B.S. Abdur Rahman®
Crescent
Institute of Science & Technology
Deemed to be University u/s 3 of the UGC Act, 1956

Regulations 2025
Curriculum and Syllabi
(Approved as per 24th Academic Council – August 2025)

B.Sc. (Computer Science)

B.S. Abdur Rahman® Crescent Institute of Science & Technology
Deemed to be University u/s 3 of the UGC Act, 1956

REGULATIONS 2025

CURRICULUM AND SYLLABI (I & II semesters)

(As approved by 24th Academic Council – August 2025)

B.Sc. (COMPUTER SCIENCE)

VISION AND MISSION OF THE INSTITUTION

VISION

B.S. Abdur Rahman Crescent Institute of Science and Technology aspires to be a leader in Education, Training and Research in multidisciplinary areas of importance and to play a vital role in the Socio-Economic progress of the Country in a sustainable manner.

MISSION

- To blossom into an internationally renowned Institute.
- To empower the youth through quality and value-based education.
- To promote professional leadership and entrepreneurship.
- To achieve excellence in all its endeavours to face global challenges.
- To provide excellent teaching and research ambience.
- To network with global Institutions of Excellence, Business, Industry and Research Organizations.
- To contribute to the knowledge base through scientific enquiry, Applied Research and Innovation.

DEPARTMENT OF COMPUTER APPLICATIONS

VISION AND MISSION

VISION

Aspires to provide quality education in the field of computer applications with state-of-the-art computational facilities and undertake quality research in collaboration with industries and universities to produce committed professionals and academicians to meet the needs of the industries and society.

MISSION

The Department of Computer Applications, endeavours

- To disseminate knowledge through education and training of graduates in the field of computer applications.
- To focus on teaching - learning, research and consultancy to promote excellence in computer applications.
- To foster graduates with opportunities required to explore, create and face challenges of IT related industries.
- To equip the graduates with the necessary skills in communication, team work and leadership qualities to meet the needs of the IT related sector globally.
- To disseminate the outcome of projects and research work undertaken by the department through appropriate measures for the benefit of society and industry.

PROGRAMME EDUCATIONAL OBJECTIVES AND OUTCOMES

B.Sc. (COMPUTER SCIENCE)

PROGRAMME EDUCATIONAL OBJECTIVES

The Programme Educational Objectives of B.Sc. (Bachelor of Science in Computer Science) are listed below:

PEO-1: To give good foundation in mathematics and computing sciences for acquiring computational knowledge level understanding of systems modeling and algorithm development.

PEO-2: To give technical knowledge in various high-level and systems level programming languages to comprehend, analyze, design and create innovative computing solutions for information technology projects.

PEO-3: To empower the students for self-learning by providing quality environment to upgrade their skill in creating and maintaining data centers, system resources and infrastructure for the organizations in their information technology projects.

PEO-4: To create awareness in the young minds of the students and motivate them to qualify academically with further studies with research acumen and serve the society with creative ideas and inventions.

PROGRAMME OUTCOMES

PO1 (Foundation Knowledge): Apply Computational knowledge, mathematical and systems modelling to build computer applications

PO2 (**Problem Analysis**): Prepare requirement engineering metrics with scientific diagrams for system software/application software product development

PO3 (**Development of Solutions**): Design and development of solution to create a system, product, or approach that addresses a business, user, or technical problem.

PO4 (**Modern Tool Usage**): Ability to select appropriate software tools for

development as well as testing for successful implementation.

PO5 (**Individual and Teamwork**): Function as individual member or leader of team and able to manage projects in the software development and project automation process.

PO6 (**Project Management and Finance**): Apply project management principles with work breakdown structures, robust scheduling, comprehensive grasp of financial principles for cost control, profitability and value delivery.

PO7 (**Ethics**): Inculcate professional ethics in managing software development. Use latest technology for the benefit of society, focusing on core values like fairness, transparency, accountability, privacy, and security.

PO8 (**Life-long learning**): Self-motivated pursuit of knowledge, skills, and competences to keep up with the changing technological advancements.

PROGRAMME SPECIFIC OUTCOMES

PSO: Apply the advanced concepts of computer science to design develop, and test software solutions for real-world applications.

REGULATIONS – 2025
B.A. / BBA/ B.Com. / BCA / B.Sc. DEGREE PROGRAMMES
(Under Choice Based Credit System)

1.0 PRELIMINARY DEFINITIONS & NOMENCLATURE

In these Regulations, unless the context otherwise requires:

i) **"Programme"** means B.A. / BBA / BCA / B.Com. / B.Sc. Degree Programmes.

ii) **"Course"** means theory / practical / laboratory integrated theory / seminar / internship / project and any other subject that is normally studied in a semester like English, Mathematics, Environmental Science, etc.,

iii) **"Institution"** means B.S. Abdur Rahman Crescent Institute of Science and Technology.

iv) **"Academic Council"** means the Academic Council, which is the apex body on all academic matters of this Institute.

v) **"Dean (Academic Affairs)"** means the Dean (Academic Affairs) of the Institution who is responsible for the implementation of relevant rules and regulations for all the academic activities.

vi) **"Dean (Student Affairs**)" means the Dean (Students Affairs) of the Institution who is responsible for activities related to student welfare, conduct of co-curricular, extra-curricular events and discipline in the campus.

vii) **"Controller of Examinations"** means the Controller of Examination of the Institution who is responsible for the conduct of examinations and declaration of results.

viii) **"Dean of the School"** means the Dean of the School of the department concerned.

ix) **"Head of the Department"** means the Head of the Department concerned.

2.0 ADMISSION REQUIREMENTS

2.1 Students for admission to the first semester of the undergraduate degree programme must have passed the Higher Secondary Examination of the 10 +2 curriculum (Academic stream) or any other examination of any authority accepted by this Institution as equivalent thereto.

2.2 The other conditions for admission such as marks obtained, number of attempts in the qualifying examination and physical fitness will be as prescribed by the Institution from time to time.

3.0 BRANCHES OF STUDY

3.1 The various programmes and their mode of study are as follows:

Degree	Mode of Study
B.A.	Full Time
BBA	
B.Com.	
BCA	
B.Sc.	

3.2 Programmes offered and Specialisation of study

The following are the details of specialization / streams offered in various programmes:

S.No.	Program	Streams / Specialisation of Study
1.	**BCA**	i. Cloud Technology and Information Security ii. Artificial Intelligence iii. Cyber security iv. Data science
2.	**B.Sc.**	i. Computer Science ii. Biotechnology iii. Aviation
3.	**BBA**	i. General
4.	**B.Com**	i. General ii. Accounts and Finance iii. Professional Accounting iv. International Accounting & Finance

5.	**B.A.**	i. English ii. Islamic Studies iii. Public Policy

3.3 Eligible entry qualifications for admission to programmes

S. No.	Programme	Eligibility Criteria
1	BCA	10+2 (Higher Secondary) with Mathematics as one of the subjects of study or equivalent subject
2	B.Sc. Computer Science	10+2 (Higher Secondary) with Mathematics as one of the subjects of study or equivalent subject
3	B.Sc. Biotechnology	10+2 (Higher Secondary) with Chemistry and Biology as subjects of study
4	B.Sc. Aviation	10+2 (Higher Secondary) with Mathematics and physics as the subjects of study
5	BBA (General)	10+2 (Higher Secondary)
6	B.Com. (General)	10+2 (Higher Secondary) with Commerce / Accountancy / Statistics as subjects of study.
7	B.Com (Accounts and Finance)	
8	B.Com. International Accounting & Finance	
9	B.Com. Professional Accounting	
10	B.A. English	10 +2 (Higher Secondary)
11	B.A. Islamic Studies	
12	B.A. Public Policy	

4.0 STRUCTURE OF THE PROGRAMME

4.1 The curriculum of the UG programmes consists of the following

components:

- Core Courses (CC)
- Allied Courses (AC)
- Ability Enhancement Courses (AEC)
- Skill Enhancement Courses (SEC)
- Elective Courses (EC)
- Laboratory Courses (LC)
- Laboratory Integrated Theory Courses (LITC)
- Value added courses
- Mandatory courses (MC)
- Project - PROJ (Project work, seminar, and internship in industry or at appropriate workplace)

4.1.1 Personality and Character Development

All students shall enroll, on admission, in any of the following personality and character development programmes or in departmental societies:

- National Cadet Corps (NCC)
- National Service Scheme (NSS)
- National Sports Organization (NSO)
- Youth Red Cross (YRC)
- Rotaract
- Crescent Indian Society Training Development (ISTD – C)
- Crescent Creative Strokes
- Crescent Technocrats Club

The training activities / events / camp shall normally be organized during the weekends / vacation period.

4.1.2 Online Courses for Credit Transfer

Students are permitted to undergo department approved online courses under SWAYAM up to 40% of credits of courses in a semester excluding project semester (if any) with the recommendation of the Head of the Department / Dean of School and with the prior approval of Dean Academic Affairs during his/ her period of study. The credits earned through online courses ratified by the respective Board of Studies shall be transferred following the due approval procedures. The online courses can be considered in lieu of core courses and elective courses.

4.1.3 Value Added Courses

The students are permitted to pursue department approved online courses (excluding courses registered for credit transfer) or courses offered / approved by the department as value added courses.

The details of the value added course viz., syllabus, schedule of classes and the course faculty shall be sent to the Dean (Academic Affairs) for approval. The students may also undergo the value added courses offered by other departments with the consent of the Head of the Department offering the course.

These value added courses shall be specified in the consolidated mark sheet as additional courses pursued by the student over and above the curriculum during the period of study.

4.1.4 Industry Internship

The students shall undergo training for a period as specified in the curriculum during the summer vacation in any industry relevant to the field study.

The students are also permitted to undergo internship at a research organization / eminent academic institution for the period prescribed in the curriculum during the summer vacation, in lieu of Industrial training. In any case, the student shall obtain necessary approval from the Head of the Department / Dean of School and the training has to be taken up at a stretch.

4.1.5 Industrial Visit

The student shall undergo at least one industrial visit every year. The Heads of Departments / Deans of Schools shall ensure the same.

4.2 Each course is normally assigned certain number of credits:

- One credit per lecture period per week
- One credit per tutorial period per week
- One credit for two to three periods and two credits for four periods of laboratory or practical sessions per week
- One credit for two periods of seminar / project work per week
- One credit for two weeks of industrial training or 80 hours per semester.

4.3 Each semester curriculum shall normally have a blend of lecture

courses, laboratory courses, laboratory integrated theory courses, etc.

4.4 For successful completion of the programme, a student must earn a minimum total credit specified in the curriculum of the respective programme of study.

4.5 The medium of instruction, examinations and project report shall be English, except B.A. Islamic Studies (Arabic medium) and for courses in languages other than English.

5.0 DURATION OF THE PROGRAMME

5.1 A student is expected to complete the programme in 6 semesters but in any case not more than 10 continuous semesters reckoned from the date of first admission.

5.2 Each semester shall consist of a minimum of 90 working days including the days of examinations.

5.3 The maximum duration for completion of the programme as mentioned in clause 5.1 shall also include period of break of study vide clause 7.1 so that the student may be eligible for the award of the degree.

6.0 REGISTRATION AND ENROLLMENT

6.1 The students of first semester shall register and enroll for courses at the time of admission by paying the prescribed fees. For the subsequent semesters registration for the courses shall be done by the student one week before the last working day of the previous semester.

6.2 Change of Elective Course

A student can change an enrolled elective course within 10 working days from the commencement of the course, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department / Dean of School of the student.

6.3 Withdrawal from a Course

A student can withdraw from an enrolled course at any time before the first continuous assessment test for genuine reasons, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department / Dean of School of the student.

7.0 BREAK OF STUDY FROM PROGRAMME

7.1 A student may be allowed / enforced to take a break of study for two semesters from the programme with the approval of Dean (Academic

Affairs) for the following reasons:

7.1.1 Medical or other valid grounds

7.1.2 Award of 'I' grade in all the courses in a semester due to lack of attendance

7.1.3 Debarred due to any act of indiscipline.

7.2 The total duration for completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 5.1).

7.3 A student who has availed break of study in the current semester (odd/even) can rejoin only in the subsequent corresponding (odd/even) semester in the next academic year on approval from Dean, Academic affairs.

7.4 During the break of study, the student shall not be allowed to attend any regular classes or participate in any activities of the institution. However, he / she shall be permitted to enroll for the 'I' grade courses and appear for the arrear examinations.

8.0 CLASS ADVISOR AND FACULTY ADVISOR

8.1 Class Advisor

A faculty member will be nominated by the Head of the Department / Dean of School as class advisor for the class throughout the period of study.

The class advisor shall be responsible for maintaining the academic, curricular and co-curricular records of students of the class.

8.2 Faculty Advisor

To help the students in planning their courses of study and for general counselling, the Head of the Department / Dean of School of the students will attach a maximum of 20 students to a faculty member of the department who shall function as faculty advisor for the students throughout their period of study. Such faculty advisors shall guide the students in taking up the elective courses for registration and enrolment in every semester and also offer advice to the students on academic and related personal matters.

9.0 COURSE COMMITTEE

9.1 Each common theory course offered to more than one group of students shall have a "Course Committee" comprising all the course faculty teaching the common course with one of them nominated as

course coordinator. The nomination of the course coordinator shall be made by the Head of the Department / Dean (Academic Affairs) depending on whether all the course faculty teaching the common course belong to a single department or from several departments. The course committee shall ensure preparation of a common question paper and scheme of evaluation for the tests and semester end examination.

10.0 CLASS COMMITTEE

A class committee is constituted branch wise and semester wise by the Head of the Department / Dean of the School shall normally comprise of faculty members handling the courses, student representatives and a senior faculty member not handling any courses for that class as chairman.

10.1 The composition of the class committee will be as follows:

- One senior faculty member preferably not handling courses for the concerned semester, appointed as chairman by the Head of the Department.
- All the faculty members handling courses of the semester.
- Six student representatives (male and female) of each class nominated by the Head of the Department in consultation with the relevant faculty advisors.
- All faculty advisors and the class advisors
- Head of the Department - Ex-Officio Member

10.2 The class committee shall meet at least three times during the semester. The first meeting shall be held within two weeks from the date of commencement of classes, in which the components of continuous assessment for various courses and the weightages for each component of assessment shall be decided for the first and second assessment. The second meeting shall be held within a week after the date of first assessment report, to review the students' performance and for follow up action.

10.3 During these two meetings the student members shall meaningfully interact and express opinions and suggestions to improve the effectiveness of the teaching-learning process, curriculum, and syllabi, etc.

10.4 The third meeting of the class committee, excluding the student members, shall meet after the semester end examinations to analyse the performance of the students in all the components of assessments and decide their grades in each course. The grades for a common course shall be decided by the concerned course committee and shall be presented to the class committee(s) by the course faculty concerned.

11.0 CREDIT LIMIT FOR ENROLLMENT

A student can enroll for a maximum of 38 credits during a semester including Redo / Predo courses.

12.0 ASSESSMENT PROCEDURE AND PERCENTAGE WEIGHTAGE OF MARKS

12.1 Every theory course shall normally have a total of three assessments during a semester as given below:

Assessments	Course Coverage in Weeks	Duration	Weightage of Marks
Assessment 1	1 to 6	1.5 hours	25%
Assessment 2	7 to 12	1.5 hours	25%
Semester End Examination	Full course	3 hours	50%

12.2 Theory Course

Appearing for semester end theory examination for each course is mandatory and a student shall secure a minimum of 40% marks in each course in semester end examination for the successful completion of the course.

12.3 Laboratory Course

Every practical course shall have 60% weightage for continuous assessments and 40% for semester end examination. However, a student shall have secured a minimum of 50% marks in the semester end practical examination for the award of pass grade.

12.4 Laboratory integrated theory (LIT) courses

For laboratory integrated theory courses, the theory and practical

components shall be assessed separately for 100 marks each and consolidated by assigning a weightage of 75% for theory component and 25% for practical component (for a 4 credit LIT course). Grading shall be done for this consolidated mark. Assessment of theory components shall have a total of three assessments with two continuous assessments carrying 25% weightage each and semester end examination carrying 50% weightage. The student shall secure a separate minimum of 40% in the semester end theory examination. The evaluation of practical components shall be through continuous assessment.

Component	Maximum Marks	Weightage for Final Grade	Mode of Assessment
Theory Component	100	75%	CAT1 (25%) + CAT2 (25%) + SEE (50%)
Practical Component	100	25%	Continuous assessment only
Final Grade Basis	Consolidated	100%	75% Theory + 25% Practical
Pass Requirement	-	-	Minimum 40% in Semester-End Theory Exam (SEE)

Note:

1. Proportionate weightage shall be assigned to LIT courses based on their credit value, whether 2 or 3 credits.
2. In Lab-Integrated Professional Elective courses, the laboratory component shall be assessed by the course faculty.

12.5 The components of continuous assessment for theory / practical / laboratory integrated theory courses shall be finalized in the first class committee meeting.

12.6 Industry Internship

In the case of industry internship, the student shall submit a report, which shall be evaluated along with an oral examination by a committee of faculty members constituted by the Head of the Department. The student shall also submit an internship completion certificate issued by the industry / research / academic organisation. The weightage of marks for industry internship report and viva voce examination shall be

60% and 40% respectively.

12.7 Project Work

In the case of project work, the project shall be carried out individually or as a group activity, involving a maximum of three or four students.

A committee of faculty members, constituted by the Head of the Department / Dean of the School, shall conduct three periodic reviews during the semester to monitor and assess the progress of the project. At the end of the semester, students shall submit a project report, based on which a semester-end oral examination (viva voce) shall be conducted by an external examiner approved by the Controller of Examinations.

The assessment weightage shall be as follows:

- Periodic Reviews – 50%
  - 25% by the Project Guide
  - 25% by the Review Committee
- Project Report – 20%
- Viva Voce Examination – 30%.

12.8 Assessment of seminars and comprehension shall be carried out by a committee of faculty members constituted by the Head of the Department.

12.9 **For the first attempt of the arrear theory examination**, the internal assessment marks scored for a course during first appearance shall be used for grading along with the marks scored in the arrear examination. From the subsequent appearance onwards, full weightage shall be assigned to the marks scored in the semester end examination and the internal assessment marks secured during course of study shall become invalid.

In case of laboratory integrated theory courses, after one regular and one arrear appearance, the internal mark of theory component is invalid and full weightage shall be assigned to the marks scored in the semester end examination for theory component. **There shall be no arrear or improvement examination for lab components**.

13.0 SUBSTITUTE EXAMINATIONS

13.1 A student who is absent, for genuine reasons, may be permitted to write a substitute examination for any one of the two continuous assessment tests of a course by paying the prescribed substitute examination fee.

However, permission to take up a substitute examination will be given under exceptional circumstances, such as accidents, admission to a hospital due to illness, etc. by a committee constituted by the Head of the Department / Dean of the School for that purpose. There is no substitute examination for semester end examination.

13.2 A student shall apply for a substitute exam in the prescribed form to the Head of the Department / Dean of the School within a week from the date of assessment test. However, the substitute examination will be conducted only after the last instructional day of the semester.

14.0 ATTENDANCE REQUIREMENT AND SEMESTER / COURSE REPETITION

14.1 A student shall earn 100% attendance in the scheduled contact hours (such as lectures, tutorials, labs, etc.) for that course. However, a relaxation of up to 25% in attendance may be granted to account for valid reasons such as medical emergencies, participation in co-curricular or extracurricular activities with prior approval, or other genuine circumstances.

If a student's attendance falls below 75% in a particular course, even after considering the permissible relaxation, they will not be allowed to appear for the semester-end examination in that course. Instead, the student will be awarded an “I” grade (Incomplete) for the course.

14.2 The faculty member of each course shall cumulate the attendance details for the semester and furnish the names of the students who have not earned the required attendance in the concerned course to the class advisor. The class advisor shall consolidate and furnish the list of students who have earned less than 75% attendance, in various courses, to the Dean (Academic Affairs) through the Head of the Department/ Dean of the School. Thereupon, the Dean (Academic Affairs) shall officially notify the names of such students prevented from writing the semester end examination in each course.

14.3 If a student’s attendance in any course falls between 65% and 75% due to medical reasons (e.g., hospitalization, illness) or participation in institution-approved events, they may be granted exemption from the minimum attendance requirement and allowed to appear for the semester-end exam. The student must submit valid documents to the class advisor upon rejoining, with approval from the HoD/Dean. Final

approval for **condonation** will be granted by the Vice Chancellor based on the Dean (Academic Affairs)'s recommendation.

14.4 A student who has obtained an **"I"** grade in all the courses in a semester is not permitted to move to the next higher semester. Such students shall **repeat** all the courses of the semester in the subsequent academic year.

14.5 The student awarded **"I"** grade, shall enroll and repeat the course when it is offered next. In case of "I" grade in an elective course either the same elective course may be repeated, or a new elective course may be taken with the approval of Head of the Department / Dean of the School.

14.6 A student who is awarded **"U"** grade in a course shall have the option to either write the semester end arrear examination at the end of the subsequent semesters, or to **redo** the course in the evening when the course is offered by the department. Marks scored in the continuous assessment in the redo course shall be considered for grading along with the marks scored in the semester end (redo) examination. If any student obtains "U" grade in the redo course, the marks scored in the continuous assessment test (redo) for that course shall be considered as internal mark for further appearance of arrear examination.

14.7 If a student with "U" grade, who **prefers to redo** any particular course, fails to earn the minimum 75% attendance while doing that course, then he / she is not permitted to write the semester end examination and his / her earlier "U" grade and continuous assessment marks shall continue.

15.0 REDO / PRE-DO COURSES

15.1 A student can register for a maximum of three redo courses per semester without affecting the regular semester classes, whenever such courses are offered by the concerned department, based on the availability of faculty members and subject to a specified minimum number of students registering for each of such courses.

15.2 The number of contact hours and the assessment procedure for any redo course shall be the same as regular courses, except there is **no provision for any substitute examination and withdrawal from a redo course**.

15.3 A student shall be permitted to pre-do a course offered by the concerned department, provided it does not affect the regular semester class schedule. Such permission shall be granted based on the availability of faculty members, the maximum permissible credit limit of the semester, and the student's fulfillment of the necessary prerequisites for the course. The proposal shall be recommended by the Dean of the School and the Head of the Department, and shall require final approval from the Dean (Academic Affairs).

16.0 PASSING AND DECLARATION OF RESULTS AND GRADE SHEET

16.1 All assessments of a course shall be made on absolute marks basis. The class committee without the student members shall meet to analyse the performance of students in all assessments of a course and award letter grades following the relative grading system. The letter grades and the corresponding grade points are as follows:

Letter Grade	Grade Points
S	10
A	9
B	8
C	7
D	6
E	5
U	0
W	-
I	-
PA	-
FA	-

"W"- denotes withdrawal from the course

"I" - denotes "Incomplete" ie. inadequate attendance in the course and prevention from appearance of semester end examination

"U" - denotes unsuccessful performance in the course.

"PA" - denotes the 'Pass' of the zero credit courses.

"FA" - denotes the 'Fail' of the zero credit courses.

16.2 A student who earns a minimum of five grade points ('E' grade) in a course is declared to have successfully completed the course. Such a course cannot be **repeated by the student for improvement of grade**.

16.3 Upon awarding grades, the results shall be endorsed by the chairman of the class committee and Head of the Department / Dean of the School. The Controller of Examinations shall further approve and declare the results.

16.4 **Within one week** from the date of declaration of result, a student can apply for revaluation of his / her semester end theory examination answer scripts of one or more courses, on payment of prescribed fee, through proper application to the Controller of Examinations. Subsequently, the Head of the Department / Dean of the School offered the course shall constitute a revaluation committee consisting of chairman of the class committee as convener, the faculty member of the course and a senior faculty member having expertise in that course as members. The committee shall meet within a week to revalue the answer scripts and submit its report to the Controller of Examinations for consideration and decision.

16.5 After results are declared, grade sheets shall be issued to each student, which contains the following details: a) list of courses enrolled during the semester including redo courses / arrear courses, if any; b) grades scored; c) Grade Point Average (GPA) for the semester and d) Cumulative Grade Point Average (CGPA) of all courses enrolled from the first semester onwards.

GPA is the ratio of the sum of the products of the number of credits of courses registered and the grade points corresponding to the grades scored in those courses, taken for all the courses, to the sum of the number of credits of all the courses in the semester.

If C_i, is the number of credits assigned for the i^{th} course and GP_i is the Grade Point in the i^{th} course,

$$GPA = \frac{\sum_{i=1}^{n}(C_i)(GPi)}{\sum_{i=1}^{n} C_i}$$

Where n = number of courses

The Cumulative Grade Point Average (CGPA) is calculated in a similar manner, considering all the courses enrolled from first semester.

“I”, "W", “PA” and **“FA”** grades are excluded for calculating GPA.

"U", “I”, "W", “PA” and **“FA”** grades are excluded for calculating CGPA.

The formula for the conversion of CGPA to equivalent percentage of marks shall be as follows:

Percentage equivalent of marks = CGPA X 10

16.6 After successful completion of the programme, the degree shall be awarded to the students with the following classifications based on CGPA.

Classification	CGPA
First Class with Distinction	8.50 and above and passing all the courses in first appearance and completing the programme within the prescribed period of six semesters.
First Class	6.50 and above, having completed within a period of eight semesters.
Second Class	Others

16.6.1 Eligibility for First Class with Distinction

- A student should not have obtained ‘U’ or ‘I’ grade in any course during his/her study
- A student should have completed the UG programme within the minimum prescribed period of study (except clause 7.1.1)

16.6.2 Eligibility for First Class

- A student should have passed the examination in all the courses not more than two semesters beyond the minimum prescribed period of study (except clause 7.1.1)

16.6.3 The students who do not satisfy clause 16.6.1 and clause 16.6.2 shall be classified as second class.

16.6.4 The CGPA shall be rounded to two decimal places for the purpose of classification. The CGPA shall be considered up to three decimal places for the purpose of comparison of performance of students and

ranking.

17.0 SUPPLEMENTARY EXAMINATION

Final year students and passed out students can apply for supplementary examination for a maximum of three courses thus providing an opportunity to complete their degree programme. The students can apply for supplementary examination within three weeks of the declaration of results in the even semester.

18.0 DISCIPLINE

18.1 Every student is expected to observe discipline and decorum both inside and outside the campus and not to indulge in any activity which tends to affect the reputation of the Institution.

18.2 Any act of indiscipline of a student, reported to the Dean (Student Affairs), through the Head of the Department / Dean of the School concerned shall be referred to a Discipline and Welfare Committee constituted by the Registrar for taking appropriate action.

19.0 MULTI ENTRY – MULTI EXIT (MEME) FRAMEWORK *

In accordance with the provisions of the National Education Policy (NEP) 2020, the programme shall support a Multi Entry – Multi Exit (ME-ME) framework to provide flexibility in the academic pathway of students.

*** At present (AY 2025-26), it is applicable only for BBA (General), B.Com. (General), B. Com (Accounts and Finance), B.Com. International Accounting & Finance, BA (Public Policy) and B.Sc. (Biotechnology)**

19.1 Exit Option:

19.1.1 Credit Requirement for Award of B.A. / BBA/ B.Com. / B.Sc. Degree

To qualify for the award of a B.A. / BBA/ B.Com. / B.Sc. degree (applicable for NEP adopted programmes) from the Institute, a student must successfully complete the total credit requirements as prescribed in the approved curriculum of the respective programme. The specific credit requirements are determined by the programme curriculum.

19.1.2 Provision for Multiple Exit

In alignment with NEP 2020 guidelines, the Institute provides students enrolled in undergraduate programmes with the option of multiple exits,

as per the credit requirements and qualifications at different levels which is given in **section 19.3.**

a. Application for Exit

A student intending to exit must submit a formal written application in the prescribed format at least **eight weeks prior to the scheduled end of the academic year**.

b. Departmental Recommendation

1. Upon receipt of the application, the concerned Department shall evaluate the academic record of the student and recommend the award of a **Certificate, Diploma, Degree**, **or Honours/Honours with Research** as applicable, based on the credits earned.
2. In the case of arrear courses, the Certificate/Diploma will be conferred only after successful clearance of all pending arrears.

c. Notification of Completion

Once a student has fulfilled the requirements for the award of Certificate/Diploma/Degree/Honours or Honours with Research, the Department shall notify the same to Controller of Examinations for further processing and issuance.

19.1.3 Conditions Governing Exit

1. The multiple exit facility is intended strictly for **genuine and exceptional circumstances**, such as prolonged illness, or securing an employment opportunity necessitating a temporary withdrawal from the programme.
2. Students opting for a temporary exit after the first, second or third year must obtain **prior approval from the Registrar through Dean (Academics)**, based on the recommendation of the respective Head of the Department.

19.1.4 Expectation of Programme Continuity

While the option for multiple exits exists, it is generally expected that students admitted to a B.A. / BBA/ B.Com. / B.Sc. programme shall pursue their studies continuously until completion of the final degree requirements.

19.2. Entry Option:

Students seeking re-entry into the programme (multi-entry) must submit an application through the proper channel at the beginning of

the odd semester. Admission shall be subject to fulfilment of Institutional guidelines, credit mapping, and availability of seats.

19.3. Credit Requirements and Qualifications at Different Levels:

The level of the four years B.A. / BBA/ B.Com. / B.Sc. Programme shall be as per the NEP 2020. As per the guidelines, the number of credits to be earned at each level are as under:

Level	Nomenclature (qualifications within each level)	Credit earned without exit option	Credit earned with exit option
Level – 4.5	Undergraduate Certificate for those who exit after successful completion of first year (two semesters) of the undergraduate programme	40*	44
Level – 5	Undergraduate Diploma for those who exit after successful completion of second year (four semesters) of the undergraduate programme	80*	84
Level – 5.5	Bachelor's Degree for those who exit after successful completion of three years (six semesters) of the four year undergraduate programme	120*	-
Level – 6	Bachelor's Degree with Honours for those who have successfully completed four years (eight semesters) of the undergraduate programme	160*	-
Level – 6	Bachelor's Degree with Research* for those who have successfully completed four years (eight semesters) of the undergraduate programme	160*	-

* The minimum number of credits that a student must earn (as per the respective curriculum) in order to get the above Certification/ Diploma/ Degree program as per the above levels.

Candidates who meet the minimum CGPA (Cumulative Grade Point Average) of 7.5 till Level 5.5 will be allowed to continue studies in the 4th year of B.A. / BBA/ B.Com. / B.Sc. Programme leading to B.A. / BBA/ B.Com. / B.Sc. (Bachelors' Degree – Research) – Level 6. Others can either exit after Level 5.5 acquiring the B.A. / BBA/ B.Com. / B.Sc. Degree or can pursue B.A. / BBA/ B.Com. / B.Sc. (Honours / Honours with Research) – Level 6.

20.0 ELIGIBILITY FOR THE AWARD OF DEGREE

20.1 A student shall be declared to be eligible for the award of B.A. / BBA / BCA / B.Com. / B.Sc. degree provided the student has:

i) Successfully earned the required number of total credits as specified in the curriculum of the programme of study within a maximum period of 10 semesters from the date of admission, including break of study.

ii) Successfully completed the requirements of the enrolled professional development activity through various institute level clubs or department level membership in societies.

iii) No dues to the Institution, Library, Hostel, etc.

iv) No disciplinary action pending against him/her.

20.2 The award of the degree must have been approved by the Institution.

21.0 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council has the right to modify the above regulations from time to time.

****

B. S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE AND TECHNOLOGY

B.Sc. (COMPUTER SCIENCE)

CURRICULUM & SYLLABI, REGULATIONS 2025

SEMESTER I

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	AEC	ENE 1183	General English - I	3	0	0	3
		LNE 1181	General Tamil – I	3	0	0	3
2	AEC	LNE 1182	German - I	3	0	0	3
		LNE 1183	Arabic Language	3	0	0	3
3	AC	MAE 1187	Algebra, Calculus and Numerical Methods	3	1	0	4
4	CC	CAE1101	Problem Solving and Programming using C	3	0	0	3
5	CC	CAE1102	Computer Architecture	3	0	0	3
6	CC	CAE1104	Fundamentals of Data Structures	3	0	0	3
7	LC	CAE1105	Programming in C Laboratory	0	0	2	1
8	LC	CAE1106	Data Structures and Algorithms Laboratory	0	0	2	1
			Total				**21**

SEMESTER II

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	AEC	ENE 1283	General English - II	3	0	0	3
		LNE 1281	General Tamil – II	3	0	0	3
2	AEC	LNE 1282	German- II	3	0	0	3
		LNE 1283	Modern Communicative Arabic	3	0	0	3
3	MC	GEE1281	Environmental Studies	2	0	0	2
4	AC	MAE 1287	Probability and Statistics	3	1	0	4
5	CC	CAE1201	Object Oriented Programming Using C++	3	0	0	3

6	CC	CAE1202	Fundamentals of Operating Systems	3	0	0	3
7	CC	CAE1204	Data Communication and Networking	3	0	0	3
8	LC	CAE1205	Fundamentals of Operating Systems Laboratory	0	0	2	1
9	LC	CAE1207	Object Oriented Programming Using C++ Laboratory	0	0	2	1
			Total				**23**

SEMESTER III

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	CC	CAE 2101	Design and Analysis of Algorithms	3	0	0	3
2	CC	CAE 2102	Secure Software Engineering	3	0	0	3
3	CC	CAE 2103	Relational Database Management Systems	3	0	0	3
4	CC	CAE 2104	Programming in Java	3	0	0	3
5	DSC	CAE 2105	Digital Marketing	3	0	0	3
6	LC	CAE 2106	Relational Database Management Systems Laboratory	0	0	2	1
7	LC	CAE 2107	Programming in Java Laboratory	0	0	2	1
8	VAC	GEE 2103	Aptitude and Interpersonal Skills	0	0	2	1
9	VAC		MOOC courses				1
			Total				**19**

SEMESTER IV

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	CC	CAE 2201	Python Programming	3	0	0	3
2	DSC	CAE 2202	Web Design and Development	3	0	0	3
3	DSC	CAE 2203	Data Mining and Warehousing	3	0	0	3
4	DSC	CAE 2204	Object Oriented Analysis and Design	3	0	0	3
5	SEC	GEE 2203	Career Readiness and Professional Skills	0	0	2	1
6	MC	GEE 2204	Human Values for Ethics	2	0	0	2
7	PE		**Programme Elective – I**	3	0	0	3
8	OEC		**General / Open Elective**	3	0	0	3
9	LC	CAE 2205	Python Programming Laboratory	0	0	2	1
10	LC	CAE 2206	Web Design and Development Laboratory	0	0	2	1
			Total				**23**

SEMESTER V

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	CC	CAE 3101	Full Stack Development	3	0	0	3
2	CC	CAE 3103	Big Data Analytics	3	0	0	3
3	CC	CAE 3104	Block chain Technology	3	0	0	3
4	LITC	CAE 3105	Cloud Technology and Information Security	3	0	2	4
5	PE		**Programme Elective II**	3	0	0	3
6	SEC	CAE 3106	Machine Learning Using Python	3	0	0	3
7	LC	CAE 3107	Full Stack Development Laboratory	0	0	2	1
8	LC	CAE 3108	Machine Learning Using Python Laboratory	0	0	2	1
			Total				**21**

SEMESTER VI

S. No.	Course Category	Course Code	Course Name	L	T	P	C
1	LITC	CAE 3201	Data Visualization Using Power BI	3	0	2	4
2	PROJ	CAE 3202	Project	0	0	0	8
3	CC	CAE 3203	Mobile Application Development	3	0	0	3
4	CC	CAE 3204	Artificial Intelligence	3	0	0	3
5	PE		**Programme Elective III**				3
			Total				**21**

Overall Total Credits = 128

Sl. No.	Course Code	Course Title	L	T	P	C
		PROGRAMME ELECTIVE– I				
1	CAEX 201	E-Commerce	3	0	0	3
2	CAEX 202	Information Retrieval	3	0	0	3
3	CAEX 203	Social Media Analytics	3	0	0	3
4	CAEX 204	High Performance Computing	3	0	0	3
5	CAEX 205	Fundamentals of Linux and Administration	3	0	0	3
		PROGRAMME ELECTIVE– II				
1	CAEX 101	Healthcare Analytics	3	0	0	3
2	CAEX 102	Agile Methodology	3	0	0	3
3	CAEX 103	Organizational Behaviour	3	0	0	3
4	CAEX 104	Human Computer Interaction	3	0	0	3
5	CAEX 105	Advanced Linux and Server Administration	3	0	0	3
		PROGRAMME ELECTIVE– III				
1	CAEX 206	Information Security	3	0	0	3
2	CAEX 207	Computer Vision	3	0	0	3
3	CAEX 208	Open source Technologies	3	0	0	3
4	CAEX 209	AI and Robotics	3	0	0	3

SEMESTER – I

ENE 1183	**GENERAL ENGLISH - I**	**L**	**T**	**P**	**C**
SDG: 4		**3**	**0**	**0**	**3**

COURSE OBJECTIVES:

COB1: To introduce students to literary texts that foster appreciation of language and culture.

COB2: To develop the ability to read and comprehend a variety of genres including poetry, short stories, prose, and drama.

COB3: To enhance listening and speaking skills through structured activities and role plays.

COB4: To enable learners to write coherent descriptive, narrative, and formal paragraphs and letters.

COB5: To build foundational grammar and vocabulary for effective communication.

MODULE I **L: 9**

Poetry: Sarojini Naidu – “Street Cries”

Short story: R.K. Narayan – “Fellow Feeling”

Listening: SundarPitchai – “You will prevail”- Listening for Comprehension

Writing: Descriptive Paragraph

Grammar& Vocabulary: i) Articles ii) Adjectives (Degrees of Comparison)iii) Synonyms & Antonyms

MODULE II **L: 10**

Poetry: Thomas Hardy – “Ah, Are You Digging My Grave?

Prose: I.A.R. Wylie – “The Key to Courage”

Speaking: Introducing oneself and others

Writing: Letter seeking permission to attend conferences

Grammar & Vocabulary: i) Conjunctions ii) Prefixes & Suffixesiii) Synonyms & Antonyms

MODULE III **L: 8**

Short story: Oscar Wilde – “The Model Millionaire”

Prose: Edward de Bono – “Six Thinking Hats” (Excerpt)

Reading: Skimming and Scanning

Writing: Letter of Invitation

Grammar& Vocabulary: i) Tenses ii) Synonyms & Antonyms

MODULE IV **L: 8**

Novella: Ruskin Bond – *A Flight of Pigeons*

Listening: TED Talk: Julian Treasure"How to Speak So That People Want to Listen" – Guided Note taking

Writing: Hints Development

Grammar& Vocabulary: i) Homonyms ii) Question tagiii) Synonyms & Antonyms

MODULE V **L: 10**

One-act play: Fritz Karinthy - *Refund*

Speaking: Role play

Writing: Creative Writing - Story writing

Grammar & Vocabulary: i) Active and Passive Voice ii) Synonyms & Antonyms

L – 45; Total Hours: 45

TEXT BOOKS:

1. Course material by the Department of English

REFERENCES:

1. "Street Cries by Sarojini Naidu." *Allpoetry.com*, 2023, allpoetry.com/poem/8496447-Street-Cries-by-Sarojini-Naidu. https://allpoetry.com/poem/8496447-Street-Cries-by-Sarojini-Naidu
2. https://eruditesdps.wordpress.com/wp-content/uploads/2017/01/malgudi-days-narayan_-r-k_.pdf
3. https://www.youtube.com/watch?v=UUheH1seQuE
4. ""Ah, Are You Digging on My Grave."" *Victorianweb.org*, https://victorianweb.org/authors/hardy/poems/digging.html
5. Palanivel, R. (Ed.), *Textures of English*, Foundation Books, New Delhi, 2010.
6. https://www.ama.ac.in/wp-content/uploads/2023/10/ModelMillionLESSON_11.pdf
7. Bond, Ruskin. *A Flight of Pigeons*. Penguin Books, 2002.
8. https://www.youtube.com/watch?v=eIho2S0ZahI
9. Ansari, Rafeeque. "The Refund - a Hilarious Literary Play." *Blogspot.com*, 2015. https://rafiq-lis.blogspot.com/2013/02/the-refund-hilarious-literary-play.html

COURSE OUTCOMES:

On completion of the course, the students will be able to

CO1: Interpret and critically appreciate diverse literary works that reflect cultural and social values.

CO2: Demonstrate reading strategies like skimming and scanning to extract general and specific information.

CO3: Apply listening & speaking strategies to comprehend and respond to spoken English in academic settings.

CO4: Compose structured written documents in academic context.

CO5: Demonstrate the use of accurate grammar and context-appropriate vocabulary in both spoken and written communication.

Board of Studies (BoS):
18th BoS of the Department of English held on 04.06.2025

Academic Council:
24th AC held on 26th August 2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1														
CO2														
CO3														
CO4														
CO5														

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Statement: The acquisition of LSRW skills of English language could help students in promoting lifelong learning opportunities.

LNE 1181	பொதுத் தமிழ் - I	L	T	P	C
நோக்கங்கள்	GENERAL TAMIL -I	2	1	0	3

- சமூக மாற்றச்சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியங்களை அறிமுகம் செய்தல்
- இருபதாம் நூற்றாண்டு மரபுக்கவிதைகளை அறிமுகம் செய்தல்
- புதுக்கவிதை, சிறுகதை, உரைநடை ஆகிய இலக்கியங்களை நயம் பாராட்டுதல்
- புதுக்கவிதை மற்றும் சிறுகதையின் தோற்றம் வளர்ச்சி குறித்து எடுத்துரைத்தல்
- சந்திப் பிழையின்றி எழுத மாணவர்களைப் பயிற்றுவித்தல்
- கவிதை மற்றும் சிறுகதை எழுத மாணவர்களை ஊக்கப்படுத்துதல்

அலகு I	இருபதாம் நூற்றாண்டு மரபுக்கவிதைகள்	8

கவிமணி தேசிய விநாயகம் பிள்ளை - புத்தரும் ஏழைச்சிறுவனும், பாரதியார் - ஊருக்கு உழைத்திடல் யோகம், பாரதிதாசன் - பெண் கல்வி, கண்ணதாசன் - மனிதரைப் பாட மாட்டேன்.

அலகு II	புதுக்கவிதைகள்	8

முடியரசன்-உலகை மாற்றுவோம், அப்துல்ரகுமான் -வீட்டுக்கொரு மரம் வளர்ப்போம், வைரமுத்து-கால வித்தியாசம், நா.காமராசன் -வானவில், மாலதி மைத்ரேயி-ஒணான் கொடி , மு.மேத்தா-செருப்புடன் ஒரு பேட்டி, வெ. இறையன்பு-சருகுகள் சலசலக்கின்றன, ஹைக்கூ

அலகு III	சிறுகதைகள்	8

ஜெயகாந்தன் - வாய்ச்சொற்கள் , கல்கி - கேதாரியின் தாயார், புதுமைப்பித்தன் - காலனும் கிழவியும், மௌனி - அழியாச்சுடர், திலகவதி - வதம்

அலகுIV	மொழிப்பயிற்சி	7

கலைச்சொல்லாக்கம், பிழைத்திருத்தம் (ஒருமை, ல-ள-ழகர, ர-ற-கர, ண-ந-னகர வேறுபாடுகள்), அயற்சொற்களைதல்.

அலகு V	இலக்கிய வரலாறு	7

பாடந்தழுவியது (இருபதாம் நூற்றாண்டு மரபுக் கவிதைகள், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், சிறுகதையின் தோற்றமும் வளர்ச்சியும் நாவலின் தோற்றமும் வளர்ச்சியும்)

அலகு VI	படைப்பிலக்கியம்	7

கவிதை எழுதுதல், சிறுகதை வரைதல்

L – 45 ; T – 15 ; TOTAL HOURS – 45

குறிப்புகள்

1. பொதுத் தமிழ் - செய்யுள் திரட்டு - தமிழ்த் துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - சோம. இளவரசு
3. சிறுகதைத் தொகுப்பு (கட்டுரைக் களஞ்சியம்)

வெளிப்பாடு				

- மாணவர்கள் சமூக மாற்றச்சிந்தனைகளை அறிந்து கொள்வர்

- இருபதாம் நூற்றாண்டு மரபுக்கவிதைகள் குறித்த அறிவினைப் பெறுவர்.
- சந்திப்பிழைகளை நீக்கி எழுதும் திறன் பெறுவர்
- இருபதாம் நூற்றாண்டு தமிழ் இலக்கியத்தின் வரலாறு, வளர்ச்சி, பாடுபொருள் ஆகியவற்றை உணர்ந்து கொள்வர்.
- இருபதாம் நூற்றாண்டு தமிழ் இலக்கியப் படைப்பாளர்களைப் பற்றி அறிந்து கொள்வர்.
- புத்திலக்கியங்களைப் படைக்கும் திறனையும் திறனாய்வு செய்யும் திறனையும் பெறுவர்

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1							M	M	M	M		M				
CO2							L	L	L	M		M				
CO3							L	M	L	L		L				
CO4							L	L	M	L		L				
CO5							L	L	L	L		L				
CO6							M	M	M	M		L				

Note: L – Low Correlation M – Medium Correlation H – High Correlation

SDG 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

This Course make the students to understand the importance of Strengthening relevant national Institutions, including through international co-operation, for building capacity at all levels, particularly in developing countries, to prevent violence and combat terrorism and crime through the Quranic, Vedic and Biblical literature.

LNE 1182	GERMAN – I	L	T	P	C
SDG: 8		3	0	0	3

COURSE OBJECTIVES:

The objectives of this course are:

COB1: To improve the proficiency of students in German language.

COB2: To create awareness of using vocabulary among students.

COB3: To expose them to correct grammatical forms of the language.

COB4: To empower them for successful communication in the society.

COB5: To understand matters which are of daily usage

COB6: To understand them for describe the people need and their requirements.

MODULE I Guten Tag L:9

Deutsche Alphabet,Begrüßungen und Verabschiedungswörter, Sich vorstellen und Sprechen Über - Name,, Wohnort, Berufe, Hobbys, Länder und Sprachen, Verb Konjugationen, Telefonnummer und E-Mail-Adresse nennen, Sprachen,Bundesländer und Hauptstädte,W-Fragen,Farben,Tage, Monate, Jahreszeiten, Tageszeiten, Zahlen bis ein Hundert.

MODULE II Freunde, Kollegen und Ich. L:9

Personal Pronomen im Nominativ, Konjugation - Regelmäßige Verben und Unregelmäßige Verben ausführlich lernen, Zahlen bis ein Tausend, Satzbau formulieren im Präsens– Aussage Satz, Ja / Nein Frage Satz und W-Frage Satz,Formular ausfüllen, Einfache Übersetzung -Englischer Satz/die Textstelle auf Deutsch..

MODULE III In der Stadt. L:9

Wortschatz lernen-Plätze und Gebäude, Verkehrsmittel, Schulsachen, Technik und Geräte benennen, Adjektiv

-Gegenteile, Nominativ- Bestimmter Artikel *der, die, das*, Unbestimmter Artikel *ein, eine, ein*, Negation *kein, keine, kein*, nach dem Weg fragen und einen Weg beschreiben(Sprechen auch) -links, rechts, geradeaus und die Himmelrichtungen, Ordinalzahlen lernen, einen Text verstehen und antworten.

MODULE IV Guten Appetit. L:9

Lebensmittel - Über Essen und Getränke sprechen, den Einkauf planen, Über Preise sprechen, Akkusative Bestimmter Artikel *den, die, das*, Unbestimmter Artikel *einen, eine, ein*, Negation *keinen, keine, kein*, Verben mit Akkusativ*,* Die Uhrzeit verstehen und anwenden können- Singular und Plural, Texte verstehen und antworten.

MODULE V Meine Familie L:9

Modal Verben – müssen, können, wollen, sollen, möchten, dürfen, mögen, Modal Verb im Satz, Kurze

Alltagsgespräche führen und verstehen, Trennbare Verben, Possessivepronomen im Nominativ – mein, dein, sein

. . ., Über die Familie schreiben und sprechen, Andere vorstellen, Präteritum – sein und haben, Texte verstehen und antworten, Negation- nicht, Einfache Übersetzung -Deutscher Satz/die Textstelle auf Englisch

L – 45; Total Hours: 45

TEXT BOOKS:

1. Netzwerk Neu Deutsch als Fremdsprache A1
   German Edition 2023 by Helen Schmitz Stefanie Dengler,Paul Rusch (Author).
2. Basic German: A Grammar and Workbook (Routledge Grammar Workbooks)
   by Heiner Schenke , Anna Miell

PRACTICE BOOK:

1. Menschen: Kursbuch A1
   German Edition by Sandra Evans (Author), Angela Pude (Author),

REFERENCES:

1. Tangram aktuell: Kurs- und Arbeitsbuch 1.
   1 January 2004 German Edition by Seelmann Kurt (Author).
2. Prima aktiv A1.1 Deutsch fur Jugendliche Textbook + Workbook.
   by Sabine jentges (Author), Friederike jin (Author),

COURSE OUTCOMES:

On successful completion of this course learners will be able to

CO1: Show their proficiency in German Language.

CO2: Use appropriate vocabulary in real life contexts.

CO3: Use appropriate grammatical forms while communicating with people.

CO4: Effectively use the language in social and academic contexts.

CO5: Comprehend matters which are of daily usage

CO6: Communicate as per people's need and requirement.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	H	H	M	H		H	H	H	M	H	M	H				
CO2				H		H	H	H	H	H		H				
CO3				H		H	H	H	H	H		H				
CO4				H		H	H	H		H		H				
CO5				H		H	H	H		H		H				
CO6				H		H	H	H		H		H				

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4 : Quality Education

The substantially improve the relevant skills which develop the confidence in young people, including technical and vocational skills, help for employment, decent work and entrepreneurship.

LNE 1183	ARABIC LANGUAGE	L	T	P	C
SDG 4		3	0	0	3

COURSE OBJECTIVES:

The course aims to teach :

COB1: Arabic alphabets, reading and writing and pronunciation.

COB2: Listening and writing of words related to market, doctor, parts of body, dining.

COB3: Arabic simple sentences using names of animals, birds, singular and plural.

COB4: Listening and writing of Countries‟ names, singular, dual and plural.

COB5: Arabic sentences using verbs, tenses, numbers and basic grammar

MODULE I INTRODUCTION TO ARABIC READING AND WRITING 9

Introduction to Arabic alphabets - reading from right to left - Listening to audio & video – practice correct pronunciation – Writing join letters from right to left – Introduction to Sun letters and Moon letters – Reading words with harakath (lessons: 1 and 2): (حجرة الدراسة ، حجرة الدراسة 2) - introduction to Arabic words in and around the classroom – Writing practice of words

MODULE II INTRODUCTION TO BASIC ARABIC GRAMMAR 9

Reading skill: Vocabulary related to Traffic (المرور) – Preposition in Arabic (حروف الجر) - Definite and Indefinite words (المعرفة والنكرة)- Vocabulary related to market (Lesson 3) – Adverb of place and time – Gender variation (المذكر والمؤنث) - Demonstrative pronoun (أسماء الإشارة)

MODULE III VOCABULARIES AND SIMPLE SENTENCES 9

Introduction of verbs (lessons: 4 – 6) – Changing the pronouns (الضمائر) - Sentence pattern - Words related to doctor, parts of the body (أعضاء الجسم) – Verbal Sentence (جملة الفعلية) - object in a verbal sentence (المفعول به) - dining, fruits, vegetables and food items (الخضار والمطعم والفواكه) - Airport vocabularies (المطار) - family members, household objects (البيت والأسرة) - Vocabulary related to names of animals, birds (الحيوانات و الطيور)

MODULE IV GRAMMATICAL SENTENCE FORMATION 9

(lessons: 7 – 12) Home – singular, dual and plural (مفرد مثنى والجمع) - introduction to gender: first person, second person and third person (الضمائر المنفصلة) – interrogatory sentences - arabic

simple sentences – nominal sentence and verbal sentence (الجملة الاسمية والفعلية) - subject and predicate (المبتدأ والخبر) – Congregation of pronouns – Attached pronouns (الضمائر المتّصلة)

MODULE V TENSE AND BASIC CONVERSATIONS 9

(lessons: 13 & 14) Words related to kitchen utensils – cooking (أسماء المطبخ والطبخ)– Introduction to gender in verbs: first person, second person and third person (التذكُّر والتأنُّث) – singular and plural in verbs – present tense conjugation (تصريف الفعل المضارع) - past tense conjugation (تصريف الفعل الماضي) – possession (الإضافة) -
(المحادثة العربُّية) - verbs and tenses – communication on dining

L - 45; TOTAL HOURS – 45

TEXT BOOK:

1. Al Qirathul Arabiyya Lil Mubtadiyeen القراءة العربّة للمبتدئّن (UmmulQura University, Makkah), Bukhari Aalim Arabic College, 2005.

REFERENCES:

1. Al Arabiya Lin Nashiyeen (Education Ministry, K.S.A.), Bukhari Aalim Arabic College, 2005.
2. Dr. V. Abdur Raheem, Durus Al Lugathil Arabiyya Li Ghairin NatiqeenBiha, Islamic Foundation Trust, Chennai, 2002.

COURSE OUTCOMES:

At the end of the course, the student is expected to

CO1: vocabulary related to the market, doctor, parts of body, dining.

CO2: Identify Arabic names of animals, birds, singular and plural, interrogatory sentences.

CO3: recognize Arabic alphabets, reading and writing and pronunciation.

CO4: use basic grammar rules, singular, dual and plural.

CO5: form Arabic sentences using verbs, tenses and numbers.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1						L									
CO2							M								
CO3							M								
CO4						L									
CO5							M								

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

This course enables the learners to enhance effective communication in the workplace.

MAE 1187	ALGEBRA, CALCULUS AND NUMERICAL METHODS	L	T	P	C
SDG: 4		3	1	0	4

COURSE OBJECTIVES:

COB1: To introduce the concept of eigenvalues and eigenvectors of matrix.

COB2: To lay the foundation for finding the roots of equations.

COB3: To familiarize the functions of several variables.

COB4: To impart the basic concepts of numerical methods.

COB5: To introduce interpolation techniques and finite difference concepts.

MODULE I MATRICES **9 + 3**

Symmetric, skew-symmetric, orthogonal and unitary matrices – Rank of a matrix – System of linear equations – Consistency and solutions – Characteristic equation – Eigenvalues and eigenvectors – Properties – Cayley Hamilton's theorem (Excluding proof).

MODULE II THEORY OF EQUATIONS **9 + 3**

Polynomial equations with real coefficients – Irrational and complex roots – Symmetric functions of roots – Transformation of equation by increasing or decreasing roots by a constant – Reciprocal equations.

MODULE III CALCULUS **9 + 3**

Differentiation – Derivative of implicit function – Successive differentiation – Partial differentiation – Euler's theorem (Excluding proof) – Maxima and minima of functions of two variables – Lagrange's multiplier – Integration – Integration by parts – Bernoulli's formula and definite integrals.

MODULE IV NUMERICAL SOLUTION OF EQUATIONS **9 + 3**

Algebraic and Transcendental equations–Bisection method –Regula falsi method – Newton Raphson method – System of linear equations – Gauss elimination method – Gauss Jordan method – Gauss Jacobi method – Gauss Seidel method.

MODULE V INTERPOLATION **9 + 3**

Operators E, Δ, ∇ and their relations – Interpolation with equal intervals – Newton's forward and backward interpolation formula – Interpolation with unequal intervals – Newton's divided difference – Lagrange's interpolation.

L – 45; T – 15; TOTAL HOURS – 60

TEXT BOOKS:

1. B. S. Grewal, "Higher Engineering Mathematics", 45th Edition, Khanna Publishers, New Delhi, 2024.
2. B. S. Grewal, "Numerical Methods in Engineering and Science", 11th Edition, Khanna Publishers, New Delhi 2013.
3. Kandasamy P., "Numerical methods", S. Chand Publishers, Bangalore, 2022.

REFERENCES:

1. Stewart J,, "Single Variable Calculus", 9th Edition, Cengage Learning 2020.
2. Tom M. Apostol, "Calculus", Vol. I, 2nd Edition, John Wiley and Sons, New Jersey, 1967 (reprint 2007).
3. MacDuffee C. C., "Theory of Equations", John Wiley & Sons., New Jersey, 1971.

COURSE OUTCOMES: At the end of the course students will be able to

CO1: solve eigenvalue and eigenvector problems.

CO2: solve various polynomial equations.

CO3: evaluate the maxima and minima of functions of two variables, and definite integrals.

CO4: find the roots of the equation numerically.

CO5: apply various interpolation techniques.

Board of Studies (BOS):
17th BOS of Department of Mathematics and Actuarial Science held on 23.06.2025.

Academic Council:
24th AC held on 26.08.2025

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H														
CO2	M														
CO3	M														
CO4	H														
CO5	H														

*** Legend: L – Low (1), M – Medium (2), H – High (3).**

SDG 4 – Quality Education: Ensure inclusive and equitable quality education and promote lifelong opportunities for all.

Learning various mathematical tools will lead to knowledge of applications in Computer Science.

CAE1101	PROBLEM SOLVING AND PROGRAMMING USING C	L	T	P	C
SDG: 9		3	0	0	3

COURSE OBJECTIVES:

COB1: Develop logical thinking and structured problem-solving abilities through algorithms, flowcharts and pseudocode.

COB2: Understand the use of control structures, functions, recursion and debugging techniques in C programming.

COB3: Impart knowledge on the basics of C programs and control structures.

COB4: Examine the use of functions, pointers and arrays in C to develop efficient programs.

COB5: Familiarize students with structures, union and file handling in C.

MODULE I INTRODUCTION TO COMPUTER PROBLEM SOLVING 9

Overview of problem solving: Definition, Types of problems – computational, mathematical, and real-world problems. Problem-solving strategies: Trial and error, pattern recognition, divide and conquer, top-down approach. Algorithm development: Characteristics of algorithms, writing, analyzing, and tracing algorithms. Flowcharts: Symbols, conventions, and drawing flowcharts for problem solving. Pseudocode: Writing and understanding pseudocode for simple problems.

MODULE II CONTROL STRUCTURES AND MODULAR PROBLEM SOLVING 9

Control flow concepts: Sequential, selection, and iteration. Modular design: Need for modularity, top-down design principles, function prototypes and definitions. Recursion: Basic recursive functions (factorial, Fibonacci). Steps for Creating and Running programs. Compilation Process: Compilation and Interpretation, Phases of Compilation. Debugging, Types of Errors- Syntax Errors, Logical Errors.

MODULE III INTRODUCTION TO PROGRAMMING IN C 9

History and features of C – Structure of a C program – Compilation and execution of C program – Data types – Variables and constants – Operators and expressions – Input and output functions – Type conversion. Conditional statements: if, if-else, nested if – switch statement. Looping structures: while, do-while, for. Jump statements: break, continue, goto .

MODULE IV ARRAYS, FUNCTIONS AND POINTERS 9

Functions: definition, declaration, call, recursion – Storage classes – Scope and lifetime of variables. Arrays: one-dimensional and two-dimensional – String operations. Pointers: declaration, initialization, operations, pointers and arrays, pointers to functions.

MODULE V STRUCTURES, UNION AND FILE HANDLING 9

Structures: definition, declaration, arrays of structures, Pointers to structures, nested structures – Unions. File operations: open, read, write, close.- Case Studies: Student Record Management System, Library Management System, Simple Banking System.

L – 45; TOTAL HOURS –45

TEXT BOOKS:

1. E. Balaguruswamy, “Programming in ANSI C”, 8th Edition, McGraw Hill Education, 2019.
2. Yashavant P. Kanetkar, “Let Us C”, 16th Edition, BPB Publications, 2019.

REFERENCES:

1. Maureen Sprankle, Jim Hubbard “Problem solving & programming concepts”,9 th edition, 2012.
2. Kernighan, B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.
3. Forouzan, Richard F.Gilberg, “Programming for Problem Solving”, 1st edition, Cengage publications, 2019.

COURSE OUTCOMES:

CO1: Design algorithms, flowcharts, and pseudocode to solve real-world problems systematically.

CO2: Gain Knowledge about programming concepts and compilation processes to develop efficient programs.

CO3: Implement C programs using control structure.

CO4: Apply functions, arrays and pointers in solving problems.

CO5: Construct programs using structures, union and file handling techniques.

Board of Studies (BoS):	**Academic Council:**
21st BoS of Computer Applications held on 13.06.2025	24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1													H	
CO2	M		H											H
CO3			M					L	H	M				
CO4			M	M					H				H	
CO5								L	H	M		H		H

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 9 : Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation

Statement: Programming logics, design and developments taught in this course for the learners with respect to the course outcomes are measurable and useful in improving the programming skill of the learner. As the future of the software industry enhances rapidly, the learners will be able to understand and implement any technologies by having a strong foundation in C programming language.

CAE1102 COMPUTER ARCHITECTURE L T P C

SDG: 9 3 0 0 3

COURSE OBJECTIVES:

COB1: Introduce the basic structure and organization of a computer System and fundamental principles of digital logic, number systems.

COB2: Explore Boolean algebra and sequential logic elements.

COB3: Develop the architecture and functioning of the CPU, instruction formats, addressing modes, and the design of ALUs and control units..

COB4: Examine various memory organizations and understand hierarchy and management techniques.

COB5: Gain insights into input/output systems, interfaces, storage technologies, and modern I/O standards.

MODULE I INTRODUCTION 9

Introduction to Computer Architecture: Structure vs. Organization - Computer organization, Block Diagram of Computer- Central processing unit - Secondary storage devices – Magnetic and optical media - Input and output units: OMR, OCR, MICR, scanner, mouse, modem. Number Systems: Binary, Octal, Decimal, Hexadecimal – Conversions - Signed number representation: 1's and 2's Complement - Boolean Algebra:

Laws and Theorems, Simplification - Logic Gates and Truth Tables.

MODULE II BOOLEAN ALGEBRA AND LOGIC CIRCUITS 9

Boolean Algebra, Axioms - Truth table simplification of Boolean function- logic diagrams - Dem organs theorems, duality theorem - K-map method – Flip-Flops: SR, JK, D, T – Truth Tables and Timing Diagrams -

Registers and Counters: Synchronous and Asynchronous Counters.

MODULE III PROCESSOR AND CONTROL UNIT DESIGN 9

Central Processing Unit - Architecture and Functions - Instruction Formats: Zero, One, Two, and Three Address - Addressing Modes: Immediate, Direct, Indirect, Indexed - ALU Operations and Control Unit Design - RISC vs. CISC Architectures - Introduction to Instruction

Pipelining.

MODULE IV MEMORY ORGANIZATION 9

Computer memory – primary memory and secondary memory - Types of

Memory : Cache, Main Memory, Virtual Memory - Memory Hierarchy and

Access Time - Associative Memory, Cache Mapping Techniques - Virtual Memory Management: Paging and Segmentation - Memory Protection and Access Control.

MODULE V INPUT/OUTPUT AND STORAGE SYSTEMS 9

I/O Interfaces and Data Transfer Modes: Programmed, Interrupt-Driven, DMA- I/O Processors and Channels - Secondary Storage: HDD, SSD, Optical Drives - RAID Levels and Disk Scheduling Algorithms - Introduction to I/O Standards: USB, PCIe SATA·

L – ; P – ; TOTAL HOURS – 45

TEXT BOOKS:

1. David A. Patterson & John L. Hennessy (2021), Computer Organization and Design: RISC-V Edition, Morgan Kaufmann.
2. William Stallings (2023), Computer Organization and Architecture: Designing for Performance, 11th Edition, Pearson.
3. Morris Manno (2021), Computer System Architecture, Second edition by Pearson.

REFERENCES:

1. Hennessy, J. L., & Patterson, D. A. (2019). Computer Architecture: A Quantitative Approach (6th Ed.)
2. Andrew S. Tanenbaum & Todd Austin – Structured Computer Organization, 6th Edition, Pearson, 2022.
3. Behrooz Parhami – Computer Architecture: From Microprocessors to Supercomputers, 2nd Edition, Oxford University Press, 2022.
4. John L. Hennessy & David A. Patterson – Computer Architecture: A Quantitative Approach, 6th Edition, Morgan Kaufmann, 2023.1. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, 43rd edition, New Delhi, 2012.
5. Rajaraman V., Computer Organization and Architecture, PHI Learning, 2011.

COURSE OUTCOMES:

CO1: Design and simplify digital logic circuits using Boolean algebra and implement basic combinational circuits.

CO2: Construct the sequential circuits, and demonstrate the functional organization of a simple computer.

CO3: Explain and evaluate CPU architecture, including instruction formats, ALU operations, and control unit design.

CO4: Evaluate memory organization techniques and compare various types of memory based on performance characteristics.

CO5: Analyze I/O interfaces, implement data transfer protocols, and explain secondary storage system operations.

Board of Studies (BoS):

21st BoS of Computer Applications held on 13.06.2025

Academic Council:

24th AC held on 26.08.2025

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12
CO1	H	H	M	M	L	-	-	-	-	L	-	L
CO2	H	H	M	M	L	-	-	-	-	L	-	L
CO3	H	H	H	M	M	-	-	-	-	L	-	L
CO4	H	H	M	M	M	-	-	-	-	L	-	L
CO5	H	M	M	M	M	-	-	-	-	L	-	L

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 9: Industry, Innovation and Infrastructure - : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Statement:

The course equips students with foundational and advanced concepts in computer architecture, including processor design, memory systems, and input/output technologies. By understanding digital logic, control units, memory hierarchy, and modern I/O standards, learners are prepared to design and optimize computing infrastructure. This knowledge contributes to the development of efficient, innovative, and sustainable computing systems that form the backbone of industrial digitization and smart technology solutions, fostering innovation in sectors such as IT, automation, and embedded systems.

CAE1104	FUNDAMENTALS OF DATA	L	T	P	C
SDG: 4 & 9	STRUCTURES	3	0	0	3

COURSE OBJECTIVES:

COB1: To introduce the fundamental concepts of data structures, arrays, searching and sorting.

COB2: To design and implement linked lists, applications of linked list and advantages of linked list.

COB3: To design and implement linear data structure like stack, queue and its operation.

COB4: To explore tree-based structures and apply recursive techniques for hierarchical data organization and manipulation.

COB5: To model complex relationships using graph structures and apply traversal techniques in solving real-world problems.

MODULE I INTRODUCTION - SEARCHING AND SORTING 9

Introduction to Data Structures - Types of Data Structures: Linear and Non- linear – Abstract data types. Arrays: Introduction – Representation – One Dimensional Array, Traversing, Insertion, Deletion, Searching, Sorting, Multidimensional Arrays, Applications - Memory Allocation – Advantages and Limitations of Arrays. Linear and Binary Search - Sorting Techniques:

Bubble, Selection, Insertion, Merge, Quick Sort.

MODULE II LINKED LISTS 9

Singly Linked List – Traversal of Singly Linked List – Searching – Memory Allocation and De-allocation – Insertion at beginning, Insertion at specific location, Insertion at the end of the Singly Linked List -Deletion at the beginning, Deletion at any specific location, Deletion at the end of the Singly Linked Lists - - Circular Linked Lists- Applications of Circular Linked List - Doubly Linked Lists– Traversing of Doubly linked list – Searching – Memory Allocation and De-allocation - Insertion at beginning, Insertion at specific location, Insertion at the end of the Doubly Linked List -Deletion at the beginning, Deletion at any specific location, Deletion at the end of the Doubly Linked Lists – Advantages of Linked List – Applications of Linked Lists.

MODULE III STACKSAND QUEUES 9

Stacks: Introduction – Push and Pop operations on the stack – Array Representation of Stacks – Applications of Stack – Evaluation of Arithmetic expressions – Infix and Postfix operations - Recursion - Implementation of Stack using Linked Lists, Applications - Queues: Introduction – Operations on the Queue – Array Representation of Queue – Implementation of Queue using Linked Lists – Applications of Queue - Circular Queue – Types of Queues – Deque – Priority Queue – Applications of Priority Queue.

MODULE IV TREES 9

Introduction to Trees, Binary Trees - Tree Traversals: Inorder, Preorder, Postorder - Binary Search Trees (BST) - AVL Trees - Red Black Tree - Applications in File Systems and Expression Evaluation.

MODULE V HASHING & GRAPHS 9

Hashing Techniques – Hash Functions –Address calculation techniques – common hashing functions Collision resolution –Linear probing, Quadratic, Double hashing, Bucket hashing, Deletion and rehashing.

Graph: Introduction, Terminology and Representation (Adjacency Matrix/List) - Graph Traversal Algorithms: BFS, DFS - Minimum Spanning Tree (Prim's and Kruskal's Algorithms) – Shortest path Algorithms.

L – 45 ; TOTAL HOURS – 45

TEXT BOOKS:

1. Dr. Rahul Sharma, Fundamentals of Data Structures: DS, Notion Press, April 2025
2. E. Horowitz, S. Sahni, and D. Mehta, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, 2008.

REFERENCES:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2002.
2. Thomas H. Cormen et al., Introduction to Algorithms, 3rd Edition, MIT Press, 2009.
3. Seymour Lipschutz, Data Structures, Schaum's Outlines Series, Tata McGraw Hill, 2014.
4. Narasimha Karumanchi, Data Structures and Algorithms Made Easy, CareerMonk Publications, 2011.
5. Reema Thareja, Data Structures Using C, Oxford University Press, 2011.

COURSE OUTCOMES:

CO1: Understand and explain core data structure concepts, Array operations, searching and sorting techniques.

CO2: Develop and implement linked list and type of linked list, applications and advantages using procedural programming

CO3: Analyze stack and queue operations and implementation

CO4: Construct and manipulate various trees such as binary trees, BSTs, and expression trees for structured data representation.

CO5: Represent and solve network-based problems using graphs and associated algorithms (BFS, DFSa).

Board of Studies (BoS):
21st BoS of Computer Applications held on 13.06.2025

Academic Council:
24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	H	M	M	L	-	-	-	-	-	L	-	-	-	-
CO2	H	H	H	M	M	-	-	-	-	M	-	-	-	-
CO3	H	M	H	H	-	-	-	-	-	M	-	-	-	-
CO4	H	M	H	H	M	-	-	-	-	M	-	-	-	M
CO5	H	M	H	H	M	-	-	-	-	M	-	-	M	-

Note: L- Low Correlation M -Medium Correlation H -High Correlation

SDG 4: Quality Education & SDG 9: Industry, Innovation, and Infrastructure

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. Increase the number of people with relevant skills for employment and entrepreneurship. Ensure literacy and numeracy for all youth and a substantial proportion of adults. Develop quality, reliable, sustainable, and resilient infrastructure. Enhance scientific research and technological capabilities. Support domestic technology development and innovation.

CAE 1105	PROGRAMMING IN C LABORATORY	L	T	P	C
SDG: 9		0	0	2	1

COURSE OBJECTIVES:

COB1: Introduce the programming skills in C.

COB2: Understand the decision and looping constructs of C.

COB3: Explore the concepts of strings, pointers, functions and structure in C.

COB4: Develop programs in C using file operations.

COB5: Create applications using C language.

PRACTICALS

List of Experiments:

1. Write a program in C using I/O statements, operators and expressions.
2. Write a program in C using decision-making constructs: if-else, switch-case and break-continue.
3. Write a program to illustrate array and string functions.
4. Write a program in C to demonstrate looping constructs: for, while, and do-while.
5. Write a C program to demonstrate Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers
6. Write a C program to demonstrate the various types Functions: call, return, passing parameters by (value, reference), passing arrays to function.
7. Write a C program to illustrate Recursion function.
8. Write a C program to demonstrate Structures: Nested Structures, Pointers to Structures and Arrays of Structures.
9. Write a C program to demonstrate Unions in C.
10. Write a C program for the operations on Files: reading and writing, File pointers, file operations, random access and processor directives.
11. Develop an application for a Learning information system for a school.

P – 60; TOTAL HOURS –60

TEXT BOOKS:

1. E. Balaguruswamy, “Programming in ANSI C”, 8th Edition, McGraw Hill Education, 2019.
2. Yashavant P. Kanetkar, “Let Us C”, 16th Edition, BPB Publications, 2019.

REFERENCES:

1. Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition, Pearson Education, 2015.
2. Behrouz A. Forouzan, Richard F. Gilberg, “Programming for Problem Solving”, 1st edition, Cengage publications, 2019.

COURSE OUTCOMES:

CO1: Apply the basic logics and mathematical concepts behind programming language.

CO2: Enhance their programming skills in C environment to use looping and decision constructs.

CO3: Develop programs using array, functions, pointer, structures and union concepts in C platform.

CO4: Create files and implement file operations on files.

CO5: Implement applications in C programming language to solve the real time problem.

Board of Studies (BoS):	**Academic Council:**
21st BoS of Computer Applications held on 13.06.2025	24th AC held on 26.08.2025

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	M								H				H	
CO2			H				H							H
CO3								M	H	M				H
CO4			H	M					H				H	
CO5							H	L	H	M		H		H

Note: L- Low Correlation M -Medium Correlation H -High Correlation

SDG 9: Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation

Statement: Programming logics, design and developments taught in this course for the learners with respect to the course outcomes are measurable and useful in improving the programming skill of the learner. As the future of the software industry enhances rapidly, the learners will be able to understand and implement any technologies by having a strong foundation in C programming language.

CAE 1106	DATA STRUCTURES AND ALGORITHMS	L	T	P	C
SDG: 9	LABORATORY	0	0	2	1

COURSE OBJECTIVES:

COB1: Develop a Strong Foundation in Data Structures - Understand and implement core data structures like arrays, linked lists, stacks, queues, and trees.
COB2: Enhance Problem-Solving Skills- Solve classical problems such as Tower of Hanoi, sorting, and searching using various algorithmic techniques.
COB3: Learn Algorithm Implementation and Analysis - Implement searching (linear, binary) and sorting algorithms (bubble, selection, insertion, quick, merge) and understand their time and space complexities.
COB4: Understand and Apply Recursion - Gain practical experience with recursive programming through problems like Tower of Hanoi and tree traversals.
COB5: Master Graph and Tree Traversal Techniques - Learn to perform DFS and BFS on graphs and various traversals (inorder, preorder, postorder) on binary trees and binary search trees

PRACTICALS

1. Implement array operations: insertion, deletion, traversal, and searching.
2. Implement matrix operations using 2D arrays.
3. Write a C program to solve Tower of Hanoi problem.
4. Implement Searching Algorithms:
    a) Linear Search
    b) Binary Search
5. Implement sorting algorithms:
    a) Bubble sort
    b) Selection sort
    c) Insertion sort
6. Write a program to implement the Quick Sort.
7. Write a program to implement the merge sort.
8. Write a C program to implement singly linked list with all operations.
9. Write a C program to implement doubly linked list with all operations.
10. Write a C program to implement stack using arrays.
11. Write a C program to implement stack using linked lists.
12. Demonstrate infix to postfix conversion.
13. Write a C program to implement queue and circular queue using arrays.
14. Write a program to implement binary tree with inorder, preorder, and postorder traversals.

15. Construct a binary search tree and perform search, insert, and delete operations.
16. Write a program to implement Depth-First Search (DFS) and Breadth-First Search (BFS).

P – 30 ; TOTAL HOURS – 30

TEXT BOOKS:

1. Reema Tharej, “Data Structures Using C”, 3rd Edition, 2023, Oxford University Press.
2. Samir Kumar Bandyopadhyay and Kashi Nath Dey ,” Data Structures Using C “,2024, Pearson India.
3. Michael T.Goodrich, Roberto Tamassia, Michael H.Goldwasser,” Data Structures and Algorithms in C: Concepts and Implementations”,2024, Wiley Publications.

REFERENCES:

1. Lipschutz: Schaum’s outline, “Data structures with C” Tata McGrawHill, 2017.
2. Ellis Horowitz, SartajSahni, “Fundamentals of Data Structures in C”, University Press, 2020.
3. R.S. Salaria , “Data Structures and Algorithms using C” ,2022, Khanna Publishers.
4. P. S. Deshpande, O. G. Kakde, "C Programming and Data Structures",2023, 4th Edition, Wiley India.
5. A. K. Sharma ,”Data Structures Using C “, 2nd Edition, 2024 by Pearson India.

COURSE OUTCOMES:

CO1: Students will be able to write C programs that effectively use arrays, linked lists, stacks, and queues.

CO2: Learners will gain the ability to implement and compare different algorithms for searching and sorting.

CO3: Students will be proficient in handling recursive functions and working with trees and graphs.

CO4: Understand real-world applications like infix to postfix conversion using stacks.

CO5: Enhanced Coding Skills for Competitive Programming and Interviews.

Board of Studies (BoS):
21st BoS of Computer Applications held on 13.06.2025

Academic Council:
24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	L	H											
CO2	H	L	H	M									M	
CO3	H	L	M	M	M									
CO4	H	L	M	H	M									
CO5	H	H	H	H	M					L				

SDG No. 9

Industry, Innovation and Infrastructure - Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Statement:

To develop fundamental programming skills in data structures and algorithms that foster innovation, critical thinking, and problem-solving capabilities. The practical knowledge of data structures and algorithms is foundational to

creating efficient software systems and digital tools. By mastering these concepts, students building robust and scalable digital infrastructure, driving innovation through optimized algorithms, enhancing the quality and efficiency of industrial and IT solutions

SEMESTER - II

ENE 1283	**GENERAL ENGLISH - II**	**L**	**T**	**P**	**C**
SDG: 4		**3**	**0**	**0**	**3**

COURSE OBJECTIVES:

COB1: To introduce students to literary texts that foster appreciation of language and culture.

COB2: To develop the ability to read and comprehend a variety of genres including poetry, short stories, prose, and drama.

COB3: To enhance listening and speaking skills through structured activities and role plays.

COB4: To enable learners to write coherent descriptive, narrative, and formal paragraphs and letters.

COB5: To build foundational grammar and vocabulary for effective communication.

MODULE I **L: 8**

Poetry: Nissim Ezekiel – "The Patriot"

Short story: Sudha Murthy – "How I Taught My Grandmother to Read"

Listening: IndraNooyi – "Be Consistent" - Listening for Comprehension

Writing: Letter of Enquiry

Grammar & Vocabulary: i) Prepositions ii) 'Wh' and Yes/No questionsiii) Synonyms & Antonyms

MODULE II **L: 10**

Poetry: Wilfred Owen – "Strange Meeting"

Prose: Sam Horn – "How to Avoid an Argument"

Speaking: Conversation – Expressing opinions – Agreeing and Disagreeing

Writing: Letter placing an order

Grammar & Vocabulary: i) Subject-Verb Agreement ii) Relative pronounsiii) Synonyms & Antonyms

MODULE III **L: 9**

Short story: Guy de Maupassant – "The Necklace"

Prose:A. P. J Abdul Kalam – "My Early Days"

Reading: Reading for Comprehension – unseen passages

Writing: Letter of Complaint

Grammar & Vocabulary:i) Modals ii) 'If' clauseiii) Synonyms & Antonyms

L: 8

MODULE IV

Novella: Ian McEwan – *The Cockroach*

Listening:TED Talks: Dr. Justin Moseley**– "**How I Overcame My Fear of Public Speaking" – Unguided Note taking

Writing: Paragraph writing – argumentative / opinion

Grammar & Vocabulary:i) Reported speech ii) Synonyms & Antonyms

MODULE V **L: 10**

One-act play: Hugh Chesterman - *The Pie and The Tart*

Speaking: Debate

Writing: Book / movie review

Grammar& Vocabulary:i) Idioms & phrases ii) Phrasal Verbs iii) Synonyms & Antonyms

L – 45; Total Hours:45

TEXT BOOKS:

1. Course material by the Department of English

REFERENCES:

1. Patriot, The. "The Patriot by Nissim Ezekiel." *Allpoetry.com*, https://allpoetry.com/poem/8592073-The-Patriot-by-Nissim-Ezekiel
2. SudhaMurty. *How I Taught My Grandmother to Read - and Other Stories.*Motilal Penguin India, 2014.
3. https://www.youtube.com/watch?v=5KOycTWpCHY
4. "Strange Meeting by Wilfred Owen - Poems | Academy of American Poets." *Poets.org*, https://poets.org/poem/strange-meeting
5. Palanivel, R. (Ed.), *Textures of English*, Foundation Books, New Delhi, 2010.
6. Guy de Maupassant. *The Diamond Necklace*. CreateSpace, 5 Sept. 2014. https://faculty.ksu.edu.sa/sites/default/files/the_diamond_necklace.pdf
7. McEwan, Ian. *The Cockroach*. Knopf Canada, 1 Oct. 2019.
8. https://www.youtube.com/watch?v=aImrjNPrh30
9. Characters, Hugh. *The Pie and the Tart*. https://files.cdn-files-a.com/uploads/3433317/normal_6784b06cc2485.pdf

COURSE OUTCOMES:

On completion of the course, the students will be able to

CO1: Interpret and critically appreciate diverse literary works that reflect cultural and social values.

CO2: Demonstrate reading strategies like skimming and scanning to extract general and specific information.

CO3: Apply listening & speaking strategies to comprehend and respond to spoken English in academic settings.

CO4: Compose structured written documents in academic context.

CO5: Demonstrate the use of accurate grammar and context-appropriate vocabulary in both spoken and written communication.

Board of Studies (BoS):
18th BoS of the Department of English held on 04.06.2025

Academic Council:
24th AC held on 26th August 2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1														
CO2														
CO3														
CO4														
CO5														

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Statement: The acquisition of LSRW skills of English language could help students in promoting lifelong learning opportunities.

LNE 1281	பொதுத் தமிழ் -II GENERAL TAMIL - II	L	T	P	C
		2	1	0	3

நோக்கங்கள்

- சங்க இலக்கியங்களையும் சங்கப்புலவர்களையும் அறிமுகம் செய்தல்.
- பழந்தமிழர்களின் அகப்புற வாழ்வினையும் பண்பாட்டினையும் எடுத்துரைத்தல்.
- அற இலக்கியங்கள், பக்தி இலக்கியங்கள், காப்பியங்களை அறிமுகம் செய்தல்
- பல்வேறு சமயக்கோட்பாடுகளையும் உண்மைகளையும் உணர்த்துதல்
- கட்டுரைகளை எழுத மாணவர்களைப் பயிற்றுவித்தல்
- சந்திப் பிழையின்றி எழுத மாணவர்களைப் பயிற்றுவித்தல்

அலகு I	சங்க/அற இலக்கியங்கள்	8

புறநானூறு - (முதல் பாடல், நற்றிணை - (முதல் பாடல், திருக்குறள் - வாய்மை, நூல்நயம் , நாலடியார் - ஊழ் இயல் (தெரிவு செய்யப்பட்ட 5 பாடல்கள், முதுமொழிக்காஞ்சி (தெரிவு செய்யப்பட்ட 5 பாடல்கள், ஏலாதி - முதல் ஐந்து பாடல்கள்

அலகு II	பக்தி இலக்கியங்கள்	8

ஆண்டாள் - (தெரிவு செய்யப்பட்டப் பாடல்கள், சிவவாக்கியர் பாடல்கள் (தெரிவு செய்யப்பட்ட 5 பாடல்கள், திருவருட்பா - (தெரிவு செய்யப்பட்டப் பாடல்கள் .

அலகு III	காப்பியங்கள்	8

சிலப்பதிகாரம் – ஊர்காண் காதை (கவுந்தி அடிகள் அற உரை மட்டும் '), கம்பராமாயணம் - கும்பகர்ணன் வதைப்படலம் (10 பாடல்கள், சீறாப்புராணம் - புலி வசனித்தப் படலம் (தெரிவு செய்யப்பட்ட 5 பாடல்கள் இரட்சண்யயாத்ரிகம் - குமாரப்பருவம் (10 பாடல்கள்,

அலகு IV	கட்டுரைகள்	7

பாரதிதாசன் - பொதுவுடைமைத் தத்துவம், மு.வ. - நாணுகிறான் தமிழன் க. பஞ்சாங்கம் - பொருளாதாரப் பின்னணியில் பெண், எஸ். ராமகிருஷ்ணன் - நதியில் ஒருகூழாங்கல் .

அலகு V	இலக்கிய வரலாறு	7

எட்டுத் தொகை, பத்துப்பாட்டு

அலகு VI	மொழிப்பயிற்சி	7

இலக்கணக்குறிப்புத் தருதல், வல்லினம் மிகுவிடங்களும் மிகாவிடங்களும், மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல்) கடிதங்களும் வகைகளும்

L – 30; T – 15; TOTAL HOURS–45

குறிப்புகள்

1. பொதுத்தமிழ் - செய்யுள்திரட்டு - தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - சோம.இளவரசு
3. சிறுகதைத் தொகுப்பு (கட்டுரைக் களஞ்சியம்)

வெளிப்பாடு

- சங்க இலக்கியங்கள் குறித்தும் சங்ககால மக்களின் வாழ்வு குறித்தும் உணர்ந்து கொள்வர்.
- சங்கப்புலவர்கள் பற்றிய தகவல்களையும் அவர்தம் படைப்பாளுமை பற்றியும் அறிந்து கொள்வர்.
- தமிழர்களின் ஆன்மீகச் சிந்தனைகளைப் பற்றியும் அறச்சிந்தனைகள் பற்றியும் அறிந்து கொள்வர்,
- மாணவர்கள் பல்வேறு சமயச்சிந்தனைகள் குறித்து தெரிந்து கொள்வர்.
- தமிழ் இலக்கணங்கள் பற்றி அறிந்து கொள்ளவும் மொழிபெயர்ப்பு செய்யும் திறனும்பெறுவர்.
- புத்திலக்கியங்களைப் படைக்கும் திறனையும் திறனாய்வு செய்யும் திறனையும்பெறுவர்

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1							M	M	M	M		M				
CO2							L	L	L	M		M				
CO3							L	M	L	L		L				
CO4							L	L	M	L		L				
CO5							L	L	L	L		L				
CO6							M	M	M	M		L				

Note: L – Low Correlation M – Medium Correlation H – High Correlation

SDG 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

This Course make the students to understand the importance of Strengthening relevant national Institutions, including through international co-operation, for building capacity at all levels, particularly in developing countries, to prevent violence and combat terrorism and crime through the Quranic, Vedic and Biblical literature.

LNE 1282	GERMAN – II	L	T	P	C
SDG: 8		3	0	0	3

COURSE OBJECTIVES:

The objectives of this course are:

COB1: To improve the proficiency of students in German language.

COB2: To create awareness of using vocabulary among students.

COB3: To expose them to correct grammatical forms of the language.

COB4: To empower them for successful communication in the society.

COB5: To understand matters which are of daily usage

COB6: To understand them for describe the people need and their requirements.

MODULE I **Zeit mit Freunden.** **L:9**

Untrennbare Verben, ADUSO Konnektoren, Akkusativ Possessivpronomen, Freizeitaktivitäten, Veranstaltungen, Über den Geburtstag sprechen, eine Einladung verstehen und schreiben, über ein Ereignis sprechen, Büro Alltag, Small Talk im Büro, Briefe und Email schreiben. Einfache Übersetzung - Deutscher Satz/die Textstelle auf Englisch

MODULE II **Fit und Gesund.** **L:9**

Akkusativ Personal Pronomen, Akkusativ Präpositionen, Imperativ Satz(informell), Körperteile, Krankheiten und Medikamente, Farben, Aufforderungen verstehen und ausdrücken, Gespräch beim Arzt führen, Anweisungen und Gesundheitstipps verstehen und geben, Hausmittel gegen Krankheiten.

MODULE III **Meine Wohnung.** **L:9**

Dativ Verben, Possessivpronomen im Dativ, Dativ Personalpronomen, Dativ Präpositionen, Wechsel Präpositionen, Zimmer, Wohnformen, eine Wohnung beschreiben, einen Text über eine Wohnung schreiben, Gefallen und Missfallen ausdrücken,Futur I.

MODULE IV **Studium und Berufe.** **L:9**

Perfekt mit haben und sein, Partizip II: regelmäßige Verben, unregelmäßige Verben, trennbar und nicht trennbar Verben, Berufe und Jobs, Arbeitsorte,

Studium, Kleidung, im Kaufhaus, über Vergangenes sprechen und berichten, Gespräche beim Kleiderkauf führen , Aussagen über Jobsuche verstehen, Jobs rund ums Jahr.

MODULE V **Ab in den Urlaub!.** **L:9**

Welcher? Welches? Welche? , Wer? Wen? Wem? , Pronomen man, Satz Verbinden: denn, Urlaubsarten und Reiseziele, Sehenswürdigkeiten, Wetter, Vorschläge für eine Stadttour machen, das Wetter beschreiben, Bildungssystem in Deutschland, österreich und in der Schweiz. Einfache Übersetzung -Englischer Satz/die Textstelle auf Deutsch.

L – 45; Total Hours: 45

TEXT BOOKS:

1. Netzwerk Neu Deutsch als Fremdsprache A1
   German Edition 2023 by Helen Schmitz Stefanie Dengler,Paul Rusch (Author).

PRACTICE BOOK:

1. Menschen: Kursbuch A1
   German Edition by Sandra Evans (Author), Angela Pude (Author),

REFERENCES:

1. Tangram Aktuell Arbeit und Kurs Buch II.
   Author: Von , Rosa-Maria Dallapiazza ,Eduard von Jan,Till Schonherr
2. Prima aktiv A1.1 and A1.2 Deutsch fur Jugendliche Textbook + Workbook.
   by Sabine jentges (Author), Friederike jin (Author),

COURSE OUTCOMES:

On successful completion of this course learners will be able to

CO1: Show their proficiency in German Language.

CO2: Use appropriate vocabulary in real life contexts.

CO3: Use appropriate grammatical forms while communicating with people.

CO4: Effectively use the language in social and academic contexts.

CO5: Comprehend matters which are of daily usage

CO6: Communicate as per people's need and requirement.

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	H	H	M	H		H	H	H	M	H	M	H				
CO2				H		H	H	H	H	H		H				
CO3				H		H	H	H	H	H		H				
CO4				H		H	H	H		H		H				
CO5				H		H	H	H		H		H				
CO6				H		H	H	H		H		H				

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4 : Quality Education

The substantially improve the relevant skills which develop the confidence in young people, including technical and vocational skills, help for employment, decent work and entrepreneurship.

LNE 1283 MODERN COMMUNICATIVE ARABIC L T P C

SDG 4 3 0 0 3

COURSE OBJECTIVES:

The course aims to teach:

COB1: Communication in the situations of marketing clothes, food, etc.

COB2: Vocabulary about the climates, seasons and hold telephonic conversations

COB3: Vocabulary related to various games, students" associations.

COB4: Communication in Work place like ticketing, booking, confirmation & passport procedures

COB5: Vocabulary related to illness, numbers and communication with doctors.

MODULE I BUSINESS PLACE COMMUNICATION 9

Reading and listening - emphasis on interrogation - Lesson 9: marketing (التسوٌّق) –vocabulary related to marketing clothes, food - communication on dining - dining – gender - singular and dual – numbers – discussion of evening – dining manners - المفرد والتثنٌّة والجمع والعدد - different types of contracts- conversation in business place - price, marketing, subject and predicate (المبتدأ والخبر), using interrogating form of (أي - بكم)

MODULE II USAGE OF TENSES 9

Situational conversation - Lesson 10: climate (الج وّو) – vocabulary related to climate, places& seasons, discussion question and answers – telephonic conversations –order (فعل الأمر) – interrogative form – Self introduction in Arabic - negative form of المضارع

Lesson 11: people and places (الناس والأماكن) – vocabulary related to people and places, colours, feminine gender – place of work – transportation – question and answer – past tense – usage of articles (– مع - من) إلى – فً استخدام الحروف:

MODULE III SENTENCES IN COMMUNICATION 9

Lesson12 : hobby (الهواٌّات) - vocabulary related to various games, students" associations – adjectives and synonyms – (– الفعل المضارع المسند إلىٌّاء المخاطبة - Countries names – world map - performing ablution – vocabulary related to prayer - Sentence construction

MODULE IV APPLIED GRAMMATICAL SENTENCES 9

Lesson:13 travel (السفر) - vocabulary related to ticket booking – confirmation – passport procedures – resident permits (الحجز والتأكّد والجوازات والإقامة)– lost luggages – four directions – conversation about services – seeking information of luggage lost.

Lesson:14 haj and umrah (الحج والعمرة) - vocabulary related to haj and umrah – expression of arabic numbers – procedures of umrah and haj – (–) الاستفهام: متى كيف – بم – أيّن

MODULE V SITUATIONAL CONVERSATION 9

Lesson 15: health (الصحة) - vocabulary related to illness – numbers 100 and 1000 – doctor"s visit – communication with doctor – (الاستفهام : لماذا)

Lesson 16: vacation (العطلة) - vocabulary related to holidays – festivals – travel – spending holidays – Arabic months – interrogative form الاستفهام: كم

L – 45; TOTAL HOURS – 45

TEXT BOOK:

1. Al Lughathul Arabiya (اللغة العربيّة ، الصف الأول ، الجزء الأول), Part I, Bukhari Aalim Arabic College, 2004.

REFERENCES:

1. Dr. F. Abdur Raheem, Durus Al LugathilArabiyya, Islamic Foundation Trust, Chennai, 2002.
2. Al QirathulArabiyya Lil Mubtadiyeen (UmmulQura University, Makkah), Bukhari Aalim Arabic College, 2005.

COURSE OUTCOMES:

At the end of the course, the student is expected to

CO1: communicate in the situation of marketing clothes, food, etc.

CO2: discuss about the climates, seasons and hold telephonic conversations

CO3: discuss in the playground, students" gatherings

CO4: communicate in certain work places

CO5: recognize proper usage of sentences in communication.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1						L									
CO2							M								
CO3							M								
CO4						L									
CO5							H								

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Arabic language enhances effective communication in the workplace.

GEE 1281	ENVIRONMENTAL STUDIES	L	T	P	C
SDG: 3, 6, 13, 14, 15		2	0	0	2

COURSE OBJECTIVES: To make the student conversant with the

COB1: Various natural resources, availability, utilisation and its current scenario.

COB2: Diverse ecosystems and its function, importance of biodiversity, its values, threats and conservation.

COB3: Types of pollutants and its impacts on the environment and the effects of natural disasters.

COB4: Impacts of human population, human health, diseases and immunisation for a sustainable lifestyle.

MODULE I **MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES AND NATURAL RESOURCES** **L: 8 T: 0 P: 0**

Definition, scope and importance, Need for public awareness - Natural resources and associated problems (a) Land resources: soil erosion and desertification - (b) Forest resources: deforestation, dams and their effects on forest and tribal people - (c) Water resources: Use and over-utilization of surface and ground water, conflicts over water, dams-benefits and problems, Water conservation: rain water harvesting, watershed management - (d) Mineral resources: environmental effects of extracting and using mineral resources, mining - (e) Food resources: changes caused by agriculture and over grazing, effects of modern agriculture - (f) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

Case Studies: Case studies in the current scenario in TN/India/across the world

MODULE II **ECOSYSTEMS AND BIODIVERSITY** **L: 8 T: 0 P: 0**

Ecosystems: Concept of an ecosystem – Structure and function of an ecosystem; Producers, consumers and decomposers - Classification: (a) Terrestrial Ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem (b) Aquatic fresh water ecosystems: Ponds and lakes, rivers and streams (c) Aquatic salt water ecosystems: oceans and estuaries - Energy flow in the ecosystem - Ecological succession -Food chains, food webs - ecological pyramids - Biodiversity: Classification: genetic, species

and ecosystem diversity - Invasive, endangered, endemic and extinct species - Hot sports of biodiversity and Red Data book - Values of biodiversity - Threats to biodiversity - Conservation of biodiversity.

Case Studies: Case studies in the current scenario in TN/India/across the world

MODULE III ENVIRONMENTAL POLLUTION AND ITS CONTROL **L: 8 T: 0 P: 8**

Carbon foot prints - greenhouse effect, global warming and ozone layer depletion - Definition, Cause, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards, (h) ill-effects of fireworks and upkeep of clean environment - El Nino and La Nina - Solid waste Management and disposal: urban, industrial wastes and e-waste - Disaster management: flood, drought, cyclone, landslide, avalanche, volcanic eruptions, earthquake and tsunami.

Case Studies: Case studies in the current scenario in TN/India/across the world

MODULE IV HUMAN POPULATION, SOCIAL ISSUES AND HEALTH **L: 8 T: 0 P: 8**

Population, population growth, variation among nations - population explosion - Family Welfare Programme - Unsustainable to sustainable development - Resettlement and rehabilitation of people - Environment Protection Act - Public awareness - Human Rights - Value Education - Women and Child Welfare - HIV/AIDS - Environment and human health: air-borne, water borne, infectious diseases, contagious diseases and immunization (all types of vaccines from birth), risks due to chemicals in food and water, endocrine disrupting chemicals, cancer and environment.

Case Studies: Case studies in the current scenario in TN/India/across the world

L – 30; T – 0; P – 0; Total Hours: 30

TEXT BOOKS:

1. Erach Bharucha, Text Book for Environmental Studies - Environmental Studies for Undergraduate Courses, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune, 2004.
2. Ravikrishnan A., Environmental Science and Engineering, Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2017.

3. G. Amala Jothi Grace, P. Authi Devi, M. Siva Kumar, P. Anitha Devi, Environmental Science and Engineering, CBA Publishers, 2015

REFERENCES:

1. Clair N. Sawyer, Perry L. McCarthy and Gene F. Parkin, Chemistry for Environmental Engineering and Science, 5th Edition, Tata McGraw-Hill Education Pvt. Ltd., India, 2011.
2. J. Glynn Henry and Gary W. Heinke, Environmental Science and Engineering, 2nd Edition, Prentice Hall of India, 2004.
3. J. Jeffrey Peirce, P. Aarne Vesilind, Ruth F. Weiner, Environmental Pollution and Control, Butterworth-Heinemann, 1997.
4. Trivedi, R.K., Handbook of Environmental Law's, Rules, Guidelines, Compliances and Standards, Volume 1 and 1, Envio Media.
5. https://www.teriin.org/article/e-waste-management-india-challengesand-opportunities.
6. https://green.harvard.edu/tools-resources/how/6-ways-minimizeyour-e-waste.
7. https://www.aiims.edu/en/departments-and-centers/centralfacilities/265-biomedical/7346-bio-medical-waste-management.html.
8. https://tspcb.cgg.gov.in/Shared%20Documents/Guidelines%20for%20Management%20of%20Healthcare%20Waste%20Waste%20Management%20Rules,%202016%20by%20Health%20Care%20Facilities .pdf.

COURSE OUTCOMES: The student will be able to

CO1: Analyse the current scenario of various natural resources and their depletion and suggest remedies to curb the exploitation.

CO2: Identify food chains and web and its function in the environment, assess the impacts on the biodiversity and propose solutions to conserve it.

CO3: Analyse the types and impacts of pollutants in the environment and propose suitable methods to alleviate the pollutants and the natural disasters.

CO4: Assess on the impact of human population and the health related issues and immunisation practices and sustainable developments for a healthy life.

Board of Studies (BoS):
14th BoS of Chemistry held on 17.07.2025

Academic Council:
24th AC held on 26.08.2025

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	L		M			H					
CO2	L		M			H					
CO3	L		M			H	L				
CO4	L		M			H	L				

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 3: Good Health and Well-Being	Ensure healthy lives and promote well-being for all at all ages
SDG 6: Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all
SDG 13: Climate Action	Take urgent action to combat climate change and its impacts
SDG 14: Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
SDG 15: Life on Land	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Statement:

Natural resources, land and water ecosystems, biodiversity and its degradation, pollution and its management to have a sustainable environment.

MAE 1287	PROBABILITY AND STATISTICS	L	T	P	C
SDG: 4		3`	1	0	4

COURSE OBJECTIVES:

COB1: To provide an understanding of the measures of central tendency and their applications.

COB2: To provide a comprehensive understanding of measures of dispersion and variability in data.

COB3: To introduce the fundamental principles of probability and the concept of random variables.

COB4: To provide knowledge of various discrete and continuous probability distributions and their real-world applications.

COB5: To introduce the concept of hypothesis testing, including the formulation of null and alternative hypothesis.

MODULE I DESCRIPTIVE STATISTICS 9+3

Introduction to statistics – Types of data – Classification and tabulation of data – Stem and leaf plots – Graphical representation – Bar diagrams, pie charts, histograms, frequency polygons, line graphs – Construction of frequency distribution – Measures of central tendency – Arithmetic mean, median, and mode– Partition values – Quartiles, deciles, and percentiles.

MODULE II DISPERSION AND REGRESSION 9+3

Measures of dispersion – Range – Interquartile range, quartile deviation, mean deviation, and standard deviation – Correlation – Karl Pearson’s correlation coefficient and Spearman’s rank correlation coefficient – Regression – Linear regression.

MODULE III PROBABILITY AND RANDOM VARIABLE 9+3

Basics of probability – Axioms of probability – Conditional probability – Addition and multiplication theorems of probability – Baye’s theorem – Random variables – Discrete and continuous random variables – Probability distribution functions – Expectation – Moments – MGF – Properties.

MODULE IV PROBABILITY DISTRIBUTIONS 9+3

Discrete distributions – Binomial, Poisson and Geometric distributions – Continuous distributions – Uniform, Exponential and Normal distributions.

MODULE V TESTING OF HYPOTHESIS 9+3

Hypothesis testing – Types of errors – Large sample tests – Test for single mean, difference of means – Small sample tests – t test for single mean and difference of means – F test – Chi square test for goodness of fit and analysis of independence of attributes.

L – 45; T – 15; TOTAL HOURS – 60

TEXT BOOKS:

1. S. C. Gupta, “Fundamentals of Statistics”, Himalayan Publication House, 8th Edition, 2024.
2. P. Kandasamy, K. Thilagavathy and K. Gunavathy, “Probability and Queueing Theory”, 3rd Edition, S. Chand Publishing, New Delhi, 2013.
3. Ross S. M, “Introduction to Probability Models”, Academic press, 11th Edition, 2014.

REFERENCES:

1. Miller I., Miller M., “Mathematical Statistics”, 7th Edition, Prentice Hall International, New Jersey, 1999.
2. S. C Gupta, V. K. Kapoor, “Fundamentals of Mathematical Statistics”, 12th Edition, Sultan Chand and sons, New Delhi, 2019.
3. S. C Gupta, V. K. Kapoor, “Fundamentals of Applied Statistics”, Sultan Chand and Sons, New Delhi, 2017.
4. C. Kraaikamp, F. M. Dekking, H. P. Lopuhaa, L. E Meester, “A Modern Introduction to Probability and Statistics”, 2nd Edition, Springer text series, 2005.

COURSE OUTCOMES: At the end of the course students will be able to

CO1: relate the scope and applications of statistics in real-world scenarios.

CO2: interpret measures of dispersion and regression.

CO3: employ probability laws and analyze discrete and continuous random variables.

CO4: apply discrete and continuous probability distributions.

CO5: formulate and interpret null and alternative hypotheses in various contexts.

Board of Studies (BOS):
17th BOS of Department of Mathematics and Actuarial Science held on 23.06.2025.

Academic Council:
24th AC held on 26.08.2025

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	M														
CO2	H														
CO3	M		M												
CO4	M														
CO5	H		H												

*** Legend: L – Low (1), M – Medium (2), H – High (3).**

SDG 4 – Quality Education: Ensure inclusive and equitable quality education and promote lifelong opportunities for all.

Learning various mathematical tools will lead to knowledge of applications in Computer Science.

CAE 1201	OBJECT ORIENTED PROGRAMMING USING C++	L	T	P	C
SDG: 9		3	0	0	3

COURSE OBJECTIVES:

COB1: Impart a strong foundation in object-oriented programming concepts and implement them in C++.

COB2: Provide a comprehensive understanding of object-oriented programming constructs in C++.

COB3: Equip with advanced knowledge of operator overloading, type conversion, and inheritance in C++.

COB4: Explore the concepts of pointers and dynamic memory management in C++

COB5: Enable to understand and apply file handling.

MODULE I INTRODUCTION 9

Object-Oriented Languages – I/O in C++ - C++ Declarations. Control Structures: - Decision Making and Statements: If-Else, jump, go to, break, continue, Switch case statements- Loops in C++: for, While functions - Do- while functions in C++ -Inline functions– Key Concepts of Object-Oriented Programming –Advantages.

MODULE II CLASSES AND OBJECTS 9

Declaring Objects – Defining Member Functions – Access Specifiers – Static Member variables and functions – Array of objects–Friend functions- Method Overloading –Constructor and destructor with static members.

MODULE III OPERATOR OVERLOADING AND INHERITANCE 9

Overloading unary, binary operators–Overloading Friend functions–type conversion–Inheritance: Types of Inheritance–Single, Multilevel, Multiple, Hierarchical, Hybrid, Multipath inheritance– Overriding - Virtual base Classes –Abstract Classes.

MODULE IV VIRTUAL FUNCTIONS 9

Declaration–Pointer to Class, Object– this pointer–Pointers to derived classes and Base classes –Arrays–Characteristics–array of classes–Memory models–new and delete operators–dynamic object – Binding, Polymorphism and Virtual Functions- Pure Virtual Functions.

MODULE V EXCEPTION HANDLING AND FILES 9

Exception handling - File stream classes – File modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates - String – Declaring and Initializing string objects– String Attributes– Miscellaneous functions.

Case Study: Student Management System, Bank Account Simulation, Library Management System.

L – 45 ; TOTAL HOURS – 45

TEXT BOOKS:

1. E. Balagurusamy, *Object Oriented Programming with C++*, 8th ed. New Delhi, India: Tata McGraw-Hill Education, 2020.
2. A. N. Kamthane, *Object-Oriented Programming with ANSI and Turbo C++*. New Delhi, India: Pearson Education India, 2009.

REFERENCES:

1. K. R. Venugopal and R. Buyya, *Mastering C++*, 2nd ed. New Delhi, India: McGraw-Hill Education, 2013.
2. H. Schildt, *C++: The Complete Reference*, 5th ed. New York, NY, USA: McGraw-Hill Education, 2015.
3. B. Stroustrup, *The C++ Programming Language*, 4th ed. Boston, MA, USA: Pearson Education, 2013.
4. M. Litvin and G. Litvin, *C++ for You*, New Delhi, India: Vikas Publishing House, 2002.

COURSE OUTCOMES:

CO1: Construct different programming paradigms, such as procedure-oriented and object-oriented programming methodology and conceptualize elements of OO methodology.

CO2: Model real-world objects and map it into programming objects for a legacy system.

CO3: Identify the concept of inheritance and its types and develop applications using overloading features.

CO4: Demonstrate the application of pointers in object-oriented programming using classes

CO5: Perform the file operation, work with templates and understand the importance of Exception Handling

Board of Studies (BoS):
21st BoS of Computer Applications held on 13.06.2025

Academic Council:
24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	H											H		H
CO2						H						L		
CO3		M				H						M		
CO4		H											H	
CO5				M			M						H	

Note: L- Low Correlation, M - Medium Correlation, H - High Correlation

SDG 9: Industry, Innovation and Infrastructure – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation **..**

Statement: Object Oriented Programming concepts taught in this course for the learners with respect to the course outcomes are measurable and useful in applying one's disciplinary knowledge and transferable skills to new/unfamiliar contexts. As the future industrial personnel, the learner would be able to demonstrate competence in the practical art of computing by identifying, analyzing problems and seek solutions to real-life problems.

CAE 1202	FUNDAMENTALS OF OPERATING SYSTEMS	L	T	P	C
SDG: 9		3	0	0	3

COURSE OBJECTIVES:

COB1: Introduce the Fundamentals Concepts of Operating Systems and Linux

COB2: Understand the CPU Scheduling Algorithms and Process Synchronization.

COB3: Explore the Memory Management Concepts.

COB4: Familiarize the Storage Management as well as Disk Management Techniques.

COB5: Learn the OS Installations, Configurations and Tools for various Real-time Applications.

MODULE I INTRODUCTION 09

Operating System Overview- Objectives and Functions - Evolution of Operating System; Operating System Structures – Operating System Services - User Operating System Interface - System Calls – System

Programs -- Design and Implementation – Operating- System Structure.

MODULE II PROCESS MANAGEMENT AND SYNCHRONIZATION 09

Process concepts – Process Scheduling – Operations – Interprocess communication – Multithread – Multithreading Models -Process Scheduling: Scheduling Criteria-Scheduling Algorithm, Process Synchronization: Critical Section Problem, Peterson's Solution – Semaphores - Dining Philosophers Problem, Mutual Exclusion, Deadlock: Deadlock Prevention, Avoidance, Detection and Recovery.

MODULE III MEMORY MANAGEMENT 09

Logical versus Physical Address space, Swapping, Contiguous and Non- Contiguous Allocation, Fragmentation, Compaction, Paging, segmentation, Virtual Memory, Demand paging-Page Replacement Algorithms: First In First Out(FIFO) – Optimal Page Replacement(ORP) - Least Recently Used(LRU)-Allocation of Frames - Thrashing.

MODULE IV STORAGE MANAGEMENT 09

File System: Concepts, Access Methods, Disk and Directory Structure, File sharing and protection, Allocation Methods, Free Space Management, Disk Management: Disk Structure, Disk Attachment, Disk, Secondary Storage Structure, Scheduling Algorithms – FCFS, SSTF, SCAN, C-SCAN, CLOOK.

MODULE V CASE STUDY AND MOBILE OS 09

UNIX Operating System – LINUX Operating System – Design Principles – Process Management – Scheduling – Memory Management – File Systems – Security, Mobile OS: iOS and Android - Architecture and SDK

Framework, Media Layer, Services Layer, Core OS Layer, File System.

L – 45; TOTAL HOURS – 45

TEXT BOOKS:

1. Silberschatz, Galvin & Gagne, 8th Edition, “Operating Systems”, Wiley publications, 2023.
2. Andrew S Tenenbaum& Herbert Bos, 5th Edition, “Modern Operating Systems”, Pearson Publications, 2024.

REFERENCES:

1. OleksandrHalochkin& Viktor Ivashko, “Basics ofOperating Systems”, Lambert Academic Publications, 2024.
2. Richard Fox, 2nd Edition, “Linux with Operating System Concepts”, CRC Press, 2024.
3. William Stallings, 9th edition, “Operating System: Internals and Design Principles”, Pearson Education, 2018.

COURSE OUTCOMES:

CO1: Explain the Fundamental Concepts of Operating System and Apply

Basic Linux Commands.

CO2: Analyze the Various CPU Scheduling Algorithms and Process

Synchronization Techniques used in Operating systems.

CO3: Construct the File System Structure and Evaluate the Disk Scheduling Algorithms.

CO4: Evaluate the Memory Management Techniques Effectiveness in Operating System Performance.

CO5: Demonstrate the Ability to Install, Configure and Utilize Operating System Tools for Real-Time Application Scenarios.

Board of Studies (BoS):

21st BoS of Computer Applications held on 13.06.2025

Academic Council:

24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	L		M											
CO2	M	M	H										L	
CO3			M				L							M
CO4					M			H	M				M	
CO5					H		M	H					H	

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SGD 3: Industry, Innovation and Infrastructure – To build sustainable industries, support Innovations, and improve infrastructure.

Statement:

This course covered the fundamentals of operating systems. By gaining an understanding of the prominent concepts, various CPU, disk scheduling algorithms, and file management methods the students will be motivated to implement different types of OS tools in real-world scenarios. The skills and knowledge acquired through this course will help students meet the demand an expertise in industry.

CAE 1204 DATA COMMUNICATION AND NETWORKING L T P C

SDG: 09 3 0 0 3

COURSE OBJECTIVES:

COB1: To understand fundamental concepts of data communication, network architectures, and networking devices.

COB2: To explain and analyze physical and data link layer protocols including framing, flow/error control, and MAC mechanisms.

COB3: To study and analyze network layer functionalities, IP addressing, and routing protocols.

COB4: To understand transport layer mechanisms like congestion control, flow control, and connection management.

COB5: To explore application layer protocols and simulate network scenarios using tools like Cisco Packet Tracer and NS2.

MODULE I INTRODUCTION 9

Data Communication – Networks – Network Types - Protocol Layering - TCP/IP Protocol suite - OSI Model - Transmission media - Concepts and terminology - Networking Devices: Hubs, Bridges,
Switches, Routers, Repeaters and Gateways.

MODULE II PHYSICAL AND DATA LINK LAYER 9

Data Link Layer Framing Flow Control Error Control Data-Link Layer Protocols HDLC PPP - Media Access Control - Ethernet Basics (IEEE 802.3, IEEE 802.5) - CSMA/CD - Virtual LAN - Wireless LAN (802.11).

MODULE III NETWORK LAYER 9

Packet Switching - Internet protocol - IPV4 - IP Addressing - Subnet - IPV6 – ARP – RARP – ICMP – DHCP. Routing and protocols: Unicast routing - Distance Vector Routing - RIP - Link State Routing - OSPF -
Path-vector routing - BGP - Multicast Routing: DVMRP PIM.

MODULE IV TRANSPORT LAYER 9

Functions - UDP – TCP - Connection Management - Flow control: Sliding window- ARQ- Stop and wait - Congestion Control - Congestion avoidance - Quality of Service.

MODULE V APPLICATION LAYER AND TOOLS 9

Application Layer protocols: HTTP – FTP – SMTP- DNS- SNMP-
POP3. Tools: CISCO Packet Tracer, NS2. Case study- Merge RS 232 Protocol and MIDI

L – 45 ; TOTAL HOURS – 45

TEXT BOOKS:

1. Behrouz A. Forouzan., “Data Communications and Networking with TCP/IP Protocol Suite”, Sixth Edition TMH, 2022
2. Andrew S. Tanenbaum., “Computer Networks”, Sixth Edition Pearson Education, 2022
3. William Stallings, Data and Computer Communications, Nineth Edition, Pearson Education, 2013.

REFERENCES:

1. James F. Kurose, Keith W. Ross., “Computer Networking, A Top-Down Approach Featuring the Internet”, Eighth Edition, Pearson Education, 2021.
2. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
3. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2012.

COURSE OUTCOMES:

CO1: Explain the principles of data communication, network types, protocol layering, and devices.

CO2: Analyze data link layer protocols, Ethernet, and WLAN technologies.

CO3: Apply IP addressing and routing algorithms to real-world network scenarios.

CO4: Demonstrate transport layer operations like error control, flow control, and congestion handling.

CO5: Use tools like Packet Tracer and NS2 to simulate and evaluate network performance.

Board of Studies (BoS):	**Academic Council:**
21st BoS of Computer Applications held on 13.06.2025	24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H	H											H	
CO2	H	H			H								H	M
CO3	H	H	M	M									H	H
CO4	H	H	M	M									H	
CO5	H				H				M	M				H

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 9 : Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation

Statement: Training in protocols, routing, and network simulation supports modern communication systems. Enhances readiness for roles in telecom, IT, cloud networking, and cyber infrastructure.

CAE 1205	FUNDAMENTALS OF OPERATING SYSTEMS LABORATORY	L	T	P	C
SDG: 9		0	0	2	1

COURSE OBJECTIVES:

COB1: Installation of Linux and windows operating system.

COB2: Introduce the basic commands of UNIX.

COB3: Explore shell program in UNIX.

COB4: Implement CPU Scheduling Algorithms**.**

COB5: Familiarize the Disk scheduling Algorithms

List of Experiments:

1. Installation of Ubuntu/Fedora on a physical or logical (virtual) machine.
2. Installation of Windows 11 and essential software on a physical machine.
3. Execute pwd,ls,cd,mkdir,rmdir,cat, mv,whoami commands of UNIX.
4. Basics functionality and modes of VI Editor.
5. Write a shell program to print all odd numbers between1-30.
6. Write a shell program to ind the text is palindrome or not .
7. Write a C program to simulate the FCFS CPU scheduling algorithm.
8. Write a C program to simulate the SJF CPU scheduling algorithm.
9. Simulate FIFO page replacement algorithm.
10. Simulate LRU and Optimal page replacement algorithm.
11. Write a C program to demonstrate thread creation and thread termination.
12. Write a C program to simulate solutions to Classical Process
    a. Synchronization Problems: Dining Philosophers and Producer – Consumer.
13. Write a C program to simulate Bankers Algorithm for Dead Lock Prevention.
14. Write a C program to simulate implementation of Disk Scheduling Algorithms.

P – 30; TOTAL HOURS – 30

TEXT BOOKS:

1. Joachim Puls and Michael Wegner “The operating system Linux and programming languages An Introduction”, 2010, 1st edition.

REFERENCES:

1. P.C.P Bhatt, “An Introduction to Operating Systems: concepts and practice” 5th edition,2021, PHI.
2. Andrew S Tanenbaum “Modern Operating Systems”, 5th Edition, 2014,PHI

COURSE OUTCOMES:

CO1: Installing Linux and Windows Operating System in machine.

CO2: Implement basic commands of UNIX.

CO3: Analyze and simulate CPU Scheduling Algorithms.

CO4: Implement page replacement algorithms.

CO5: Understand the concepts of Disk Scheduling Algorithms.

Board of Studies (BoS):	**Academic Council:**
21st BoS of Computer Applications held on 13.06.2025	24th AC held on 26.08.2025

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO 12	PSO1	PSO2
CO1														
CO2				L										
CO3						M		M						
CO4														
CO5													H	

SDG 9: Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation

Statement: To analyze, design and develop Linux skills and operating systems concepts Practically taught in this course for the learners with respect to the course outcomes are measurable. Learners will pursue research and to become a software Professionals through innovative

approach

CAE 1207	OBJECT ORIENTED PROGRAMMING	L	T	P	C
SDG: 9	USING C++ LABORATORY	0	0	2	1

COURSE OBJECTIVES:

COB1: Introduce the basic concepts of Object-Oriented Programming, such as classes, objects, and function overloading, to develop well-structured C++ programs.

COB2: Explore the usage of control structures and functions, including inline functions and function overloading to solve simple real-life problems.

COB3: Familiarize students with operator overloading using member and friend functions to extend the functionality of existing operators.

COB4: Understand the various types of inheritance, including single, multiple, and multilevel inheritance to build flexible and reusable C++ applications.

COB5: Examine file handling concepts, templates, exception handling, and string operations to effectively perform data management and error control in C++ programs.

PRACTICALS

List of Experiments:

1. Write a C++ program with I/O and variable declaration.
2. Develop a C++ program to demonstrate control structures using if...else and switch case.
3. Write a C++ program to demonstrate the use of various looping statements.
4. Write a program to create a class with member functions and static member variables.
5. Demonstrate the concept of friend function and array of objects in C++.
6. Write a program in C++ to demonstrate function overloading and an inline function.
7. Implement type conversion and friend function overloading in C++.
8. Write a program to implement constructor and destructor with static data members.
9. Write a program to overload unary and binary operators.
10. Write a program to demonstrate single and multiple inheritance.
11. Write a program to demonstrate pointer to object and ‘this’ pointer.

12. Create a program using array of objects with dynamic memory allocation using new and delete.
13. Implement polymorphism using virtual functions and base class pointer.
14. Develop a C++ program to demonstrate template function and exception handling.
15. Write a program to perform read and write operations in a file using file streams.
16. Write a program to declare and use string objects and perform string operations.

Use Case

Student Management System:

Design a C++ program to manage student records using classes and objects. Include features such as storing student details, calculating average marks, displaying grade using control structures, and saving/retrieving data from a file.

Banking System Simulator:

Create a C++ application to simulate basic banking operations like deposit, withdrawal, and balance enquiry. Use operator overloading for transactions, inheritance for different account types (e.g., Savings, Current), and dynamic memory allocation for multiple users.

Library Book Management System:

Develop a C++ program for managing a small library. Include functionalities to add books, issue books to users, return books, and display available books. Use arrays of objects, constructors/destructors, and file operations to maintain data persistently.

Location-Based Food Delivery System:

Create a C++ program simulating a location-based food delivery system with user registration, area-wise restaurant selection, order placement, dynamic delivery charge calculation, and order tracking. Utilize classes, file handling, constructors, arrays of objects, control structures, and function overloading for managing delivery zones.

Smart Traffic Light Control System:

Develop a C++ program that simulates a real-time smart traffic light control system using sensor data inputs (simulated via user input). Include features like adaptive signal timing based on traffic density, emergency vehicle priority, and pedestrian crossing management. Use classes, file handling, control structures, and multilevel inheritance to model various road scenarios.

P – 30; TOTAL HOURS – 30

TEXT BOOKS:

1. E.Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill. Publications ,8 th edition,2020

REFERENCES:

1. Jacek Galowicz, Modern C++ Programming Cookbook, Packt Publishing, 2nd Edition, 2023,
2. Anthony Williams, C++ Concurrency in Action, Manning Publications, 2nd Edition, 2023,
3. BjarneStroustrup," The C++ Programming Language", Addison Wesley, 4th edition, 2013.
4. MariaLitvin & GrayLitvin, C++ for you, Vikas publication, 2002.

COURSE OUTCOMES:

CO1: Implement basic OOP concepts like classes, objects, and function overloading in C++ programs.

CO2: Demonstrate control structures and functions including inline and overloaded functions.

CO3: Exhibit operator overloading using member and friend functions.

CO4: Illustrate inheritance and interfaces to build reusable applications.

CO5: Execute file handling, templates, exception handling, and string operations for data management.

Board of Studies (BoS):	**Academic Council:**
21st BoS of Computer Applications held on 13.06.2025	24th AC held on 26.08.2025

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	H											H		H
CO2						H						L		
CO3						H						M		
CO4		M											H	
CO5		H		M			M						H	

Note: L - Low Correlation M - Medium Correlation H - High Correlation

SDG 9 : Industry, Innovation and Infrastructure – Build resilient Infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Statement: By understanding the object oriented features, the students will be able to apply the knowledge to derive solutions to real world problems. The students will be able to analyze complex problems in the domain of software development with better effectiveness.