will be considered for TGPA and CGPA calculations. It is recommended that an external expert from industry/academia may be a member of the evaluation team of four persons (two professors, external expert and respective project guide).
- MLC must be completed by a student at appropriate time or at his convenience. The 'S' grade is awarded for satisfactory completion of the course and 'N' grade is awarded for non-satisfactory completion of the course. In case 'N' grade is awarded, the student has to re-register for the same course if no alternative options are available. However, one can opt for other courses if provided with multiple options. The 'S' and 'N' grades do not carry grade-points and, hence, are not included in the TGPA and CGPA computations.
  Courses that come under this category are the following:
  (a) Environment Science and Ecology
  (b) Community Service Oriented Project
  (c) Professional Development Courses
- Students admitted to the University will be required to take suitable additional Courses in Mathematics (5-0-0) and or Communication Skills (3-0-0), if found deficient.

ASSOCIATION

- Every under graduate student of the University shall be associated with Parent Department (degree awarding department) offering the degree programme that the student undergoes throughout his study period, right from the very first day of admission into the programme. However, in the first year class he may report to the Dept. of Applied Science and Humanities for administrative/ academic purpose.
- A student will be placed in GROUP-A/B/C for all the three terms in an academic year.
- The schedule of academic activities for a term, including the dates of registration, mid-term examinations (MTE), end-term examination (ETE), 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 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 and 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.

CREDIT LIMITS

- A student of the B.Tech. degree programme must register for a minimum of 10 credits, and up to a maximum of 23 credits in a Term. However, the minimum / maximum credit limit can be relaxed by the DAA on the recommendation of the HOD, only under exceptional circumstances. The maximum credits that a student can register in a Summer Term are 10.
- Professional Development courses are one credit courses each, with multiple options, to be completed at student's convenience in each Term. Some of them may be mandatory and others two-letter grade category. However, registration has to be done for all courses.

CHANGE IN REGISTRATION

- 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 (a) and (b) 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 MTE due to illness and/or any exigencies may give a request for make-up examination within one week after the MTE 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 may forward the case to DAA with his recommendation for the award of 'I' grade. After permission by DAA in writing, the 'I' Grade is converted into a regular double letter grade on the basis of the students' marks in Mid-Term Test and Class Work. However, if a student has scored 50% or more marks in Mid-Term Test plus Class work his/her marks will be increased by 50% before awarding the grade. This applies to both theory and practical courses.

COURSE CREDIT ASSIGNMENT

- Every course comprises of specific Lecture-Tutorial-Practical (L-T-P) schedule. The credits for various courses are shown in the Scheme 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	Fail
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 terms/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 Section “Absence during Examination”).
- ‘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' 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 MTE 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 feed back will be given through the laboratory records which are required to be submitted after performing the experiment in the next laboratory class.
- The continuous feedback on project/major project will be through project diary and interim report.
- For Internship stream, the continuous assessment and feedback is to be through seminars, professional dairy and interim reports at the place of work.

EVALUATION

Theory Course:

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

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

Laboratory Course:

- 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%

Project (Including Seminar):

- The double letter grade awarded to the student in Project (Includes Seminar) i.e. 0-0-P course will be based on his performance in technical work pertaining to the solution of a small size problem, project report, and presentation of work and defending it in a viva-voce. The weightage of the components of continuous evaluation may be as follows:

Technical Work	:	50%
Report	:	25%
Seminar, Presentation & Viva-voce	:	25%
Total	:	100%

Major Project:

- The double letter grade awarded to the student in Major Project Phase-I and Phase-II i.e. 0-0-P course will be based on his performance in technical work pertaining to the solution of a problem, project report, presentation and defending in a viva-voce. The weightage of the components of continuous evaluation may be as follows:

Technical Work	:	50%
Report	:	25%
Presentation & Viva-voce	:	25%
Total	:	100%

Internship:

- The Internship-II will be treated as Major Project for evaluation purpose. The double letter grade awarded to the student in Internship-II i.e. 0-0-P course will be based on his performance in technical work pertaining to the solution of a real-life problem, project report, presentation and defending in a viva-voce. The weightage of the components of continuous evaluation may be as follows:

Technical Work	:	50%
Report	:	25%
Presentation & Viva-voce	:	25%
Total	:	100%

The continuous assessment and feedback is to be through seminars, professional diary and entering report at the place of work.

Seminar:

- The double letter grade awarded to the student in Seminar i.e. 0-0-P course will be based on his performance in oral presentation with emphasis on technical contents, presentation and ability to answer questions. The

weightage of the components of continuous evaluation may be as follows:

Technical Contents	:	40%
Presentation	:	30%
Questions and answers	:	30%
Total	:	100%

Industrial/Field Training/Internship-I:

- The double letter grade awarded to the student in Industrial/Field Training/Internship-I i.e. 0-0-P course will be based on Practical Training/Internship-I in an industry, professional organization/ research laboratory. The components of continuous evaluation with weightage may be as follows:

Training report	:	40%
Presentation	:	30%
Questions and answers	:	30%
Total	:	100%

Professional Development:

- There are 14 credits divided into 14 courses of one credit each. The evaluation process of these courses will be as per the nature, contents and delivery of these courses. Some of the common components of evaluation could be quizzes, viva-voce, practical test, group discussion, etc. Participation by students is to be given more weightage in Co-curricular courses.

SCHEME OF EXAMINATION

- The duration of examinations for a theory course will be 3 hours for ETE and 1½ hours for MTE.
- The pattern of question paper/examination will be as under:

- **Theory Courses:**
  The University shall conduct the ETE for all theory courses being taught in the term.
  i) There will be eight questions in all distributed over all the units in a course syllabus. The question paper will be in two parts with weightage 20 percent and 80 percent respectively. The paper setter must set the questions such that each question can be answered in about 35 minutes and the paper can be solved in 3 hours by an average student.
  ii) Part-A will have one question of objective types with multiple choices, covering all the units in the syllabus, which will be compulsory.
  iii) Part-B will consist of seven questions, one question from each of the seven units, and the students are required to solve any four. Out of seven any three questions will have long answers of comprehensive/ derivation/description type and the remaining four questions will be of problem solving type in order to measure ability on analysis/ synthesis/application.

If any special instruction(s) is/are required for a particular course, it/they is/are to be specified by the concerned HOD with prior approval of DAA.

- 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 ETE 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:**
  There is one compulsory question covering all topics taught till then. Further, there will be four questions, two of which will be essay type and the other two to measure ability on analysis/ synthesis/ application. The studet will answer any two out of the four.

TRANSPARENCY

- The answer books of all MTE and ETE 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 and grades shall be displayed on the notice board and a student can approach the Course Instructor(s) concerned for any clarification within the period stipulated in the Academic Calendar. 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 error/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

- 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.

- 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:
  $TGPA = \sum C_i G_i / \sum C_i$
  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:
  $CGPA = \sum C_i G_i / \sum C_i$
  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 courses 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 ≥ 8.5 No 'FF', N or W grade in any course during the programme and total 195 credits
First Division with Distinction	CGPA ≥ 8.5
First Division	CGPA ≥ 6.75
Second Division	CGPA ≥ 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.

B. TECH. DEGREE REQUIREMENTS

- The requirements of the award of B.Tech. Degree programme are as follows:
  - (a) **University Requirements:**
    - (i) Minimum Earned Credit Requirement for Degree is 190 for regular programme. However, the credits required for consideration for honours degree will be 195.
    - (ii) Satisfactory completion of all Mandatory Learning Courses.
  - (b) **Programme Requirements:**
    Minimum Earned Credit Requirements on all Core Courses, Elective Courses and Major Project/Internship as specified by the BOS.
  - (c) The CGPA at the end of programme is atleast 5.0.
  - (d) The Maximum duration for a student for complying with the Degree Requirement is SEVEN years from date of first registration for first Term.

GRADE IMPROVEMENT

- A student may be allowed to improve the TGPA in an appropriate Term, if his TGPA falls below 5.0. Similarly, any student may be allowed to improve performance in any course provided the course is being floated and available.

TERMINATION FROM THE PROGRAMME

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

CHECK POINT	CREDIT THRESHOLD** (Percentage of Credits of Theory Courses)
End of FIRST year	50*
End of SECOND year	60*
End of THIRD year	70
End of FOURTH year	80

Note 1:

* A student may be given one more chance to cover the shortfall in the threshold at the end of first two years during the following summer terms if s/he can fulfill the requirement by doing two courses. In case s/he fails to clear the threshold even after the summer term he has to

leave the course.

** If at any stage, a student fails to cross the thresh hold 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 (refer: Clause No. G8.1) is not to be counted for the above Credit Threshold.

(b) If a student is absent for more than 4 (Four) weeks at a stretch in a Term without sanctioned leave.

(c) Based on disciplinary action by the AC, on the recommendation of the appropriate committee.

Note: Under any circumstances of termination, the conditions specified in Permanent. Withdrawal (refer: Clause No: G8.2) shall also apply.

WITHDRAWAL FROM PROGRAMME

Temporarily:

- 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 University 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/ University / Hostels/Library and any other centers;
  - (iii) Scholarship holders are bound by the appropriate Rules applicable to them.
  - (iv) The decision of the VC of the University 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.

***Permanently*:**

- 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 University for good, will be permitted to do so (and take Transfer Certificate from the University, 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 University shall repay all such amounts, in addition, to clearing all the dues for the remaining duration of the course.
- The decision of the VC regarding all aspects of withdrawal of a student shall be final and binding.

*****

Scheme of Studies
B. Tech. Degree Programme (Regular)
(Common to all Disciplines)

1st Year					
TERM – I					
THEORY					
Sl. No.	**Group**	**Course No.**	**Course Name**	**Periods L-T-P**	**Cr**
1	A	MA-101	Applied Mathematics-I	5-1-0	4
	B	MA-101	Applied Mathematics-I	5-1-0	4
	C	ME-101	Engineering Mechanics	5-1-0	4
2	A	PH-101	Physics	5-1-0	4
	B	PH-101	Physics	5-1-0	4
	C	EL-101	Electrical Engineering	5-1-0	4
3	A	CH-101	Applied Chemistry	5-0-0	3
	B	CS-101	Computer Programming	5-1-0	4
	C	CE-101	Environmental Science & Ecology***	5-0-0	3
4	A	EN-101	Communication Skills	5-0-0	3
PRACTICAL/DRAWING/DESIGN					
1	C	ME-151	Engineering Mechanics Lab	0-0-3	1
2	A	PH-151	Physics Lab	0-0-3	1
	B	PH-151	Physics Lab	0-0-3	1
	C	EL-151	Electrical Engineering Lab	0-0-3	1
3	A	CH-151	Applied Chemistry Lab	0-0-3	1
	B	CS-151	Computer Programming Lab	0-0-3	1
4	A	EN-151	Language Lab	0-0-3	1
	B	ME-152	Workshop Practice	0-0-6	2
	C	ME-153	Engineering Graphics	0-0-6**	3
5	A	PD-192	Personality Skills	0-0-3	1
	B	PD-193	Enterpreneural & Professional Skills	0-0-3	1
	C	PD-151	Basics of Computer Fundamentals	0-0-3	1
6	A/B/C	PD-191	Co-curricular Activities		1*

Note: A student will be placed in GROUP A/B/C for all the three terms in an academic year.

GROUP	TOTAL CONTACT HOURS	TOTAL CREDITS
A	20-2-12 (34)	18
B	15-3-15 (33)	17
C	15-2-15 (32)	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.

** One hour for explanation/demonstration.

*** CE-101 is a Mandatory Learning Course.

Scheme of Studies
B. Tech. Degree Programme (Regular)
(Common to all Disciplines)

1st Year					
TERM – II					
THEORY					
Sl. No.	**Group**	**Course No.**	**Course Name**	**Periods L-T-P**	**Cr**
1	A	MA-102	Applied Mathematics-II	5-1-0	4
	B	ME-101	Engineering Mechanics	5-1-0	4
	C	MA-101	Mathematics-I	5-1-0	4
2	A	PH-102	Applied Physics	5-1-0	4
	B	EL-101	Electrical Engineering	5-1-0	4
	C	PH-101	Physics	5-1-0	4
3	A	CS-101	Computer Programming	5-1-0	4
	B	CE-101	Environmental Science & Ecology***	5-0-0	3
	C	CH-101	Applied Chemistry	5-0-0	3
4	C	EN-101	Communication Skills	5-0-0	3
PRACTICAL/DRAWING/DESIGN					
1	B	ME-151	Engineering Mechanics Lab	0-0-3	1
2	A	PH-152	Applied Physics Lab	0-0-3	1
	B	EL-151	Electrical Engineering Lab	0-0-3	1
	C	PH-151	Physics Lab	0-0-3	1
3	A	CS-151	Computer Programming Lab	0-0-3	1
	C	CH-151	Applied Chemistry Lab	0-0-3	1
4	A	ME-152	Workshop Practice	0-0-6	2
	B	ME-153	Engineering Graphics	0-0-6**	3
	C	EN-151	Language Lab	0-0-3	1
5	A	PD-193	Enterpreneural & Professional Skills	0-0-3	1
	B	PD-151	Basics of Computer Fundamentals	0-0-3	1
	C	PD-192	Personality Skills	0-0-3	1
6	A/B/C	PD-191	Co-curricular Activities		1*

Note: A student will be placed in GROUP A/B/C for all the three terms in an academic year.

GROUP	TOTAL CONTACT HOURS	TOTAL CREDITS
A	15-3-15 (33)	17
B	15-2-15 (32)	17
C	20-2-12 (34)	18

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.

** One hour for explanation/demonstration.

*** CE-101 is a Mandatory Learning Course.

Scheme of Studies
B. Tech. Degree Programme (Regular)
(Common to all Disciplines)

1st Year					
TERM – III					
THEORY					
Sl. No.	**Group**	**Course No.**	**Course Name**	**Periods L-T-P**	**Cr**
1	A	ME-101	Engineering Mechanics	5-1-0	4
	B	MA-102	Applied Mathematics-II	5-1-0	4
	C	MA-102	Applied Mathematics-II	5-1-0	4
2	A	EL-101	Electrical Engineering	5-1-0	4
	B	PH-102	Applied Physics	5-1-0	4
	C	PH-102	Applied Physics	5-1-0	4
3	A	CE-101	Environmental Science & Ecology***	5-0-0	3
	B	CH-101	Applied Chemistry	5-0-0	3
	C	CS-101	Computer Programming	5-1-0	4
4	B	EN-101	Communication Skills	5-0-0	3
PRACTICAL/DRAWING/DESIGN					
1	A	ME-151	Engineering Mechanics Lab	0-0-3	1
2	A	EL-151	Electrical Engineering Lab	0-0-3	1
	B	PH-152	Applied Physics Lab	0-0-3	1
	C	PH-152	Applied Physics Lab	0-0-3	1
3	B	CH-101	Applied Chemistry	0-0-3	1
	C	CS-151	Computer Programming Lab	0-0-3	1
4	A	ME-153	Engineering Graphics	0-0-6**	3
	B	EN-101	Language Lab	0-0-3	1
	C	ME-152	Workshop Practice	0-0-6	2
5	A	PD-151	Basics of Computer Fundamentals	0-0-3	1
	B	PD-192	Personality Skills	0-0-3	1
	C	PD-193	Enterpreneural & Professional Skills	0-0-3	1
6	A/B/C	PD-191	Co-curricular Activities		1*

Note: A student will be placed in GROUP A/B/C for all the three terms in an academic year.

GROUP	TOTAL CONTACT HOURS	TOTAL CREDITS
A	15-2-15 (32)	17+1*
B	20-2-12 (34)	18+1*
C	15-3-15 (33)	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.

** One hour for explanation/demonstration.

*** CE-101 is a Mandatory Learning Course.

IMPORTANT NOTES

1. Laboratory Courses are being offered as distinct courses (0-0-3) without being mixed with lecture components.
2. Conduct of Lab Courses:
   a. At least ten experiments/programs are to be performed in a term.
   b. It is expected that more experiments/programs 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 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 admitted through Lateral Entry Scheme will be required to take a Bridge Course on Mathematics (5-0-0) as an Audit Course.
4. Assessment of Industrial/Field Training and Internship-I will be based upon certificate of Industry/Field training obtained by the student, report, seminar and viva-voce examination. A student who is awarded 'FF' Grade is required to repeat Industry/Field training.
5. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.
6. For open elective, all students will be permitted to opt for any one elective run by another department. However, the departments will offer only those elective for which they have expertise. Further, the students will not be allowed to opt for any course under this category, which has already been done. An open elective opted during the end of tenth term, allotted list of which will be displayed on notice board and taught in the eleventh term.
7. The choice of students for the Internship stream shall not be a binding for the department to offer.
8. Elective-II is not required to be done by the students pursuing the degree through Internship Mode.
9. Students are allowed in the examination the use of single memory, non-programmable calculator. However, sharing of calculator is not permitted.

DETAILED SYLLABUS

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", 4th Edition, New Age International Publishers, 2004

REFERENCE BOOKS

1. Agarwal, K.C., "Environmental Biology", 2nd Edition, Nidhi Publ. Ltd., Bikaner, 2001
2. Bharucha Erach, "The Biodiversity of India", 2nd Edition, Mapin Publishing Pvt. Ltd., 2006
3. Brunner R. C., "Hazardous Waste Incineration", 1st Edition McGraw Hill Inc., 1989.
4. Clark R.S., "Marine Pollution", 1st Edition Clanderson Press Oxford,1989
5. Cunningham, W.P., Cooper, T.H. Gorhani, E. & Hepworth, M.T., Environmental Encyclopedia", 2nd Edition, 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", 1st Edition, Himalaya Pub. House, Delhi, 1995.
8. Mckinney, M.L. and Schocl. R.M., "Environmental Science Systems & Solutions", 2nd Edition, Web enhanced edition, 1996.
9. Rao M.N. and Datta, A.K., "Waste Water Treatment", 2nd Edition, Oxford & IBH Publ. Co., 1987.
10. Sharma B.K., "Environmental Chemistry", 2nd Edition, Goel Publ. House, Meerut, 2001
11. Trivedi R.K. and Goel, P.K., "Introduction to Air Pollution", 2nd Edition, Techno-Science Publications, 1996

CH-101	APPLIED CHEMISTRY	L T P	Cr
		5 0 0	3

OBJECTIVE

To introduce to the students the latest topics of interests of the new generation science with the accomplishment of various technological advancements of biochemistry and texture of advanced photochemistry.

1. **PHASE RULE**: Terminology of phases; components and degree of freedom; derivation of Gibbs phase rule equation; one component system (water system); application of reduced / condensed phase rule; two component system; eutectic (Pb-Ag) system; congruent (Zn-Mg) system; Incongruent system (Na-K) system; merits and demerits of phase rule.
2. **THERMODYNAMICS:** Entropy; entropy change for an ideal gas; free energy and its physical significance; variation of free energy with temperature and pressure; work function and its significance; relation between Gibb's free energy and work function; second law of thermodynamics; Gibbs Helmholtz equation; Its application and significance; chemical potential; Gibbs Duhem equation; Clausius Clapeyron equation and its application.
3. **WATER AND ITS TREATMENT**: Specification of water for different uses; hardness of water; equivalent of calcium carbonate; units of hardness; disadvantages of hard water and determination of hardness; alkalinity of water and its determination; related numericals; scale and sludge formation in boilers and its prevention; caustic embrittlement; water softening; Zeolite process; Ion exchange process and mixed bed demineralization; disinfection of water; desalination; reverse osmosis; electrodialysis.
4. **CORROSION AND ITS PREVENTION**: Introduction; classification; dry and wet corrosion; electrochemistry theory of corrosion; galvanic, pitting and waterline corrosion; differential aeration corrosion; stress corrosion; factors affecting corrosion; preventive measures; material selection; proper designing; barrier protection; sacrificial protection; cathodic; anodic protection.
5. **LUBRICATION AND LUBRICANTS:** Friction; mechanism of lubrication; classification of lubricants; additives of lubricants; synthetic lubricants; properties of lubricants; consistency; drop point; fire and flash point; cloud point; pour point; viscosity; viscosity index; Iodine no.; aniline no.; saponification no.; steam emulsion no.; neutralization no.; decomposition stability and their significance.
6. **PHOTOCHEMISTRY:** Photochemical and dark reactions; laws of photochemistry; quantum efficiency; classification of photochemical reactions on the basis of their quantum efficiencies; non-radiative processes (ISC and IC); fluorescence; phosphorescence (Jablonski diagram); chemiluminiscence; photosensitization; technology based on photochemical processes.
7. **BIOMOLECULES:** Structure; function; diversity and distribution; general composition of living matter. carbohydrates; monosaccharides and their inter-relationship; structure of sugars; glucose; fructose; maltose; lactose, sucrose; stereoisomerism and optical isomerism of sugars; ring structure and tautomeric form and mutarotation; lipids: definitions; classification of lipids; fatty acids; glycerol; building block of lipid; proteins and amino acid; classification and formulae; proteinous and non-proteinous; essential and non-essential amino-acids; primary, secondary, tertiary, quaternary structure of proteins; N and C terminal determination.

TEXT BOOK

Srivastava, H.C., "Engineering Chemistry", Pragati Prakashan Publishing House.

REFERENCE BOOKS

1. Chawla, Shashi, "Engineering Chemistry", 1st Edition, Dhanpat Rai and Co., 2003
2. Ambasta, B.K, "Engineering Chemistry", 2nd Edition, Laxmi Publications, 2007
3. Singh, Devender and Vats Satish K., "Comprehensive Engineering Chemistry", 1st Edition, I. K. International Publication, 2007
4. Chatwal Gurdeep "Organic Chemistry on Natural Products", Vol. 1, 1st Edition, Himalaya Publishing House, Reprint 2002.
5. Chatwal Gurdeep, "Photochemistry", 1st Edition, Himalaya Publishing House, 2003.
6. Jain, P.C., and Jain, Monica, "Engineering Chemistry", 3rd Edition, Dhanpat Rai & Co., 2008
7. Morrison, R.T., and Boyd, R.N., "Organic Chemistry", 6th Edition, Pearson Education,1994

CH-151	APPLIED CHEMISTRY LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS

1. Determination of Ca++ and Mg++ hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Find the melting and eutectic point for a two component system by using method of cooling curve.
4. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
5. Prepare Phenol-formaldehyde and Urea formaldehyde resin.
6. Find out Saponification number of oil.
7. Determination of concentration of $KMnO_4$ solution spectro-photometerically.
8. Determination of strength of HCl solution by titrating it against NaOH solution conductometerically.
9. Determination of drop point of given lubricant using drop point apparatus.
10. Estimate the sugar (Glucose) using Fehling solution method.
11. Determine flash point and fire point of oil by Pensky - Marten's flash point apparatus.
12. Determine amount of sodium and potassium in a given water sample by flame photometer.

REFERENCE BOOKS

1. Dara, S. S. "A Text Book on Experimental and Calculation – Engineering Chemistry", 3rd Edition, S. Chand & Company, 2005.
2. Chawla, Shashi, "Essential of Experimental Engineering Chemistry", 2nd Edition, Dhanpat Rai Publishing Company, 2006
3. Virmani, O. P., and Narula, A. K., "Theory & Practice Applied Chemistry", 1st Edition, New Age Publications, 2008.

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", 2nd Edition, 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", 2nd Edition, Prentice Hall of India, 1996.
6. Byron, C. Gottfried, "Theory and Problem of Programming with C", 2nd Edition, 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.

CS-151	COMPUTER PROGRAMMING LAB	L T P	Cr
		0 0 3	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. Kernigham, "The C Programming Language",2nd Edition, Prentice Hall of India, 1988.

2. Byron, C. Gottfried, "Theory and Problem of Programming with C", 2nd Edition,Tata McGraw Hill, 2010
3. Barkakati, Nabajyoti, "Object Oriented Programming in C++", 3rd Edition, Prentice Hall of India, 2008.
4. Schildt, Herbert, "C++: The Complete Reference", Tata McGraw Hill, 4th Edition, 2003

EL-101	ELECTRICAL ENGINEERING	L T P	Cr
		5 1 0	4

OBJECTIVE

To provide basic knowledge and understanding of fundamental concepts of Electrical Technology, explaining various basic laws governing the circuit configurations and evaluation and its applications to electrical circuits.

1. **DC NETWORKS:** EMF, potential difference; current, resistance; Ohm's law; effect of temperature on resistance; source conversion; KCL, KVL; mesh analysis, nodal analysis; network theorems – superposition, Thevenin's, Norton, reciprocity, maximum power transfer theorem; star-delta conversion.
2. **SINGLE PHASE AC CIRCUIT**: Generation of AC voltages, frequency, cycle, period, instantaneous, Peak, RMS and average value, peak factor, form factor, phase and phase difference, polar, rectangular, exponential and trigonometric representation of phasors; R, L and C components, behavior of these components in A.C. circuits, series and parallel A.C. circuits and their phasor diagrams, concept of impedance and admittance, power and power factor, Complex power; resonance-Series and parallel resonance, Q factor; bandwidth.
3. **THREE PHASE CIRCUITS:** Phase and line voltages and currents, balanced star and delta circuits; phasor diagram, power equation, measurement of three phase power by two wattmeter method; comparison of single phase, three phase and DC system and their relative advantages.
4. **MAGNETIC CIRCUITS:** Magnetic effect of electric current; concept of MMF; flux, flux density, reluctance, permeability; B-H curve; hysterisis loop, hysterisis and eddy current loss; comparison of electrical and magnetic circuits.
5. **TRANSFORMER:** Construction, principle, working of ideal and practical transformer; equivalent circuit, phasor diagram; OC and SC tests, regulation and efficiency; autotransformer.
6. **ROTATING ELECTRICAL MACHINES:** DC MACHINES – construction, principle of operation and classification of dc machines, EMF equation and characteristics of dc generator, starting and speed control of dc motor.
   INDUCTION MACHINES: Construction and principle of operation of three phase induction motor, concept of slip and its importance.
7. **MEASURING INSTRUMENTS**: Voltmeter; ammeter; wattmeter; energy meter.

TEXT BOOK

Gupta, J.B. "Electrical Technology", Katson Publication

REFERENCE BOOKS

1. Theraja, B.L. "Electrical Technology Vol I & II", 3rd Edition, S. Chand Publications, 2005
2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill, 2002
3. Theodore, Wildi "Electrical Machines, Drives and Power Systems", 2nd Edition, Prentice Hall, 1991.
4. Edward, Hughes (revised by Ian McKenzie Smith), "Electrical Technology", 7th Edition, English Language Book Society, Publication with Longman, 1995.
5. Del Torro Vincent, "Electrical Engineering Fundamentals", 2nd Edition, Prentice Hall of India, 1994.
6. Cathey, J.J. and Naser, S.A. "Basic Electrical Engg.", 2nd Edition, Schaum Series, McGraw Hill Publ.

EL-151	ELECTRICAL ENGINEERING LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS

1. To verify KCL and KVL.
2. To verify Thevenin's and Norton's Theorems.
3. To verify maximum power transfer theorem in D.C Circuit and A.C Circuit.
4. To verify Reciprocity and Superposition theorems.
5. To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-Factor for various Values of R, L, C.
6. To study frequency response of a parallel R-L-C circuit and determine resonant frequency and Q-Factor for various values of R, L, C.
7. To perform direct load test of a transformer and plot efficiency Vs load characteristic.
8. To perform open circuit and short circuit tests on a single-phase transformer determine the losses and efficiency.
9. To perform direct load test of a DC shunt generator and plot load voltage Vs load current curve.
10. To study various types of meters.
11. Measurement of power by 3 voltmeter / 3 ammeter method.
12. Measurement of power in a 3 phase system by two watt meter method.
13. Connection and testing of a single-phase energy meter (unit power factor load only).

REFERENCE BOOKS

1. Theraja, B.L. "Electrical Technology Vol I & II", S. Chand Publications, 2005
2. Kothari and Nagarath, "Basic Electrical Engg.", 2nd Edition, Tata McGraw Hill, 2002
3. Del Torro Vincent, "Electrical Engineering Fundamentals", 2nd Edition, Prentice Hall of India, 1994.
4. Cathey, J.J. and Naser, S.A. "Basic Electrical Engg.", 2nd Edition, Schaum Series, McGraw Hill Publ, 2006.

EN-101	COMMUNICATION SKILLS	L T P	Cr
		5 0 0	3

OBJECTIVE

By doing this course the students will be acquiring reasonable level of oral and in writing proficiency in English language ultimately they will be able to communicate with their counter parts in business/industry in the country and abroad effectively.

1. Vocabulary; Use of Words; Synonyms; Homophones; Homonyms; Forms and Functions of Words
2. Sentence Structure; Verb patterns; Simple; Complex and Compound Sentences
3. Remedial English Grammar; Common Errors and Rules of Concord
4. Phonetics; Basic Concepts; Vowels; Consonants; Syllables; Manner of Articulation and Place of Articulation; Speech Sounds; Transcription of Words ; Word Stress and Intonation
5. Comprehension; Interpretation of Seen/Unseen Passages
6. (A) Oral Communication: Practicing short dialogues; Group Discussions; and Debates
   (B) Technical Writing:
      (i) Business Letters (Format of Business Letters and Business Letter Writing)
      (ii) Email Writing
      (iii) Reports and types of reports and Press reports
7. Book Review (for internal assessment)
   Language lab: Emphasis will be laid on accent, pronunciation, intonation, reading/ listening comprehension

TEXT BOOK

Bansal, R.K. and Harrison, J.B., "Spoken English for India", 2nd Edition, Orient Longman, 2009

REFERENCE BOOKS

1. Tickoo M. L. and Subramanian, A. E., "Intermediate Grammar, Usage and Composition", 1st Edition, Orient Longman, 1976
2. Thomson and Martinet, "A Practical English Grammar", 1st Edition, Oxford University Press, 1986
3. Hornby, A. S., "Guide to Patterns and Usage in English", 2nd Edition, Oxford University Press, 2005
4. Balasubramanian T, "A Textbook of English Phonetics for Indian Students", 1st Edition, MacMillan, 2004.
5. D.O'Connor J, "Better English Pronunciation" 1st Edition, Cambridge University Press, 2004
6. McCarthy, "English Vocabulary in Use Foundation Books", 2nd Edition, Cambridge University Press, 2005.
7. Hashem Abul, "Common Errors in English", 1st Edition,Ramesh Publishing House, 2008

8. Roach P., "English Phonetics & Phonology", 1st Edition,Cambridge University Press, 2006.
9. Ramesh M. S. and C.C. Pattanshetti, "Business Communication", 2nd Edition, R. Chand and Company, 2007.
10. Wood F. T., "Remedial English Grammar for Foreign Students", 1st Edition, The Macmillan Press Ltd., 1975
11. Hari Mohan Prasad and Uma Rani Sinha, "Objective English", 2nd Edition, Tata McGraw Hill Education, 2005

EN-151	LANGUAGE LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS/EXERCISES

1. Word accent based on stress: Cluster of words will be repeated by the students on the basis of recorded voice.
   (a) 1st syllable stress
   (b) 2nd syllable stress
   (c) 3rd syllable stress
2. Sentence intonation: Simple day to day sentences will be repeated by the students
3. Public speeches and debates: Recorded debates and public speeches will be heard by the students to enhance their knowledge on the pitch and tone.
4. Conversation: Regular conversations will be heard and later practiced in the lab.
5. Listening comprehension: Students will hear the text and answer the questions that follow.
6. Reading comprehension: Text at par with international standard will be read by the students. Questions will than be answered.
7. Speaking: Text conversation, debates & lecturers will be heard by the students. The students will be used their aptitude and language to give their on them
8. Error correction: Grammatically incorrect sentences will be given to the students to correct.
9. Listening and speaking exercises will be practiced for the improvement of the language.
10. Added exercise on reading comprehension.

MA-101	APPLIED MATHEMATICS–I	L T P	Cr
		5 1 0	4

OBJECTIVE

To acquaint the students with the various concepts and tools of applied mathematics which will be very basic and the very soul and guide of various engineering subjects.

1. **MATRICES & ITS APPLICATIONS:** Rank of a matrix; elementary transformations; elementary matrices; inverse using elementary

transformations; normal form of a matrix; linear dependence and independence of vectors; consistency of linear system of equations; linear and orthogonal transformations; Eigen values and Eigen vectors; properties of Eigen values; Cayley - Hamilton theorem and its applications.

2. **INFINITE SERIES:** Convergence and divergence; comparison; D' Alembert's ratio; Integral; Raobes; De Morgan's & Bertrand's; logarithmic and Cauchy root tests; alternating series; absolute and conditional convergence.
3. **APPLICATIONS OF DIFFERENTIATION:** Taylor's and Maclaurin's series; asymptotes; curvature.
4. **PARTIAL DIFFERENTIATION:** Functions of two or more variables; partial derivatives; total differential and differentiability; derivatives of composite and implicit functions; Jacobian's; higher order partial derivatives.
5. **APPLICATION OF PARTIAL DIFFERENTIATION:** Homogeneous functions; Euler's theorem; Taylor's series for functions of two variables (without proof); maxima-minima of function of two variables; Lagrange's method of undetermined multipliers; differentiation under integral sign.
6. **FOURIER SERIES:** Euler's formula; conditions for a Fourier expansion; change of interval; Fourier expansion of odd and even function; Fourier expansion of square wave; rectangular wave; saw-toothed wave; half and full rectified wave functions; half range sine and cosine series.
7. **ORDINARY DIFFERENTIAL EQUATIONS & ITS APPLICATIONS:** Exact differential equations; equations reducible to exact differential equations; applications of differential equations of first order and first degree to simple electric circuits; Newton's law of cooling; heat flow and orthogonal trajectories.

TEXT BOOK

Kreyszig F., "Advanced Engineering Mathematics", 9th Edition, John Wiley, 2006

REFERENCE BOOKS

1. Jeffery, "Engineering Mathematics", 2nd Edition, Academic Press/Elsevier, 2003.
2. Sastry, S. S., "Engineering Mathematics Part-I", 2nd Edition, Prentice Hall of India, 2004.
3. Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics" 2nd Edition, Narosa Publishing House, 2002.
4. Greenberg, D., Michael., "Advanced Engg. Mathematics", 2nd Edition, Dorling Kindersley India Pvt. Ltd., 2005.

MA-102	APPLIED MATHEMATICS-II	L T P	Cr
		5 1 0	4

OBJECTIVE

To acquaint the students with the various concepts and tools of applied mathematics which will be very basic and the very soul and guide of various engineering subjects.

1. **DIFFERENTIAL EQUATIONS OF HIGHER ORDER AND ITS APPLICATION:** Linear differential equations of second and higher order; complete solution; complementary function and particular integral; method of variation of parameters to find differential particular integral; Cauchy's and Legendre's linear equations; simultaneous linear equations with constant coefficients; applications of linear differential equations to simple pendulum; oscillatory electric circuits.
2. **LAPLACE TRANSFORMS AND ITS APPLICATIONS:** Laplace transforms of elementary functions; properties of Laplace transforms; existence conditions; transforms of derivatives; transforms of integrals; multiplication by t; division by t.
3. **EVALUATION OF INTEGRALS BY LAPLACE TRANSFORMS:** Laplace transform of unit step function; unit impulse function and periodic function; Inverse transforms; convolution theorem; application to linear differential equations and simultaneous linear differential equations with constant coefficients.
4. **FOURIER TRANSFORMS:** Fourier integral transforms; shifting theorem (both on time and frequency axes); Fourier transforms of derivatives; Fourier transforms of integrals; convolution theorem; Fourier transform of Dirac-delta function.
5. **CURVE TRACING:** Applications of single integration to find volume of solids and surface area of solids of revolution; double integral; change of order of integration; double integral in polar coordinates.
6. **APPLICATIONS OF MULTIPLE INTEGRALS:** Applications of double integral to find area enclosed by plane curves and volume of solids of revolution; triple integral; volume of solids; change of variables; beta and gamma functions and relationship between them.
7. **VECTOR CALCULUS:** Differentiation of vectors; scalar and vector point functions; gradient of a scalar field and directional derivative; divergence and curl of a vector field and their physical interpretations; integration of vectors; line integral; surface integral; volume integral; Green's, Stoke's and Gauss' theorems (without proof) and their simple applications.

TEXT BOOK

Kreyszig F., "Advanced Engineering Mathematics", 9th Edition, John Wiley, 2006

REFERENCE BOOKS

1. Ross, S. L., "Differential Equation", 2nd Edition, Wiley India Publishers, 2005.
2. Piaggio, H. T. H., "Differential Equations", 1st Edition, CBS Publishers and Distributors, 2003
3. Jain, R. K. and Iyengar, S. R. K. "Advanced Engineering Mathematics", 3rd Edition, Narosa Publishing House, 2006
4. Greenberg, D., Michael "Advanced Engg. Mathematics", 2nd Edition, Dorling Kindersley India Pvt. Ltd., 2004.

ME-101	ENGINEERING MECHANICS	L T P	Cr
		5 1 0	4

OBJECTIVE

Engineering Mechanics is one of the core subjects that introduces the student to analysis of forces and motion and prepares the student for studying strength of materials and theory of machines.

1 **FORCE SYSTEMS**: Basic concepts of space, time, mass, force, particle and rigid body; scalars and vectors; conventions for equations and diagrams; external and internal effects of a force; principle of transmissibility; force classification; rectangular components of two and three dimensional force systems; resultant of two and three dimensional and concurrent force systems; moment about a point and about an axis; Varignon's theorem; resultant of non-concurrent force systems; couple; equivalent couples; force couple systems.

2 **EQUILIBRIUM**: Equilibrium in two and three dimensions; system isolation and the free-body-diagram; modeling the action of forces; equilibrium conditions; applications including plane trusses; frames and machines.

3 **PROPERTIES OF SURFACES/CROSS SECTIONS**: Centre of mass; determining the centre of gravity; centre of mass versus centre of gravity; centroids of lines, areas and volumes including composite sections; moments of inertia; MI of plane figures; MI with respect to axis in its plane and with respect to an axis perpendicular to the plane of figure; parallel axis theorem; moment of inertia of a rigid body – of a lamina and of three dimensional body; MI of composite figures.

4 **SIMPLE STRESSES AND STRAINS**: Resistance to deformation; Hook's law and stress-strain diagram; types of stresses; stresses and strains in bars of varying sections; stresses in composite bars; lateral strain and Poisson's ratio; volumetric strain, modulus of rigidity and bulk modulus; relation between elastic constants.

5. **TORSION OF CIRCULAR SHAFTS, TORSION FORMULA POWER TRANSMISSION**

6. **SHEAR FORCE AND BENDING MOMENTS**: Definitions: SF and BM diagrams for cantilevers, simply supported beams with or without overhang and calculation of max. BM and SF and point of contra-flexture under i) concentrated loads, ii) uniformly distributed loads over whole span or part of it iii) combination of concentrated and uniformly distributed loads, iv) uniformly varying loads and application of moments; relationship between rate of loading, shear force and bending moments.

7. **KINEMATICS / KINETICS OF PARTICLES:** Velocity and acceleration under rectilinear and circular motion; Newton's Second Law; D'Alembert principle; Inertial system; Newton's Second Law applied to bodies under rectilinear and circular motion; solutions of problems using D'Alembert Principle and free-body diagrams.

TEXT BOOK

Meriam, J. L. "Engineering Mechanics", 6th Edition, John Wiley & Sons, 2005.

REFERENCE BOOKS

1. Beer, F.P. and Johnston, E.R. "Mechanics of Materials", 3rd Edition, Tata McGraw Hill, 2005.
2. Shames, I.H. "Engineering Mechanics", 4th Edition, Pearson Education, 2003
3. Pytel, A and Kiusalaas, J. Thomsom, "Mechanics of Materials", 1st Edition, Brooks & Cole, 2003

ME-151	ENGINEERING MECHANICS LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS

1. To study various forces and moments.
2. Prove polygon law of coplanar forces, experiments with pulley systems.
3. Find support reactions for simply supported beam
4. Find Forces in Truss elements
5. Measuring forces in members of jib crane.
6. Finding C.G. and MOI of various parts like connecting rod. Flywheel using various methods
7. To find mechanical advantage and mechanical efficiency of compound screw jack.
8. To study various simple machines including gear trains e.g. Wedge; clock; sewing machine, etc.
9. To conduct tensile test and determining ultimate tensile strength percentage elongation of steel specimen
10. To conduct compression test and determine compressive strength of specimen
11. To calculate VR, MA and efficiency of single, doubles and triple start worm and worm wheel
12. To study slider crank mechanism of 2 stroke and 4 stroke IC engine models
13. To study and analyze gear trains

ME-152	WORKSHOP PRACTICE	L T P	Cr
		0 0 6	2

OBJECTIVE

To provide an overview of the basic production techniques and allied / supporting techniques used to produce finished products from raw materials. In addition to theory, students will be given practical training on various basic production techniques. After going through this course, the students will be in a position to understand the working of a mechanical workshop.

1. **INTRODUCTION:** Basic manufacturing processes and safety in workshop.
2. **ENGINEERING MATERIALS:** Classification of materials–their general mechanical properties and their selection

3. **CASTING PROCESSES:** Sand casting process; pattern making; types of moulding sands, cores, mould making, melting and pouring of metal; Casting defects.
4. **MACHINING PROCESSES:** Production of components involving turning; facing; taper turning; milling; shaping; planning and drilling operations.
5. **METAL FORMING PROCESSES:** Sheet metal forming operations; shearing, bending, punching and blanking, forging processes as upsetting, drawing down, bending etc.
6. **JOINING PROCESSES:** Metal arc welding; gas welding; resistance welding; soldering and mechanical fastening processes.
7. **FITTING AND MAINTENANCE:** Study of fitting tools, marking tools and measuring instruments like micrometer, vernier calipers and height gauge; introduction to some basic maintenance techniques/processes.

TEXT BOOK

Raghuwanshi, B.S., "A course in Workshop Technology, Vol. I & II", 1st Edition, Dhanpatrai & Co., 2002.

REFERENCE BOOK

Hazra & Chaudhary, "Workshop Technology Vol. I & II", 2nd Edition, Asian Book Co., 2001.

NOTES

1. In all sections of workshop, students will study about the tools used, different operations performed and main parts of the machine
2. Term final evaluation will be done on the basis of doing a practical job and viva-voce. There will be no theory paper on this subject.

JOBS TO BE DONE

A. **Machine Shop**
   1. To prepare a job on a lathe involving facing, turning, taper turning, step turning, radius making and parting off.
   2. To prepare horizontal surface/ vertical surface / curved surface/ slot or v-grooves on a shaper / planer.
   3. To prepare a job involving side and face milling on a milling machine.
   4. To prepare a job involving drilling and tapping of holes.

B. **Sheet Metal Work**
   1. To draw layout, do marking and prepare a rectangular tray of sheet metal.
   2. To draw layout, do marking and prepare a funnel of sheet metal.

C. **Foundry**
   1. To prepare a single piece pattern mould, put metal in the mould and fettle the casting.
   2. To prepare a split piece pattern mould.

D. **Welding**
   1. To prepare joints (Lap and butt) by metal arc welding
   2. To prepare welded joint by resistance welding

E. **Fitting and Maintenance Jobs**

1. Fitting jobs involving, chipping, filing, marking and measuring with precision instruments.
2. Maintenance and repair of common domestic appliances such as desert cooler, LPG stove, room heater, water tap, flush system, electric iron, scooter etc.

ME-153	ENGINEERING GRAPHICS	L T P	Cr
		0 0 6*	3

OBJECTIVE

Engineering graphics is the primary medium for development and communicating design concepts. Through this course the students are trained in engineering Graphics concepts through manual drafting. The ISI code of practice is followed. With this course students can improve the visual concepts in all engineering streams.

1. **INTRODUCTION:** Need drawing instruments; geometrical drawing, conventional representation–indicating welds, Joints, surface texture, structural work etc.; various types of projections; first and third angle systems of orthographic projections.
2. **SIMPLE PROJECTS:** Projection of points in different quadrants; projections of, lines parallel to or inclined to one or both reference planes, true length of a line and its inclination with reference planes; traces of a line; concept of auxiliary plane.
3. **PROJECTIONS OF PLANES:** Parallel to one reference plane; inclined to one plane but perpendicular to the other, inclined to both reference planes.
4. **PROJECTIONS OF SOLIDS AND SOLIDS OF REVOLUTION:** In simple positions with axis perpendicular to a plane; with axis parallel to both planes; with axis parallel to one plane and inclined to the other.
5. **SECTIONS OF SOLIDS:** Prisms; pyramids; cylinders and cones; section plane is parallel, perpendicular and inclined to both reference planes; true shape of sections.
6. **DEVELOPMENT OF LATERAL SURFACES OF REGULAR SOLIDS**: Rectangular block; cylinder; cone; pyramid.
7. **ISOMETRIC VIEWS OF PLANES:** circle, square, rectangle; Isometric views of solids- prisms, pyramids and cylinders; principle of perspective projection, perspective of planes and solids.

* One hour for explanation/demonstration.

TEXT BOOK

Bhatt, N.D., and Panchal, V.M., “Engineering Drawing Plane and Solid Geometry”, 44th Edition, Charotar Publishing House, 2002.

REFERENCE BOOKS

1. Gill, P. S., “Engineering Graphics and Drafting”, Millennium Edition, S. K. Kataria and Sons, 2009.

2. Mathur, S.B., "A Text Book of Engineering Drawing", Second Revised and Enlarged Edition, Vikas Publishing House, 2000.
3. SP 46-1988, Bureau of Indian Standards (BIS), New Delhi, 2009

LIST OF SHEETS TO BE MADE:

Sl. No.	Details of the sheet	No. of sheets
1.	Basic Geometrical Constructions including the curves, ellipse, parabola, Hyperbola, and cycloidal curves.	1
2.	Projection of Lines including traces.	2
3.	Projection of Planes.	1
4.	Projection of Solids.	2
5.	Section of solids.	2
6.	Developments of surfaces	1
7.	Isometric and Perspective views.	2

PH-101	PHYSICS	L T P	Cr
		5 1 0	4

OBJECTIVE

To educate the students with the present day physical sciences through concepts like optics, acoustics, EM theory, etc.

1. **INTERFERENCE**: Interference by division of wave front; Fresnel's biprism and its application to find wavelength; interference by division of amplitude; Newton's rings and its applications; determination of wavelength and refractive index of liquids; Michelson interferometer and its applications; determination of wavelength; resolution of spectral lines (difference in wavelength); determination of refractive index of thin sheet.
2. **DIFFRACTION**: Difference between Interference and diffraction; difference between Fraunhofer and Fresnel diffraction; Fraunhofer diffraction through single slit; variation of intensity (analytical); plane transmission diffraction grating; absent spectra; maximum order spectra; dispersive and resolving power of grating.
3. **POLARIZATION**: Polarised and unpolarized light; double refraction; Nicol prism; quarter and half wave plates; optical activity; Dextro and Leavo rotatory; specific rotation; biquartz and Laurent's half-shade polarimeters**.**
4. **LASER AND FIBRE OPTICS**: Spontaneous and stimulated emissions; laser action (pumping and population inversion); characteristics of laser beam-concepts of coherence; solid state (Ruby) laser; gas (He-Ne) laser; applications; basic principles; fiber construction; propagation of light in fibers; numerical aperture; single mode and multi mode fibers; applications of optical fibers.
5. **SPECIAL THEORY OF RELATIVITY**: Inertial frames of reference; Galilean transformations; non-inertial frames of reference; Michelson-Morley

experiment; postulates of special theory of relativity; Lorentz's transformations; length contraction; time dilation; variation of mass with velocity; mass energy equivalence.

6. **ELECTRO MAGNETIC THEORY and ELECTROSTATICS :** Review of basic concepts of electrodynamics; Maxwell's modification of Ampere's law, equation of continuity; Maxwell's equations and its simple plane wave solution in free space; Poynting's theorem; dielectric polarization; electric displacement; susceptibility and permittivity and various relations between these; Gauss law in dielectrics; electrostatic energy stored in dielectrics; behaviour of dielectrics in A.C. field: simple concepts; dielectric losses.
7. **ULTRASONICS:** Production of ultrasonics by magnetostriction and piezoelectric oscillator methods; detection of ultrasonics by Kundt's tube and acoustic grating method.

TEXT BOOK

Avadhunulu and Kshirsagar, "A Text Book of Engineering Physics", 3rd Edition, S. Chand & Co., 2008

REFERENCE BOOKS

1. Sears, F.W., "Electricity and Magnetism", 6th Edition, Narosa, 2005.
2. Arthur Beiser, "Perspectives of Modern Physics", Tata McGraw Hill
3. Vasudeva, A.S., "Modern Engineering Physics", 3rd Edition, S. Chand & Co., 2006.
4. Resnick and Halliday, "Physics Vol. I-II", 6th Edition, Wiley Eastern, 2009
5. Brij Lal and Subramanyam, "A Text Book of Optics" 2nd Edition, S. Chand & Co., 2004.
6. Brij Lal and Subramanyam, "A Text Book of Sound", 2nd Edition, S. Chand & Co., 2003
7. Wehr, Richards and Adair, "Physics of the Atom", 2nd Edition,Narosa, 2005.

PH-102	APPLIED PHYSICS	L T P	Cr
		5 1 0	4

OBJECTIVE

To educate the students with the present day physical sciences through concepts like nanotechnology, quantum physics, thermal physics, super conductivity, etc.

1. **CRYSTAL STRUCTURE**: Space lattice; unit cell and translation vector; Miller indices; simple crystal structure(sc; bcc; fcc; hcp); principle of X- ray diffraction; Bragg's law; experimental X-ray diffraction methods: Laue method and Powder method; point defects in solids; concentration of Frenkel defects and Schottky defects.
2. **QUANTUM PHYSICS**: Failure of classical concepts; black body radiation; Planck's radiation law; wave packets; group velocity and phase velocity; Schrödinger wave equations: time dependant and time independent equations; significance of wave function; wave function for a particle in a box.

3. **FREE ELECTRON THEORY**: Elements of classical free electron theory and its limitations; Drude's theory of conduction; quantum theory of free electrons; Fermi level; Density of states (3D); average kinetic energy $\left(=\frac{3}{5}E_F\right)$ of free electrons (3D); Fermi-Dirac distribution function; thermionic emission; Richardson's equation.
4. **BAND THEORY and NANO TECHNOLOGY:** Origin of energy bands; classification of solids into metals; semiconductors and insulators; Kronig Penney model (Qualitative); E-K diagrams; Brillouin zones; concept of effective mass and holes; hall effect and its application, nanotechnology (basic concept only) and its application.
5. **THERMAL PHYSICS:** Gas law; iso-thermal and isentropic process; Rankin cycle; Carnet cycle; principal of equipartition of energy; specific heat of monoatomic gases; Maxwell's velocity distribution; mean velocity; RMS velocity; most probable speed; Joule Thomson's expansion; liquification of He I and He II Stefan Boltzmann's law; Newton's law of cooling.
6. **MAGNETIC PROPERTIES OF SOLIDS:** Atomic magnetic moments; orbital diamagnetism; classical Langevin's theory of dia–magnetism and para-magnetism; ferro-magnetic domains; antiferromagnetism; ferrimagnetism (simple ideas).
7. **SUPERCONDUCTIVITY:** Introduction (experimental survey); Meissner effect; Type I and Type II superconductor; London equation.

TEXT BOOK

Avadhunulu and Kshirsagar, "A Text Book of Engineering Physics", 2nd Edition, S. Chand & Co., 2003.

REFERENCE BOOKS

1. Kittel, Charles "Introduction to Solid State Physics", 2nd Edition, John Wiley Powell and Crasemann, "Quantum Mechanics", Oxford and IBH, 2008.
2. Aggarwal, R.S., "Thermal Physics and Statistical Physics", MTG Books.
3. Saxena, B.S., and Gupta, R.C., "Fundamentals of Solid State Physics", 2nd Edition, Pragati Prakashan, 2009.
4. Pillai, "Solid State Physics", New Age
5. Ghatak and Loknathan, "Quantum Mechanics", 3rd Edition, McMillan, 2005
6. Beiser, Arthur, "Modern Physics", 4th Edition, Tata McGraw Hill, 2009.

PH-151	PHYSICS LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS

The experiments in 1st term will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of 1st term.

1. To find the wavelength of sodium light by Newton's rings experiment.

2. To find the wavelength of sodium light by Fresnel's biprism experiment.
3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the pitch of a screw using He-Ne laser.
8. To find the specific rotation of sugar solution by using a polarimeter.
9. To compare the capacitances of two capacitors by De'Sauty bridge and hence to find the dielectric constant of a medium.
10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor.
11. To study the photoconducting cell and hence to verify the inverse square law.
12. To find the temperature co-efficient of resistance by using platinum resistance thermometer and Callender and Griffith bridge.
13. To find the frequency of A.C. mains by using sonometer.
14. To find the velocity of ultrasonic waves in non-conducting medium by piezo-electric method.

REFERENCE BOOKS

1. Worshnop, B. L. and Flint, H. T. "Advanced Practical Physics", 1st Edition, KPH, 2002
2. Gupta, S. L. & Kumar, V. "Practical Physics", 1st Edition, Pragati Prakashan, 2008.
3. Chauhan & Singh, "Advanced Practical Physics Vol. I & II", 1st Edition, Pragati Prakashan, 2005.

PH-152	APPLIED PHYSICS LAB	L T P	Cr
		0 0 3	1

LIST OF EXPERIMENTS

1. To find the low resistance by Carey – Foster's bridge.
2. To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box.
3. To find the value of high resistances by Substitution method.
4. To find the value of high resistances by Leakage method.
5. To study the characteristics of a solar cell and to find the fill factor.
6. To find the value of e/m for electrons by Helical method.
7. To find the ionization potential of Argon/Mercury using a thyratron tube .
8. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.
9. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.
10. To find the value of Planck's constant by using a photo electric cell.
11. To find the value of co-efficient of self-inductance by using a Raleigh bridge.

12. To find the value of Hall co-efficient of semi-conductor.
13. To study the V-I characteristics of a p-n diode.
14. To find the band gap of intrinsic semi-conductor using four probe method.
15. To calculate the hysteresis loss by tracing a B-H curve.

REFERENCE BOOKS

1. Worshnop, B.L. and Flint, H.T. "Advanced Practical Physics", 1st Edition, KPH, 2002.
2. Gupta, S.L. and Kumar, V. "Practical Physics", 1st Edition, Pragati Prakashan, 2008.
3. Chauhan and Singh, "Advanced Practical Physics Vol. I & II", 1st Edition, Pragati Prakashan, 2005.

PD-151	BASICS OF COMPUTER FUNDAMENTALS	L T P	Cr
		0 0 3	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 3	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 3	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.

*****

NOTES

NOTES

Lingaya's Group of Institutions:

- **Lingaya's University (Faridabad)**
- **Lingaya's Institute of Health Sciences**
- **Lingaya's Public School**
- **Lingaya's Lalita Devi Institute of Management & Sciences, New Delhi (I.P. University)**
- **Sri Viveka Institute of Technology, Vijayawada**

LINGAYA'S UNIVERSITY

choose to know

(u/s 3 of UGC Act 1956)

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**