

**BACHELOR OF COMPUTER APPLICATIONS
(BCA)
CHOICE BASED CREDIT SYSTEM (CBCS)**

Curriculum and Syllabus

Regular (2025 – 2026)



**DEPARTMENT OF COMPUTER APPLICATIONS
FACULTY OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT (FASCM)**

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University)

(Established Under Section 3 of UGC Act, 1956)

(Accredited with A+ Grade by NAAC in the Second Cycle)

Eachanari (Post), Coimbatore – 641 021.

Tamil Nadu, India

Phone No. 0422-2980011 – 14 Fax No. 0422-2980022-23

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FACULTY OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT (FASCM)

UNDER – GRADUATE PROGRAMME

(BCA)

(REGULAR PROGRAMME)

REGULATIONS

(2025)

CHOICE BASED CREDIT SYSTEM

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FACULTY OF ARTS, SCIENCE, COMMERCE AND MANAGEMENT UNDERGRADUATE PROGRAMMES REGULAR MODE CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATIONS – 2025 - 2026

The following regulations shall apply to candidates admitted to Undergraduate (UG) programmes in the Faculty of Arts, Science, Commerce and Management, Karpagam Academy of Higher Education (KAHE) from the academic year 2025-2026 onwards.

1 PROGRAMMES OFFERED, MODE OF STUDY AND ADMISSION REQUIREMENTS

1.1 UG Programmes Offered

A candidate may undergo any one of the undergraduate programmes approved by KAHE as given below.

S. No.	PROGRAMME	DISCIPLINE
1.	B.Com.	Commerce
2.	B.Com.	Computer Applications
3.	B.Com.	Professional Accounting
4.	B.Com.	Business Process Services
5.	B.Com.	Financial Analytics
6.	B.Com.	International Accounting and Finance
7.	B.Com.	Information Technology
8.	B.Com.	FinTech
9.	BBA	Business Administration
10.	BCA	Computer Applications
11.	B.Sc.	Biotechnology
12.	B.Sc.	Microbiology
13.	B.Sc.	Computer Science
14.	B.Sc.	Information Technology
15.	B.Sc.	Computer Technology
16.	B.Sc.	Computer Science (Cognitive Systems)

17.	B.Sc.	Computer Science (Artificial Intelligence and Data Science)
18.	B.Sc.	Computer Science (Cyber Security)

1.2 Admission Requirements (Eligibility)

A student for admission to the first year of the UG degree Programme shall be required to have passed the Higher Secondary Examination (10 + 2) [Academic or Vocational] prescribed by the Government of Tamil Nadu Board or any similar examination of any other Board accepted by KAHE as equivalent thereto. (Annexure I)

1.3 Mode of Study

All Programmes are offered under Full-Time Regular mode.

2. DURATION OF THE PROGRAMMES

2.1 The minimum and maximum period for the completion of the UG Programmes are given below:

Programme(s) (Honors)	Min. No. of Semesters	Max. No. of Semesters
B.Sc., B.Com., BCA and BBA	8	15

2.2 Each semester normally consists of 90 working days or 450 instructional hours of study. Examination shall be conducted at the end of every semester for the respective courses.

2.3 Multiple Entry and Exit

Undergraduate degree programmes of either 3 or 4-year duration, with multiple entry and exit points and re-entry options, with appropriate certifications such as: UG certificate after completing 1 year (2 semesters) of study in the chosen fields of study, UG diploma after 2 years (4 semesters) of study, bachelor's degree after a 3-year (6 semesters) programme of study, 4-year bachelor's degree (honours) after eight semesters programme of study. If the student completes a rigorous research project in their major area(s) of study in the 4th year of a bachelor's degree (honours with research). The 4-year bachelor's degree programme is considered a preferred option since it would provide the opportunity to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per the choices of the student. Similarly, the student from other institutions can join Karpagam Academy of Higher Education in the 3rd, 5th or 7th semester with an appropriate UG Certificate or UG Diploma or Bachelor's Degree respectively.

3. CHOICE BASED CREDIT SYSTEM

Credit means the weightage given to each course by the experts of the Board of Studies concerned. All programmes are offered under Choice Based Credit System with a minimum of 120 and up to a maximum of 125 credits for three years. Additional credits of 40 can also be earned on successful completion of fourth year. A range of 160 to 165 credits are offered as per the UGC Guidelines for the four-year UG Programme.

4. STRUCTURE OF THE PROGRAMME

Major Courses, Minor Courses, Multi-Disciplinary Courses (MDC), Skill Enhancement Courses (SEC), Ability Enhancement Courses (AEC), Value Added Courses (VAC) (Common to all UG Programmes), Summer Internship, Minor Project (for 3 Year programme), Research Project/Dissertation (for 4 Year programme) are part of curricular structure.

4.1 Major Courses

Major Courses consist of theory and practical components of department domains. The student has to earn a minimum of 60/80 Credits in Major Courses for 3/4 years programme respectively.

4.2 Minor Courses

Students have courses from Major disciplinary / interdisciplinary minors and skill-based courses. Students have to earn a minimum of 24/32 Credits in Minor Courses for 3/4 years programme respectively.

4.3 Multi Disciplinary Courses (MDC)

All UG students are required to undergo 3 introductory-level courses relating to any of the broad disciplines. These courses are intended to broaden the intellectual experience and form part of liberal arts and science education. The students have to study three Multi-Disciplinary Courses and they have to earn a minimum of 09 Credits.

4.4 Skill Enhancement Courses (SEC)

These courses are aimed at imparting practical skills, hands-on training, soft skills, etc., to enhance the employability of students. Three Skill Enhancement Courses are offered within the first four semesters. Students have to earn a minimum of 09 Credits in Skill Enhancement Courses.

4.5 Ability Enhancement Course (AEC)

There are four Ability Enhancement Courses offered during the first four semesters. Three credits are awarded for each course and students have to earn a minimum of 12 Credits in Ability Enhancement Courses. Tamil or any one of the Indian / Foreign Languages *viz*, Hindi, Malayalam, Sanskrit, French is offered as an Ability Enhancement Course (AEC) for Arts, Science, Commerce and Management Programmes.

4.6 Value Added Courses (VAC)

The students shall study Value Added Courses in the first four semesters of their programme. 6 to 8 credits need to be earned under VAC. The assessment of the VAC is based on Internal Evaluation.

4.7 Internship

The students exiting the programme after first or second year must have completed an internship/apprenticeship of 02 or 04 credits respectively during the first year and second year summer term.

4.8 Minor Project Work

The project work shall start at the beginning of the sixth semester in the Department/Industry/Research Institute (National/International) and the project report has to be submitted at the end of the sixth semester. The project may be an individual or group task. The Head of the Department concerned shall assign a project supervisor who in turn shall monitor the project work of the student(s). A project work shall be carried out by the students and they have to earn 06 to 08 credits.

If the candidate undertakes the Project work outside the Department, the faculty concerned within the Department shall be the Supervisor and the teacher/scientist of the host institute will be the Co-supervisor. The candidate shall bring the attendance certificate from the place where the project work was carried out.

A Project Assessing Committee (PAC) shall be constituted with HoD and two senior faculty members of the Department. The PAC shall announce the dates for the reviews and demonstration. Three reviews shall be conducted as part of internal assessment. The student shall make a presentation on the progress and demonstration of their project before the PAC in the presence of their supervisor on the scheduled dates.

4.9 Research Project /Dissertation

The candidates shall undertake the Research Project work in the eighth Semester in the Department/Industry/Research Institute (National / International). The report shall be submitted at the end of the eighth semester. Students have to earn a minimum of 12 Credits in Research Project/Dissertation Work.

If the candidate undertakes the Research Project work outside the Department, the faculty concerned within the Department shall be the Supervisor and the teacher/scientist of the host Institute will be the Co-supervisor. The candidate shall bring the attendance certificate from the place where the project work was carried out.

HoD shall assign a Project Supervisor who shall monitor the student's project work(s). A Project Assessing Committee (PAC) shall be constituted with HoD and two senior faculty members of the Department. The PAC shall announce the dates for the reviews and demonstration. Three reviews shall be conducted as part of internal assessment. The student shall make a presentation on the progress and demonstration of their project before the PAC in the presence of their Supervisor on the scheduled dates.

Approval of the project

The candidate has to submit, in consultation with his/her supervisor, the title, objective and the action plan of his/her project to the PAC on the first review. Only after obtaining the approval of PAC, the student can initiate the project work.

5. ADVANCED LEARNERS AND ON-DEMAND EXAMINATION

Students who secure 7.5 CGPA, maintain an attendance of 80% in every semester and clear all the courses in their first appearance itself are referred to as advanced learners. When a student fails to maintain any of these conditions at any given time, the student will no longer retain advanced learner status.

These students can request for an on-demand examination for the courses from second semester onwards. These students on prior registration can appear for examinations well in advance and complete the entire courses well before the prescribed period of study and can progress for a full time Research Project/Internship/Minor Project during the remaining prescribed period of study. The Internal and External examinations shall be conducted for these courses as like the other courses. One or more faculty mentors will be allocated based on the number of students/courses enrolled for the on-demand

examination. When the number of students enrolled for a particular course is less than 30, only self-learning mode is applicable and will be monitored by the mentor. Otherwise, a faculty will handle the course after regular working hours. The examination will be conducted along with the current semester courses.

Also, these advanced learners can register for online courses from NPTEL/SWAYAM/SWAYAM Plus portals on prior and proper approval from the department. The credits earned from those courses will be transferred to the mark statement of the students as in Clause 6.

6. TRANSFER OF CREDITS EARNED THROUGH ONLINE PLATFORM / INTERNATIONAL STUDIES

Students are encouraged to enroll in courses offered by NPTEL/Swayam/Swayam Plus platforms and international institutions of higher learning, either virtually or in person. The equivalent credits for these courses will be determined by a committee named Subject & Grade Equivalence Committee consisting of the Dean of the Faculty (Chairman), Dean (R&D and Industrial Relations), Head of the Department (HoD), and a faculty member nominated by the Vice Chancellor. The committee's decision will be submitted for ratification/approval by the Board of Studies (BoS) and the Academic Council. If the student fails in NPTEL/Swayam/ Swayam Plus course, he/she can appear for the examination conducted by the University for the equivalent course in the curriculum.

7. EXTRA CURRICULAR ACTIVITIES

Every student is encouraged to participate in at least any one of the following activities:

- National Service Scheme (NSS)
- National Cadet Corps (NCC)
- Sports / Mass drill
- Youth Red Cross (YRC)
- Club activities
- Other Extra-curricular activities

The student's performance shall be examined by the staff in-charge of activities along with the faculty mentor and the Head of the respective department. Marks for Extra-curricular shall be sent to the Controller of Examination (CoE) before the commencement of the Sixth End Semester Examinations.

8. MEDIUM OF INSTRUCTION

The medium of instruction and examinations for the courses under Language I – Tamil / Hindi / Malayalam / French / Sanskrit shall be in the language concerned. For all other courses, the medium of instruction and examination is in English.

9. SCHEME OF EXAMINATION

Evaluation: Evaluation of the course comprises two parts such as the Continuous Internal Assessment (CIA) and the End Semester Examination (ESE) until or otherwise the course is explicitly mentioned as only internal/only external.

The theory and practical courses shall carry a maximum of 100 marks, out of which 40 percent of marks are awarded for Continuous Internal Assessment (CIA) and 60 percent of marks for End Semester Examinations (ESE). When it is only an internal assessment course, 100 percent of marks are awarded for Continuous Internal Assessment.

10. FACULTY MENTOR

To help students in planning their courses of study and for general advice on the academic programme, the HoD shall allot twenty students to a faculty who will function as a faculty mentor throughout their period of study. A Faculty mentor shall advise the students and monitor their behavior and academic performance. Problems if any shall be counseled by them periodically. The faculty mentor is also responsible to inform the parents of their mentee's progress. The faculty mentor shall display the cumulative attendance particulars of his / her mentees periodically (once in 15 working days) on the Notice Board to know their attendance status and satisfy clause 14 of this regulation.

11. ONLINE COURSE COORDINATOR

To help students for planning their online courses and for general orientation on online courses, the HoD shall nominate a coordinator for the online courses. The Online course coordinator shall identify the courses which students can select for their programme from the available online courses offered by different agencies periodically and inform the same to the students. Further, the coordinators shall orient the students regarding the online courses and monitor their participation.

12. CLASS COMMITTEE

Every class shall have a Class Committee consisting of the faculty members of various courses of the class concerned, student representatives (Minimum 2 boys and 2 girls of various capabilities and Maximum of 6 members) and the concerned HoD / senior faculty as Chairperson. The objective of the Class Committee Meeting is all about the teaching – learning process. The Class Committee shall be convened at least once in a month. The constitution and functions of the Class Committee shall include

- 1.The class committee shall be constituted during the first week of each semester.
- 2.The Class Committee of a particular class of any department is normally constituted by the HoD/Chairperson of the Class Committee. However, if the students of different departments are mixed in a class, the Class Committee shall be constituted by the respective Dean of the Faculty.
- 3.The HoD/Chairperson of the Class committee is authorized to convene the meeting of the class committee.
4. The respective Dean of the Faculty has the right to participate in any Class committee meeting.
5. The Chairperson is required to prepare the minutes of every meeting, and submit the same to the Dean concerned within two days after having convened the meeting. Serious issues, if any, shall be brought to the notice of the Registrar by the HoD/Chairperson immediately.
- 6.Analyzing and solving problems experienced by students in the classroom and in the laboratories.
- 7.Analyzing the performance of the students of the class after each test and finding the ways and means to improve the performance.

13. COURSE COMMITTEE FOR COMMON COURSES

Each common course offered to more than one programme or department shall have a “Course Committee” comprising all the teachers handling the common course with one of them nominated as Course Coordinator. The nomination of the course coordinator shall be made by the respective Dean depending upon whether all the teachers handling the common course belong to a single department or to various other departments. The ‘Course Committee’ shall meet in order to arrive at a common scheme of evaluation for the tests to ensure a

uniform evaluation of the tests. If feasible, the course committee shall prepare a common question paper for the Internal Assessment Test(s). The Course Committee Meeting is conducted once in a semester. To indicate the common course, the Course Code should be suffixed with the letter “G”.

14. ATTENDANCE REQUIREMENTS TO APPEAR FOR THE END SEMESTER EXAMINATION

a. Every student is expected to attend all classes and should secure 100% attendance. However, in order to allow for certain unavoidable circumstances, the student is expected to have at least 75% of attendance and the conduct of the student has been satisfactory during the Programme.

b. A candidate who has secured attendance between 65.00% and 74.99% (both included), due to medical reasons (Hospitalization / Accident / Specific Illness) shall be given exemption from prescribed minimum attendance requirements and shall be permitted to appear for the examination on the recommendation of the Head of the Department concerned and the Dean. The Head of the Department has to verify and certify the genuineness of the case before recommending it to the Dean concerned. However, the candidate has to execute an undertaking along with the parent and assure that this situation does not arise in the future. This permission is given only once during the entire period of study.

c. A candidate who has secured attendance between 55.00% and 64.99% (both included), due to medical reasons (Hospitalization / Accident / Specific Illness with all the medical records, bills and discharge summary), will not be presented to that semester examination. However, that candidate will be permitted to go to the next semester wherein he / she has to compensate for the previous semester's lack of attendance. In such a case, the candidate will be permitted to write both semester examinations at the end of the next semester. This combination of lack of attendance can be done only between subsequent semesters. That is 1 & 2 or 2 & 3 or 3 & 4 or 4 & 5 or 5 & 6.

d. However, a Student who has secured less than 55% in any of the semesters due to any reasons, shall not be permitted to appear for the End Semester Examinations. But he/she will be permitted to appear for his/her arrear examinations. In order to redo the semester with lack of attendance, he/she has to attend the corresponding semester of the subsequent year(s) with the approval of the Dean of the Faculty, Dean - Students Affairs and the Registrar.

15. PROCEDURE FOR AWARDING MARKS FOR INTERNAL ASSESSMENT

15.1 Attendance and Assessment: Every Faculty is required to maintain an **Attendance and Assessment Record (Log book)** which consists of attendance of students marked for each lecture/practical/ project work, the CIA, Assignment and Seminar marks and the record of class work completed (topic covered), separately for each course. This should be submitted to the HoD once in a week for checking the syllabus coverage, records of test marks and attendance. The HoD shall sign with the date after due verification. The same shall be submitted to the respective Dean once in a fortnight. After the completion of the semester, the HoD should keep this record in safe custody for five years as records of attendance and assessment and shall be submitted for inspection as and when required by the KAHE/any other approved body.

15.2 Continuous Internal Assessment (CIA): The performance of students in each course will be continuously assessed. Retest will be conducted and considered based on the requirements and recommendations by the Head of the Department on valid reasons. The distribution of marks for the Continuous Internal Assessment (CIA) are given below:

Theory Courses

S. No.	Category	Maximum Marks
1.	Assignment	5
2.	Attendance	5
3.	Seminar	5
4.	Test – I (2 ½ Units)	12.5
5.	Test – II (2 ½ Units)	12.5
Total		40

For Environmental Studies and Universal Human Values:

S. No.	Category	Maximum Marks
1.	Assignment	15
2.	Attendance	5
3.	Test – I (2 ½ Units)	40
4.	Test – II (2 ½ Units)	40
Total		100

For Yoga for Youth Empowerment:

S. No.	Category	Maximum Marks
1.	Activity	15
2.	Attendance	5
3.	Test – I (2 ½ Units)	40
4.	Test – II (2 ½ Units)	40
Total		100

For Community Engagement and Social Responsibility:

S. No.	Category	Maximum Marks
1.	Field Visit	15
2.	Attendance	5
3.	Test – I (1 ½ Units)	40
4.	Test – II (1 ½ Units)	40
Total		100

Practical Courses

S.No.	Category	Maximum Marks
1.	Attendance	5
2.	Observation work	5
3.	Record work	5
4.	Internal Practical Assessment	20
5.	<i>Viva – voce</i> [Comprehensive]*	5
Total		40

* *Viva- voce* is conducted during the model practical exam.

Every practical Exercise / Experiment shall be evaluated based on the conduct of Exercise/ Experiment and records need to be maintained.

15.3 Pattern of Test Question Paper

Theory Courses:

Maximum Marks : 60*

Duration: 2 ½ Hours

Section	Marks
Part – A	Answer ALL the Questions (6 x 2 = 12 Marks)
Part - B	Answer ALL the Questions (3 x 6 = 18 Marks) (‘either – or’ type)
Part - C	Answer ALL the Questions (3 x 10 = 30 Marks) (‘either – or’ type)

* The 60 Marks will be converted to 12.5 Marks.

15.4 Attendance

Distribution of Marks for Attendance

S. No.	Attendance (%)	Maximum Marks
1	91 and above	5
2	81 - 90	4
3	75-80	3

16. ESE EXAMINATIONS

16.1 End Semester Examination (ESE): End Semester Examination will be conducted at the end of each semester for each course. The question paper is for a maximum of 100 marks.

16.2 Pattern of ESE Question Paper:**Theory Courses:****Maximum Marks: 100*****Duration: 3 Hours**

Section	Marks
Part – A	Answer ALL the Questions (10 x 2 = 20 Marks)
Part - B	Answer ALL the Questions (5 x 6 = 30 Marks) (‘either – or’ type)
Part - C	Answer ALL the Questions (5 x 10 = 50 Marks) (‘either – or’ type)

*The 100 Marks will be converted to 60 Marks.

Practical Courses: There shall be combined evaluation by the Internal and External examiners. The pattern of distribution of marks shall be as given below.

S. No.	Category	Maximum Marks
1.	Experiments	40
2.	Record work	10
3.	<i>Viva – voce</i> [Comprehensive]	10
Total		60

Record Notebooks for Practical Examination

Candidates taking the practical examination should submit a prescribed Bonafide Record Notebook for the practical examination; failing which the candidate will not be permitted to take the practical examination.

In case of failures in Practical Examination, the marks awarded for the Record at the time of first appearance of the Practical Examination shall remain the same at the subsequent appearance also by the candidate.

16.3. Evaluation of Project Work

16.3.1 The project work shall carry a maximum of 100 marks.

(CIA - 40 and ESE – 60)

The distribution of marks for the Continuous Internal Assessment (CIA) is given below:

Maximum Marks: 40

S. No.	Category	Maximum Marks
1.	Problem Selection	10
2.	Progress of the work (3 reviews X 5 marks)	15
3.	Presentation of the work (3 reviews X 5 marks)	15
Total		40

The distribution of marks for the End Semester Examination is given below:

Maximum Marks: 60*

S. No.	Category	Maximum Marks
1.	Project Report	30
2.	Project Presentation	20
3.	Viva Voce	10
Total		60*

*Combined valuation of Internal and External Examiners.

16.3.2 The project report prepared according to the approved guidelines and duly signed by the supervisor(s) shall be submitted to HoD.

16.3.3 The evaluation of the project will be based on the project report submitted and a *viva-voce* examination by a team consisting of the supervisor, who will be the Internal Examiner and an External Examiner who shall be appointed by the Controller of Examination. In case the supervisor is not available, the HoD shall act as an Internal Examiner for the same.

16.3.4 If a candidate fails to submit the project report on or before the specified date given by the Examination Section, the candidate is deemed to have failed in the Project Work and shall re-enroll for the same in a subsequent semester.

If a candidate fails in the respective viva-voce examinations he/she has to resubmit the Project Report within 30 days from the date of declaration of the results. The resubmitted report shall be evaluated in the subsequent semester.

16.3.5 A Copy of the approved project report after the successful completion of *viva-voce* examination shall be kept in the KAHE library.

17. PASSING REQUIREMENTS

17.1 Passing minimum: A candidate needs to secure a minimum of 20 marks out of 40 marks in CIA and 30 marks out of 60 marks in ESE. The overall passing minimum in each course is 50 marks out of 100 marks.

17.2 If a candidate fails to secure a pass in a particular course (either CIA or ESE or Both) as per clause 17.1, it is mandatory that the candidate has to register and reappear for the examination in that course during the subsequent semester when examination is conducted for the same till, he / she receives pass both in CIA and ESE (vide Clause 2.1).

17.3 The CIA marks secured by the candidate in the first passed attempt shall be retained by the Office of the Controller of Examinations and considered valid for all subsequent attempts till the candidate secures a pass in ESE.

17.4 Candidate failed in internal assessment will be permitted to reappear to pass the internal assessment in the subsequent semesters by writing tests and by re-submitting Assignments/ Seminars.

The distribution of marks for this test shall be as given below.

S. No.	Category	Maximum Marks
1.	Assignment	5
2.	Attendance (Retained from the respective semester)	5
3.	Seminar	5
4.	Test*	25
	Total	40

* Tests shall be conducted in the ESE pattern for 100 marks and converted to 25 marks.

The examination should be completed within 6 weeks after reopening of the subsequent semester.

17.5 A Candidate who is absent in ESE in a Course / Practical / Project Work after having enrolled for the same shall be considered to have Absent (AAA) in that examination.

18. ONLINE EXAMINATIONS

The students who are going for Project / Internship / Coursework at National level are permitted to write their CIA test through Online Mode and ESE in Offline/Online mode. When they go for an International Project / Internship / Coursework, both the CIA and ESE shall be conducted through online mode.

19. IMPROVEMENT OF MARKS IN THE COURSES ALREADY PASSED

The Candidates desirous to improve the marks secured in a course which they passed in their first attempt, shall reappear once (**only in ESE**) in the subsequent semester. **The improved marks shall be considered for classification but not for ranking.** If there is no improvement, there shall be no change in the marks awarded earlier.

20. AWARD OF LETTER GRADES

All the assessments of a course will be done on an absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain number of points, will be awarded as per the range of total marks (out of 100) obtained by the candidate in each course as detailed below:

Letter grade	Marks Range	Grade Point	Description
O	91-100	10	OUTSTANDING
A+	81 - 90	9	EXCELLENT
A	71 - 80	8	VERY GOOD
B+	61 - 70	7	GOOD
B	56 - 60	6	AVERAGE
C	50 - 55	5	PASS
RA	Below 50	-	REAPPEARANCE
AAA	-	-	ABSENT

21. GRADE SHEET

After the declaration of the results, Grade Sheets will be issued to each student which will contain the following details:

- i. The list of courses enrolled during the semester and the grade scored.
 - ii. The Grade Point Average (**GPA**) for the semester and
 - iii. The Cumulative Grade Point Average (**CGPA**) of all courses enrolled from first semester onwards.
 - iv. Remark on Extension Activities (only in the 6th Semester Grade Sheet)
- GPA of a Semester and CGPA of a programme will be calculated as follows.

$$\text{GPA of a Semester} = \frac{\sum_i C_i G P_i}{\sum_i C_i}$$

Sum of the product of the GP by the

Sum of the credits of the courses of
that Semester

i.e. **GPA** of a Semester = $\frac{\sum_i C_i G P_i}{\sum_i C_i}$

Sum of the product of the GPs by the corresponding credits of the courses offered for the entire programme

CGPA of the entire programme

Sum of the credits of the courses of the entire programme

i.e. **CGPA** of the entire programme = $\frac{\sum_n \sum_i C_{ni} G P_{ni}}{\sum_n \sum_i C_{ni}}$

where,

- C_i is the credit fixed for the course 'i' in any semester
- G_{Pi} is the grade point obtained for the course 'i' in any semester
- 'n' refers to the Semester in which such courses are credited.

Note: RA grade will be excluded for calculating **GPA** and **CGPA**.

22. REVALUATION

A candidate can apply for revaluation or re-totaling of his / her semester examination answer script (**theory courses only**), within 2 weeks from the date

of declaration of results on payment of a prescribed fee. The prescribed application has to be sent to the Controller of Examinations through the HoD. **A candidate can apply for revaluation of answer scripts not exceeding 5 courses at a time.** The Controller of Examinations will arrange for the revaluation and the results will be intimated to the candidate through the HoD concerned. Revaluation is not permitted for Supplementary Examinations.

23. TRANSPARENCY AND GRIEVANCE COMMITTEE

Revaluation and Retotaling are allowed on representation (clause 22). Students may get the Xerox copy of the answer script on payment of prescribed fee, if he / she wishes. The student may represent the grievance, if any, to the Grievance Committee, which consists of Dean of the Faculty, (if Dean is HoD, the Dean of another Faculty nominated by the KAHE), the HoD of Department concerned, the faculty of the course and Dean from other discipline nominated by the KAHE and the CoE. If the Committee feels that the grievance is genuine, the script may be sent for external valuation and the marks awarded by the External examiner will be final. The student has to pay the prescribed fee for the same.

24. ELIGIBILITY FOR THE AWARD OF THE DEGREE

A student shall be declared to be eligible for the conferment of the Degree if he / she

24.1 Successfully completed all the components prescribed by Curriculum and Credit Framework for Undergraduate Programme of UGC and earned the minimum required credits as specified in the curriculum corresponding to his / her programme within the stipulated period (vide clause 2.1).

24.1 No pending disciplinary enquiry/ action against him/her

24.2 The award of the degree must be approved by the Executive Council.

25. CLASSIFICATION OF THE DEGREE AWARDED

25.1 Candidates who qualify for the award of the Degree (vide clause 24) having passed the examination in all the courses in their first appearance, within the specified minimum number of semesters and securing a **CGPA not less than 8** shall be declared to have passed the examination in the **First Class with Distinction.**

25.2 Candidates who qualify for the award of the Degree (vide clause 24) having passed the examination in all the courses within the specified maximum number of semesters (vide clause 2.1), securing a **CGPA not less than 6.5** shall be declared to have passed the examination in the **First Class.**

25.3 Candidates (not covered in clauses 25.1 and 25.2) who qualify for the award of the degree (vide Clause 24) shall be declared to have passed the examination in the **Second Class.**

26. RANKING

Candidates who qualify for the UG Degree programme passing all the Examinations in the first attempt, within the minimum period prescribed for the programme of study from Semester I through Semester VI/VIII to the programme shall be eligible for ranking. Such ranking will be confined to 10% of the total number of candidates qualified in that particular programme of study subject to a maximum of 10 ranks.

27. SUPPLEMENTARY EXAMINATION

Supplementary Examination will be conducted only for the final semester students within ten days from the date of publication of results for students who have failed in one theory course only. This is applicable only for the ESE component of the course which the student failed. Such students shall apply with prescribed fee to the Controller of Examinations within the stipulated time.

28. DISCIPLINE

28.1 If a student indulges in malpractice in any of the Internal / External Examinations he / she shall be liable for punitive action as prescribed by the KAHE from time to time.

28.2 Every student is required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the KAHE. The erring students will be referred to the disciplinary committee constituted by the KAHE, to enquire into acts of indiscipline and recommend the disciplinary action to be taken.

29. KAHE ENTRANCE EXAMINATION

At the end of Sixth/Eighth Semester, the KAHE Entrance Examinations will be conducted for those candidates who are aspiring for Higher Education (PG).

30. REVISION OF REGULATION AND CURRICULUM

Karpagam Academy of Higher Education may from time-to-time revise, amend or change the Regulations, Scheme of Examinations and Syllabi, if found necessary.

Annexure – I

S.No.	Programme	Subject	Eligibility
1.	B. Sc.	Biotechnology	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Biology, Botany, Zoology, or Chemistry as subjects at the Higher Secondary level.
2.	B. Sc.	Computer Science	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
3.	B. Sc.	Microbiology	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Biology, Botany, Zoology, or Chemistry as subjects at the Higher Secondary level.
4.	B. Sc.	Information Technology	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
5.	B. Sc.	Computer Technology	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
6.	B.Sc.	Computer Science (Cognitive Systems)	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.

7.	B.Sc.	Computer Science (Artificial Intelligence and Data Science)	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
8.	BCA	Computer Application	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
9.	B. Com.	Commerce	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
10.	B.Com (CA)	Commerce with Computer Applications	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
11.	B. Com. (PA)	Commerce with Professional Accounting	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
12.	B. Com. (BPS)	Commerce with Business Process Services	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
13.	B.B.A.	Business Administration	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.

14.	B. Com	Financial Analytics	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
15.	B. Com	International Accounting and Finance	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
16.	B. Com	Information Technology	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.
17.	B. Sc.	Computer Science (Cyber Security)	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, or those who hold a 3-year diploma after 10th grade, with Computer Science or Mathematics as one of the subjects.
18.	B. Com	FinTech.	Candidates who have passed Higher Secondary Education (XII) or any equivalent examination conducted by a State Government, University, or Board under the 10+2 pattern, with Commerce as a subject under the academic or vocational stream at the Higher Secondary level.

Karpagam Innovation and Incubation Council (KIIC)

(A Section 8 Company)

Based on the 2019 National Innovation and Startup Policy and the 2019–2023 Tamil Nadu Startup Policy, KIIC has recommended to the KAHE students who are affiliated with the KIIC that it be incorporated in the university Program Regulations 2023-24 and implement from this academic year.

Norms to Student Start-Ups

- a) Any (UG/PG / (Ph.D.) Research scholars, student, right from the first year of their program is allowed to set a startup (or) work part time/ full time in a startup or work as intern in a startup
- b) Any (UG/PG / (Ph.D.) Research scholars) student right from the first year of their program is allowed to earn credit for working on Innovative prototypes/business Models/ Pre incubation (case to case basis).
- c) Start Up activities will be evaluated based on the guidelines being given by the expert committee of the KIIC
- d) Student Entrepreneurs may use the address of incubation center (KIIC) to register their venture while studying in KAHE.
- e) Students engaged in startups affiliated with the KIIC or those who work for them may be exempted from KAHE's attendance requirements for academic courses under current regulations, up to a maximum of 30% attendance per semester, including claims for ODs and medical emergencies Potential Students who have been incubated at KIIC may be permitted to take their University semester exams even if their attendance is below the minimum acceptable percentage, with the proper authorization from the head of the institution. (On case-to-case basis depends upon the applicability strength, societal benefits and quality of the Innovation and Subsequent engagement of the students with the/ her business)
- f) Any Students Innovators/entrepreneurs are allowed to opt their startup in place mini project /major project, /seminar and summer training etc. (In plant training, Internship, value added Course.). The area in which the student wishes to launch a Startup may be interdisciplinary or multidisciplinary.
- g) Student's startups are to be evaluated by Expert committee, formed by KIIC and KAHE

Guide lines to award Credits/ Marks to a Student startup

Student's startup stages are divided into five phases and these startup phases can be considered equally in place of the course title as mentioned below with the same credits allotted to the course title in a University curriculum.

Sl. No.	Description/Startup phases	In place of the Subject / Course title	Grades/Credits /Marks
1	Idea stage/Problem Identification	Seminar	Same Marks/Credits can be awarded that are listed in the course title's curriculum for the respective startup phases.
2	Proof of Concept (POC) /Solution development	In-plant training /Internship	
3	Product Development (Lab scale) /Prototype Model/ Company Registered	Mini Project/ Value added Course	
4	Validation/Testing	Main Project phase I	
5	Business Model/Ready for Commercialization/Implementation	Main Project phase II,	

PROGRAMME OUTCOMES

By the end of the programme, our graduates will

1. **Disciplinary knowledge:** Possess a profound understanding of the foundational concepts, theories, methodologies, and practices within the discipline of Computer Applications.
2. **Communication Skills:** Emerge as confident communicators capable of articulating complex concepts, advocating for their viewpoints, and engaging in meaningful discourse to address contemporary issues and drive positive change.
3. **Critical thinking:** Master advanced critical thinking skills, analyzing complex issues, and solving problems through evidence-based decision-making.
4. **Problem solving:** Excel in problem-solving, applying analytical techniques and creative thinking to address complex challenges in the field of Computer Applications.
5. **Analytical reasoning:** Emerge as adept analytical thinkers, equipped to tackle challenging problems, make informed decisions, and contribute to the advancement of knowledge in the field of Computer Applications.
6. **Research-related skills:** Demonstrate proficiency in data analysis, critical appraisal, and ethical research practices, contributing original insights to the advancements in Computer Applications.
7. **Cooperation/Team work:** Develop strong cooperation and teamwork skills, collaborating effectively with diverse peers to achieve common goals.
8. **Scientific reasoning:** Excel in scientific reasoning, applying logic and evidence to analyze phenomena, solve problems, and advance knowledge in the area of Computer Applications.
9. **Reflective thinking:** Master reflective thinking, fostering self-awareness and insight to evaluate experiences, perspectives, and actions critically.
10. **Information/digital literacy:** Excel information and digital literacy, adeptly locating, evaluating, and ethically using diverse sources of information
11. **Self-directed learning:** Be empowered individuals to take ownership of their educational journey, fostering autonomy, critical thinking, and adaptability.
12. **Multicultural competence:** Be enabled to effectively navigate diverse contexts, fostering empathy, understanding, and collaboration across cultures.
13. **Moral and ethical awareness/reasoning:** Possess the capacity to critically analyze ethical issues from various perspectives and apply ethical principles to real-world situations.
14. **Leadership readiness/qualities:** Develop the skills and attributes necessary to effectively lead and inspire others.
15. **Lifelong learning:** Foster a commitment to lifelong learning by cultivating curiosity, critical thinking, and a growth mindset.

PROGRAMME SPECIFIC OBJECTIVES (PSOs):

PSO 1: Apply the scientific knowledge acquired to develop smart applications.

PSO 2: Ability to design and develop software with appropriate documentation.

PSO 3: Apply current tools and techniques to design and develop innovative applications for solving real life challenges.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. PEO 1: Design, model and develop smart applications by utilizing strong technical and domain knowledge acquired from the programme for the improvement of society.
2. PEO 2: Apply tools, technologies and critical thinking to develop applications for solving industry-oriented problems
3. PEO 3: Function as a team member and develop projects in a multi-disciplinary environment by emulating leadership skills

MAPPING of PEOs and POs

POs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PEO1	X	X	X	X	X										
PEO2		X	X	X		X		X		X	X	X	X	X	X
PEO3			X		X	X	X		X		X	X		X	X

DEPARTMENT OF COMPUTER APPLICATIONS

FACULTY OF ARTS, SCIENCE COMMERCE AND MANAGEMENT

UG PROGRAMME (CBCS) – Bachelor of Computer Applications

(2025–2026 Batch and onwards)

Course code	Name of the course	Category	Objectives and outcomes		Instruction hours / week			Credit(s)	Maximum Marks			Page No.
			PO	PSO	L	T	P		CIA	ESE	Total	
									40	60	100	
SEMESTER I												
25LTU101G/ 25LHU101G/ 25LMU101G/ 25LSU101G/ 25LFU101G	Language I: (Tamil - I / Hindi - I / Malayalam - I / Sanskrit - I / French - I)	AEC 1	1,2	3	4	-	-	3	40	60	100	1
25ENU101G	English I	MDC 1	3,4	3	3	-	-	3	40	60	100	17
25CAU101	Problem Solving Techniques Using C	Major 1	1,4,5,6, 8,10,	1	5	-	4	5	40	60	100	20
25CAU102	Digital Computer Fundamentals	Major 2	1,4,5,6, 8	1,2	4	-	-	3	40	60	100	24
25MAU101G	Numerical Methods	Minor 1	1,4,5,6, 8	-	4	-	-	4	40	60	100	26
25CAU111	Web Technologies - Practical	SEC 1	3,2, 4	1	-	-	4	2	40	60	100	28
25VAC101G	Yoga for Youth Empowerment	VAC 1	1,12	1	2	-	-	2	100	-	100	30
Semester Total					22	0	8	22	340	360	700	
SEMESTER II												
25LTU201G/ 25LHU201G/ 25LMU201G/ 25LSU201G/ 25LFU201G	Language II: (Tamil - II / Hindi - II / Malayalam - II / Sanskrit -II / French - II)	AEC 2	1,2,3	-	4	-	-	3	40	60	100	33
25ENU201G	English II	MDC 2	2,3,9	-	3	-	-	3	40	60	100	46
25CAU201	Object Oriented Programming Using JAVA	Major 3	1,3,4, 5, 9,11,12	1, 2	5	-	4	5	40	60	100	49
25CAU202	Data Structures	Major 4	1,3,4,8, 9,11	1	4	-	-	3	40	60	100	53
25MAU201G	Discrete Structures	Minor 2	1,3,4,5	-	4	-	-	4	40	60	100	56
25CAU211	Data Structures Using Python - Practical	SEC 2	1,3,4,5, 11	1,2	-	-	4	2	40	60	100	59
25VAC201G	Environmental Studies	VAC 2	1,3,4,5, 8,9,12, 13	1	2	-	-	2	100	-	100	61
Semester Total					22	0	8	22	340	360	700	

SEMESTER III												
25LTU301G/ 25LHU301G/ 25LMU301G/ 25LSU301G/ 25LFU301G	Language III: (Tamil - III / Hindi - III / Malayalam - III / Sanskrit - III / French - III)	AEC 3	1,2,3	-	4	-	-	3	40	60	100	64
25ENU301G	English III	MDC 3	1,2,3,4	-	3	-	-	3	40	60	100	77
25CAU301	Operating Systems	Major 5	1,3,4,5, 6,13	1	5	-	4	5	40	60	100	79
25CYU302G	Computer Networks	Major 6	1,3,4,5, 6,8	2	4	-	-	3	40	60	100	82
25MAU301G	Operations Research	Minor 3	1,3,4,5, 8,10,11	-	4	-	-	4	40	60	100	84
25CYU311G	Computer Networks -Practical	SEC 3	1,2,7	1	-	-	4	2	40	60	100	87
25VAC301G	Community Engagement and Social Responsibility	VAC 3	1,2,3,4, 5,6,7,8, 10,15	1,2	2	-	-	2	100	-	100	89
25CAU391	Internship - I	Summer Internship	1,3,4,7, 8,11,12	2	-	-	-	2	100	-	100	92
Semester Total					22	0	8	24	440	360	800	
SEMESTER IV												
25LTU401G/ 25LH4U01G/ 25LMU401G/ 25LSU401G/ 25LFU401G	Language IV: (Tamil - IV / Hindi - IV / Malayalam - IV / Sanskrit -IV / French - IV)	AEC 4	1,2,3	-	4	-	-	3	40	60	100	93
25ENU401G	English IV	SEC 4	1,2,4	-	3	-	-	3	40	60	100	105
25CAU401	Relational Database Management System	Major 7	1,2,3,4, 5,6,9, 11,12	1	5	-	4	5	40	60	100	107
25CYU402G	Network Security	Major 8	1,3,4,7, 8,11,12	2	4	-	-	3	40	60	100	110
25MAU401G	Probability and Statistics	Minor 4	1,3,4,5, 8,9,10, 11,12, 13	-	4	-	-	4	40	60	100	112
25CYU412G	Network Security -Practical	Major 9	1,3,4,5, 6,7,8,9, 10,11, 12	2	-	-	4	2	40	60	100	115
25VAC401AG	Universal Human Values	VAC 4	6,7,8,9, 12	-	2	-	-	1	100	-	100	119
SEMESTER TOTAL					22	0	8	21	340	360	700	

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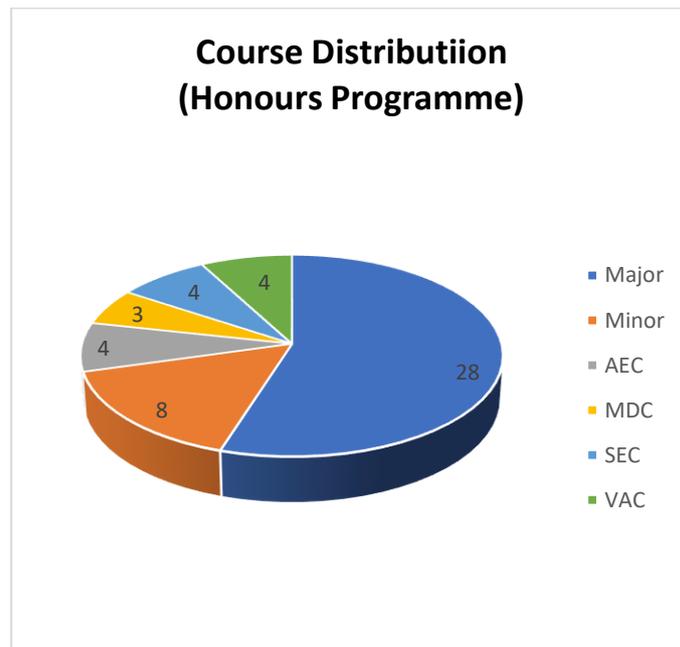
SEMESTER V												
25CAU501	.NET Programming	Major 10	1,2,3,4, 5,6,7,8	1	5	-	5	5	40	60	100	122
25CSU502AG	Full Stack Development	Major 11	1,2,3,4, 13	2	5	-	-	3	40	60	100	125
25CAU502BG	Enterprise Infrastructure and Cloud Technologies		1,6,9, 10,11, 12	2								127
25CYU503AG	Digital Identity and Access Management	Major 12	1,3,4,5, 11,12	1,2	4	-	-	3	40	60	100	129
25CAU503B	Introduction to Machine Learning		1,2,3,4, 9,10	2								132
25CAU503C	Natural Language Processing		1,2,3,4, 9,10	1,2								135
25CMU501BG	Basics of Accounting	Minor 5	1,3,4,7, 8,9, 11	-	6	-	-	4	40	60	100	138
25CSU512AG	Full Stack Development- Practical	Major 13	1,3,4,5, 9,11,12	1,2	-	-	5	2	40	60	100	140
25CAU512BG	Enterprise Infrastructure and Cloud Technologies - Practical		1,2,3,4, 5,6,7,8, 9,10,11 ,12	1								142
25CAU591	Internship - II	Summer Internship	1,2,3,4, 5,6,7,8, 9,10,11 ,12	1	-	-	-	2	100	-	100	144
SEMESTER TOTAL					20	0	10	19	300	300	600	
SEMESTER VI												
25CAU601	Neural Networks	Major 14	5,9,12	3	6	-	5	5	40	60	100	145
25CAU602A	Introduction to Data Science	Major 15	1,4,9	1	4	-	-	3	40	60	100	148
25CAU602B	Time Series Analysis											151
25CAU602C	Artificial intelligence with Machine Learning											154
25CAU602D	Semantic Web and Ontologies											157
25BAU601G	Entrepreneurship Development	Minor 6	1,4,5,7, 8,13	1	6	-	-	4	40	60	100	160
25CAU691	Project and Viva Voce	Major 16	1,4,5,7, 8,13	2	-	-	9	6	40	60	100	162
25ECU601G	ECA / NCC / NSS / Sports / General interest etc		-	-	-	-	-	-	100	-	100	163
SEMESTER TOTAL					16	0	14	18	260	240	500	
GRAND TOTAL					124	0	56	126	2020	1980	4000	
SEMESTER VII												
25CAU701	Big Data Analytics	Major 17	4,5,9	1	6	-	6	7	40	60	100	167
25CAU702	Generative AI with Large Language Models	Major 18	7,8,9	1	6	-	-	5	40	60	100	171
25MAU701G	Statistical Computing	Minor 6	1,3,4,5, 6,8,10	1	6	-	-	5	40	60	100	174
25CAU711	Generative AI with Large Language Models – Practical	Major 19	3,4,9	1	-	-	6	3	40	60	100	177
SEMESTER TOTAL					18	0	12	20	160	240	400	

SEMESTER VIII A (HONOURS)												
25CAU801A	Business Intelligence and Analytics	Major 20	3,5,7	1	6	-	6	7	40	60	100	180
25CAU802A	Introduction to NoSQL Database	Major 21	2,4,7,9	2	6	-	-	5	40	60	100	184
25BAU803AG	Advanced Organizational Behavior	Minor 7	2,3,8	1	6	-	-	5	40	60	100	187
25CAU811A	Introduction to NoSQL Database -Practical	Major 22	3,4,7	1	-	-	6	3	40	60	100	190
SEMESTER TOTAL					18	0	12	20	160	240	400	
SEMESTER VIII B (HONOURS WITH RESEARCH)												
25CMU801BG	Research Methodology and IPR	Minor 7	1,3,4,5,6,8,13	1	6	-	-	4	40	60	100	193
25CAU811BG	Statistical Analysis using R - Practical	Minor 8	1,3,5,8	1	-	-	6	4	40	60	100	196
25CAU891	Research Project	Major 20	-	-	-	-	18	12	120	180	300	198
SEMESTER TOTAL					6	0	24	20	200	300	500	
GRAND TOTAL					160	0	80	166	2340	2460	4800	
SEM I/II/III/IV/V	MOOC					-	-	-	4	-	-	-
Total (Up to Semester VI) = 126+4=130 Credits												
Total (Up to Semester VIII) = 170 Credits												
*Minimum 126+4 = 130 Credits to earn the Degree (For 3 years)												
*Minimum 170 Credits to earn the Degree (For 4 years)												

Course Distribution Table

VIII- A

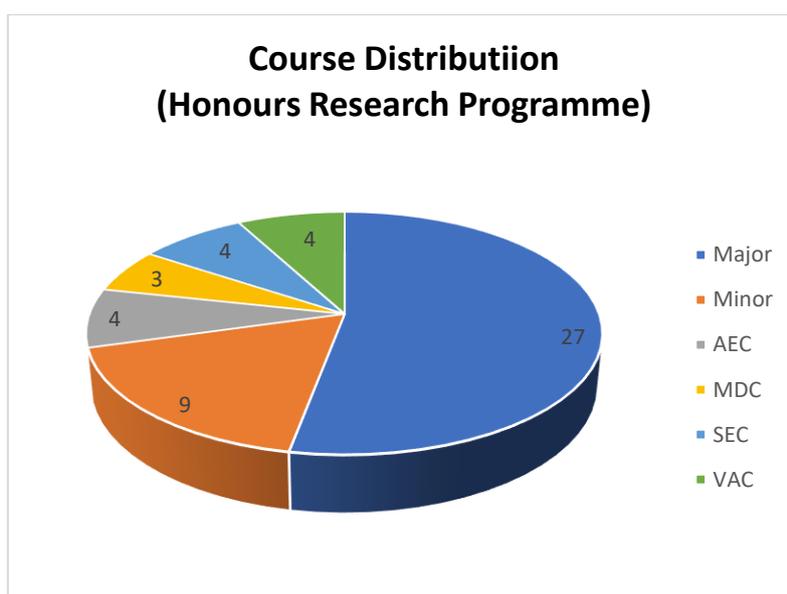
Category	No. of Courses		Total
	Theory	Practical	
Major	21	7	28
Minor	8	0	8
AEC	4	0	4
MDC	3	0	3
SEC	1	3	4
VAC	4	0	4
Total	41	10	51



Course Distribution Table

VIII-B

Category	No. of Courses		Total
	Theory	Practical	
Major	20	7	27
Minor	9	0	9
AEC	4	0	4
MDC	3	0	3
SEC	1	3	4
VAC	4	0	4
Total	41	10	51



இலக்கிய நெறிகள்

Instruction Hours/week: L:4 T:0 P:0

Marks: Internal:40 External:60 Total:100

End Semester Exam: 3 Hours

பாடத்திட்டப் பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்; திறனாய்வு நோக்கை மேம்படுத்துதல்.
- இலக்கியங்களின் வழி மனித வாழ்வியலை உணர்த்துதல்.
- இன்புறுத்தல் மற்றும் அறிவுறுத்தல் நிலைகளில் இலக்கியங்களின் பங்களிப்பை உணர்த்துதல்.
- இளைய தலைமுறையினருக்கு அற உணர்வு மற்றும் வாழ்வியல் மதிப்புகளை அறிவுறுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- இந்தியக் குடியரிமைப்பணி முதலான போட்டித் தேர்வுகளில் இடம்பெறுகின்ற, தமிழ் இலக்கிய வரலாறு குறித்த முழுமையான அறிமுகத்தை அடைதல்.
- தொல்லியல், கல்வெட்டியல் மற்றும் ஓலைச்சுவடியியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வு மனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- 'அறிவியல் தமிழ்' ; 'இணையத் தமிழ்' போன்ற தமிழின் வளர்ச்சித் துறைகள் சார்ந்த திறன் மேம்பாடு பெற்றிருத்தல்.
- வேலைவாய்ப்புக்குரிய வகையில் படைப்பாக்கத்திறன் முதலான மொழி ஆளுமை பெற்றிருத்தல் ;
- சமூக வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக உள்ள இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.

தாள்கள் வரிசையும் தேர்வுச் செயல் திட்டமும்

பகுதி-I தமிழ்

இளநிலைப்பட்ட அறிவியல் மற்றும் கலையியல் வகுப்புகள்

பருவம்	தாள்	கற்பிக்கும் நேரம் /வாரம்	தேர்வு மணிகள்	மதிப்பெண் அகமதிப்பீடு பருவ எழுத்துத் தேர்வு	மொத்தம்	மதிப்புப் புள்ளிகள்
ஒன்று	I	4	3	40 / 60	100	3

இலக்கிய நெறிகள்

அலகு - I

10 மணிநேரம்

தமிழ் இலக்கிய வரலாறு - முச்சங்கங்கள் அறிமுகம் - சங்க இலக்கியத்தின்
தோற்றுவாய் - பத்துப்பாட்டு அறிமுகம்
சங்க இலக்கியம் - முல்லைப்பாட்டு - “பால்போல” முதல் “குறுநீர்” வரை (1-58)
அற இலக்கியம் - திருக்குறள் - பெரியாரைத் துணைக்கோடல் (அதிகாரம் 45),

அறன் வலியுறுத்தல் (அதிகாரம் 4).

காப்பியம் - சிலப்பதிகாரம் - அ) புகார்க்காண்டம் - மங்கல வாழ்த்துப்
பாடல் - “நாகநீள் நகரொடு” முதல் “புகார்
நகர் அது தன்னில்” வரை (21 - 22)
மனையறம் படுத்த காதை - “வார் ஒலி கூந்தலை” முதல்
“கண்ணகி தனக்கு என்” வரை (84 - 90)

ஆ) மதுரைக்காண்டம் - கொலைக்களக் காதை - “இரு முதுகுரவர் ஏவலும்”
முதல் “என் செய்தனை” வரை (67 - 70)
“வினை விளை காலம்” முதல் “அச் சிலம்பு கொணர்க ஈங்கு”
வரை (148-153)
கட்டுரை காதை - “கடி பொழில்” முதல் “கட்டுரை கேள் நீ”
வரை (138 - 170)
வழக்குரை காதை - “அல்லவை செய்தார்க்கு” முதல் “
உண்டளவே தோற்றான் உயிர்” வரை (82 - 93)
இ) வஞ்சிக்காண்டம் - நடுகல் காதை - “மதுரை மூதூர்”
முதல் “வடதிசை வணக்கிய மன்னவர் ஏறு” (218-234)
வாழ்த்துக் காதை - “என்னே! இஃது என்னே!” முதல்
“மீவிசும்பில் தோன்றுமால்” வரை (9)

இலக்கணம் - அகத்திணைகள், புறத்திணைகள்

அலகு - 2

08

மணிநேரம்

தமிழ் இலக்கிய வரலாறு - எட்டுத்தொகை அறிமுகம்
சங்க இலக்கியம் - நற்றிணை - “விளையாடு ஆயமொடு” -(172)
சங்க இலக்கியம் - குறுந்தொகை - “நோமென் னெஞ்சே” - தலைவி
கூற்று - (202) - “ஈதலுந் துய்த்தலு” - தலைவன் கூற்று - (63)

அற இலக்கியம் - நாலடியார் - கூடா நட்பு - “செறிப்பில்” முதல்
“செய்யாது செய்து” வரை (1 முதல் 5 பாடல்கள்),
சினம் இன்மை - “மதித்து இறப்பாரும்” முதல் “இளையான்”
வரை (1 முதல் 5 பாடல்கள்), சுற்றம் தழால் - “வயாவும்”
முதல் இன்னர் வரை” (1 முதல் 5 பாடல்கள்).

காப்பியம் - மணிமேகலை - பாத்திரம் பெற்ற காதை -
“போதிநீழல்” முதல் “நல்அறம்கண்டனை” வரை (73-98)

இலக்கணம் - முதலெழுத்து - சார்பெழுத்து - விளக்கம்

அலகு - 3

10

மணிநேரம்

தமிழ் இலக்கிய வரலாறு - அற இலக்கியங்கள் அறிமுகம்
சங்க இலக்கியம் - ஐங்குறுநூறு - வேட்கைப்பத்து - “வாழி ஆதன் வாழி அவினி”
எனத் தொடங்கும் முதல் ஐந்து பாடல்கள்.
சங்க இலக்கியம் - பதிற்றுப்பத்து - ஏழாம்பத்து-

“எறிபிணம் இடறிய செம்மறுக்” (65)

அற இலக்கியம் - நான்மணிக்கடிகை - எள்ளற்க என்றும்
(1) - புகழ் செய்யும் (2)

- சிறந்தார்க்கு (3) - கொடுப்பின் (4) - நல்லார்க்கும் (5) -
(தேர்த்தெடுத்த ஐந்து பாடல்கள்)

காப்பியம் - கம்பராமாயணம் - தேர்த்தெடுக்கப்பட்ட பாடல்கள்
(18) - மன்னவன் (1604), பின்னும் பகர்வாள் (1752), பஞ்சி ஒளிர் (2762), மயில்
உடை (3151), ஆண்டு, ஆயிடை (3390), மற்று இனி (3812), கண்டனன் (5249),
வேலையுள் (6037), மண்ணொடும் (6038), வாங்கிய ஆழி (6049), இங்கு உள (6051),
கண்டனன் (6031), பைய பையப் (6053), அந்நெறி (6058), குகனொடும் (6507),
கூவி இன்று (7004), ஆள் ஐயா! (7271), கார்நின்ற (10043)

சிறுநிலக்கியம்

- கலிங்கத்துப்பரணி - போர்க்களக்காட்சிகள் -

“தேவாசரம் (472), உடலின்மேல் (475), நெடுங்குதிரை
(476), விருந்தினரும் (477), தரைமகள் (483),
பொருதடக்கை (484), வெயில்தாரை (488)”.

இலக்கணம் - சொல் - பெயர் - வினை, இடை,

உரிச்சொல் -

விளக்கமும் பயிற்சியும்.

இலக்கணம்

- மூவிடம் மற்றும் பெயர் விகுதிகள்.

தமிழ் இலக்கிய வரலாறு - காப்பியங்கள் - தோற்றமும் வளர்ச்சியும்

- சங்க இலக்கியம்** - பரிபாடல் - வையை - (பாடல் - 6) “நிறைகடல் முகந்து உராய்” முதல் “சேறு ஆடுபுனலது செலவு” வரை (1-50 அடிகள்).
- சங்க இலக்கியம்** - கலித்தொகை - “சுடர்தொடிக் கேளாய்” (51)
- அற இலக்கியம்** - ஆசாரக்கோவை - 5 பாடல்கள் (நன்றியறிதல் (1), பிறப்பு (2), தக்கணை (3), வைகறை (4), எச்சிலார் (5)).
- காப்பியம்** - தேம்பாவணி - நகர்வளம் 15 பாடல்கள் (மெய்வழி (97) முதல் - ஈரும் வாள் (106) வரை).
- சிற்றிலக்கியம்** - தமிழ்விடு தூது - “சீர்கொண்ட” முதல் - “மஞ்சள்” வரை (1 முதல் 25 கண்ணிகள்)
- இலக்கணம்** - தொடர் வகை - வினா விடை வகைகள்

அலகு - 5

- தமிழ் இலக்கிய வரலாறு - சிற்றிலக்கியங்கள் தோற்றமும் வளர்ச்சியும்
- சங்க இலக்கியம்** - அகநானூறு - “ஈன்று புறம் தந்த எம்மும் உள்ளாள்” - பாலை - நற்றாய் கூற்று (35).
- சங்க இலக்கியம்** - புறநானூறு - “புலவரை இறந்த புகழ்சால் தோன்றல்” - (21)
- அற இலக்கியம்** - பழமொழி நானூறு - (5 பாடல்கள்) 1. அவையறிதல் - கேட்பாரை நாடி (17), 2. அறிவுடைமை - அறிவினால (26), 3. ஒழுக்கம் - விழுத் தொடையர் (34), 4. இன்னா செய்யாமை - பூ உட்கும் (43), 5. வெகுளாமை - இறப்பச் சிறியவர் (51).
- காப்பியம்** - சீராப்புராணம் - மானுக்குப் பிணை நின்ற படலம் - அரியினஞ் (2), குழை குழைத் (70), கொடியிடம் (12), நிறைவளஞ் (16), வல்லவ (17), என்னுயி (18), தனியெனென் (20), வலையிடத் (25), என வினவ (29), வேட்டுவனுரைப்ப (48) என்னும் (10 பாடல்கள்).
- சிற்றிலக்கியம்** - முத்துக்குமாரசாமி பிள்ளைத்தமிழ் - காப்புப் பருவம் - பூமேவு கற்பகப் பொங்கரிற், (முதல் பாடல்), செங்கீரைப் பருவம் - இருக்கோல் இடும்பரிபுரக் கோல, (முதல் பாடல்), தாலப்பருவம்-பில்கும் பசுந்தேன் (முதல் பாடல்)
- இலக்கணம்** - வேற்றுமை உருபுகள்.

மொத்த மணிநேரம் - 48

TEXT BOOK

T1 - கற்பகச் சோலை - தமிழ்ப்பாட நூல், இலக்கிய நெறிகள், தமிழ்த்துறை வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் - 21.

பார்வை நூல்கள்

R1 - தமிழ் இலக்கிய வரலாறு, முனைவர் கா.கோ. வேங்கடராமன்,

கலையக வெளியீடு, நாமக்கல்.

R2 - வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, முனைவர் பாக்யமேரி,
பூவேந்தன் பதிப்பகம், சீனிவாசா சாலை, மயிலாப்பூர், சென்னை.

இணையதளம்

W1-www.tvu.org.in

W2- www.maduraitamilproject.com

இதழ்கள்

J1- International Research Journal of Indian Literature, irjil.in

J2 - International Tamil Research Journal, iorpress.in

வினாத்தாள் கட்டமைப்பு

இடைத்தேர்வு - மொத்த மதிப்பெண்கள் 60

பகுதி - அ (இரு மதிப்பெண் வினாக்கள்) $6 \times 2 = 12$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - ஆ (ஆறு மதிப்பெண் வினாக்கள்) $3 \times 6 = 18$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - இ (பத்து மதிப்பெண் வினாக்கள்) $3 \times 10 = 30$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பருவத்தேர்வு - மொத்த மதிப்பெண்கள் 100

பகுதி - அ (இரு மதிப்பெண் வினாக்கள்) $10 \times 2 = 20$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - ஆ (ஆறு மதிப்பெண் வினாக்கள்) $5 \times 6 = 30$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - இ (பத்து மதிப்பெண் வினாக்கள்) $5 \times 10 = 50$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Instruction Hours/week: L:4 T:0 P:0**Marks: Internal:40 External:60 Total:100****End Semester Exam: 3 Hours****(PROSE, NON-DETAILED, NIBANDH, GRAMMAR)****PREREQUISITE:** Not Required**COURSE OBJECTIVES(CO):**

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories

COURSE OUTCOMES(COs):

- Develop an interest in the appreciation of literature.
- Discuss and respond to content of a reading passage.
- Learning the literacy knowledge of Hindi specially reading and writing.
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature

UNIT - I	a) Prose - Bharathiya Sangrah b) Non-Detailed - Naya Mehman c) Nibandh - Anushasan d) Grammar - Bhasha Aur Vyakaran	10 HOURS
UNIT - II	a) Prose - Pahtha Pani Nirmal b) Non-Detailed - Eakankki ki Visheshatha c) Nibandh - Onam d) Grammar – Varna Vichar , Sangya	10 HOURS
UNIT - III	a) Prose – Rashtriya Pitha Mahathma b) Non-Detailed – Maha Bharat ki Eak Sanjh c) Nibandh – Eakatha Ka Mahathva d) Grammar – Sarvanam , Gender	10 HOURS

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

COURSE OBJECTIVE:(CO)

- Improves grammatical knowledge
- Will continue to read and learn about articles and think about them
- It is possible to read and understand short stories and understand the thoughts and life of the people of this state.

COURSE OUTCOMES: (COs)

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories
- Comprehend the grammatical structures and sentence making
- Understand the language and developing English to Malayalam translation skill

MALAYALAM: PAPER - I		
Unit No.		HOURS
I	Novel – Pathummayude Aadu - Vaikam Muhammed Basheer	10
II	Novel- - Pathummayude Aadu - Vaikam Muhammed Basheer	10
III	Short Story - Ente Priyappeta Kadhakal – Akbar Kakkattil)	09
IV	Short Story - Ente Priyappeta Kadhakal – Akbar Kakkattil)	10
V	Composition & Translation(English to Malayalam)	09
	TOTAL	48

Text Books:

1. Basheer.V.M, (1959), *PathummayudeAadu*, D.C.Books, Kottayam, Kerala
2. Akbar Kicktail ,(2022), *Ente Priyappeta Kadhakal*,D.C. Books, Kottayam, Kerala
3. Expansion of ideas, General Eassay and Translation. (A simple passage)

Reference Books:

- 1.Tharakan K.M (2023), Malayala Novel Sahithya Charitram, B.C.Book, Kerala Sast Rasahitya, Kerala
- 2.Achuyuthan, M (2023), Cherukatha Innale Innu,D.C Books, Kottayam, Kerala.
- 3.George K.M, (2013) Sahithya CharitramPrasthanangalilude-, D.C.Books, Kottayam.
- 4.Sukumar Azheekode (2018) MalayalaSahithyaVimarsam, D.C.Books, Kottayam, Kerala

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

(POETRY, GRAMMAR AND TRANSLATION)**COURSE OBJECTIVES(CO):**

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities of the students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES(COs):

- **Critical Thinking:** Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving:** Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication:** Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship:** Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development.

UNIT – I**10 HOURS**

Introduction to Poetry, Definition of Poetry

UNIT – II**10 HOURS**

Five Maha Kavyas

UNIT – III**10 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) First Ten Slokas

UNIT – IV**09 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) Slokas Eleven to Thirty

UNIT – V**09 HOURS**

Text Prescribed : Raghuvamsa (Canto – 1) Slokas Thirty One to Fifty

TOTAL: 48 HOURS**Grammar: Text Prescribed:**

Sanskrit Self Teacher

By Dr.V.Varadhachari

(Present tense and Declension of ending nouns (Masculine))

Texts Available at

- *Raghuvamasa* (Canto - I), (2019). R.S. Vadhyar and Sons Palghat, Kerala.
- Varadhachari,v.s, (2014). *Sanskrit Self Teacher* 32, Tank Bunk Road, Near Loyola College, Nungambakkam, Chennai - 600 034.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

(LEÇON, COMMUNICATION, GRAMMAIRE, VERBES, LEXIQUE, CULTURE)

PREREQUISITE: Not Required

COURSE OBJECTIVES (CO):

The objectives of this course are:

- To enable the learner to communicate effectively and appropriately.
- To develop and integrate the use of the four language skills.
- To train students to acquire proficiency in French by reading different genres of literature and learning grammar.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Retrieve fundamentals of French language to construct error free sentences.	Apply
CO2	Construct and maintain social relationships.	Analyze
CO3	Construct business letters, proposals and E-Mail communication	Apply
CO4	Adopt the skills of planning, structuring, and delivery techniques in group discussions and presentations.	Understand
CO5	Classify communication skills in business environment	Understand

Unite – I

9 HOURS

- a) Leçon – Bienvenue
- b) Communication – Un cours de francais, Entrer en contact saluer,
- c) Verbes – être ou avoir
- d) Lexique – Les couleurs, l’ alphabet
- e) Culture – La France

Unité - II

9 HOURS

- a) Leçon – Bonjour ça va ?
- b) Communication – Demander et dire, Comment ça va
- c) Verbes – Les verbes réguliers en –er.
- d) Lexique – Les Pays et les nationalités , Les animaux domestiques, Les jours de la semaine.

e) Culture	– La France et la Francophonie	
Unité - III		10 HOURS
a) Leçon	– Salut ! Je m'appelle Agnès	
b) Communication	– Se présenter et présenter quelqu'un Demander et dire la date	
c) Grammaire	– Les pronoms personnels sujets ,Les verbes être et avoir , Les articles définis et indéfinis	
d) Verbes	– Les verbes aller et venir	
e) Lexique	– Les mois de l'année, Les nombres de 0 à 69 » La famille (1)	
f) Culture	– La France physique et politique	

Unité IV **10 HOURS**

a) Leçon	- Qui est-ce ? Dans mon sac, j ' ai
b) Communication	- Demander et répondre poliment ,Demander des informations Personnelles
c) Grammaire	- La formation du feminine, La formation du pluriel , Le adjectifs possessifs
d) Verbes	-Les verbes ir et re
e) Lexique	-Les professions ,Quel ques objets ,La fiche d'identité
f) Culture	-Les symbols de la France,

Unité V **10 HOURS**

a) Leçon	- Il est comment ? Allô ?
b) Communication au telephone	- Décrire l'aspect physique et le caractère Parler
c) Grammaire interrogative	- La formation du féminin , La phrase Qu'est-ce que... ? La phrase négative
d) Verbes	- Le verbe Faire
e) Lexique	- L'aspect physique , Le caractère, Les prépositions de lieu , Les nombres à partir de 70
f) Culture-	Les frontières de la france,les villes connues en france.

TOTAL: 48 HOURS

REFERENCE BOOKS:

1. Cocton ,M-N, (2015, December), *Saison 1: méthode de français*, Volume 89, Number 2, Johns Hopkins University Press, Difier Paris.
2. Alcaraz,M,Escoufier, D., Gomy, C., Landier, M., Quéméner, Fl., Ripaud, 2014, *Saison 1- Cahier d'activites*, Dider, Paris.
3. Akvüz A., Bernadette Bazelle-Shahmaei, Joëlle Bonenfant, Marie-Françoise Gliemann, 24 Aug. 2005, *Les 500 Exercices De Grammaire Avec Corrigés*, Hachette Francais Langue Etrangere, Paris.
4. Beaulieu C,2011, *Je Pratique Exercice De Grammaire A1*, French, Goyal Publishers, Paris.
5. Bié N.,Philippe Santinan, April 2014, *Grammaire pour adolescents 250 exercices*, French, CLE INTERNATIONAL, Paris

WEBSITES :

1. <http://enseigner.tv5monde.com/>
2. [bonjourdumonde.com /exercices/contenu/le – francais-du- tourisme.html](http://bonjourdumonde.com/exercices/contenu/le-francais-du-tourisme.html)
3. <http://www.bonjurdefrance.com/>
4. <https://www.lepointdufle.net/>

CO, PO, PSO Mapping

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	P013	P014	P015	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

- To enable the learner to communicate effectively and appropriately.
- To develop and integrate the use of the four language skills.
- To train students to acquire proficiency in English by reading different genres of literature and learning grammar.

COURSE OUTCOMES(COs) :**At the end of this course, students will be able to**

COs	Course Outcomes	Blooms Level
CO1	Use English grammar to create error-free sentences.	Apply
CO2	Build and maintain social relationships through effective communication.	Remember
CO3	Construct business letters, proposals and E-Mail communication	Remember
CO4	Plan and deliver group discussions and presentations.	Understand
CO5	Classify communication skills in business environment	Understand

UNIT 1**8 HOURS****LISTENING:** Listening –Types of Listening**SPEAKING:** Basics of Pronunciation**READING:** Reading – Types of Reading**COMPOSITION WRITING:** Jumbled Sentences**LITERATURE:** Poem- Mending Wall- Robert Frost**GRAMMAR:** Parts of Speech**UNIT 2****7 HOURS****LISTENING:** Principles of Listening Skills**SPEAKING:** Self-Introduction**READING:** Reading Techniques**COMPOSITION WRITING:** Paragraph Writing**LITERATURE:** Prose- On Running After One's Hat- G. K. Chesterton

GRAMMAR: Types of Sentences

UNIT 3

7 HOURS

LISTENING: Barriers of Listening

SPEAKING: Telephone Conversations

READING: Reading Comprehension Passages

COMPOSITION WRITING: Precis Writing

LITERATURE: Short Story - The Bet - Anton Chekov

GRAMMAR: Articles

UNIT 4

7 HOURS

LISTENING: Story Narrations

SPEAKING: Group Discussion

READING: Reading Reports and profiles

COMPOSITION WRITING: Letter Writing

LITERATURE: One-act play- The Death Trap - H.H. Munro

GRAMMAR: Tenses

UNIT 5

7 HOURS

LISTENING: Listening Strategies

SPEAKING: Interview Skills

READING: Tips for MOC- Anchoring

COMPOSITION WRITING: Circular Writing and Summary Writing

LITERATURE: Short story- The Snake Song by R K Narayan

GRAMMAR: Subject Predicate, Framing Questions and Question Tags

TOTAL: 36 HOURS

TEXT BOOK:

1. Board of Editors, *Acrostic I* (2024). Karpagam Academy of Higher Education

REFERENCE BOOKS:

1. Martin's, St (2013). *Oxford Handbook of Writing: Handbook of Writing*. Cambridge University Press.
2. Julian Treasure, *Sound Business*, (2012). Oxford University Press
3. Hornby, A, S. (1975). *The Guide to patterns and usage in English*: oxford university Press.

4. Ellis, R. (1990). *Instructed second language acquisition*, Oxford: oxford university Press New York:Pergamon Press.

WEB SITES:

1. <https://www.poemhunter.com/>
2. <https://hearhandfield.com/on-running-after-ones-hat-gk-chesterton-1915/>
3. <https://www.eastoftheweb.com/short-stories/UBooks/Bet.shtml>
4. <https://masthanappa.blogspot.com/2018/09/the-death-trap-h-h-munro-saki.html>
5. <https://shorturl.at/ud8rp>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Average	-	3	3	-	-	-	3	-	-	-	-	2	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To Understand basic terminology of computers problem solving and programming.
- To Provide the knowledge about C fundamentals.
- To Understand the concepts of Arrays, User-Defined Functions.
- To Know the Concept of Pointers, Structures and Unions.
- The STUDENT can able to develop program using File Management.

COURSE OUTCOMES(CoS)

COs	Course Outcomes	Blooms Level
CO1	Outline the fundamentals of problem solving.	Understand
CO2	Categorize the concepts of programming with C through Decision making and looping.	Apply
CO3	Identify how to apply the major concepts to implement Problem Solving by Arrays and User-Defined Functions.	Apply
CO4	Design the Program development using Pointers, Structures and Unions.	Create
CO5	Build programs using File Management.	Create

UNIT 1: PROBLEM SOLVING AND ALGORITHMIC THINKING

12 HOURS

Problem Solving: Define the problem – Introduction to problem solving concept- Steps for problem solving –

Program: Characteristics of program – **Algorithm:** Definition – Characteristics of Algorithm – Quality of Algorithm – Steps in algorithm – **Flowchart:** Guidelines for preparing Flowchart – Types of Flowcharts –

Pseudocode: Definition – Characteristics of Pseudocode - Examples

UNIT 2: OVERVIEW OF C AND DECISION MAKING

12 HOURS

Overview of C - Introduction – History of C - Features of C - Structure and Execution of C-Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning

values to variables – Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators-Arithmetic Expressions Evaluation of expression-precedence of arithmetic operators - Type conversion in expression – operator precedence & associativity. **Decision Making and Looping:** Introduction – if, if.... else, nesting of if ...else statements- else..if ladder – The switch statement, The?: Operator – The goto Statement. The while statement- the do statement – the for statement-jumps in loops.

UNIT 3: ARRAYS AND USER-DEFINED FUNCTIONS

12 HOURS

Arrays: Arrays Types – Strings- User-Defined Functions: Introduction– Elements of User-Defined Functions- Definition- Declarations -Function Calls—Category of Functions-Nesting of Functions-Recursion–Passing Arrays and Strings to Functions- The Scope, Visibility and Lifetime of Variables.

UNIT 4: POINTERS, STRUCTURES AND UNIONS

12 HOURS

Pointers: Introduction-Understanding pointers -Accessing the address of a variable Declaration and Initialization of pointer Variable – Accessing a variable through its pointer Chain of pointers-Pointer Expressions – Pointer Increments and Scale factor- Pointers and Arrays- Pointers to Functions–Pointers and Structures -Structures and Unions.

UNIT 5: FILE MANAGEMENT

12 HOURS

File Management in C: Introduction-Understanding File Management-Defining and Opening a file-Closing a File- IO Operations on file-Error Handling during IO Operation-Random Access to files-Command Line Arguments – Macros – types of macros.

TOTAL: 60 HOURS

LIST OF PROGRAMS

1. Write a C program to find the sum, average, standard deviation for a given set of numbers.
2. Write a C program to generate n prime, perfect, Armstrong numbers.
3. Write a C program to generate Fibonacci series.
4. Write a C program to print magic square of order n where $n > 3$ and n is odd.
5. Write a C program to sort the given set of numbers in ascending order.
6. Write a C program to check whether the given string is a palindrome or not using pointers.
7. Write a C program to count the number of Vowels in the given sentence.
8. Write a C program to find the factorial of a given number using recursive function.
9. Write a C program to print the students Mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the

University pattern.

10. Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.
11. Write a C program which receives two filenames as arguments and check whether the file contents are same or not. If same delete the second file
12. Write a program which takes a file as command line argument and copy it to another file. At the end of the second file write the total i) no. of chars ii) no. of words and iii) no. of lines.

TOTAL:48 HOURS

TEXT BOOKS:

1. Balagurusamy, E. (2018). *Programming in ANSI C* (7th ed.).
2. Kernighan, B. W., & Ritchie, D. M. (2015). *The C Programming Language* (2nd ed.).
3. Kochan, S. G. (2014). *Programming in C* (4th ed.).

REFERENCE BOOKS:

1. Balagurusamy, E. (2008). *Computing Fundamentals & C Programming* (2nd reprint). Tata McGraw-Hill.
2. Forouzan, B. A., & Gilberg, R. F. (2000). *Computer Science: A Structured Programming Approach Using C* (3rd ed.).
3. Schildt, H. (2000). *C: The Complete Reference* (4th ed.).

WEBSITES:

1. Introduction to Programming in C-NPTEL
2. Problem solving through Programming in C -SWAYAM
3. C for Everyone: Programming Fundamentals-Coursera
4. <https://www.w3schools.com/c/>
5. <https://www.youtube.com/watch?v=5Bn8h6Id14U>
6. <https://www.javatpoint.com/c-programming-language-tutorial>

, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	3	-	2	3	3	-	-	2	-	-	-	-	-	-	-	-	2
CO3	3	-	2	3	3	-	-	2	-	-	-	-	-	-	-	-	-
CO4	3	-	2	3	3	-	-	2	-	-	-	-	-	-	-	-	1
CO5	3	-	2	3	3	-	-	2	-	-	-	-	-	-	-	-	1
Average	3	0	2	3	3	0	0	2	0	1	1.33						

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

The objectives of this course are:

- To Understand the basic components of computer system and number system
- To Apply the logical expression of SOP and POS techniques
- To Understand the concept of register and memory unit.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Classify the basic components of computer system and number system.	Understand
CO2	Inspect the distinctive features of Boolean algebra and logical gates.	Analyze
CO3	Make use of the logical expression of SOP and POS techniques.	Apply
CO4	Relate the various types of flip flops, registers and counters.	Understand
CO5	Infer the concept of register and memory unit.	Understand

UNIT 1: INTRODUCTION**8 HOURS**

Application of Computer - Different types of Computer systems - Basic components of Digital Computer System - Programming Languages; Number Systems.

UNIT 2: BOOLEAN ALGEBRA AND GATE NETWORKS**10 HOURS**

Fundamentals concepts of Boolean Algebra – Logical Multiplication AND Gates, OR Gates, and Inverters – Evaluation of logical Expressions – Basic Law of Boolean Algebra – Simplification of expressions – De Morgan's theorems – Basic Duality of Boolean Algebra - Derivation of a Boolean Expression.

UNIT 3: INTERCONNECTING GATES**10 HOURS**

Sum of products (SOP) and Products of sums (POS) – Derivation of products of sums expressions – Derivation of three Input variable expression – NAND gates and NOR gates - The Map method for simplifying expressions – Sub

cube and covering – product of sums expressions – Don't cares.

UNIT 4: COMBINATION OF LOGIC CIRCUITS

10 HOURS

Half Adder- Full adder- Half Subtractor – Full Subtractor- Encoder-Decoder Multiplexer-Demultiplexer-Sequential Circuits-Flipflops: Basic of Flipflops-SR Flipflops-JK Flipflops-D Flipflops-T Flipflops- Edge triggered Flipflops – Master-slave Flip-flops.

UNIT 5: REGISTER, COUNTER AND MEMORY UNIT

10 HOURS

Register: Introduction- Types of Register- Counter: Introduction- Asynchronous or ripple counters Asynchronous or ripple counters Memory: Introduction - Magnetic Memory - Optical Memory - Memory Addressing - ROMs, PROMs, EPROMs and EEPROM.

TEXT BOOKS:

1. Mano, M. M. (2018). *Digital Logic and Computer Design* (7th ed.). Pearson India Education Services Pvt. Ltd.
2. Stallings, W. (2016). *Computer Organization and Architecture* (10th ed.). Pearson Education, Inc.

REFERENCE BOOKS:

1. Floyd, T. L. (2010). *Digital Fundamentals*. Prentice-Hall.
2. Malvino, P. A., & Leach, D. P. (2000). *Digital Principles and Applications* (4th ed.). Tata McGraw-Hill.
3. Bartee, T. C. (1991). *Digital Computer Fundamentals* (6th ed.). Tata McGraw-Hill.

WEBSITES:

1. https://nios.ac.in/media/documents/vocational/CLS/Certificate_Course_in_Library_Science_english/M4_PDF/M4L1.pdf
2. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
3. <https://www.javatpoint.com/digital-computers>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	1	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	3	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
CO5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3
Average	3	-	3	1.7	2.3	-	2.5	2.3									

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Understanding of basic calculus.

COURSE OBJECTIVES(CO):

- To learn the fundamental methods for solving numerical algebraic and transcendental equations.
- To understand various techniques for solving simultaneous linear algebraic equations.
- To gain knowledge of interpolation, numerical differentiation, numerical integration, and numerical solutions of ordinary differential equations.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Apply numerical analysis which has enormous application in the field of science.	Apply
CO2	Implement numerical methods to solve systems of simultaneous linear algebraic equations.	Apply
CO3	Summarize the principles of Gregory-Newton forward and backward and Lagrange's Interpolation formulas.	Understand
CO4	Explain numerical differentiation and numerical integration formulas.	Understand
CO5	Implement numerical methods to solve ordinary differential equations.	Apply

UNIT - I SOLUTIONS OF NUMERICAL ALGEBRAIC AND TRANSCENDENTAL EQUATIONS 10 HOURS

Bisection method - Iteration method - False Position method - Newton's method

UNIT - II SOLUTION OF SIMULTANEOUS LINEAR ALGEBRAIC EQUATION 10 HOURS

Gauss elimination method - Gauss Jordan method - Gauss Jacobi method - Gauss Seidel methods.

UNIT - III INTERPOLATION**10 HOURS**

Gregory-Newton forward and backward interpolation formula – Equidistant terms with one or more missing values - Lagrange and Inverse Lagrange Interpolation formula.

UNIT - IV NUMERICAL DIFFERENTIATION AND INTEGRATION**09 HOURS**

Numerical Differentiation: Newton's forward difference and Newton's backward difference formula. Numerical Integration: Trapezoidal Rule and Simpson's Rule.

UNIT - V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS**09 HOURS**

Taylor's series - Euler's method – Modified Euler's method - Runge-Kutta methods (Fourth order Runge - Kutta method only).

TOTAL: 48 HOURS**TEXT BOOKS:**

1. Kandasamy, P., Thilagavathi K. and Gunavathi K. (2015). Numerical Methods, Published by Chand & Company Pvt. Ltd., New Delhi.
2. Jain M.K., Iyengar S.R.K., and Jain R.K. (2012). Numerical Methods for Scientific and Engineering Computation, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

1. Veera Rajan T. and Ramachandran T. (2008). Numerical Methods with Programs in C, Tata McGraw-Hill Publishing company limited, New Delhi.
2. Bradie B. (2007). A Friendly Introduction to Numerical Analysis, Pearson Education, India.

WEBSITES:

1. <https://testbook.com/maths/bisection-method>
2. <https://kanchiuniv.ac.in/coursematerials/Numerical%20-%20Algebraic%20equations.pdf>
3. <https://youtu.be/TIWRyzzFUYQ?si=rK4kUBpTzVpavVdU>
4. <https://theengineeringmaths.com/wp-content/uploads/2017/11/num-diff-integ-web.pdf>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	1	2.6	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

The objectives of this course are:

- To introduce the fundamentals of Internet and the Web functions.
- To impart knowledge and essential skills necessary to use the internet and its various components.
- To find, evaluate, and use online information resources.
- To use Google Apps for education effectively
- To introduce the fundamentals of HTML functions.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the fundamentals of Internet and the Web concepts	Understand
CO2	Understand the various component of web concepts	Understand
CO3	Explain the usage of internet concepts and analyze its components.	Analysis
CO4	Identify and apply the online information resources	Apply
CO5	Inspect and utilize the appropriate Google Apps for education effectively	Analysis

List of Programs using HLML

1. Design a web page using text formatting, List, Image, table and anchor tags.
2. Create a website of your department with minimum five links using HTML.
3. Design a form to read student details using form elements.
4. To create a web page using Frames in HTML.
5. Create a document using Form to support Local Processing of Order form.
6. Create a web page with the following:
 - i) Cascading style sheets.
 - ii) Use your college information for the web pages Using Frames

List of Programs using JAVASCRIPT

7. To write JavaScript program to compute squares and cubes of numbers from 5 to 15.
8. To write JavaScript program to find the largest of three numbers.
9. To write JavaScript program to find the factorial of a number.
10. To write JavaScript program to calculate sum and average of numbers.
11. To write JavaScript program to count the number of negative numbers, positive numbers and zeros in the list.
12. To write JavaScript program to prompt username and display it.

TOTAL:48 HOURS

Suggested Readings

1	Principles of web design.,Joel sklar,sixth edition,2015
2	“Web Coding & Development All-in-One For Dummies”,Paul McFedries ,2018
3	Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013
4	“HTML and CSS: Design and Build Websites”, Jon Duckett,2014
5	“Fundamentals of Web Development” ,Randy Connolly, Ricardo Hoar ,2017

Websites

- 1 <https://developer.mozilla.org/enUS/docs/Web/JavaScript/Guide>.
- 2 [http://www. freeCodeCamp Guides.com/](http://www.freeCodeCamp Guides.com/)
- 3 [http://www. Codrops CSS Reference/](http://www.Codrops CSS Reference/)

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	1	3	-	-	-	-	-	-	-	-	-	-	2	-
CO3	3	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2
CO5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	3
Average	3	-	3	1.7	2.3	-	2.5	2.3									

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES(CO):

- Create awareness about Yoga and Physical Health.
- Providing value education to improve the student's character, understanding the greatness of life force and the Mind.
- Know about five aspects of life and develop good Qualities and eliminate bad ones.
- Learning introspection practices like analysis of Thought, Moralization of Desires, Neutralization of Anger, and Eradication of Worries, Diversity in men (Why Men Differ)
- To understand yoga, life, and practice Yoga asanas

COURSE OUTCOMES(COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the concepts of about Yoga and Physical Health	Understand
CO2	Study the concepts the greatness of Life Force and Mind	Understand
CO3	Learn the aspects of Personality Development - Sublimation	Understand
CO4	Practices Human Resource Development	Apply
CO5	Understand about the yoga, life and Law of Nature	Apply

UNIT 1 YOGA AND PHYSICAL HEALTH

5 HOURS

Manavalakalai (SKY) Yoga: Manavalakalai (SKY) Yoga: Introduction - Education as a means for youth empowerment - greatness of education yoga for youth empowerment. Simplified physical exercises hand, leg, breathing, eye exercises, kapalabathi, makarasana part 1, Makarasana part 2, body massage, acupressure relaxation exercises and its benefits Yogasanas: Suryanamaskar 12 cycle pranayama, Asanas. [sitting and standing] meditation – Agna, explanation of initiation practice and its benefits

UNIT II GREATNESS OF LIFE FORCE AND MIND

5 HOURS

Kayakalpa, Aim of kayakalapa, philosophy, physical body, sexual vital fluid life force bio magnetism mind. Maintaining youth fullness, postponing old age, food transformation into seven minerals, the importance of sexual vital fluid measure and method of five aspects of life controlling undue passion. Kayakalpa Practice: Aswini

Mudra, Ojas Breath, benefits of Kayakalpa, Sex and Spirituality, Development of mind in ten stages. Mental frequencies: Meditation-five essential qualities acquired through meditation, Types of meditation, Agna, Shanthi, Thuriya, and its Benefits.

UNIT III PERSONALITY DEVELOPMENT – SUBLIMATION

5 HOURS

Purpose and philosophy of life- Needs protection, Ethics, and wisdom. Introspection: importance of thought, maneuvering of the six Temperaments, Analysis of Thought and six roots for thought, moralization of Desires. Neutralization of Anger.

UNIT IV HUMAN RESOURCE DEVELOPMENT

4 HOURS

Eradication of worries: Reasons for worries, four types of worries, Practice for eradication of worries. Benefits of Blessings: effect of good vibration self blessing (Auto suggestion), Family blessing others, world blessing, Divine protect, Human Values: greatness of Friendship, Individual peace to World Peace

UNIT V LAW OF NATURE

5 HOURS

Unified force, cause and effect system, gentle Center, Purification of gentile center, Love and Compassion. Culture values: Types of Education Non violence and five fold moral culture, Truth, honesty, patience. Excuse, self-control, obedience, consistent effort, No feeling jealousy, pleasant and polite, see good in everything.

YOGA PRACTICES: Thandasana Chakrasana (sideways) Vruchasana Thirikonasana Vakkarasana

TOTAL: 24 HOURS

TEXT BOOK:

1. Yoga for Youth Empowerment-Value Education, Thathuvagnani Vethathiri Maharishi, WCSC, Aliyar

REFERENCE BOOKS:

1. Kayakapam Thathuvagnani Vethathiri Maharishi
2. Light on yoga BKS. Iyenger
3. Manavalakala Part-1-Thathuvagnani Vethathiri Maharishi.
4. Manavalakala part-2-Thathuvagnani Vethathiri Maharishi
5. Mind Thathuvagnani Vethathiri Maharishi
6. Simplified Physical Exercises- Thathuvagnani Vethathiri Maharishi
7. Sound Health through yoga - Dr. Chandrasekaran
8. The world order of Holistic unity- Thathuvagnani Vethathiri Maharishi
9. Thirukkural-Rev. Dr. G. U. Pope
10. Yoga for modern age Thathuvagnani Vethathiri Maharishi

O, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	2	-	-	-	1	-	-	-	-	1	2
CO2	3	-	3	3	-	-	1	-	-	-	1	-	-	-	-	1	1
CO3	3	-	-	-	-	2	-	-	-	3	2	-	-	-	-	-	2
CO4	3	-	-	2	2	-	-	-	-	-	3	-	-	-	-	1	2
CO5	3	-	3	3	2	1	-	-	1	-	3	-	-	2	3	2	-
Average	3	-	3	2.6	2	1.5	1.5	-	1	3	2	-	-	2	3	1.2	1.7

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

பாடத்திட்டப் பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்; திறனாய்வு நோக்கை மேம்படுத்துதல்.
- இலக்கியங்களின் வழி மனித வாழ்வியலை உணர்த்துதல்.
- இன்புறுத்தல் மற்றும் அறிவுறுத்தல் நிலைகளில் இலக்கியங்களின் பங்களிப்பை உணர்த்துதல்.
- இளைய தலைமுறையினருக்கு அற உணர்வு மற்றும் வாழ்வியல் மதிப்புகளை அறிவுறுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- இந்தியக் குடியுரிமைப்பணி முதலான போட்டித் தேர்வுகளில் இடம்பெறுகின்ற, 'தமிழ் இலக்கிய வரலாறு' குறித்த முழுமையான அறிமுகத்தை அடைதல்.
- தொல்லியல், கல்வெட்டியல் மற்றும் ஓலைச்சுவடியியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வு மனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- 'அறிவியல் தமிழ்'; 'இணையத் தமிழ்' போன்ற தமிழின் வளர்ச்சித் துறைகள் சார்ந்த திறன் மேம்பாடு பெற்றிருத்தல்.
- வேலைவாய்ப்புக்குரிய வகையில் படைப்பாக்கத்திறன் முதலான மொழி ஆளுமை பெற்றிருத்தல்;
- சமூக வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக உள்ள இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.

தாள்கள் வரிசையும் தேர்வுச் செயல் திட்டமும்

பகுதி-I தமிழ்

இளநிலைப்பட்ட அறிவியல் மற்றும் கலையியல் வகுப்புகள்

பருவம்	தாள்	கற்பிக்கும் நேரம்/வாரம்	தேர்வு மணிகள்	மதிப்பெண் அகமதிப்பீடு/பருவ எழுத்துத் தேர்வு	மொத்தம்	மதிப்புப் புள்ளிகள்
இரண்டு	II	4	3	40 / 60	100	3

இலக்கிய இன்பம்

அலகு - 1

11 மணிநேரம்

தமிழ் இலக்கிய வரலாறு

- தமிழிலக்கிய வரிசையில் திருமுறைகள்,
பன்னிரு திருமுறைகள் அறிமுகம்,
திருமுறை ஆசிரியர்களின் இலக்கியப் பங்களிப்பு.

பக்தி இலக்கியம்

- சைவம் - பெரியபுராணம் - திருமூலநாயனார் புராணம் -
(தேர்ந்தெடுக்கப்பட்ட 15 பாடல்கள்) - அந்தியிளம்
பிறைக்கண்ணி (1) - மற்றவர்தாம் (2), காவிரிநீர் (9) -
அந்நிலைமை (10), அந்தணர்தஞ் (11) - மற்றவன்றன் (12),
இவன் உயிர் (13), பாய்த்தியபின் (14) - வெய்யசுடர் (16) -
அங்கவளம் (18) - பித்துற்ற (20) - இந்தநிலை (22) -
ஆவடுதண் (25) - ஊனுடம்பில் (26) - முன்னிய (27)

கவிதை

- கண்ணன் என் சீடன் (1-150 வரிகள்) - மகாகவி பாரதியார்

கவிதை

- பெண்களின் உரிமைகள்(பெண்மை) - கவிமணி

கவிதை

- செருப்புடன் ஒரு பேட்டி- கவிஞர் மேத்தா

சிறுகதை

- கடவுளும் கந்தசாமிப் பிள்ளையும் -
எழுத்தாளர் புதுமைப்பித்தன்

கட்டுரை

- ஆளுமைத்திறன் அறிவோம் (தன்னம்பிக்கை மாத இதழ்)

படைப்பிலக்கியப் பயிற்சி

- கட்டுரைப் படைப்பாக்கத்திறன்

அலகு - 2

10 மணிநேரம்

தமிழ் இலக்கிய வரலாறு

- பன்னிரு ஆழ்வார்கள் வரலாறு

பக்தி இலக்கியம்

- நாச்சியார் திருமொழி
(வாரணம் எனத் தொடங்கும் 11 பாடல்கள்) - ஆண்டாள்.

கவிதை

- மலையாளக்காற்று - கவிஞர் சிற்பி பாலசுப்பிரமணியம்.

கவிதை

- கம்ப்யூட்டர் கையில் நாம் - கவிஞர் ஈரோடு தமிழன்பன்

சிறுகதை

- நந்தவனத்தில் ஒரு ஆண்டி- எழுத்தாளர் ஜெயகாந்தன்

கட்டுரை

- அறிவியல் தமிழ் ஆக்கம் - இற்றை நிலை -

டாக்டர். வா.செ. குழந்தைசாமி

படைப்பிலக்கியப் பயிற்சி

- கவிதைப் படைப்பாக்கத்திறன்

அலகு - 3

10 மணிநேரம்

தமிழ் இலக்கிய வரலாறு

- தமிழ்ப் புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்

பக்தி இலக்கியம்

- திருவருட்பா - அஞ்சாதே நெஞ்சே (10 கண்ணிகள்) -
இராமலிங்க அடிகளார்.

கவிதை

- கனவுகள் + கற்பனைகள் = காகிதங்கள் - கவிஞர் மீரா

கவிதை

- மின்மினிகளால் ஒரு கடிதம் - கவிஞர் அப்துல்ரகுமான்

கவிதை

- ஒட்டடை - கவிஞர் தாமரை

சிறுகதை

- நாற்காலி - எழுத்தாளர் கி. ராஜநாராயணன்

கட்டுரை

- உயர்தனிச் செம்மொழி - முனைவர் இரா. குணசீலன்

இலக்கணம்

- வல்லினம் மிகும், மிகா இடங்கள்

படைப்பிலக்கியப் பயிற்சி - சிறுகதைப் படைப்பாக்கத்திறன்

அலகு- 4

10 மணிநேரம்

தமிழ் இலக்கிய வரலாறு
கவிதை

- தமிழ்ச் சிறுகதையின் தோற்றமும் வளர்ச்சியும்.
- இயேசு காவியம் - கசப்புறு பாத்திரம் – “வானி லங்கு நிலவு” முதல் “நேர மின்று நெருங்கியே” (1 முதல் 8 பாடல்கள்) - கவிஞர் கண்ணதாசன்.

கவிதை

- அதோ அந்த அவர்கள் - கவிஞர் வாலி.

கவிதை

- ஏழை இங்கொருவருமில்லை - கவிஞர் குலோத்துங்கன்.

சிறுகதை

- சுயநலம்- கவிஞர் விந்தன்.

கட்டுரை

- கங்கை வேடனும் காளத்தி வேடனும் - சொல்லின் செல்வர் ரா.பி. சேதுப்பிள்ளை.

ஆளுமைத்திறன் மேம்பாடு

- பேச்சுக்கலை

அலகு -5

07 மணிநேரம்

தமிழ் இலக்கிய வரலாறு

- தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

கவிதை

- தவத்தின் மேன்மை - கவிஞர் குணங்குடி மஸ்தான் சாகிபு

கவிதை

- சின்னச் சின்ன பிரளயங்கள் - கவிஞர் வைரமுத்து

கவிதை

- சுயம் - கவிஞர் சல்மா

சிறுகதை

- மீன் - எழுத்தாளர் பிரபஞ்சன்

கட்டுரை

- வீரச்சுவை – நாவலர் ந.மு.வேங்கடசாமி நாட்டார்

மொழித்திறன் மேம்பாடு

- பிழையின்றி எழுதுதல் பயிற்சி.
மரபுத்தமிழ் – திணைமரபு – உயர்திணை, அஃறிணை, அறிவியல் கலைச்சொற்கள்.

மொத்த மணிநேரம் - 48

TEXT BOOK T1 - கற்பகச் சோலை – தமிழ்ப்பாட நூல், இலக்கிய இன்பம், தமிழ்த்துறை வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் – 21.

பார்வை நூல்கள்

R1 - தமிழ் இலக்கிய வரலாறு, முனைவர் கா.கோ. வேங்கடராமன், கலையக வெளியீடு,

நாமக்கல்.

R2 - பெரியபுராணம் தொகுதி-1 பன்னிருதிருமுறை ஆய்வுமைய வெளியீடு, கற்பகம்

உயர்கல்விக்கழகம், கோவை-21

இணையதளம்

W1-www.tvu.org.in

W2- www.maduraitamilproject.com

இதழ்கள்

J1- International Research Journal of Indian Literature,irjil.in

J2 - International Tamil Research Journal, iorpress.in

வினாத்தாள் கட்டமைப்பு

இடைத்தேர்வு - மொத்த மதிப்பெண்கள் 60

பகுதி - அ (இரு மதிப்பெண் வினாக்கள்) $6 \times 2 = 12$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - ஆ (ஆறு மதிப்பெண் வினாக்கள்) $3 \times 6 = 18$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - இ (பத்து மதிப்பெண் வினாக்கள்) $3 \times 10 = 30$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பருவத்தேர்வு - மொத்த மதிப்பெண்கள் 100

பகுதி - அ (இரு மதிப்பெண் வினாக்கள்) $10 \times 2 = 20$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - ஆ (ஆறு மதிப்பெண் வினாக்கள்) $5 \times 6 = 30$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - இ (பத்து மதிப்பெண் வினாக்கள்) $5 \times 10 = 50$ (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

(MODERN POETRY, DRAMA, NOVEL, GRAMMAR)**PREREQUISITE:**

Not Required

COURSE OBJECTIVES(CO):

- Understand the text styles and grammatical elements
- Discuss the content of a reading passage
- Develop an interest in the appreciation of short stories

COURSE OUTCOMES(COs) :

- Basic knowledge of Hindi language will be improved.
- Knowledge of glossaries will increase.
- Hindi language expression will rise.
- Learners will enrich their grammar in Hindi.
- The desire to read literature, such as the essay on a poem, develops.

UNIT-I	a) Poetry – Nagarjun b) Drama -Dhruva Swamini c) Novel - Nirmala , Thotharam d) Grammar – Kaal , Theen Prakar	9 HOURS
UNIT-II	a) Poetry – Sita , Ram b) Drama – Mandhakini , Koma c) Novel – Mansaram , Jiyaram d) Grammar – Upsarg, Prathyay	9 HOURS
UNIT-III	a) Poetry – Lakshman, Valmiki b) Drama – Ramaguptha , Chandhraguptha c) Novel – Sudha, Bhuvan Mohan Singh d) Grammar – Sabda Vyutpathi	10HOURS

UNIT-IV a) Poetry -Vishvaamithra, Thrijada **10HOURS**
 b) Drama –Sikhar Swami,Shakraj
 c) Novel – Udhaybanulaal, Siyaram
 d) Grammar – Sambandh Chochak

UNIT-V a) Poetry – Bhagirath , Sagar **10HOURS**
 b) Drama – Khingal , Mihirdev , Prohith
 c) Novel – bhalchandra Sinha,Kalyani, Rangili Bai
 d) Samuchchaybodhak, Vishmayathibodhak **TOTAL: 48 HOURS**

REFERENC BOOKS:

1. Nagarjun, (2018). Bhoomija , Radha Krishna Publication, New Delhi - 110051.
2. Jaysankar Prasad, (1933). Dhruva Swamini, Sakshi Publication, S 16, Naveen Shahdhara, Delhi - 110032.
3. Premchandh, (2020). Nirmala, Prabhath Prakashan, 4/19 Asaf Ali Road, New Delhi - 110002.
4. V.shidhar Pro. & Dharmapal, (2005). Sugam Hindi Vyakaran, Shiksha Bharathi, Madharsa Road, Delhi - 110006.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

COURSE OBJECTIVE:(CO)

- A basic understanding of contemporary poetry can be gained and the nature of modern poetry can be realized.
- Realizing the nature of drama and its nature and improving the knowledge of reading and understanding the nature of contemporary plays.
- Understands the benefits of correspondence and can enhance the correspondence you need.

COURSE OUTCOME: (COs)

- Get a basic understanding of Memories
- It will create basic knowledge about Environmental Psychology.
- It will create awareness about our environment.
- Knowledge is gain about our country, culture etc.
- It will be an eye opener to the students towards our Mother Earth.

MALAYALAM – II		
Unit No.		Hours
I	Novel –Enmakaje	10
II	Novel – Enmakaje	10
III	Memories – Neermaathalam Poothakaalam	10
IV	Memories – Neermaathalam Poothakaalam	9
V	Translation (English to Malayalam)	9
	TOTAL	48

Text Books:

1. Ambikasuthan, (2024), *Emakaje* –DC Books Kottayam,Kerala
2. Madhavikutty (2021), *Neermaathalam Poothakaalam* , DC Books Kottayam, Kerala

Reference Books:

1. Vijayalam Jayakumar (1998), *Athmakathasahithyam Malayalathil*,N.B.S.Kottayam,Kerala
2. Tharakan K.M (2023), *Malayala Novel SahithyaCharitram*, Kerala Sast Rasahitya,Kerala
3. George K.M (2013) *SahithyaCharitramPrasthanangalilude*, D.C.Books, Kottayam, Kerala
4. Sukumar Azheekode,(2018, *MalayalaSahithyavimarsam*, D.C.Books, Kottayam,Kerala

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

(PROSE, GRAMMAR AND TRANSLATION)**COURSE OBJECTIVES(CO):**

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities of the students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES(COs) :

- Critical Thinking :Take informed actions after identifying the assumptions that frame students' thinking and actions.
- Problem Solving: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- Effective Citizenship: Demonstrate empathetic social concern and equity centered national development.
- Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.

UNIT-I**10 HOURS**

Introduction to Sanskrit Prose, Important prose works in Sanskrit

UNIT – II**10 HOURS**

Balaramayana – Balakanda

UNIT – III**10 HOURS**

Balaramayana – Ayodhyakanda

UNIT – IV

09 HOURS

Balaramayana – Aranyakanda

UNIT – V

09 HOURS

Athmanepada Declension of ending nouns (feminine) Passages from Sanskrit Self Teacher (Simple sentences)

TOTAL: 48 HOURS

Prose text book available at :

1. Balaramayana - A Simple Prose Version, (2019). R.S. Vadhyar and Sons, Palghat, Kerala

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

(LEÇON, COMMUNICATION, GRAMMAIRE, VERBES, LEXIQUE, CULTURE)

PREREQUISITE:

Not Required

COURSE OBJECTIVES (CO):

The objectives of this course are:

- To make the students to speak and write errors free French.
- To help the students develop their listening, speaking, reading and writing skills.
- Introducing literary works to the students to enhance their analytical and aesthetic skills.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	strengthen the foundation of the language.	Remember
CO2	standardize and demonstrate understanding of LSRW skills.	Understand
CO3	utilize fundamentals of language for reading, writing and effective communication.	Apply
CO4	enhancing the reading skill to build the leadership quality.	Apply
CO5	Develop the moral and aesthetic values.	Evaluate

Unité - I	a) Leçon - Les loisirs b) Communication - Parler de ses goûts et de ses préférences c) Grammaire - Les adjectifs interrogatifs , Les nombres ordinaux, L'heure, Les pronoms personnels COD d) Verbes -savoir et connaitre	9 HOURS
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	e) Lexique	- Les loisirs, Les activités quotidiennes ,Les matières	
	f) Culture	- les grands fleuves de france.	
Unité - II	a) Leçon	- La routine	9HOURS
	b) Communication	- Décrire sa journée	
	c) Grammaire	- Les verbes pronominaux, Les verbes du premier groupe en -e_er, -é_er, -eler, -eter, Le verbe prendre	
	d)	Verbes - manger, boire	
	e) Lexique	- Le temps et l'heure ,La fréquence	
	f) Culture	- les bandes dessinees.	
Unité - III	a) Leçon	-Où faire ses courses	10 HOURS
	b) Communication	- Au restaurant : commander et commenter	
	c) Grammaire	- Les articles partitifs, Le pronom en (la quantité) très	
	d) Verbes	ou beaucoup ? La phrase négative - les verbs irregulliers	
	e) Lexique	- Les aliments, Les quantités, Les commerces et les commerçants	
	f) Culture	-Les plats francais	
Unité -IV	a) Leçon	- Decourvez et dégustez	10 HOURS
	b) Communication	- Inviter et répondre ,à une invitation	
	c) Grammaire	- L'impératif ,Il faut, c'est/ il est,future proche	
	d) Verbes	- Les verbes devoir, pouvoir, savoir, vouloir	
	e) Lexique	- Demander et dire le prix, Les services, Les moyens de paiement	
	f) Culture	- Le festival du mot	
Unité - V	a) Leçon	- Tout le monde s'amuse, Les ados au quotidien	10 HOURS
	b) Communication	- Décrire une tenue , Écrire un message amical	
	c) Grammaire	- Les adjectifs demonstratives, La formation du féminin Le pronom indéfini on, passé composé'.	

- d) - Verbes - Les verbes du premier groupe en –yer,
Les verbes voir et sortir
- e) Lexique - Les sorties Situer dans le temps, La famille ,(2) Les vêtements et les accessoires
- f) Culture - Le pays des gourmands

TOTAL: 48 HOURS

REFERENCE BOOKS

1. Marie-Noëlle Cocton, December 2015, *Saison 1: méthode de français*, Volume 89, Number 2, [Johns Hopkins University Press](http://www.jhu.edu/), Difier Paris
2. Marion Alcaraz, Dorothee Escoufier, Camille Gomy, Mathilde Landier, Francine Quémener, Delphine Ripaud, 2014, *Saison 1- Cahier d'activites*, Dider, Paris.
3. Anne Akvüz, Bernadette Bazelle-Shahmaei, Joëlle Bonenfant, Marie-Françoise Gliemann, 24 Aug. 2005, *LES 500 EXERCICES DE GRAMMAIRE AVEC CORRIGÉS*, Hachette Francais Langue Etrangere, Paris.
4. Christian Beaulieu, 2011, *Je Pratique Exercice De Grammaire A1*, French, Goyal Publishers, Paris.
5. Nathalie Bié, Philippe Santinan, April 2014, *Grammaire pour adolescents 250 exercices*, French, CLE INTERNATIONAL, Paris.

WEBSITES :

1. <http://enseigner.tv5monde.com/>
2. [bonjourdumonde.com/exercices/contenu/le – francais-du- tourisme.html](http://bonjourdumonde.com/exercices/contenu/le-francais-du-tourisme.html)
3. <http://www.bonjurdefrance.com/>
4. <https://www.lepointdufle.net/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.8	2.6	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

- To enable the learner to communicate effectively and appropriately.
- To develop and integrate the use of the four language skills.
- To train students to acquire proficiency in English by reading different genres of literature and learning grammar..

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Strengthen the foundation of the language.	Remember
CO2	Standardize and demonstrate understanding of LSRW skills.	Remember
CO3	Utilize fundamentals of language for reading, writing and effective communication.	Apply
CO4	Enhancing the reading skill to build the leadership quality.	Understand
CO5	Develop the moral and aesthetic values.	Understand

UNIT - I**8 HOURS****LISTENING:** Listening to Different Accents and Intonation**SPEAKING :** Preparing for Small Talks**READING :** Syllabification**COMPOSITION WRITING:** Developing a story with pictures**LITERATURE:** Refuge Mother and Child by Chinua Achebe (Poetry)**GRAMMAR:** Subject, verb, agreement

UNIT - II**7 HOURS****LISTENING:** Listening in Different Contexts**SPEAKING:** Oral Presentation**READING:** Reading Passages**COMPOSITION WRITING:** Hints Development**LITERATURE:** Prose: My Childhood- Dr. A.P.J. Abdul Kalam**GRAMMAR:** Phrases and Clauses**UNIT - III****7 HOURS****LISTENING:** Listening to Buisness stories/Tedtalks**SPEAKING:** Public speaking and secrets of good delivery**READING :** Note Making**COMPOSITION WRITING:** Rearranging Paragraphs**LITERATURE:** Poem: A Gift of India - Sarojini Naidu**GRAMMAR:** Voice**UNIT - IV****7 HOURS****LISTENING:** Listening to instructions and announcements**SPEAKING:** Debating**READING :** Close Reading**COMPOSITION WRITING:** Writing Agenda, Memos, Minutes and Notices**LITERATURE:** Play: Dance Like a Man - Mahesh Dattani**GRAMMAR:** Degrees of Comparison**UNIT - V****7 HOURS****LISTENING:** Listening to Product Description- Labelling and Gap Filling Exercises**SPEAKING:** Developing Argument and Closing Argument**READING :** Reading Comprehension/ Summary Writing**COMPOSITION WRITING :** Dialogue Writing**LITERATURE:** Short- story: The Bear Hunt- Leo Tolstoy**GRAMMAR:** Direct and indirect speech**TOTAL: 36 HOURS**

TEXT BOOK:

1. Board of Editors (2024), Acrostic II. Karpagam Academy of Higher Education

REFERENCE BOOKS:

1. Martin's, St (2013). *Oxford Handbook of Writing: Handbook of Writing*. Cambridge University Press.
2. Julian Treasure, *Sound Business*, (2012). Oxford University Press
3. Hornby, A, S. (1975). *The Guide to patterns and usage in English*: oxford university Press.
4. Ellis, R. (1990). *Instructed second language acquisition*. Oxford: oxford university Press.

WEB SITES:

1. <https://allpoetry.com/>
2. <https://ncert.nic.in/textbook/pdf/iebe106.pdf>
3. <https://poets.org/poem/gift-india>
4. <https://shorturl.at/4sgld>
5. <https://sportingclassicsdaily.com/leo-tolstoy/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	-	2.5	2.5	-	-	-	-	-	2	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To Study the Object-Oriented Programming Concepts of Java Programming language
- To improve the analytical skills of object-oriented programming.
- To understand the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
- To objective of this course is to provide the student with the fundamental knowledge and skills to become a proficient Java programmer.
- To understand the basics of AWT and other available packages and able to accomplish real world task in an easier way.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Classify the difference between top-down and bottom-up approach.	Understand
CO2	Apply the concepts of object-oriented programming in constructor and destructor.	Apply
CO3	Apply the major object-oriented concepts to implement inheritance and polymorphism.	Apply
CO4	Analyze the basics of Java and can develop java desktop application.	Analyze
CO5	Discover Java applications using AWT and other packages	Analyze

UNIT - I INTRODUCTION TO OBJECT ORIENTED PROGRAMMING 12 HOURS

Fundamentals of Object Oriented Programming: Basic Concepts of Object Oriented Programming (OOP), Benefits and Applications of OOP. Overview of Java Language: Introduction to Simple Java Program, Use of Comments and Math function, Application of two classes, Java Program Structure, Java Tokens and statements, Implementing Java program And JVM, Command Line Arguments

UNIT - II DATA TYPES, OPERATORS 12 HOURS

Constants, Variables and Data Types: Constants, Variables, Data Types, Declaration of Variables, Giving values to Variables, Symbolic Constants, Type casting. **Operators & Expressions:** Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment & Decrement operators, conditional operators, Bitwise operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence & Associativity. **Decision Making, Branching & Looping:** Decision Making with Control Statements, Looping statements, Jump in loops, Labelled loops.

UNIT - III CLASSES AND OBJECTS 12 HOURS

Classes, Objects and Methods: Defining Class, Methods Declaration, Constructors, Methods Overloading, Overriding Methods, Inheritance

Arrays, Strings and Vectors: 1D arrays, Creating an Array, 2D arrays, Strings, Vectors, Wrapper Classes, Enumerated Types

Inheritance: Defining, extending classes, and Implementing Interfaces. Multiple inheritance and polymorphism.

UNIT - IV PACKAGES 12 HOURS

Packages: Basics of packages, System packages, Creating and accessing packages, Creating user defined packages, Adding class to a package. **Exception Handling:** Using the main keywords of exception handling: try, catch, throw, throws and finally; Nested try, Multiple catch statements, Creating user defined exceptions

UNIT - V AWT**12 HOURS**

Package Putting Class Together: Java API Packages – Naming, Creating, Accessing and Using a Package – Adding a Class to a Package. Multithreaded Programming: Creating, Extending the Thread Class – Life Cycle of Thread – Managing Errors and Exception

Applet Programming: Difference between Application and Applets – Applet Life cycle – creating an Executable Applet – Designing a Web Page – Adding Applet to HTML File – Passing Parameters to Applets.

TOTAL: 60 HOURS**LIST OF PROGRAMS****TOTAL: 48 HOURS**

1. Write a java program to find the Fibonacci series using recursive and non-recursive functions
2. Write a java program to multiply two given matrices.
3. Write a java program for Method overloading and Constructor overloading
4. Write a java program to display the employee details using Scanner class
5. Write a java program to create user defined package
6. a)Write a java program for creating multiple catch blocks
7. b)Write a java program for producer and consumer problem using Threads
8. a)Write a java program to display File class properties
b)Write a java program to represent Array List class
9. Write an applet program that displays a simple message
10. a)Write a Java program compute factorial value using Applet
b)Write a program for passing parameters using Applet
11. Write a java program that connects to a database using JDBC
a)Write a java program to connect to a database using JDBC and insert values into it.
b)Write a java program to connect to a database using JDBC and delete values from it
12. Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result

TEXT BOOKS:

1. E.Balagurusamy “ Object Oriented Programming with C++”, TMH 2/e
2. Mastering C++ A.R.Venugopal, Rajkumar, T. Ravishanker, TMH
3. E. Balagurusamy, “Programming with Java – A primer”, Second Edition, Tata McGraw Hill Publishing Company, Delhi, 2002.

REFERENCE BOOKS:

1. Stefan Bjornander, 2016. C++ Windows Programming, Published by Packt Publishing Ltd.
2. Herbert Schildt, “The complete Reference – Java 2”, Fifth Edition, Tata McGraw Hill Publishing Company, Delhi, 2002.

WEBSITES:

1. www.programmingsimplified.com
2. <https://nptel.ac.in/courses/106/105/106105171>
3. www.programiz.com/cpp-programming
4. www.cplusplus.com

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	3	-	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	-	-	3	-	2	2	-	-	-	-	-	-	-	-	-	-
Average	2	-	1	3	2	2	2	-	-	-	-	-	-	-	-	2	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- Understand the fundamental concepts of data structures.
- Demonstrate stacks, queues and linked lists.
- Learn tree data structures, and terminologies.
- Understand the fundamental concepts and terminology related to graphs.
- Classify sorting, searching and hashing algorithms.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Classify Algorithms and Data Structures.	Understand
CO2	Demonstrate about Queues and linked lists.	Understand
CO3	Experiment with Tree Data Structures and various applications.	Apply
CO4	Discover Graph Concepts and Terminology.	Analyze
CO5	Distinguish various sorting algorithms and Hashing Techniques.	Analyze

UNIT - I

10 HOURS

Introduction-Mathematical Background-Process of Analysis-Calculation of Storage Complexity- Calculation of Time Complexity-Abstract Data Types – List – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists.

UNIT - II**10 HOURS**

Stack Introduction – Operations – Applications – Evaluating arithmetic expressions- Conversion of Infix to postfix expression – Queue Introduction – Operations – Circular Queue – Priority Queue – deQueue – applications of queues.

UNIT - III**10 HOURS**

Tree – Introduction-Tree traversals – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees- AVL Trees – B-Tree – B+ Tree – Heap – Applications of heap.

UNIT - IV**09 HOURS**

Graphs Definition – Representation of Graph – Types of graph – Breadth-first traversal – Depth-first traversal – Topological Sort – Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT - V**09 HOURS**

Searching- Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Shell sort – Radix sort-Heap Sort-Quick Sort. Hashing- Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TOTAL: 48 HOURS**TEXT BOOKS:**

1. Salaria, R. S. (2018). *Data Structures and Algorithms Using C* (5th ed.). Khanna Publishing.
2. Thareja, R. (2014). *Data Structures Using C* (3rd ed.). Oxford University Press.
3. Weiss, M. A. (2012). *Data Structures and Algorithm Analysis in Java* (3rd ed.). Pearson Education.

REFERENCE BOOKS:

1. Goodrich, M., & Tamassia, R. (2014). *Data Structures and Algorithms in Java* (6th ed.). Wiley.
2. Cormen, T. H., Leiserson, C. E., Rivest, R. L., & Stein, C. (2022). *Introduction to Algorithms* (4th ed.). McGraw-Hill.
3. Sahni, S. (2011). *Data Structures, Algorithms, and Applications in C++* (2nd ed.). Universities Press.

WEBSITES:

1. http://en.wikipedia.org/wiki/Data_structure
2. <http://www.cs.sunysb.edu/~skiena/214/lectures/>
3. www.amazon.com/Teach-Yourself-Structures-Algorithms

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO3	3	-	2	3	-	-	-	-	2	-	-	-	-	-	-	-	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	3	-	2	3	2	-	-	-	2	-	-	-	-	-	-	3	3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Understanding of basic algebra and calculus

COURSE OBJECTIVES(CO):

- To learn the basic concepts of logical connectives, sets, functions, and relations.
- To understand permutation and combination, mathematical induction, and linear difference equations.
- To know the fundamental definitions and concepts of graph theory, including paths, circuits, and trees.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Interpret logical connectives and truth tables in well-formed formulas.	Understand
CO2	Explain the basic concepts of set theory and operations on sets.	Understand
CO3	Apply permutation and combination techniques to solve counting problems.	Apply
CO4	Solve linear recurrence relations using the characteristic root method and generating functions.	Apply
CO5	Define basic terminology and concepts in graph theory.	Understand

UNIT - I PREPOSITIONAL LOGIC

10 HOURS

Propositions - Truth tables - Logical connectives - Well-formed Formulas - Demorgan's Law - Tautologies and contradictions - PDNF and PCNF – Equivalences - Inference theory - Rules of universal specification and generalization.

UNIT - II SETS

10 HOURS

Introduction – Basic concepts of set theory – Operations on sets – Venn diagram - Relations - Properties

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO3	3	-	2	3	-	-	-	-	2	-	-	-	-	-	-	-	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	3	-	2	3	2	-	-	-	2	-	-	-	-	-	-	3	3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- Understand the fundamental concepts of data structures.
- Demonstrate stacks, queues and linked lists.
- Learn tree data structures, and terminologies.
- Understand the fundamental concepts and terminology related to graphs.
- Classify sorting, searching and hashing algorithms.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Classify Algorithms and Data Structures.	Understand
CO2	Demonstrate about Queues and linked lists.	Understand
CO3	Experiment with Tree Data Structures and various applications.	Apply
CO4	Discover Graph Concepts and Terminology.	Analyze
CO5	Distinguish various sorting algorithms and Hashing Techniques.	Analyze

List of Programs

48 HOURS

1. Write a Python program to implement bubble sort, selection sort and insertion sort.
2. Write a Python program to implement merge sort, quick sort.
3. Write a Python program on linear search and binary search.

4. Write a Python program to implement Singly Linked List.
5. Write a Python program to implement Doubly Linked List.
6. Write a Python program to implement Circular Linked List.
7. Write a Python programs to implement stacks using arrays and linked lists.
8. Write a Python programs to implement queues using arrays and linked lists.
9. Write a Python program to perform Binary Tree traversal operations.
10. Write a Python programs to perform Binary search tree operations.
11. Write a Python program to Travers in a graph using Depth first search.
12. Write a Python program to Travers in a graph using breadth first search.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
CO3	3	-	2	3	-	-	-	-	2	-	-	-	-	-	-	-	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	2	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Average	3	-	2	3	2	-	-	-	2	-	-	-	-	-	-	3	3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Student should know about fundamentals of environment.

COURSE OBJECTIVES(CO):

- To create awareness about structure and functions of various ecosystems.
- To develop an attitude of concern for the natural resources availability and its environment protection.
- To learn about the environment, resources available, biodiversity and its conservation.

COURSE OUTCOMES(COs) :

On completion of the course, students are able to

COs	Course Outcomes	Blooms Level
CO1	Define the structure and functions of various ecosystems	Remember
CO2	Learn the ethical, cross-cultural, and historical context of natural resources and the methods for conservation	Understand
CO3	Predict current scenarios and find ways for the protection and betterment of habitat	Analyze
CO4	Analyze the interactions between social and environmental problems	Apply
CO5	Develop systems concepts and methodologies to analyze and understand interactions between social and Environmental processes	Create

UNIT - I INTRODUCTION - ENVIRONMENTAL STUDIES & ECOSYSTEMS 5 HOURS

Environment Definition, Scope and Importance; Ecosystem, Structure, classification, and functions of ecosystem. Energy flow, Food chains and food webs, Ecological succession. Forest ecosystem, Grassland Ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT - II NATURAL RESOURCES - RENEWABLE AND NON-RENEWABLE RESOURCES 5 HOURS

Natural resources - Renewable and Non-renewable resources. Land resources, Land degradation, desertification. Forest resources – Deforestation: Causes and impacts due to mining. Water resources- Use and over-exploitation of surface and groundwater.

UNIT - III BIODIVERSITY AND ITS CONSERVATION

5 HOURS

Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity. Values of Biodiversity - Ecological, economic, social, ethical, aesthetic value. Bio-geographical classification of India. Hot-spots of biodiversity. Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.

UNIT - IV ENVIRONMENTAL POLLUTION

4 HOURS

Definition, causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution. Nuclear hazards and human health risks.

UNIT - V SOCIAL ISSUES AND THE ENVIRONMENT

5 HOURS

Concept of sustainability and sustainable development. Climate change, global warming, ozone layer depletion, acid rain and its impacts on human communities and agriculture. Environment Laws (Environment Protection Act, Air Act, Water Act, Wildlife Protection Act, Forest Conservation Act).

TOTAL: 24 HOURS

TEXT BOOKS:

1. Anonymous. (2004). *A Text book for Environmental Studies*, University Grants Commission and Bharat Vidypeeth Institute of Environmental Education Research, New Delhi.
2. Anubha Kaushik., and Kaushik, C.P.(2008). *Perspectives in Environmental Studies*, (3rd Edition), New Age International Pvt. Ltd. Publications, New Delhi.
3. Arvind Kumar,(2009). *A Textbook of Environmental Science*, APH Publishing Corporation, New Delhi.
4. Mishra, D.D,(2010). *Fundamental Concepts in Environmental Studies*. S. Chand & Company Pvt. Ltd., New Delhi.
5. Odum, E.P., Odum, H.T. and Andrews, J. (1971). *Fundamentals of Ecology*, Philadelphia: Saunders.
6. Sing, J.S., Sing. S.P. and Gupta, S.R.(2014). *Ecology, Environmental Science and Conservation*, S. Chand & Publishing Company, New Delhi.
7. Tripathy. S.N., and Sunakar Panda. (2011). *Fundamentals of Environmental Studies*, (3rd Edition), Vrianda Publications Private Ltd, New Delhi.
8. Uberoi, N.K. (2010). *Environmental Studies*, (2nd Edition), Excel Books Publications, New Delhi.

REFERENCE BOOKS:

1. Botkin., and Keller, (2014). *Environmental Science: Earth as a Living Planet.*(9th Edition), Wiley
2. Rajagopalan, R. (2016). *Environmental Studies: From Crisis to Cure*, Oxford University Press.
3. Singh, M.P., Singh, B.S., and Soma, S. Dey,(2004). *Conservation of Biodiversity and Natural Resources*, Daya Publishing House, New Delhi.
4. Verma, P.S., and Agarwal V.K(2016). *Environmental Biology (Principles of Ecology)*. S. Chand and Company Ltd, New Delhi.
5. Bruce Rittmann and Perry Mc Carty (2020), *Environmental Biotechnology: Principles and Applications*, (2nd Edition.)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO2	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO3	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO4	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
CO5	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2
Average	3	-	-	-	-	-	-	2	2	-	2	2	2	-	2	2	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

பாடத்திட்டப் பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்; திறனாய்வு நோக்கை மேம்படுத்துதல்.
- இலக்கியங்களின் வழி மனித வாழ்வியலை உணர்த்துதல்.
- இன்புறுத்தல் மற்றும் அறிவுறுத்தல் நிலைகளில் இலக்கியங்களின் பங்களிப்பை உணர்த்துதல்.
- இளைய தலைமுறையினருக்கு அற உணர்வு மற்றும் வாழ்வியல் மதிப்புகளை அறிவுறுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- இந்தியக் குடியரிமைப்பணி முதலான போட்டித் தேர்வுகளில் இடம்பெறுகின்ற, தமிழ் இலக்கிய வரலாறு குறித்த முழுமையான அறிமுகத்தை அடைதல்.
- தொல்லியல், கல்வெட்டியல் மற்றும் ஓலைச்சுவடியியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வு மனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- 'அறிவியல் தமிழ்'; 'இணையத் தமிழ்' போன்ற தமிழின் வளர்ச்சித் துறைகள் சார்ந்த திறன் மேம்பாடு பெற்றிருத்தல்.
- வேலைவாய்ப்புக்குரிய வகையில் படைப்பாக்கத்திறன் முதலான மொழி ஆளுமை பெற்றிருத்தல்;
- சமூக வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக உள்ள இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.

தாள்கள் வரிசையும் தேர்வுச் செயல் திட்டமும்**பகுதி-I தமிழ்****இளநிலைப்பட்ட அறிவியல் மற்றும் கலையியல் வகுப்புகள்**

பருவம்	தாள்	கற்பிக்கும் நேரம்/வாரம்	தேர்வு மணிகள்	மதிப்பெண் அகமதிப்பீடு/பருவ எழுத்துத் தேர்வு	மொத்தம்	மதிப்புப் புள்ளிகள்
மூன்று	III	4	3	40 / 60	100	3

போட்டித் தேர்வு நோக்கில் தமிழிலக்கியங்கள்

அலகு - 1

அற இலக்கியம்

10 மணிநேரம்

- திருக்குறள் - தெரிந்து தெளிதல் - கூடா நட்பு.
- நாலடியார்** - பெரியாரைப் பிழையாமை - (பாடல் 161 முதல் 165 வரை பொறுப்பர் என்றெண்ணி, பொன்னே கொடுத்தும், அவமதிப்பும், விரிநிற நாகம், எம்மை அறிந்திலீர்)
- பழமொழி நானூறு** - (பாடல் 151 முதல் 155 வரை - (வேளாண்மை செய்து, ஒன்றால் சிறிதால், இனி யாரும் இல்லாதார், தற்றுக்கி, வீங்குதோள்)
- இனியவை நாற்பது** - (பாடல் 31 முதல் 35 வரை) - (அடைந்தார் துயர்கூறா, கற்றறிந்தார் கூறும், ஊர்முனியா, எல்லிப் பொழுது, ஒற்றினான் ஒற்றி)
- சிறுபஞ்சமூலம்** - பூவாது காய்க்கும் (20) - பூத்தாலும் காயா மரம் உள (21).
- ஏலாதி** (1 முதல் 5 பாடல்கள் வரை - சென்ற புகழ், கொலை புரியான், தவம் எளிது, இடர் தீர்த்தல், தனக்கு என்னும்)
- மூதுரை** - (11 முதல் 15 வரை) - (பண்டு முளைப்பது, மடல் பெரிது, கவையாகி கொம்பாகி, காண மயிலாட, வேங்கை வரிப்புலி) முதலான பாடல்களைத் திறனாய்தல்.

அலகு - 2

காப்பியங்கள்

08 மணிநேரம்

- ஐம்பெருங்காப்பியங்கள்
- சிலப்பதிகார வழக்குரைகாதை
- ஐஞ்சிறு காப்பியங்கள்
- சூளாமணி அரசியற் சருக்கம்
- பிற்கால இலக்கியங்கள் (பாரதசக்தி மகாகாவியம், இராவண காவியம்)

சிறுநிலக்கியங்கள்

- குற்றாலக்குறவஞ்சி - பிள்ளைத்தமிழ் - பரணி - தூது - உலா முதலான இலக்கியங்களைத் திறனாய்தல்.

அலகு - 3

தமிழின் தொன்மை

தமிழ் வளர்த்த சான்றோர்

10 மணிநேரம்

- திராவிடமொழிகள் தொடர்பான செய்திகள்
- உ.வே.சாமிநாதர் - தெ.பொ.மீனாட்சி சுந்தரனார் - சி. இலக்குவனார்
- ஆகியோரின் தமிழ்ப்பணி - தேவநேயப்பாவாணர் - அகரமுதலி - பாவலரேறு பெருஞ்சித்திரனார் - ஜி.யு.போப் - வீரமாமுனிவர் ஆகியோரின் தமிழ்த்தொண்டு.

அலகு - 4

தமிழ்வளர்த்த சான்றோர்

- மகாகவி பாரதியார் - பாவேந்தர் பாரதிதாசன் - கவியரசு கண்ணதாசன் - பட்டுக்கோட்டை கல்யாணசுந்தரனார் - கவிஞர் முடியரசன் - நாமக்கல் கவிஞர் - சிலம்புச் செல்வர் ம.பொ.சிவஞானம் ஆகியோரின் தமிழ்ப்பணி - சாகித்ய அகாதெமி விருது பெற்ற இலக்கியங்கள்.

10 மணிநேரம்

அலகு - 5

10 மணிநேரம்

கடிதப்பயிற்சி

- 1. நண்பனுக்குப் பாராட்டுக் கடிதம்

2. தமிழ் மன்ற நிகழ்வை நாளிதழில் வெளியிட வேண்டி
பதிப்பாசிரியருக்கு விண்ணப்பம்

3. கருத்தரங்கப் பங்கேற்பிற்கான அனுமதி வேண்டி விண்ணப்பம்

4. வேலை வேண்டி விண்ணப்பம்

இலக்கணம்

- எழுத்து – குறில், நெடில் வேறுபாடு – லகர, ளகர, ழகர வேறுபாடு –
னகர, ணகர வேறுபாடு - ரகர, றகர வேறுபாடு அறிதல்.
பேச்சு வழக்குத் தொடரிலுள்ள பிழை திருத்தம் –
(எ.கா.) நேத்து மழ பேஞ்சுது – நேற்று மழை பெய்தது.

மொத்த மணிநேரம் - 48

TEXT BOOK T1 - கற்பகச் சோலை – தமிழ்ப்பாட நூல், இலக்கிய இன்பம்,
தமிழ்த்துறை

வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் – 21.

பார்வை நூல்கள்

R1- தமிழ் இலக்கிய வரலாறு, முனைவர் கா.கோ. வேங்கடராமன், கலையக
வெளியீடு,

நாமக்கல்.

R2 - வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, முனைவர் பாக்யமேரி,
பூவேந்தன்

பதிப்பகம், சீனிவாசா சாலை, மயிலாப்பூர், சென்னை.

இணையதளம்

W1-www.tvu.org.in

W2- www.maduraitamilproject.com

இதழ்கள்

J1- International Research Journal of Indian Literature, irjil.in

J2 - International Tamil Research Journal, iorpress.in

வினாத்தாள் கட்டமைப்பு

இடைத்தேர்வு - மொத்த மதிப்பெண்கள் 60

பகுதி – அ (இரு மதிப்பெண் வினாக்கள்) $6 \times 2 = 12$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – ஆ (ஆறு மதிப்பெண் வினாக்கள்) $3 \times 6 = 18$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – இ (பத்து மதிப்பெண் வினாக்கள்) $3 \times 10 = 30$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பருவத்தேர்வு - மொத்த மதிப்பெண்கள் 100

பகுதி – அ (இரு மதிப்பெண் வினாக்கள்) $10 \times 2 = 20$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – ஆ (ஆறு மதிப்பெண் வினாக்கள்) $5 \times 6 = 30$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – இ (பத்து மதிப்பெண் வினாக்கள்) 5X 10=50 (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

CO, PO, PSO Mapping

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Bachelor of Computer Applications

2025-2026

Semester III

25LHU301G

Language III: Hindi III

4H - 3C

Instruction Hours/week: L:4 T:0 P:0

Marks: Internal:40 External:60 Total:100

End Semester Exam: 3 Hours

PREREQUISITE:

Not Required

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

COURSE OBJECTIVES(CO):

- Knowledge of contemporary drama contents of Hindi literature
- Learn novels and its techniques. The ability to read novels and express criticism about it and the ability to express social thoughts will improve
- There will also be litigation messages in Hindi and news on speech techniques

COURSE OUTCOMES(COs):

- Develop an interest in the appreciation of literature.
- Discuss and respond to content of a reading passage.

- Learning the literacy knowledge of Hindi specially reading and writing .
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature

UNIT-I	a) Story – Bade Ghar Ki Beti b) Hindi Bhasha Ka Vikas c) Novel – Ramnath, Jalpa d) Letter Writing –Personal Letter	9HOURS
UNIT-II	a) Story – Puraskar b) Kaal Vibhajan , Char Prakar c) Ramesh Babu ,Devdeen d) Letter Writing – Leave Letter	9HOURS
UNIT-III	a) Story – Usne Kaha Tha b) Literature – Adhikaal c) Indhubhooshan, Rathna, Johra d) Letter Writing – Letter for the Publisher	10HOURS
UNIT-IV	a) Story – Paanchminte b) Poorva Madhya Kaal c) Manibhooshan, Dhayanath, Rameshwari d) Letter Writing – Application for job	10HOURS
UNIT-V	a) Story – kafan b) Reethi Kaal, Adhunik Kaal c) Dheen Dhayal, Manaki, d) Letter Writing – Complaint Letter	10 HOURS

TOTAL: 48 HOURS

REFERENCE BOOKS

1. Hindi Prachar Sabha D.B, (2003). Kahani Manjari, T.Nagar, Chennai - 600017.
2. Sharma, R. A., (1972). Hindi Sahithya ka Saral Ithihas, History of Hindi, Vinoth Pusthak Mandir, Aagra - 02.
3. Premchandh, (2013). Gaban, Rajkamal Prakashan, New Delhi - 110002.
4. Sharan,, (2004). Sumitha Hindi Nibandh Aur Pathra Lekhan, Kalda Publication, Mukhar Ji Nagar, Delhi - 09.

CO, PO, PSO Mapping

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

COURSE OBJECTIVE:(CO)

- May have knowledge of the contents of primitive poetry Learn about contemporary poetry and its techniques.
- Interest in reading poetry and the ability to express social thoughts will improve
- This will help you to understand the basics of Malayalam Poetry and to understand Malayalam literature properly

COURSE OUTCOME: (COs)

- Get a basic knowledge of the history of Malayalam literature.
- Enhances the art and taste of Malayalam literary works
- Literary genres can be learned
- Create more to read and enjoy Malayalam poetry
- Get the basic Knowledge of poetry techniques

Unit No	MALAYALAM - III	Hours
I	Poetry – Chintha vishtayaya Seetha	10
II	Poetry – Chintha vishtayaya Seetha	10
III	Poetry – Mrugasikshakan- (Murgasikshakan,Kausalya,Varavu,Vittupoku Ekalavyan,Mazha) 6 poetries	10
IV	Poetry – Mrugasikshakan-(Kayal,Karkkadakam,Bhagavatham,Vazhivakkile naikutty,Edavelayil oru nimisham,Verumoru kathu) 6 poetries	09
V	Poetry – Aayisha	09
	TOTAL	48

Text Books:

1. Kumaranasan,(1919) *Chinthavishtayaya Seetha*, Kerala Book Store Publishers. Kottayam
2. Vijayalakshmi, (2017) *Mrugasikshakan*, DC Books, Kottayam
3. Vayalar Rama varma,(1903) *Aayisha*, Kerala Book Store Publishers, Kerala

Reference Books:

1. Dr..Leelavathi M ,(2015),Kavitha SahithyaCharitram,Kerala SahithyaAcademy,Trichur
2. Dr..Leelavathi M ,(2023),Kavitha Dwani,D.C.Books, Kottayam
3. Dr..George K.M,(2013),Aadhunika SahithyacharithramPrasthanangalilude,D.C.Books, Kottayam
4. Chummar T.M,(1936),Padya SahithyaCharithram,Kerala SahithyaAcademy,Trichur

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1- Low, 2 - Medium, 3 - High, '-' - No Correlation

COURSE OBJECTIVES(CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities of the students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES(COs):

- **Critical Thinking:** Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving:** Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication:** Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship:** Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development.

UNIT-I**10 HOURS**

History of Sanskrit Drama and its origin.

UNIT – II**10 HOURS**

Important Sanskrit Dramas and important authors.

UNIT – III**10 HOURS**

Text Prescribed: “Dutavakyam” of Bhasa, (First half)

UNIT – IV

09 HOURS

Text Prescribed: “Dutavakyam” of Bhasa, (Second half)

UNIT – V

Translation: From the known passages of the above text.

09 HOURS

TOTAL: 48 HOURS

Drama text book available at:

1. *Dutavakyam of Bhasa*, (2017). R.S. Vadhyar and Sons, Palghat, Kerala

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1- Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES (CO):

The objectives of this course are

- To enable students to recognize native accent and usage of French language.
- To help students to become autonomous and self-directed French language learners.
- To produce entrepreneurs among students by making them French language trainers and take communicative French to schools and colleges around.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify new words by employing vocabulary building techniques.	Apply
CO2	Build correct sentence structures and grammatical patterns in oral and written communication	Apply
CO3	develop the ability to speak French language with the way of pronunciation.	Understand
CO4	Follow leadership, work ethics and management principles	Analyze
CO5	express values and skills gained through effective communication to other disciplines.	Analyze

Unite – I

9 HOURS

- a) Leçon – Vivre la ville,, Visiter une ville
- b) Communication - Indiquer le chemin
- c) Grammaire - La comparaison, Les prépositions avec les noms géographiques, Les pronoms personnels COI
- d) Lexique – La ville, Les lieux de la ville, Les transports

e) Culture – Le français : une ouverture sur le monde

Unité – II

9 HOURS

- a. Leçon -• On vend ou on garde ?
- b. Communication -Demander des renseignements touristiques
- c. Grammaire - Le pronom y (le lieu), La position des pronoms complémentsLes verbes du premier groupe en -ger et -cer,
- d. Les verbes ouvrir et accueillir
- e. Lexique - Les points cardinaux,Les prépositions de lieu (2)
- f. Culture –Le français : une ouverture sur le monde

Unité – III

10 HOURS

- a. Leçon
- b. Communication- permettre, défendre.
- c. Grammaire -La formation du pluriel (2)
- d. Les adjectifs de couleur,Les adjectifs beau, nouveau, vieux
- e. Lexique - Les couleurs, Les formes,Les me
- f. culture – les grandes fleuves en Français.

Unité – IV

10 HOURS

- a. Leçon – Félicitations !
- b. Communication - Décrire un objet
- c. Grammaire - Les pronoms relatifs qui et que,
- d. L'imparfait, Les verbes connaître, écrire, mettre et vendre
- e. Lexique – Les mesures, L'informatique
- f. DIRE, LIRE, ECRIRE , Les sons [E] / [O] / [Œ]
- g. Culture –Les lieux de la ville.

Unité - V

10 HOURS

- a. Leçon -En voyage !
- b. Communication -• Présenter ses vœux, Faire une réservation
- c. Grammaire - Les pronoms démonstratifs,La question avec Inversion,Les adverbes de manière,
- d. Lexique -Les voyages,L'aéroport et l'avion,Les fêtes
- e. Culture –Noël

TOTAL: 48 HOURS

REFERENCE BOOKS:

1. Marie-Noëlle Cocton, 2015, *Saison 1: méthode de français*, Volume 89, Number 2, Johns Hopkins University Press, Difier Paris.
2. Marion Alcaraz, Dorothée Escoufier, Camille Gomy, Mathilde Landier, Francine Quéméner, Delphine Ripaud, 2014, *Saison 1- Cahier d'activites*, Dider, Paris.
3. Anne Akvüz, Bernadette Bazelle-Shahmaei, Joëlle Bonenfant, Marie-Françoise Gliemann, 24 Aug. 2005, *LES 500 EXERCICES DE GRAMMAIRE AVEC CORRIGÉS*, Hachette Francais Langue Etrangere, Paris.
4. Christian Beaulieu, 2011, *Je Pratique Exercice De Grammaire A1*, French, Goyal Publishers, Paris.
5. Nathalie Bié, Philippe Santinan, April 2014, *Grammaire pour adolescents 250 exercices*, French, CLE INTERNATIONAL, Paris.

WEBSITES :

1. <http://enseigner.tv5monde.com/>
2. [bonjourdumonde.com /exercices/contenu/le – francais-du- tourisme.html](http://bonjourdumonde.com/exercices/contenu/le-francais-du-tourisme.html)
3. <http://www.bonjurdefrance.com/>
4. <https://www.lepointdufle.net/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Low, 2 - Medium, 3 - High, '-' - No Correlation

1 -

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

- To improve the ability to comprehend and interpret spoken information accurately.
- To cultivate effective communication for various professional and personal scenarios.
- To develop student entrepreneurs by training them as English language instructors and promoting communicative English in schools and colleges.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify new words by employing vocabulary building techniques.	Remember
CO2	Build correct sentence structures and grammatical patterns in oral and written communication	Apply
CO3	Develop the ability to speak English language with the correct pronunciation.	Apply
CO4	Follow leadership, work ethics and management principles	Understand
CO5	express values and skills gained through effective communication to other disciplines.	Understand

UNIT - I

8 HOURS

LISTENING: Listening Comprehension - Listening for Specific Information - Interpreting Charts and Diagrams

UNIT - II

7 HOURS

SPEAKING: Essentials of effective Communication - **Telephone Skills:** Understanding Telephone Conversation-Handling Calls - Leaving Messages - Making Requests - Giving Instructions and Orders.

UNIT - III

7 HOURS

READING: Reading with a purpose-Skimming and Scanning - Locating Main Points - Reading Critically - Sequencing of Sentences - Reading Comprehension.

7 HOURS

WRITING: Descriptive and Narrative-Safety Instructions - Suggestions - Expansion of Abbreviations-Spellings Rules - Translation - Translating Short Sentences and Passages from English to Tamil.

7 HOURS

VOCABULARY: Synonyms-Antonyms - Prefixes - Suffixes - Idioms - Different Types of English - Homonyms and Homophones (British and American)

TOTAL: 36 HOURS

TEXT BOOK:

1. Board of Editors (2024). Proficiency in Communication I. Karpagam Academy of Higher Education

REFERENCE BOOKS:

1. Martin's, St (2013). *Oxford Handbook of Writing: Handbook of Writing*. Cambridge University Press.
2. Wren & Martin, (2008). *High School English Grammar & Composition*, S.Chand & Company Ltd,Board of Editors,
3. Krashen, Stephen D (1982). *Principles and Practice in Second Language Acquisition*, New York:Pergamon Press

WEB SITES:

1. <https://www.scribbr.com/>
2. <https://www.quora.com/>

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO 12	PO13	PO14	PO 15	PSO 1	PSO 2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	3	-	2	-												

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Knowledge in computer language.

COURSE OBJECTIVES(CO):

- Provide knowledge about Operating Systems, including process management techniques and memory management.
- Teach concepts related to file organization and virtual memory management.
- Analyze operating system production, security, and their practical applications.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the operating systems objectives, function, structure, components and services.	Understanding
CO2	Understand the various process scheduling algorithms techniques	Understanding
CO3	Understand the various memory management techniques	Understanding
CO4	Apply and implement the file organization	Applying
CO5	Analyze the concepts of production and security	Analyzing

UNIT I INTRODUCTION

12 HOURS

Introduction to Operating System: Introduction, Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines.

UNIT II PROCESS MANAGEMENT

12 HOURS

Process Management: Processes: Process concept, Process scheduling, Co-operating processes, Operations on processes, Inter process communication, Communication in client-server systems. **Threads:** Introduction to Threads, Single and Multi-threaded processes and its benefits, User and Kernel threads, Multithreading models, Threading issues.

CPU Scheduling :Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-time Scheduling, Algorithm Evaluation, Process Scheduling Models.

Process Synchronization : Mutual Exclusion, Critical –section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions

Deadlocks: System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock

UNIT III MEMORY MANAGEMENT

12 HOURS

Memory Management: Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging.

Virtual Management: Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, Operating System Examples, Page size and other considerations, Demand segmentation.

UNIT IV FILE ORGANIZATION

12 HOURS

Storage Management: File-System Interface: File concept, Access Methods, Directory structure, File- system Mounting, File sharing, Protection and consistency semantics

File-System Implementation: File-System structure, File-System Implementations, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery

Disk Management: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation

UNIT V PRODUCTION AND SECURITY

12 HOURS

Protection and Security: Protection: Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Capability- Based Systems, Language-Based Protection Security: Security Problem, User Authentication, One –Time Password, Program Threats, System Threats, Cryptography, Computer – Security Classifications.

TOTAL: 60 HOURS

TEXT BOOKS:

1. Khurana, R. (2023). *Operating System* (2nd ed.). Vikas Publishing.
2. Silberschatz, A., Galvin, P. B., & Gagne, G. (2023). *Operating System Concepts* (9th ed.). Techno Series
3. Silberschatz, A., Peterson, J. L., & Galvin, P. B. (2020). *Operating system concepts* (10th ed.). John Wiley & Sons.

LIST OF PROGRAMS

TOTAL: 48 Hours

- 1 Program to perform process creation
- 2 Program to implement process scheduling – FCFS, SJFS, round robin
- 3 Program to implement inter- process communication using pipes
- 4 Program to perform process synchronization
- 5 Implement producer and consumer problem using semaphores
- 6 Program to perform memory management scheme using first fit and best fit

- 7 Implement a Deadlock Detection Algorithm
- 8 Implement a Paging Technique of Memory Management
- 9 Basics of Linux commands
- 10 Write Simple programs using Shell

REFERENCE BOOKS:

1. Deitel, H. M., Deitel, P. J., & Choffnes, D. R. (2023). *Operating System* (3rd ed.). Pearson Education.
2. Bhatt, P. C. P. (2023). *An Introduction to Operating Systems: Concepts and Practice (GNU/Linux and Windows)* (5th ed.). PHI Learning

WEBSITES:

1. <https://www.geeksforgeeks.org/operating-systems/>
2. https://www.tutorialspoint.com/operating_system/index.htm
3. <https://www.javatpoint.com/operating-system>
4. <https://www.studytonight.com/operating-system/>
5. <https://www.guru99.com/os-tutorial.html>

CO,PO,PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	1	-	3	-	-	-	-	-	-	-	-	-	-	1	-
CO2	1	-	1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
CO3	-	-	1	3	3	-	-	-	-	-	-	-	-	-	-	1	-
CO4	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	1	-
CO5	-	-	-	3	3	1	-	-	-	-	-	-	1	-	-	1	-
Average	1	-	1	3	3	1	-	-	-	-	-	-	1	-	-	1	-

1- Low, 2 - Medium, 3 - High, '-' - No Correlation.

PREREQUISITE:

- Basic understanding of Networks Concept.

COURSE OBJECTIVES(CO):

- Understand the basics of computer networks and the data link layer.
- Learn about protocols, routers, cellular networks, and routing algorithms for the network layer.
- Analyze the application layer concepts and network security.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

Cos	Course Outcomes	Blooms Level
CO1	Understand the fundamentals concepts of computer network	Understand
CO2	Understand the DLL services and different protocol uses in computer networks	Understand
CO3	Understand the uses of various protocols and Connection devices	Understand
CO4	Analyze the network layer and transport layer services	Analyze
CO5	Analyze the application layer and network security in trouble shooting the network	Analyze

UNIT I INTRODUCTION TO COMPUTER NETWORK**10 HOURS**

Networking Fundamentals: Basics of Networking, Networking Terms- Host, Workstations, Server, Client, Node, Advantages of Networking, Types of Networks, Network Topologies, Types of Transmission Media- Guided and Unguided, Communication Modes. Data communication protocols and standards, Network models – OSI model- layers and their functions, TCP / IP protocol suite.

UNIT II DATA LINK LAYER**8 HOURS**

Data link layer: Error Detection and Correction, Framing, flow and error control, Protocols -Noiseless channels (Simplest, Stop and Wait) and Noisy channels (Stop and Wait and Piggy Backing), PPP.

UNIT III MULTIPLE ACCESS PROTOCOLS**8 HOURS**

Multiple Access Protocols, Random Access – ALOHA, CSMA. Connecting Devices - Repeater, Modem, Hub, Switch, Bridge, Router, Gateway. Wired LANs - IEEE standards, wireless LANs - Bluetooth, Cellular Telephony, Satellite Networks, SONET.

UNIT IV NETWORK LAYER AND TRANSPORT LAYER**10 HOURS**

Network layer and Transport layer: Logical addressing – IPv4 addressing, IPv4 address Classes, Subnet Mask, Public & Private IP Address and IPV6 addressing, Address mapping-ICMP, IGMP. Connectionless and Connection-Oriented Services: Transport layer services, UDP and TCP. Congestion Control, Quality of Service. Introduction to Routing and Switching concepts.

UNIT V APPLICATION LAYER

12 HOURS

Application Layer: DHCP, DNS, HTTP / HTTPS, FTP, TFTP, SFTP, Telnet, Email: SMTP, POP3 / IMAP. Virtual Private Networking, Network security: Common Threats – Firewalls (advantages and disadvantages), Digital Signature, Troubleshooting the network.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Kizza, J. M. (2024). *Computer Network Security and Cyber Ethics* (4th ed.). .
2. Kurose, J., & Ross, K. (2023). *Computer Networking: A Top-Down Approach* (8th ed.).
3. Odom, W. (2023). *Computer Networking First-Step*.
4. Tanenbaum, A. S., Feamster, N., & Wetherall, D. J. (2021). *Computer Networks* (6th ed.). Pearson Education

REFERENCE BOOKS:

1. Tanenbaum, A. S. (2012). *Computer networks* (5th ed.). PHI Learning.
2. Jain, S., Jain, M., Pillai, V., & Kratika. (2010). *A level data communication & network technologies*. BPB Publications.

WEBSITES:

1. <https://www.geeksforgeeks.org/computer-network-tutorials/>
2. <https://www.javatpoint.com/computer-network-tutorial>
3. https://www.vssut.ac.in/lecture_notes/lecture1423905560.pdf
4. https://www.tutorialspoint.com/data_communication_computer_network/index.htm
5. <https://www.scaler.com/topics/computer-network/>

CO,PO,PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	3	-	3	-	-	3	-	-	-	-	-	-	-	2	-
CO2	2	-	3	-	3	-	-	3	-	-	-	-	-	-	-	2	-
CO3	2	-	3	1	3	-	-	3	-	-	-	-	-	-	-	2	-
CO4	2	-	3	1	3	-	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	3	1	3	1	-	3	-	-	-	-	-	-	-	2	-
Average	2	-	3	1	3	1	-	3	-	-	-	-	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation.

PREREQUISITE:

- Basic understanding of algebra and mathematical modeling

COURSE OBJECTIVES(CO):

- To learn the basic concepts and applications of linear programming and to impart knowledge in concepts and tools of Operations Research.
- To make the student capable of formulating the various real-life decision-making problems as Mathematical programming problems.
- To enable the practical application of operations research methods for decision-making in real-world scenarios.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the basic concepts and formulate real-world problems as a linear programming model.	Understand
CO2	Apply methods to find initial basic feasible solutions and optimal solutions for transportation problems.	Apply
CO3	Apply different queuing models and assignment problem to solve real-life problems.	Apply
CO4	List and understand the costs involved in inventory management.	Understand
CO5	Construct project networks and perform time calculations using CPM and PERT methods.	Apply

UNIT - I LINEAR PROGRAMMING

09 HOURS

Mathematical Model assumption of linear Programming – Graphical method - Principles of Simplex method- Big-M Method- Duality in LPP.

UNIT - II TRANSPORTATION MODEL

09 HOURS

Introduction – Mathematical Formulation – Finding Initial Basic Feasible Solutions – Optimum

Solution for Non degeneracy and Degeneracy Model - Unbalanced Transportation Problems and Maximization case in Transportation Problem.

UNIT - III ASSIGNMENT PROBLEM AND QUEUEING THEORY 10 HOURS

Mathematical Formulation of the Problem – Hungarian Method – Unbalanced Assignment Problem- Maximization Case in Assignment Problem - Travelling Salesman Problem.

Introduction – Characteristics of Queueing System. Problems in (M/M/1):(8/FIFO) and (M/M/1):(N/FIFO) models.

UNIT - IV INVENTORY CONTROL 10 HOURS

Introduction – Costs involved in Inventory – Deterministic EOQ Models – Purchasing Model without and with Shortage, Manufacturing Model without and with Shortage - Price Break.

UNIT - V PERT AND CPM 10 HOURS

Introduction - Network scheduling by PERT / CPM – Network and basic components – Rules of Network construction – Time calculation in Networks – CPM. PERT – PERT calculations.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Kandiswarup, P. K. Gupta and Man Mohan. (2011). *Operations Research*, 12th Revised edition, S. Chand & Sons Education Publications, New Delhi.
2. Sharma S.D. (2017). *Operations Research Theory, Methods & Applications*, Kedar Nath Ram Nath Publications, India.

REFERENCE BOOKS:

1. Hamdy A. Taha., (2017). *Operations Research-An Introduction*, Tenth Edition, published by Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
2. Prem Kumar Gupta and Hira D.S., (2014). *Operations Research*, S. Chand & Company Ltd, Ram Nagar, New Delhi.
3. Prem Kumar Gupta and Hira D.S., (2014). *Operations Research*, S. Chand & Company Ltd, Ram Nagar, New Delhi.
4. Srinivasan G., (2017). *Operations Research: Principles and Applications*, PHI, New Delhi

WEBSITES:

1. <https://youtu.be/vUMGvpsb8dc>

2. <https://youtu.be/ItOuvM2KmD4>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	1	3	-	2	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	1	3	1	2	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To learn and use network commands and socket programming.
- To learn and use simulation tools.
- To use simulation tools to analyze the performance of various network protocols

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Utilize various protocols using TCP and UDP.	Apply
CO2	Experiment with the performance of different transport layer protocols.	Apply
CO3	Organize simulation tools to analyze the performance of various network protocols.	Apply
CO4	Categorize various routing algorithms.	Analyze
CO5	Inspect error correction codes.	Analyze

LIST OF PROGRAMS		48 HOURS
1.	Write a HTTP web client program to download a web page using TCP sockets	
2.	Simulation of DNS using UDP sockets.	
3.	Write a code simulating ARP /RARP protocols.	
4.	Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.	
5.	Study of TCP/UDP performance using Simulation tool.	
6.	Simulation of Distance Vector/ Link State Routing algorithm	
7.	Performance evaluation of Routing protocols using Simulation tool	

8.	Simulation of error correction code (like CRC).
9.	Simulate and implements top and wait protocol for noisy channel.
10.	Simulate and implement go back n sliding window protocol
TEXT BOOKS:	
1.	Tanenbaum, A.S. Computer Networks, 4th Edition, PHI
2.	Godbole, A. (2007). Data Communication and Networks, TMH.
3.	Black, U. <i>Computer Networks: Protocols, Standards, and Interfaces</i> , 2nd Edition, PHI.
REFERENCE BOOKS:	
1.	Jain, S., Jain, M., Pillai, V., & Kratika. (2016). A Level Data Communication & Network Technologies, BPB Publication.
2.	Tanenbaum, A.S. (2016). Computer Networks (7th Edition), New Delhi: PHI..
WEBSITES:	
1.	http://docwiki.cisco.com/wiki/Introduction_to_WAN_Technologies
2.	www.w3schools.com/tcpip/default.asp

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	2	2	1	-	-	-	1	-	-	-	-	-	-	1	-
CO2	3	-	1	1	1	-	-	-	1	-	-	-	-	-	-	-	-
CO3	3	-	1	1	1	-	-	-	1	-	-	-	-	-	-	-	-
CO4	3	-	1	1	1	-	-	-	1	-	-	-	-	-	-	1	-
CO5	3	-	2	1	1	-	-	-	1	-	-	-	-	-	-	-	1
Average	3	-	1.4	1.2	1	-	-	-	1	-	-	-	-	-	-	1	1

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PRE-REQUISITE:

- Not required

COURSE OBJECTIVES (CO):

- To gain insights into the structures, challenges, and opportunities within communities
- To explore ethical frameworks and dilemmas related to community engagement and social responsibility
- To develop skills in monitoring, evaluating, and reporting on the outcomes of community engagement efforts to ensure effectiveness and accountability.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand the concept, ethics, and spectrum of community engagement	Understand
CO2	Recognize the significance in local community development and rural culture.	Understand
CO3	Know the rural development programs, institutions	Understand
CO4	Analyze the role of local administration in fostering community involvement and social networking.	Analyze
CO5	Develop skills in conducting community engaged research with a focus on ethics, rural distress, poverty alleviation, and disaster mitigation.	Apply

UNIT I INTRODUCTION AND PRINCIPLES

5 HOURS

Concept, Ethics and Spectrum of Community engagement, Local community, Rural culture and Practice of community engagement - Stages, Components and Principles of community development, Utility of public resources. Contributions of self-help groups

UNIT II RURAL DEVELOPMENT

5 HOURS

Rural Development Programs and Rural institutions Local Administration and Community Involvement- Social contribution of community networking, Various government schemes. Programmes of community engagement and their evaluation.

UNIT III COMMUNITY AND RESEARCH

5 HOURS

Community Engaged Research and Ethics in Community Engaged Research Rural Distress, Rural Poverty, Impact of COVID-19 on Migrant Laborers, Mitigation of Disaster.

UNIT IV DIGITAL LITERACY AND EMPOWERMENT INITIATIVES**5 HOURS**

Digital Literacy and Empowerment Initiatives –Community Training: Basic computer and internet use - Social media usage and safety: WhatsApp, Facebook, Telegram - Cyber safety and digital payments - Designing digital surveys and feedback mechanisms (Google Forms) – Data collection, analysis, and problem identification. Accessing e-governance portals (Aadhaar, DigiLocker, etc.).

UNIT V ICT FOR PROMOTING SELF-HELP GROUPS (SHGS)**4 HOURS**

ICT for Promoting Self-Help Groups (SHGs) – Digital promotion tools: simple websites, social media marketing- Online branding using simple websites and social media page – Selling products through WhatsApp Business, Amazon etc. - Digital finance and payments: UPI, BHIM, Paytm, PhonePe,– Record-keeping using spreadsheets and mobile apps.

TOTAL: 24 HOUR**TEXT BOOK:**

1. Principles of Community Engagement, (2011).2nd Edition, NIH Publication No. 11-7782.

WEBSITES:

1. <https://youtu.be/-SQK9RGBt7o>
2. https://www.uvm.edu/sites/default/files/community_engagement_handout.pdf(Community Engagement)
3. https://www.atsdr.cdc.gov/communityengagement/pce_concepts.html (Perspectives of Community)
4. <https://egyankosh.ac.in/bitstream/123456789/59002/1/Unit1.pdf> (community concepts)
5. <https://sustainingcommunity.wordpress.com/2013/07/09/ethics-and-community-engagement/>(Ethics of community engagement)
6. <https://www.preservearticles.com/sociology/what-are-the-essential-elements-of-community/4558> (Elements of Community)
7. <https://www.yourarticlelibrary.com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968> (features of rural community)
8. <https://www.mapsofindia.com/my-india/government/schemes-for-rural-development-launched-by-government-of-india> (Government programmes for rural development)
9. <https://www.yourarticlelibrary.com/sociology/rural-sociology/rural-community-top-10-characteristics-of-the-rural-community-explained/34968> (rural lifestyle)
10. <https://www.insightsonindia.com/social-justice/issues-related-to-rural-development/government-schemes-for-rural-development-in-india/> (schemes for rural development)
11. <https://www.mpgkpdf.com/2021/09/community-development-plan-in-hindi.html?m=1>
12. <https://images.app.goo.gl/sNF2HMWCuCfkqYz56>
13. <https://images.app.goo.gl/VaMNNMEs77XyPMrP7>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	-	-	3	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	2	-	-	3	-	2	1	-	2	-	-	-	-	-	-	1
CO3	3	-	2	3	-	2	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	2	-	-	2	-	1	-	3	-	-	-	-	2	-	1
CO5	3	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	2.5	2	2	3	2	2	1	-	2.5	-	-	-	-	2	-	1

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

பாடத்திட்டப் பொதுநோக்கம்

- கற்றல் வழி சிந்தனைத் திறனையும், கருத்து வெளிப்பாட்டுத் திறனையும், மேம்படுத்துதல்.
- அரசுத் தேர்வுகளுக்கு மாணவர்களை ஆயத்தமாக்குதல்; திறனாய்வு நோக்கை மேம்படுத்துதல்.
- இலக்கியங்களின் வழி மனித வாழ்வியலை உணர்த்துதல்.
- இன்புறுத்தல் மற்றும் அறிவுறுத்தல் நிலைகளில் இலக்கியங்களின் பங்களிப்பை உணர்த்துதல்.
- இளைய தலைமுறையினருக்கு அற உணர்வு மற்றும் வாழ்வியல் மதிப்புகளை அறிவுறுத்துதல்.

பாடத்திட்டப் பயன்விளைவு

- இந்தியக் குடியரிமைப்பணி முதலான போட்டித் தேர்வுகளில் இடம்பெறுகின்ற, தமிழ் இலக்கிய வரலாறு குறித்த முழுமையான அறிமுகத்தை அடைதல்.
- தொல்லியல், கல்வெட்டியல் மற்றும் ஓலைச்சுவடியியல் சார்ந்த ஆவணத் தேடலுக்குரிய ஆய்வு மனப்பான்மையுடன், இலக்கியங்களை அணுகுதல்.
- 'அறிவியல் தமிழ்' ; 'இணையத் தமிழ்' போன்ற தமிழின் வளர்ச்சித் துறைகள் சார்ந்த திறன் மேம்பாடு பெற்றிருத்தல்.
- வேலைவாய்ப்புக்குரிய வகையில் படைப்பாக்கத்திறன் முதலான மொழி ஆளுமை பெற்றிருத்தல்;
- சமூக வாழ்வியல் மதிப்புகளைப் பேணுவதற்குக் கருவியாக உள்ள இலக்கியங்களை நாடுகின்ற மனப்பான்மை வளர்ச்சி.

தாள்கள் வரிசையும் தேர்வுச் செயல் திட்டமும்

பகுதி-I தமிழ்

இளநிலைப்பட்ட அறிவியல் மற்றும் கலையியல் வகுப்புகள்

பருவம்	தாள்	கற்பிக்கும் நேரம்/வாரம்	தேர்வு மணிகள்	மதிப்பெண் அகமதிப்பீடு/பருவ எழுத்துத் தேர்வு	மொத்தம்	மதிப்புப் புள்ளிகள்
நான்கு	IV	4	3	40 / 60	100	3

தமிழக வரலாறும் பண்பாடும்

அலகு - 1 தமிழக வரலாறும் நாட்டுப்பிரிவுகளும்

10 மணிநேரம்

பழைய கற்காலம் - புதிய கற்காலம் - இரும்புக்காலம் - சங்க கால மூவேந்தர் நாடுகள் (சேர, சோழ, பாண்டியர்கள்) - பிற்கால நாட்டுப் பிரிவுகள் - பல்லவர் நாடு - நடு நாடு - தொண்டை நாடு - கொங்கு நாடு.

அலகு - 2 தமிழகத்தில் கலை இலக்கிய வளர்ச்சி

10 மணிநேரம்

காலந்தோறும் தமிழகத்தில் கட்டடக்கலை - கோயிற்கலை - கூத்துக்கலை - நாடகக்கலை - ஆடற்கலை - சிற்பக்கலை - ஓவியக்கலை வளர்ச்சி - தமிழ் வளர்ச்சிக்குப் பக்தி இலக்கியங்களின் பங்களிப்பு.

அலகு - 3 தமிழர்களின் வணிகம்

08 மணிநேரம்

சங்க கால வணிகம் - தமிழர்களின் அயல்நாட்டு வணிகத்தொடர்பு - கிரேக்கர்கள் - ரோமர்கள் - மௌரியர்களுடனான வணிகத்தொடர்பு - நாணயங்கள்.

அலகு - 4 தமிழகப் பண்பாட்டில் கொங்கு நாடு

10 மணிநேரம்

கொங்கு நாடும் அதன் வரலாறும் - அரசர்கள் - சிற்றரசர்கள் - கொங்கு நாட்டு எல்லைகள் - கொங்கு நாடும் பிற பகுதிகளும் - புலவர்கள் - இலக்கியங்கள் - பண்பாட்டுச் சிறப்புகள்.

அலகு - 5 தமிழகத் தொல்லியல் ஆய்வுக்களங்கள்

10 மணிநேரம்

அரிக்கமேடு - ஆதிச்சநல்லூர் - அழகன்குளம் - கீழடி - கொடுமணல் - கொற்கை - மயிலாடும்பாறை - கங்கை கொண்ட சோழபுரம் போன்ற ஆய்வுக்களங்களில் கிடைத்துள்ள தமிழக வரலாற்றுக் குறிப்புகள்.

மொத்த மணிநேரம் - 48

TEXT BOOK T1 - கற்பகச் சோலை - தமிழ்ப்பாட நூல், இலக்கிய இன்பம், தமிழ்த்துறை

வெளியீடு, கற்பகம் உயர்கல்விக்கழகம், கோயம்புத்தூர் - 21.

பார்வை நூல்கள்

R1- தமிழக வரலாறு மக்களும் பண்பாடும் - கே.கே.பிள்ளை - உலகத் தமிழாராய்ச்சி

நிறுவனம், தரமணி, சென்னை.

R2 - தமிழக வரலாறும் பண்பாடும் - வே.தி.செல்வம் - மணிவாசகர் பதிப்பகம், பிராட்வே, சென்னை.

இணையதளம்

W1-www.tvu.org.in

W2- www.maduraitamilproject.com

இதழ்கள்

J1- International Research Journal of Indian Literature, irjil.in

J2 - International Tamil Research Journal, iorpress.in

வினாத்தாள் கட்டமைப்பு

இடைத்தேர்வு - மொத்த மதிப்பெண்கள் 60

பகுதி - அ (இரு மதிப்பெண் வினாக்கள்) 6 X 2 = 12 (அனைத்து வினாக்களுக்கும் விடையளித்தல்)

பகுதி - ஆ (ஆறு மதிப்பெண் வினாக்கள்) 3 X 6 = 18 (அனைத்து வினாக்களுக்கும்

விடையளித்தல்)

பகுதி – இ (பத்து மதிப்பெண் வினாக்கள்) $3 \times 10 = 30$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பருவத்தேர்வு - மொத்த மதிப்பெண்கள் 100

பகுதி – அ (இரு மதிப்பெண் வினாக்கள்) $10 \times 2 = 20$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – ஆ (ஆறு மதிப்பெண் வினாக்கள்) $5 \times 6 = 30$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

பகுதி – இ (பத்து மதிப்பெண் வினாக்கள்) $5 \times 10 = 50$ (அனைத்து வினாக்களுக்கும்
விடையளித்தல்)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES(CO):

- Develop an interest in the appreciation of short stories
- Comprehend the grammatical structures and sentence making
- Understand the language and developing English to Hindi translation skill

COURSE OUTCOMES(COs):

- Learning the literacy knowledge of Hindi specially reading and writing .
- Learning the literary knowledge specially reading and understanding of Hindi short Stories
- Learning the history of Hindi literature.
- The ability to translate from Hindi to English and from English to Hindi will be improved.
- Develop a skill in spoken Hindi.

UNIT-I	a) Poetry – Lakshmanan ke Bare Me b) Bharath ka Bhagya c) Essay – Dhokha d) Translation – Lesson – 1 to 3	9 HOURS
UNIT-II	a) Poetry – Soorpanakha Ki Visheshatha b) Bahu Ki Vida c) Essay – Jabaan d) Translation– Lesson – 4 to 6	9 HOURS
UNIT-III	a) Poetry– Kavya Ke AdharPar b) Reed Ki Haddi c) Essay – Kya Janvar Bhee Sochthi Hai d) translation– Lesson – 7 to 9	10 HOURS
UNIT-IV	a) Khanda Kavya Ke Adhar Par Panchavati b) Rajputni Ka Badhala c) Essay – Shradha-Bhakthi	10 HOURS

UNIT-V

- d) Translation– Lesson – 10 to 12
- a) Kavya Ke Adhar Par Prakruthik Varnan
- b) Bheem Aur Raakshas
- c) Essay – Adhunik Nari
- d) Translation – Lesson –13 to 15

10 HOURS**TOTAL: 48 HOURS****REFERENCE BOOKS:**

- I. Gupt,M.S, (2015). Panchavati, Bharathiya Sahithya Sangrah, Kanpur - 208002, Uttar Pradesh.
- II. Hindi Prachar Sabha D.B, (2007). Adarsh Akanki, T.Nagar, Chennai - 600017, TamilNadu.
- III. Ranjan,S.D,Dr., (1987). Nibandh Nishchay, Hindi Sahithya Sammelan Prayag, 12, Sammelan Marg, Illahabadh.
- IV. Hindi Prachar Sabha D.B, (2007). Anuvadh Abhyas - III, T.Nagar, Chennai - 600017, TamilNadu.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

COURSE OBJECTIVE:(CO)

- Knowledge of contemporary drama contents of Malayalam literature
- Learn Screen play and its techniques. The ability to read drama and express criticism about it and the ability to express social thoughts will improve
- There will also be litigation messages in Malayalam and news on speech techniques Able to write articles on their own and improve their creative skills.

COURSE OUTCOME: (COs)

- Get a basic knowledge of drama
- Can read and critique Screenplay
- Create interest in art literature courses
- The hope of writing a Drama or a Screen Play
- The idea of creating new works and critique knowledge will improve.

Unit No.	MALAYALAM -IV	Hours
I	Screen Play - Perumthachan	10
II	Screenplay - Perumthachan	10
III	Drama - Saketham	10
IV	Drama - Saketham	09
V	Drama - Saaketham	09
	TOTAL	48

Text Books:

1. Vasudevan Nair M.T., (2015), *Perumthachan*, DC Books, Kerala
2. Sreekandan Nair C.N., (1974) *Saketham*, DC Books, Kerala

Reference Books:

1. Sankara Pillai G,(1980)Malayala Nataka Sahithya Charithram, Kerala Sahithya Akademi, Trissur
2. Vayala Vasudevan Pillai,(2005),Malayala Nataka Sahithya Charithram,Kerala Sahithya Akademi, Thrissur
3. SmarakaPrasanga Samithi C.J,(1963) Natakam OruPatanam, Koothattukulam Natakaroopacharcha, Kattumadam Narayanan ,NBS, Kottayam
4. Vijaykrishanan,(2024)Chalachithrasameeksha, Kerala Bhasha Institute,Current Book, Kottayam
5. Jose-K.Manual ,(2004)Cinemayude Paadangal,VisakalanavumVeekshanavum ,D C Book,Kerala

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

COURSE OBJECTIVES(CO):

- The fundamental objective of the curriculum is to impart effective science education at the undergraduate level, exposing them to recent trends and developments in the subject.
- Creating scientific temper is another major objective of this curriculum.
- Another major thrust given here is to develop an environmental concern in all activities of the students. 'Go green', the motto of the syllabus emphasizes the urgent need to conserve nature without destruction of natural resources.

COURSE OUTCOMES(COs) :

- **Critical Thinking** :Take informed actions after identifying the assumptions that frame students' thinking and actions.
- **Problem Solving**: Understand and solve problems of relevance to society to meet the specified needs using the knowledge, skills and attitudes acquired.
- **Effective Communication**: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
- **Effective Citizenship**: Demonstrate empathetic social concern and equity centered national development.
- **Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development.

UNIT-I		10 HOURS
	Introduction to Sanskrit Lyrics and erotic literature.	
UNIT – II		10 HOURS
	Devotional Literature, Important works	
UNIT – III		10 HOURS
	Krishnakarnamrita of Leelasuka (Second Section only)	
UNIT – IV		09 HOURS
	Grammar – Past tense, Declension of personal pronouns	
UNIT – V		09 HOURS
	Simple sentences from Sanskrit Self Teacher	

TOTAL: 48 HOURS

Drama text Book Available at:

- *Krishnakarnamrita of Leelasuka*, (2013). Sri Ramakrishna Mud, Mylapore, Chennai.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES (CO):

The objectives of this course are:

- To provide the students with an ability to build and enrich their communication skills.
- To help them think and write imaginatively and critically.
- To strengthen their professional skills.

COURSE OUTCOMES (COS):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	make the students proficient communicators in French.	Apply
CO2	develop learners' ability to understand French.	Understand
CO3	understand the nuances of listening, speaking and reading French.	Understand
CO4	prepare the learners to face situations with confidence and to seek employment in the modern globalized world.	Apply
CO5	build the students' ability to listen and to speak French better.	Apply

Unite – I

9 HOURS

- a) Leçon – On fait le ménage !
- b) Communication - Protester et réagir
- c) Grammaire - Le présent progressif, Les pronoms possessifs
- d) Lexique – Le logement, La maison, Les pièces
- e) Culture – Paris et ses symboles

Unite – II

9 HOURS

- a) Leçon – À propos de logement

b) Communication	-	Exprimer l'intérêt et l'indifférence	
c) Grammaire	-	Quelques adjectifs et pronoms indéfinis Les verbes lire, rompre et se plaindre	
d) Lexique	-	Meubles et équipement, Les tâches ménagères	
e) Culture	-	Les fêtes et les traditions en France	
Unité – III	-		10 HOURS
a) Leçon	-	Tous en forme ! Accidents et catastrophes	
b) Communication	-	Raconter au passé	
c) Grammaire	-	Le passé composé et l'imparfait Le passé récent, L'expression de la durée,	
d) Lexique	-	Le corps humain : l'extérieur, Le corps humain l'intérieur Les maladies et les remèdes	
e) Culture	-	La longue histoire de la Francophonie	
Unité – IV	-		10 HOURS
a) Leçon	-	Faire ses études à l'étranger	
b) Communication	-	Exprimer la peur et rassurer	
c) Grammaire	-	Les adjectifs et les pronoms indéfinis : rien personne, aucun Les verbes dire, courir et mourir	
d) Lexique	-	Les accidents, Les catastrophes naturelles	
e) Culture	-	Les jeux de la Francophonie	
Unité – V	-		10 HOURS
a) Leçon	-	Bon voyage ! La météo	
b) Communication	-	Exprimer son opinion, Parler de la météo	
c) Grammaire	-	Les pronoms démonstratifs neutres, Le futur simple, Situer dans le temps	

- | | | |
|-----------|---|--|
| d)Lexique | - | Le système scolaire,Les formalités pour partir à l'étranger La météo |
| e)Culture | - | Le français hors de France |

TOTAL:48 HOURS

REFERENCE BOOKS:

1. Marie-Noëlle Cocton, December 2015, *Saison 1: méthode de français*, Volume 89, Number 2, [Johns Hopkins University Press](http://www.jhu.edu/), Difier Paris.
2. Marion Alcaraz, Dorothée Escoufier, Camille Gomy, Mathilde Landier, Francine Quéméner, Delphine Ripaud, 2014, *Saison 1- Cahier d'activites*, Dider, Paris.
3. Anne Akvüz, Bernadette Bazelle-Shahmaei, Joëlle Bonenfant, Marie-Françoise Gliemann, 24 Aug. 2005, *LES 500 EXERCICES DE GRAMMAIRE AVEC CORRIGÉS*, Hachette Francais Langue Etrangere, Paris.
4. Anne Akyüz, Bernadette Bazelle- Shahmael, Joëlle Bonenfant, Marie-Françoise Gliemann, Les *exercices de grammaire*, *Hachette FLE*, Paris, 2005
5. Christian Beaulieu, 2011, *Je Pratique Exercice De Grammaire A1*, French, Goyal Publishers, Paris.
6. Nathalie Bié, Philippe Santinan, April 2014, *Grammaire pour adolescents 250 exercices*, French, CLE INTERNATIONAL, Paris.

WEBSITES :

1. [http:// enseigner.tv5 monde.com/](http://enseigner.tv5monde.com/)
2. [bonjourdumonde.com /exercices/contenu/le – francais-du- tourisme.html](http://bonjourdumonde.com/exercices/contenu/le-francais-du-tourisme.html)
3. <http://www.bonjurdefrance.com/>
4. <https://www.lepointdufle.net/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	2.6	2.6	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

- To provide the students with an ability to build and enrich their communication skills.
- To help them think and write imaginatively and critically.
- To strengthen their professional skills.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Make the students proficient communicators in English.	Apply
CO2	Develop learners' ability to understand English.	Understand
CO3	Understand the nuances of listening, speaking and reading English.	Understand
CO4	Prepare the learners to face situations with confidence and to seek employment in the modern globalized world.	Apply
CO5	Build the students' ability to listen and to speak English better.	Apply

UNIT – I**8 HOURS**

Concept of Communication- Barriers to Communication- Body Language-Personality Development-Etiquette and Manners-Soft Skills

UNIT – II**7 HOURS**

Listening Comprehension-Reading Comprehension-Paragraph Writing-Precis Writing-Collocation

UNIT – III**7 HOURS**

Writing-Writing Resume and Covering Letter- Types of Letter Writing-Letter Formats-E-mail Writing-Writing MoU- DictoComposition--Term Paper-Book Reviews.

UNIT - IV**7 HOURS**

Speaking-Interview Skills-Preparing Welcome address and Vote of Thanks-Compering.

UNIT - V**7 HOURS**

Punctuation Marks- Figures of Speech.

TOTAL: 36 HOURS**TEXT BOOK:**

- 1 Board of Editors (2024). *Proficiency in Communication II*, Karpagam Academy of Higher Education.

REFERENCE BOOKS:

1. Martin's, St (2013). *Oxford Handbook of Writing: Handbook of Writing*. Cambridge University Press.
2. Wren & Martin, (2008). *High School English Grammar & Composition*, S.Chand & Company Ltd, Board of Editors.
3. Krashen, Stephen D (1982). *Principles and Practice in Second Language Acquisition*. New York:Pergamon Press.

WEB SITES:

1. <https://www.skillsbuilder.org/blog/top-5-speaking-skills-for-success-in-interviews>
2. <https://www.coursera.org/articles/interviewing-skills>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	3	-	2	-												

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Not Required

COURSE OBJECTIVES (CO):

- To give a good formal foundation on the data models and E-R model.
- To introduce the concepts of basic SQL as a universal Database language.
- To have an introductory knowledge about the PL/SQL concept

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Outline the necessity of database along with various Data models	Understand
CO2	Choose the ways to work with combined table using relational model	Apply
CO3	Classify normalization techniques and organize the order of storing data	Analyze
CO4	Distinguish SQL and PL/SQL operations	Apply
CO5	Make use of the complex queries using SQL	Apply

UNIT I: INTRODUCTION AND DATABASE DESIGN MODEL

12 HOURS

Introduction: Database System Applications - View of Data - Database Architecture. Database Design and the E-R Model: Overview of the Design Process - The Entity-Relationship Model - Constraints - Removing Redundant Attributes in Entity Sets - Entity Relationship Diagrams - Extended E-R Features.

12 HOURS

UNIT II: INTRODUCTION TO SQL

Overview of SQL Query Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - DDL, DML, TCL and DCL statements - SELECT Operations Set Operations - Null Values - Aggregate Functions - Nested Sub Queries - Modification of the Database

12 HOURS

UNIT III: RELATIONAL DATABASE DESIGN

Features of Good Relational Designs - Functional Dependency - Atomic Domains and First Normal Form – Second Normal Form - Third Normal Form - Boyce-Codd Normal Form - Multivalued Dependency and Fourth Normal Form - Join Dependency and Fifth Normal Form

UNIT IV: INTERMEDIATE AND PL/ SQL **12 HOURS**

Intermediate SQL: Join Expressions - Views - Materialized Views - Transactions - Commit - Rollback – Integrity Constraints - Assertions - SQL Data Types and Schemas - Authorization. PL/SQL: Introduction to PL/SQL-Variable-Constants-Conditional Statements-Cursor-Implicit Cursors-PL/SQL Explicit Cursors - PL/SQL Procedures - PL/SQL Functions - PL/SQL Exception Handling PL/SQL Triggers

UNIT V: TRANSACTIONS AND CONCURRENCY CONTROL

12 HOURS

Transactions: Transaction Concept - A Simple Transaction Model – Storage Structure - Transaction Atomicity and Durability - Transaction Isolation - Serializability. Concurrency Control: Lock Based Protocols - Timestamp Based Protocols - Validation Based Protocols

TOTAL: 60 HOURS

List of Programs

1. Basic SQL SELECT Statements – Creating and managing tables using DDL, DML, Integrity constraints.
2. DCL, TCL and DB Object (View, Sequence, Index, Synonym, Alias) commands
3. Single row Functions (character, mathematical and date functions) and Aggregate functions
4. Displaying Data from Multiple Tables using SQL operators, GROUPBY, HAVING and ORDERBY clause and also perform join operation.
5. Write a program to perform Basic PL/SQL programs
6. Write a PL/SQL program to implement a control structures
7. Write a PL/SQL block that handles exceptions.
8. Write SQL Triggers for insert, delete, and update operations in a database table.
9. Write the PL/SQL programs to Create the procedure
10. Write the PL/SQL programs to create the recursive function

TOTAL: 48 HOURS

Suggested Readings

- 1 Silberschatz Abraham, Korth Henry F., and Sudarshan S, "Database System Concepts", 6 Edition, McGraw Hill Education, India, 2018.
- 2 Elmasri Ramez, Navathe Shamkant B, "Fundamentals of Database Systems", 7 Edition, Pearson Education, 2016.

- 3 Ramakrishnan Raghu, Gehrke Johannes, "Database Management Systems", 3 Edition, McGraw Hill Education,2014

Websites

- 1 <http://www.digimat.in/nptel/courses/video/106105175/L01.html>
 2 https://www.tutorialspoint.com/oracle_sql/index.htm

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-	2	1
CO3	3	-	2	2	-	-	-	-	-	-	-	-	-	-	-	2	1
CO4	3	-	2	2	2	-	-	-	-	-	-	-	-	-	-	2	2
CO5	3	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	2
Average	3	-	2	2	2	-	2	1.2									

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Computer networks and cybersecurity fundamentals.

COURSE OBJECTIVES(CO):

- Familiarize students with network protection tools, including firewalls, intrusion detection systems, and proxies.
- Introduce secure communication protocols, techniques, and LAN attack methods such as ARP cache poisoning and VLAN hopping.
- Provide knowledge about web security, IP security, and firewalls.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

Cos	Course Outcomes	Blooms Level
CO1	Understand the principles of network protection and the role of firewalls.	Understand
CO2	Understand the principles and usage of secure communication protocols like SSH, SSL/TLS, and VPN.	Understand
CO3	Understand the concepts of Encrypting and Signing Emails	Understand
CO4	Analyze the Network based malware techniques	Analyze
CO5	Analyze network Security in LAN attacks	Analyze

UNIT I INTRODUCTION TO NETWORK SECURITY

7 HOURS

TECHNIQUES FOR NETWORK PROTECTION, MONITORING AND DETECTION: Firewalls, packet filter and stateful firewalls, application aware firewalls, personal firewalls – IP tables, Proxies, NAT, Intrusion Detection System-Snort, Signature and Anomaly based detection, Honeypots and Honeynets. Network Log management-syslog or SPLUNK.

UNIT II SECURE NETWORK COMMUNICATION

7 HOURS

Secure Network Communication: SCP, SSH, SSL3.0, TLS1.2, START TLS, IPsec, VPN and Secure HTTP; Attacks on SSL / TLS: SSL stripping, Drown and Poodle attack.

UNIT III ENCRYPTING AND SIGNING EMAILS

7 HOURS

Encrypting and Signing Emails: PGP – GPG / open PGP, DKIM and SPF; Network packet creation and Manipulation using scapy and dpkt libraries; SDN Securit.

UNIT IV ATTACK TECHNIQUES**7 HOURS**

Attack Techniques: Network reconnaissance – Nmap and vulnerability audits – open VAS; DNS based attacks, Phishing – DNS Twist ; Network based malware attacks: Remote access Trojan – Poison Ivy and Domain name generation algorithm – based Botnets

UNIT V LAN ATTACKS**8 HOURS**

LAN attacks: ARP Cache poisoning- Ettercap / arpspoof, MAC flooding, Port Stealing, DHCP attacks, VLAN hopping; Network Sniffing – Wire shark and Password Cracking-John the Ripper

TOTAL: 36 HOURS**TEXT BOOKS:**

1. Stallings, W. (2020). *Cryptography and network security: Principles and practice* (8th ed.). Pearson Education.
2. Forouzan, B. A. (2015). *Cryptography and network security* (3rd ed.). McGraw-Hill Education.
3. Stallings, W. (2016). *Network security essentials: Applications and standards* (6th ed.). Pearson.

REFERENCE BOOKS:

1. Vacca, J. R. (2023). *Computer and information security handbook* (4th ed.). Morgan Kaufmann.
2. William Stallings (2020), *Cryptography and Network Security: Principles and Practice*, 8th Edition, Pearson edition.

WEBSITES:

1. <https://dl.hiva-network.com/Library/security/Cryptography-and-network-security-principles-and-practice.pdf>
2. <https://daxinimehul321.wordpress.com/wp-content/uploads/2014/11/cryptography-and-network-security-forouzan-copy.pdf>
3. <https://aitskadapa.ac.in/ebooks/CSE/COMPUTER%20NETWORKS/PrinciplesEdition.pdf>

CO,PO,PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2		3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	-	-	-	-	3	-	-	2	-	-	-	-	-	-	-	2	-
CO3	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	2	-
CO4	-	-	3	-	-	-	1	-	-	-	-	1	-	-	-	2	-
CO5	-	-	3	-	-	-	-	-	-	-	3	-	-	-	-	2	-
Average	2	-	3	2	3	-	1	2	-	-	3	1	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Basic understanding of algebra, arithmetic, elementary statistics, and probability.

COURSE OBJECTIVES (CO):

- To understand the basic concepts in probability theory and the nature of uncertainty.
- To develop the ability to work with discrete and continuous probability distributions, understand their properties.
- To equip students with skills in univariate and bivariate analysis, including measures of central tendency, dispersion, correlation, regression, and the construction of index numbers.

COURSE OUTCOMES(COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the counting principles, probability rules, and theorems to solve probability problems.	Analyze
CO2	Apply probability distributions such as Binomial, Poisson, Uniform, Normal, and Exponential to real-world scenarios.	Analyze
CO3	Solve measures of central tendency and dispersion to data sets.	Analyze
CO4	Utilize the correlation or regression methods to find the relationship between two variables.	Analyze
CO5	Understand the basic concept of index numbers and weighted index numbers.	Analyze

UNIT I BASICS OF PROBABILITY**10 HOURS**

Introduction – Sample Space and Events, Equally Likely Events and Exhaustive Events, Dependent and Independent Events, Simple and Compound Events – Axioms of Probability – Addition and Multiplication Theorem – Combinations and Permutations – Conditional Probability – Bayes Formula.

UNIT II DISCRETE AND CONTINUOUS PROBABILITY DISTRIBUTIONS**10 HOURS**

Random variables (Discrete and Continuous) - Mathematical expectation - Binomial distribution -Poisson distribution and its properties. Uniform distribution - Normal distribution -Conditions and properties, Standard normal distribution.

UNIT III BASICS OF STATISTICS AND UNI VARIATE ANALYSIS

10 HOURS

Meaning and definition of statistics - Frequency Distribution, Concepts of measurement, scales of measurement of data. Measures of Central Tendency: Arithmetic Mean, Median, Mode. Measures of dispersion – Range, Coefficient of range - Quartile deviation - Coefficient of Quartile deviation - Standard deviation and Coefficient of variation.

UNIT IV BIVARIATE ANALYSIS

9 HOURS

Correlation – Meaning and definition - Scatter diagram –Karl Pearson’s Correlation Coefficient, Rank Correlation. Regression: Regression in two variables – Properties of Regression, uses of Regression.

UNIT V INDEX NUMBERS

9 HOURS

Definition – Types of Index numbers – Problems in the construction of index numbers – Construction of simple index numbers – Simple aggregate method and Simple average of price relatives using A.M, G.M – Construction of Weighted Index Numbers – Laspeyre’s, Paasche’s, Dorbish Bowley’s, Marshall Edge worth and Fisher’s Ideal Index Numbers - Simple problems.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Ross, S.M. (2021). *A First Course in Probability*, 10th Edition, Pearson, New Delhi.
2. Pillai, R.S.N. and Bagavathi, V. (2019). *Statistics Theory and Practice*, S. Chand & Company Ltd, New Delhi.
3. Evans James, R. (2017). *Business Analytics*, 2nd Edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Dinesh Kumar, U. (2021). *Business Analytics: The Science of Data - Driven Decision Making* (2nd ed.), Wiley, New Delhi.
2. Hogg, R.V., McKean, J.W., & Craig, A.T. (2019). *Introduction to Mathematical Statistics* (8th ed.). Pearson Education Asia.
3. Miller, I., and Miller, M. (2006). *John E. Freund’s Mathematical Statistics with Applications* (7th ed.). Pearson Prentice Hall.
4. Srivastava, T. N., & Rego, S. (2016). *Statistics for Management* (3rd ed.). McGraw Hill Education (India) Private Limited.

WEBSITES:

1. <https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2022/pages/classes-reading-and-in-class-materials/>
2. https://www.youtube.com/watch?v=COI0BUmNHT8&list=PLyqSpQzTE6M_JcleDb1nE0PixKs2JE

3. <https://nptel.ac.in/courses/110107114/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	1	3	-	2	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	1	3	1	2	-	-	-	-	-	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Network security concepts and hands-on experience with networking tools.

COURSE OBJECTIVES(CO):

- Configure and manage a simple LAN with Linux and Windows machines, set up VLANs using Kali Linux, and generate RSA keys.
- Capture, analyze traffic for encryption, export and analyze web traffic files, and investigate Bluetooth communications and WPA handshake.
- Perform vulnerability assessments, penetration testing on Wi-Fi networks, and use automated attack tools like NetStumbler, Kismet, CowPatty, and Aircnort.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

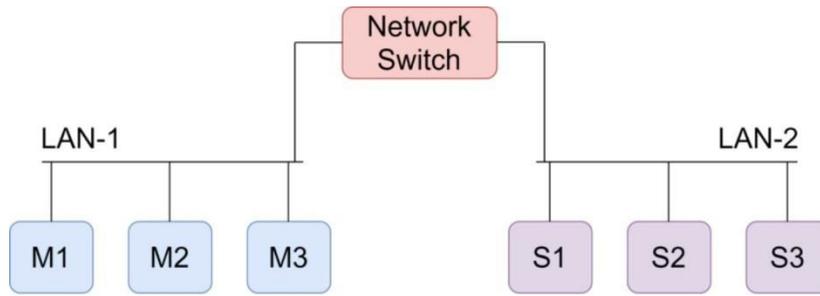
COs	Course Outcomes	Blooms Level
CO1	Understand the basics of LAN with Linux and windows machines and configure separate VLAN using Kali Linux and open-source tools.	Understand
CO2	Analyze the RSA public and private key for client	Analyze
CO3	Analyse the traffic between hosts to ensure proper encryption, Export files from web traffic and analyze for secret information.	Analyze
CO4	Apply the Bluetooth device communications and analyze WPA handshake for wireless security	Apply
CO5	Apply the Vulnerability Assessment (VA) and Penetration Testing (PT) on local Wi-Fi networks, automated attacks with tools like NetStumbler, Kismet, CowPatty, and Aircnort.	Apply

List of Programs:

The experiments make use of Kali Linux distros and other open-source security tools. Install Kali Linux on Virtual Machine and most of the open-source tools are available along with Kali Linux.

1. LAN Security:

shown in S1-3 are Linux and

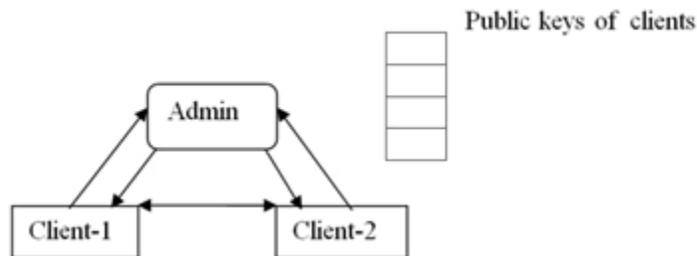


based Network
Set up a simple LAN as below figure. M1-3 and machine which have Windows running.

- i) Configure LAN-1 and LAN-2 as separate VLANs in the network switch (use inter VLAN ACL).
- ii) Create a SPAN port in the network switch and send the mirrored traffic to a promiscuous mode port for the purpose of IDS and other packet analysis. Practice port based and VLAN based mirroring.
- iii) Familiarize with 802.1x, Network Admission Control, Microsoft NAP, RADIUS protocol, RADIUS per port ACL.

2. Application of Cryptographic algorithms using Crypto tools :

Establish a Client-Client Secure communication protocol as shown in below Figure.



The Client machines (Client-1 and Client-2) and Admin machine are installed in different VMs. All the three machines are interconnected through a network switch with different IP addresses. The Admin runs a program that generates 2048 bit RSA public and private key for a Client that wants to communicate. Admin generates 2048 bit RSA public and private key for Client-1 and Client-2. The private keys are distributed to client machines and public keys are stored in a structure in the admin machine. When Client-1 wants to send message to Client-2, it encrypts the messages with public key of Client-2. The message is decrypted by Client-2 with its private key. Similar communication pattern from Client-2 to Client-1 need to be maintained.

Manually capture the traffic between the hosts to ensure the proper working of the encryption. Construct an asynchronous communication between Client-1 and Client-2. Run a Wireshark/ TCPdump at the

SPAN/Promiscuous port of the network switch and identify the communication between the communicating entities (Admin, Client-1, and Client-2).

3. Network Security Lab: Network Packet analysis using Wireshark.

Use Wireshark to solve the below scenarios:

- i) You, as a SOC analyst noted that someone try to send information (PING) to unknown IP address and you are suspecting some malicious information might transferred in it. Analyse the log file and find the data.
 - a) Find the source and destination IP of that log.
 - b) Find the Data length (Bytes) and verify the checksum status on destination.
- ii) Now you have found that some kind of file is been downloaded by insider in unencrypted web traffic. Your task is to
 - a) Find the type of file.
 - b) Export that file from that web traffic, then analyse the file for any secret information.
 - c) Find the hostname in which the file is stored.
- iii) Based upon their activities, auditing team has started investigation against them and found that the insider passed some sensitive information via call to someone. The traffic is been captured. Analyse the traffic and find those conversations and extract the sensitive information in it.
 - a) Find the call-ID when the status of the call is ringing.
- iv) On further investigation, you have a suspect on some wireless device communications. List out the Bluetooth devices communications from this traffic and find the details about native Bluetooth adapter.
- v) Analyse the captured WPA handshake from this traffic and report in detail about it to your administrator.
 - a) Geo locate all the endpoint of wireless devices.
 - b) Analyse the protocol level information transfer between wireless devices.

4.. Wireless Security Lab:

Perform a VA/PT on your local Wi-Fi network and try automated attacks with NetStumbler and Kismet to gather information wireless network and try attacks like CowPatty and Airsnort. Further execute aircrackng to simulate attacks 802.11 WEP and WPA-PSK keys for auditing wireless networks and performing airodump, aircrack, airmon, airbase, aireplay and airtun using Kali 2.0 (Sana) Linux. Attempt a Wi-Fi sniffing to gather location data which can be used to identify device parameters of wireless communication devices.

Tools Recommendation:

Firewall UTM Box – Fortigate 40F

Open Source SIEM – ELK (<https://www.elastic.co/elastic-stack>)

Kali Linux OS included with Burpsuite Community Version, OWASP ZAP, Metasploit, OpenVAS

TOTAL: 48 HOURS

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	2	-	3	-	-	-	-	-	-	-	-	-	-	2	-
CO2	2	-	-	-	-	1	-	-	-	3	-	-	-	-	-	2	-
CO3	-	-	-	2	3	-	2	-	--	3	-	-	-	-	-	2	-
CO4	-	-	2	-	3	-	-	-	2	-	-	-	-	-	-	2	-
CO5	-	-	-	-	-	-	-	3	-	-	3	3	-	-	-	2	-
Average	2	-	2	2	3	1	2	3	2	3	3	3	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation.

PREREQUISITE:

- Ethics and Social Principles.

COURSE OBJECTIVES(CO):

- To help the students appreciate the essential complementarity between ‘VALUES’ and ‘SKILLS’ to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and manually enriching interaction with Nature.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

1. To become more aware of themselves, and their surroundings (family, society, nature).
2. To become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
3. To have better critical ability.
4. To become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
5. To apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

**UNIT I: NEED, BASIC GUIDELINES, CONTENT AND PROCESS FOR VALUE EDUCATION
5 HOURS**

Purpose and motivation for the course, recapitulation from Universal Human Values-I - Self-Exploration–what is it? - Its content and process; ‘Natural Acceptance’ and Experiential Validation- as the process for self-exploration - Continuous Happiness and Prosperity- A look at basic Human Aspirations - Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority - Understanding Happiness and Prosperity correctly- A critical appraisal of the current

scenario - Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

UNIT II : UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF!

5 HOURS

Understanding human being as a co-existence of the sentient 'I' and the material 'Body' - Understanding the needs of Self ('I') and 'Body' - happiness and physical facility - Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) - Understanding the characteristics and activities of 'I' and harmony in 'I' - Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail - Programs to ensure Sanyam and Health.

UNIT III : UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMAN- HUMAN RELATIONSHIP

5 HOURS

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship - Understanding the meaning of Trust; Difference between intention and competence - Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship - Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals - Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

UNIT IV : UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS COEXISTENCE

5 HOURS

Understanding the harmony in the Nature – Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and selfregulation in nature – Understanding Existence as Co-existence of mutually interacting units in all-pervasive space – Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film “Home” can be used), pollution, depletion of resources and role of technology etc.

UNIT V : IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

4 HOURS

Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order - Competence in professional ethics: Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems.- Case studies of typical holistic technologies, management models and production systems - Strategy for transition from the present state to Universal Human Order: At the level of individual: as socially and ecologically responsible engineers, technologists and managers, At the level of society: as mutually enriching institutions and organizations - Sum up.

TOTAL: 24 HOURS

TEXT BOOKS:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria,

- Excel Books, New Delhi, 2010
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
 3. The Story of Stuff (Book).
 4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
 5. Small is Beautiful - E. F Schumacher.
 6. Slow is Beautiful - Cecile Andrews.

REFERENCE BOOKS:

1. Economy of Permanence - J C Kumarappa
2. Bharat Mein Angreji Raj - PanditSunderlal
3. Rediscovering India - by Dharampal
4. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
5. India Wins Freedom - Maulana Abdul Kalam Azad
6. Vivekananda - Romain Rolland (English)

CO,PO,PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	-	-	-	-	3	3	1	1	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	2	1	2	1	-	-	3	-	-	-	-	-
CO3	-	-	-	-	-	1	2	1	1	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	3	3	3	1	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	3	3	3	1	-	-	3	-	-	-	-	-
Average	-	-	-	-	-	2.4	2.4	2	1	-	-	3	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Not Required.

Course Objectives

- Create windows forms using arrays and flow control statements.
- Learn to use the classes and namespaces in the .NET Framework class library.
- Develop Web Applications using Microsoft ASP.NET programming.
- Learn to use Basic windows controls using Visual Basic.Net
- Understand the concept of Multiple Document Interface

Course Outcomes

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Develop Windows based applications using Visual Basic.Net	Apply
CO2	Implement ADO.Net concept in VB.Net and ASP.Net applications	Apply
CO3	Create server-side web applications using ASP.NET	Understand
CO4	Analyze the concept of data sources and data bound controls in VB.NET and ASP.NET	Apply
CO5	Demonstrate the working of ADO.Net controls for developing ASP.Net web applications	Apply

UNIT I – Introduction

12 HOURS

Getting Started With VB.NET: The Integrated Development Environment-IDE Components- Environment Options. Visual Basic: The Language Variables-Constants-Arrays – Variables as Objects-Flow Control Statements. Working with forms: The appearance of Forms-Loading and Showing Forms-Designing Menus.

UNIT II - Basic Windows Controls

12 HOURS

Textbox Control- ListBox, CheckedListBox-Scrollbar and TrackBar Controls-More Windows Control-The common Dialog Controls-The Rich TextBox Control - Handling Strings, characters and Dates. The TreeView and ListView Controls: Examining the Advanced Controls.

UNIT III - ASP.NET

12 HOURS

Goal of ASP.NET –ASP.NET Web Server Control-Validation Server Controls-Themes and Skins - Content Page Holder,ASP.NET - Web Forms, MVC, Core.

UNIT IV - Data Binding in ASP.Net

12 HOURS

Data source Controls – Configuring data source control caching – storing connection information - Using Bound list

controls with Data Source Controls – Other Data bound Controls- Data Management with ADO.Net and Working with databases.

UNIT V - Web services, WCF

12 HOURS

Development & consuming web services, WCF Services, Fundamentals WCF Concepts, Creating a New Service, Generating a Service and Client Proxy, Hosting a service in IIS, Messaging protocol, WCF Contracts and Serialization, Service Contracts, Approaches to Serialization, Web Service Bindings, Object Oriented Bindings, One way and Duplex Communication, Large Message Transfers, Hosting Features, Hosting in IIS, WCF Exception Handling.

TOTAL:60 HOURS

List of Programs

TOTAL: 60 HOURS

VB.Net

1. Develop a program which makes use of String and String Builder class.
2. Develop a VB.NET application to perform Tree view operation
3. Develop a VB.NET application using menu
4. Create an application using Common Dialog Controls.
5. Write a program for Databinding using datalist control.
6. Write a program to demonstrate insert, delete and update operations using ADO.Net Code.

ASP.Net

1. Write a program to create an on-line quiz using content page holder.
2. Write a program to retrieve Cookies information.
3. Write a program to count web page hits.
4. Create an ASP page to accept customer details and post the data into the database and perform edit, delete and view the customer information at any point of time.
5. Write program to retrieve environment variables browser capability information.
6. Write a program for database connectivity to retrieve student information

TEXT BOOKS

1. Evangelos Petroustos, 2017. Mastering Visual Basic.Net, BPB Publications, New Delhi.
2. Shirish Chavan. 2007. Visual Basic.Net, 1st Edition, Pearson Education, New Delhi.
3. Bill Evjen, Scott Hanselman, Devin Rader, Farhan Muhammad and S.Srinivasa Sivakumar, 2006. Professional ASP.net 2.0, Special Edition.

- Duncan Mackenzie Kent Sharkey, 2006. Sams Teach yourself Visual Basic.JNet, 1stEdition, McGraw Hill, NewDelhi.
- Dave Mercer, ASP.Net Beginner’s Guide, 2003. 2nd Edition McGraw Hill, New Delhi.

REFERENCE BOOKS:

- Roman, S., & Lomax, P. (2016). VB.Net in a Nutshell, 2nd Edition, O’Reilly.
- Deitel, P.J., & Deitel, H.M., & Nieto, T.R. (2018). Visual Basic 6 – How to Program, 1st Edition, Pearson Education.

WEB LINKS

- www.microsoft.com/NET/
- www.en.wikipedia.org/wiki/.net
- www.w3schools.com/ngws/default.asp
- www.vbtutot.com

CO,PO,PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	3	-	-	-	-	1	-	-	-	3	-	-	-	-
CO2	2	-	-	1	-	-	-	-	1	-	-	-	3	-	-	-	-
CO3	1	-	-	2	-	-	-	-	1	-	-	-	3	-	-	-	-
CO4	3	-	-	3	-	-	-	-	1	-	-	-	3	-	-	-	-
CO5	3	-	-	3	-	-	-	-	1	-	-	-	3	-	-	-	-
Average	2.4	-	-	2.4	-	-	-	-	1	-	-	-	3	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Web development (HTML, CSS, JavaScript) and programming fundamentals.

COURSE OBJECTIVES (CO):

- Understand the basic concepts of Full Stack application development, including user-interface design and application development fundamentals.
- Gain knowledge about Node.js, AngularJS, and ReactJS for front-end and back-end development.
- Acquire working knowledge of backend development with MongoDB.

COURSE OUTCOMES (COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the concepts of Full Stack Development	Understand
CO2	Develop applications with Node JS.	Apply
CO3	Identify various concepts of developing applications using Node JS	Apply
CO4	Develop React JS to test and run the applications.	Apply
CO5	Utilize rapid prototyping techniques to design and develop sophisticated database connectivity through MONGO DB.	Apply

UNIT I INTRODUCTION TO FULL STACK DEVELOPMENT

12 HOURS

Introduction: History of Full Stack Development – Features- - The Python Full Stack-Advantages of Full Stack- Applications of Full Stack - Technologies included in Full Stack Development: Frontend-Backend – Database- Examples Stacks in Development: The MEAN Stack - The MERN Stack AND The Python Full Stack.

UNIT – II ANGULAR JS

12 HOURS

What is AngularJS?, Why AngularJS?, Features of AngularJS, AngularJS architecture, Setting up the Environment, Model-View-Controller explained, My first AngularJS app All about Angular expressions, How to use expressions, Number and String Expressions, Object Binding and Expressions, Working with Arrays, Forgiving Behaviour, Angular expressions v/s Javascript expressions.

UNIT III NODE JS

12 HOURS

Node.js basics - Local and Export Modules - Node Package Manager - Node.js web server - Node.js File system - Node Inspector - Node.js EventEmitter - Frameworks for Node.js - Express.js Web App - Serving static Resource

Node.js Data Access

UNIT – IV REACT JS

12 HOURS

Introduction to React Router and Single Page Applications React Forms, Flow Architecture and Introduction to Redux More Redux and Client-Server Communication.

UNIT – V: MONGO DB

12 HOURS

Introduction-History and features of MONGODB -Differences between SQL,MYSQL and NOSQL- Benefits of NoSQL- MongoDB Installation-Collections in MongoDB- Documents In mongoDb- Inserting data into database- Filter queries in MongoDB Database- Schema Validation-Indexing-Aggregation-Embedded Document.

TOTAL: 60 HOURS

TEXT BOOKS:

1. D. K. Sasidharan, S. N. Kumar, (2017), *Full Stack Development with JHipster*, Packt Publishing.
2. J. DiMarzio, (n.d.), *Beginning Android Programming with Android Studio (4th Edition)*.
3. B. Phillips, C. Stewart, K. Marsicano, (2021), *Android Programming: The Big Nerd Ranch Guide (4th Edition)*, Big Nerd Ranch Guides.

REFERENCE BOOKS:

1. Meier, R. (2010.). *Professional Android 2 application development*. Wiley India Pvt Ltd
2. Murphy, M. L. (2011). *Beginning Android*. Wiley India Pvt Ltd.
3. Burd, B.(2015.). *Android application development all-in-one for dummies (1st ed.)*. For Dummies.

WEB REFERENCES:

1. <https://developer.android.com/guide>
2. https://en.wikipedia.org/wiki/Android_10
3. Develop App for Free
4. <https://flutter.dev/>
5. <http://ai2.appinventor.mit.edu>
6. https://en.wikipedia.org/wiki/Android_version_history
7. <https://aws.amazon.com/mobile/mobile-application-development/> (Unit 1)

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	-
CO1	-	-	1	-	-	3	-	-	-	-	-	-	-	-	-	2	-
CO3	-	-	-	3	-	3	-	3	-	-	-	-	-	-	-	2	-
CO4	-	-	1	3	-	3	-	3	-	-	-	-	-	-	-	2	-
CO5	-	-	-	3	-	3	-	3	-	-	2	-	-	-	-	2	-
Average	1	-	1	3	-	3	-	3	-	-	2	-	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

COURSE OBJECTIVES (CO):

- To Understand and Apply Core Networking and Server Infrastructure Concepts
- To Administer and Maintain Windows Server Environments
- To Manage Active Directory and Secure Enterprise Environments
- To Operate and Troubleshoot Linux Servers and Virtualization Platforms
- To Implement Cloud Solutions, Backup Strategies, and Infrastructure Monitoring

COURSE OUTCOMES (COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand and differentiate between various networking devices, server hardware, storage types, and operating systems used in enterprise environments	Apply
CO2	Install, configure, and manage Windows Server infrastructure including storage, performance, patching, high availability, and automation using PowerShell.	Apply
CO3	Configure and secure Active Directory services, manage domain environments, and implement authentication, auditing, and backup policies.	Apply
CO4	Administer Linux server environments, manage system processes and services, implement virtualization using tools like VMware and Hyper-V.	Analyze
CO5	Describe cloud computing models and services, work with key cloud platforms (AWS, Azure), and utilize tools for backup, monitoring, and troubleshooting of IT infrastructure.	Analyze

UNIT I NETWORKING AND SERVER INFRASTRUCTURE

12 HOURS

Introduction to Networking Devices and LAN/WAN - IPv4 and IPv6. Routers and Switches Overview. Datacenter Overview and Server Form Factors - Server Management Portals (IPMI/iLO/iDrac) and Events - Introduction to Storage: NAS, DAS, SAN - RAID Levels and Comparisons (Fibre Channel, iSCSI, FCoE) - Operating Systems Overview (Server & Client) - Domain vs. Workgroup - File Systems: FAT, NTFS, ReFS, EXT3, EXT4 - Installing and Managing OS (Windows Server, Linux) - Firewall Fundamentals (Hardware/Software)

UNIT- II WINDOWS SERVER ADMINISTRATION

12 HOURS

Windows Server Core Installation, Upgrades, Patch Management & Migrations - Storage Spaces, iSNS, DCB, and MPIO - Data Deduplication and Disk Management - High Availability, Fail-over Clustering, iSCSI, NLB - Deployment Images using MDT and WSUS - PowerShell DSC and Monitoring Tools - Performance Monitoring and Event Logs

UNIT - III ACTIVE DIRECTORY AND SSECURITY**12 HOURS**

AD DS, DNS Server Role, Zones, and Transfers - AD DS Replication and Sites - Group Policy Management and Templates - Securing Domain Controllers and Accounts - Audit Authentication and Managed Service Accounts - Certificate Services (CAs, Templates, Revocation, Recovery) - AD FS, AD RMS, and Smart Cards - Backup & Restore of Active Directory

UNIT – IV LINUX SERVER ADMINISTRATION AND VIRTUALIZATION**12 HOURS**

RHEL / Cent OS Overview, Boot Process and GRUB2 - Filesystem Hierarchy, Shell Environment, Text Editors - User and Group Management, File Permissions, ACLs - RPM, YUM, Dependency Management, Patching , System Logging, Snapshots, Backup/Restore. Virtualization: Hypervisors, Hyper-V, VMware vSphere/vCenter - Configuring VMs, Networking, Storage, HA/DRS - vMotion, Templates, Resource Pools, dvSwitches

UNIT – V CLOUD, BACKUP AND MONITORING**12 HOURS**

Cloud Computing Fundamentals, Deployment Models - SaaS, PaaS, IaaS and Key Providers (AWS, Azure, GCP) - Cloud Security, Navigation, and Resource Management- AWS EC2, S3, VPC, IAM; Azure VM, Storage, Networking. Backup Technologies: Disk, Tape, VM Backups, Restoration, Deduplication, Troubleshooting. Infra Monitoring Tools Overview : Nagios.

TOTAL: 60 HOURS**REFERENCES:**

1. Mustafa Toroman , "Hands-On Cloud Administration in Azure" , Packt, 2020.
2. Sara Perrott, "Windows Server 2019 & PowerShell All-in-One For Dummies", Wiley, 2021.
3. Sander van Vugt, "Red Hat RHCSA 8 Cert Guide: EX200", Pearson IT Certification, 2021.
4. Nick Marshall, "Mastering VMware vSphere 7", Wiley, 2021.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	2	2	3	1	2	2	3	2	2	3	2	-	-	-	2	-
CO1	2	3	3	1	3	3	3	2	3	1	2	3	-	-	-	2	-
CO3	1	2	2	3	2	2	2	1	3	2	3	2	-	-	-	2	-
CO4	3	2	3	2	3	2	3	3	2	3	2	2	-	-	-	2	-
CO5	2	3	2	3	2	3	2	2	3	2	3	3	-	-	-	2	-
Average	2.2	2.5	2.4	2.4	2.2	2.4	2.4	2.2	2.6	2	2.6	2.4	-	-	-	2	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Digital identity concepts and access control principles.

COURSE OBJECTIVES (CO):

- Impart knowledge about digital identity and its management concepts and techniques.
- Understand the importance of identity and access management in organizations and apply access control techniques through user groups.
Develop the ability to prepare and implement various access control mechanisms.

COURSE OUTCOMES (COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand about the Digital Identity.	Understand
CO2	Understand the importance privileged access	Understand
CO3	Apply and Analyze various partitions	Apply
CO4	Categorize the various access control techniques through user Authentication.	Analyze
CO5	Develop capacity to prepare various access control mechanism	Apply

UNIT I DIGITAL SECURITY & GOVERNANCE

10 HOURS

Access control & identity management, Identification, Authentication and Authorization, Classification of Information, Separation of Duties, need for strong credentials. Access Controls: Models, Authentication Factors, Network Access Control.

Security Governance: Managing Information Security, Organization and responsibilities, Information Security Governance, Security Incident Management, Application Security, Data and information Analyze, Role of databases and database management systems, Knowledge management systems and data warehouses, Secure Coding Practices, ISO 27001 - Domains, Introduction to SOX, HIPAA, CoBIT.

UNIT – II IDENTITY AND ACCESS MANAGEMENT

10 HOURS

Introduction to IAM: Introduction to IAM, Enterprise or Organizational Identities, Electronics and non-electronics Identities, AM Frame work, Key Principles, and Definitions, Common Challenges and Key Considerations, IAM Roadmap and Strategy.

Implementation: Implementation Methodology and Approach, Access Request, Approval, and Provisioning
Enforcement: Authentication, Authentication Implementation Approaches, Authorization, Logging and

Monitoring.

Access Review and Certification: Benefits and Objectives, Access Review and Certification Processes Roles and Rules: Rules and Enforcement, The RBAC Model and the Access Management Life Cycle, RBAC Implementation Considerations, Guiding Principles and Lessons Learned.

Privileged Access Management: Understanding Privileged Access, Key Business Drivers, Privileged Access Management Program.

UNIT III DIRECTORY SERVICES

10 HOURS

The LDAP Protocol, LDAP Basics: Objects in LDAP, Object Classes, Attributes, and Schema, Server Configuration, First Steps with LDAP, Updating a Directory with a Batch Process, The LDIF Standard LDAP Models: Information Model (Object classes, Object Identities, Attributes, Matching Rules) Naming model, Functional Model (LDAP operations), Security Model (Authentication and Authorization)
Directory Architectures: Introduction to Replication and Partitioning, Data Distribution between LDAP and Non-LDAP Systems, Partitioning, Replication, Data Distribution between LDAP and Non-LDAP Systems

UNIT – IV SECURED ACCESS PARADIGMS: EXPLORING MULTI-FACTOR AUTHENTICATION, SSO, AND FEDERATED SYSTEMS

10 HOURS

Multi-Factor Authentication (MFA): Introduction to Authentication Methods, Principles of Multi - Factor Authentication, Biometrics and Behavioural Authentication, Security and Privacy Considerations in MFA, Implementing MFA in Different Environments.

UNIT – V: SSO, AND FEDERATED SYSTEMS

8 HOURS

Secured Access Paradigms: Exploring Multi-Factor Authentication, SSO, and Federated Systems Federated Systems and SSO: Introduction to Federated Identity, Federated Identity Standards and Protocols, Design and Implementation of Federated Systems Single Sign-On: Fundamentals of Single Sign-On, Single Sign – On Protocols(SAML, OAuth, OpenID Connect), Implementing SSO in Different Environments, SSO Security Best Practices

TOTAL: 48 HOURS

TEXT BOOKS:

1. Godbole, N. (2016). *Cybersecurity*. Wiley India Pvt. Ltd.
2. Brooks, C. J., Grow, C., Craig, P., & Short, D. (2016). *Cybersecurity essentials*. John Wiley & Sons
3. Peltier, T. R. (2012). *Information security risk analysis*. CRC Press

REFERENCE BOOKS:

1. Whitman, M., & Mattord, H. (2022). *Principles of information security (2nd ed.)*. Thomson Course Technology
2. Johnson, D. (2020), *Single Sign-On: The Comprehensive Guide*, Springer.

WEB REFERENCES:

1. <https://nptel.ac.in/courses/106/105/106105171>
2. <https://www.simplilerarn.com>
3. <http://elarning.vtu.ac.in/econtent/courses/video/BS/14CPL.16.html>
4. <https://learndata.com>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-
CO2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	-	-	1	2	-	-	-	-	-	-	3	-	-	-	-	-	2
CO4	-	-	-	-	-	-	-	-	-	-	3	2	-	-	-	-	2
CO5	-	-	-	2	-	-	-	-	-	-	3	2	-	-	-	-	2
Average	2	-	1	2	2	-	-	-	-	-	3	2	-	-	-	1	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Basic knowledge of statistics and probability. Familiarity with fundamental programming concepts and proficiency in Python. .

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To acquire knowledge on the fundamental concepts and importance of feature engineering in the machine learning pipeline.
- To make use of various data preprocessing, transformation, and feature extraction techniques to real-world datasets.
- To evaluate and select optimal features using statistical methods and dimensionality reduction techniques to improve model performance.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Define and explain machine learning concepts, types, and basic metrics.	Understand
CO2	Implement and apply supervised learning techniques (e.g., KNN, Linear Regression, Logistic Regression).	Apply
CO3	Apply unsupervised learning methods (e.g., K-Means, Hierarchical Clustering, Association Rules)	Apply
CO4	Develop and evaluate simple machine learning models (e.g., Perceptron, single-layer neural networks)	Evaluate
CO5	Analyze and apply appropriate machine learning algorithms depending on the problems with some real-world data.	Analyze

UNIT I : INTRODUCTION TO MACHINE LEARNING**10 HOURS**

Introduction – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search- Statistical Decision Theory - Regression, Classification, Bias Variance – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II: MACHINE LEARNING MODELS

10 HOURS

Linear Models – Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods- Multi-Layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-Layer Perceptron in Practice – Examples of using the MLP – Overview – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT III : NEURAL NETWORKS

10 HOURS

Introduction, Early Models, Perceptron Learning, Backpropagation, Initialization, Training & Validation, Parameter Estimation - MLE, MAP, Bayesian Estimation- Stopping Criterion & Pruning loss functions, Categorical Attributes- Instability Evaluation Measures- Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks.

UNIT IV : TREE AND PROBABLISTIC MODELS

9 HOURS

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers - Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

UNIT V : GRAPHICAL MODELS

9 HOURS

Graphical Models – Markov Chain Monte Carlo Methods – Sampling —Markov Chain Monte Carlo –Graphical Models – Bayesian Networks – Hidden Markov Models – Tracking Methods- Partitional Clustering, Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering- Machine Learning Case Studies in Technology- Machine Learning Case Studies on American Cancer Society on Google Cloud ML Engine.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Ethem Alpaydin, (2014). *Introduction to Machine Learning* 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press.
2. Charu C. Aggarwal. (2018). *Neural Networks and Deep Learning* , 1st Kindle Edition.

REFERENCE BOOKS:

1. Kevin P. Murphy . (2022). *Probabilistic Machine Learning: An Introduction*.
2. Jayabalaji K.A, A. H Ambiha, Preethi D, Mydhili S K. (2023). *Machine Learning*, Charulatha publications

WEBSITES:

1. <https://ai.google/education/>

2. <https://machinelearningmastery.com/>

3. <https://www.tensorflow.org/>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Basic understanding of data analysis concepts and familiarity with data types.

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To introduce fundamental concepts and techniques of Natural Language Processing.
- To understand and apply linguistic preprocessing, syntactic parsing, and machine learning techniques in NLP.
- To implement NLP applications such as text classification, sentiment analysis, and language modeling using modern libraries.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand the basic concepts of natural language and linguistic processing.	Understand
CO2	Apply text preprocessing, tokenization, and vectorization techniques.	Apply
CO3	Analyze text using syntactic, semantic, and statistical methods.	Analyze
CO4	Evaluate NLP models for tasks like classification, translation, and generation.	Evaluate
CO5	Design and implement NLP solutions for real-world problems using modern frameworks.	Create

UNIT - I INTRODUCTION TO NLP**9 HOURS**

Overview and challenges of NLP - Natural language vs formal language - Language models and their applications - Applications of NLP in Data Science - Text preprocessing: Tokenization, Stemming, Lemmatization, Stopwords

UNIT - II LINGUISTIC FUNDAMENTALS 10 HOURS

Morphology, POS tagging, N-grams - Syntax and parsing (CFG, Dependency Parsing) - Named Entity Recognition (NER) - POS taggers: Rule-based and probabilistic.

UNIT - III TEXT REPRESENTATION AND SEMANTICS 10 HOURS

Bag of Words (BoW), TF-IDF - Word Embeddings: Word2Vec, GloVe, FastText - Contextual embeddings: ELMo, BERT - Word similarity and distance measures.

UNIT - IV TEXT CLASSIFICATION AND SEQUENCE MODELS 10 HOURS

Text classification: Naive Bayes, SVM, Logistic Regression - Sequence Labeling: CRFs, RNNs, LSTM - Sentiment analysis and spam detection - Text summarization (extractive and abstractive).

UNIT - V ADVANCED NLP AND APPLICATIONS 09 HOURS

Transformer architecture - BERT and GPT models - Machine Translation and Chatbots - Question Answering and Language Generation - Ethical considerations in NLP.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Jurafsky, D., & Martin, J. H. (2023). *Speech and language processing* (3rd ed.). Pearson.
2. Bird, S., Klein, E., & Loper, E. (2009). *Natural language processing with Python*. O'Reilly Media.

REFERENCE BOOKS:

1. Eisenstein, J. (2019). *Introduction to natural language processing*. MIT Press.
2. Goldberg, Y. (2017). *Neural network methods for natural language processing*. Morgan & Claypool.
3. Cambria, E., & White, B. (2014). *Jumping NLP curves: A review of natural language processing research*. IEEE Computational Intelligence Magazine, 9(2), 48-57.

WEBSITES:

1. <https://www.nltk.org>
2. <https://spacy.io>
3. <https://huggingface.co>
4. <https://towardsdatascience.com/tagged/nlp>
5. <https://www.kaggle.com>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Financial concepts

COURSE OBJECTIVES(CO):

- Understand basic accounting concepts and prepare various subsidiary books.
- Prepare financial statements and account for depreciation on fixed assets.
- Prepare accounts for nonprofit organizations.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand basic concepts on Accounting	Understand
CO2	Prepare various subsidiary books	Understand
CO3	Prepare financial statements	Apply
CO4	Carry out depreciation on fixed assets	Apply
CO5	Prepare accounts for nonprofit organizations	Apply

UNIT I**14 HOURS**

Accounting – Definition- Fundamentals of Book Keeping – Branches of Accounting – Nature of Accounts - Accounting Concepts and Conventions – Journal – Ledger.

UNIT II**14 HOURS**

Subsidiary books – Introduction – Types of subsidiary books - purchases book - sales book- returns book - cash book - single column cash book – Two column cash book - Three column Cash book - petty cash book

UNIT III**14 HOURS**

Trial balance - Errors and their rectification - Final accounts of a sole trader with adjustments - Trading and Profit and Loss Account - Balance Sheet – Difference between Profit and Loss Account and Balance Sheet.

UNIT IV**15 HOURS**

Depreciation- Definition- Methods of depreciation- straight line method- written down value method- annuity value method- sinking fund method- provisions and reserves

UNIT V**15 HOURS**

Accounts for Non-Profit organization- Receipts and Payments and income and expenditure account and Balance sheet – Difference between Receipts and Payments and income and expenditure account and Balance sheet

Note: Distribution of Marks between problems and theory shall be 75% and 25%.

TOTAL: 72 HOURS

TEXT BOOKS:

1. N.Vinayakam, P.L.Maniam and K.L.Nagarajan, (2012) *Principles of Accountancy* New Delhi. S.Chand & Company Ltd
2. S. P. Jain & K. L. Narang, (2010), *Advanced Accountancy*, Sultan Chand & Sons. New Delhi
3. T.S.Grewal,(2011) *Introduction to Accountancy*, New Delhi S.Chand & Company Ltd.
4. R.L.Gupta, V.K.Gupta and M.C.Shukla, (2010), *New Delhi Financial Accounting*, Sultan Chand.

REFERENCE BOOKS:

1. T.S.Grewal, S.C. Gupta, and S.P. Jain, (2010), *Advanced Accountancy*, Sultan Chand, New Delhi.
2. K.L. Narang and S.N. Maheswari, (2010), *Advanced Accountancy*, Kalyani Publishers, New Delhi.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
CO1	-	-	3	2	-	-	3	-	-	-	3	-	-	-	-	-	-
CO3	-	-	3	-	-	-	3	-	2	-	3	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	2	-	3	-	-	-	-	-	-
CO5	-	-	3	2	-	-	3	2	-	-	3	-	-	-	-	-	-
Average	1	-	3	2	-	-	3	2	2	-	3	-	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- HTML/CSS, JavaScript

COURSE OBJECTIVES(CO):

- Gain knowledge of the basic concepts, characteristics, user-interface design, and fundamentals of Full Stack application development.
- Learn and apply AngularJS and React JS to build dynamic and interactive user interfaces.
- Obtain practical experience in developing applications with Node.js and managing data using MongoDB.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Understand the concepts of Full Stack Development	Understand
CO2	Develop applications with Node JS.	Understand
CO3	Identify various concepts of developing applications using Node JS	Understand
CO4	Apply and implement React JS to test and run the applications.	Apply
CO5	Utilize rapid prototyping techniques to design and develop sophisticated database connectivity through MONGO DB.	Understand

List of Programs

1. Develop Angular JS program that allows user to input their first name and last name and display their full name. Note: The default values for first name and last name may be included in the program.
2. Develop an Angular JS application that displays a list of shopping items. Allow users to add and remove items from the list using directives and 7: The default values of items may be included in the program.
3. Develop a simple Angular JS calculator application that can perform basic mathematical operations (addition, subtraction, multiplication, division) based on user input.
4. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
5. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
6. Write a program to create a voting application using React JS
7. Write a program to create a simple calculator Application using React JS
8. Create a Simple Login form using React JS

9. Execute the Commands of MongoDB and operations in MongoDB : Insert, Query, Update, Delete and Projection.
10. Implementation of Aggregation and Map Reduce functions in MongoDB.

TOTAL: 60 HOURS

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, (2011) “*Android Wireless Application Development*”, Pearson Education, 2nd ed.
2. Jerome DiMarzio, (2016) “*Beginning Android Programming with Android Studio*”, 4th Edition
3. Android Programming: (2021) “*The Big Nerd Ranch Guide*” (4th Edition) by Bill Phillips, Chris Stewart, and Kristin Marsicano.
4. Reto Meier, (2010) “*Professional Android 2 Application Development*”, Wiley India Pvt Ltd
5. Mark L Murphy, (2014) “*Beginning Android*”, Wiley India Pvt Ltd
6. Barry Burd, (2020) *Android Application Development All in one for Dummies*, Edition: 3
7. Dawn Griffiths, David Griffiths, (2017) “*Head First Android Development: A Brain-Friendly Guide*”.
8. Neil Smyth , (2017) “*Android Studio 3.0 Development Essentials: Android*”, 8th Edition.
9. Azat Mardan, (2015) *Full Stack JavaScript: Learn Backbone.js, Node.js and MongoDB*. Apress.

REFERENCES:

1. <https://developer.android.com/guide>
2. https://en.wikipedia.org/wiki/Android_10
3. Develop App for Free
4. <https://flutter.dev/>
5. <http://ai2.appinventor.mit.edu>
6. https://en.wikipedia.org/wiki/Android_version_history
7. <https://aws.amazon.com/mobile/mobile-application-development/> (Unit 1)
8. https://en.wikipedia.org/wiki/Mobile_app_development

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	2
CO1	3	-	3	3	-	2	-	3	-	-	-	-	-	-	-	-	2
CO3	3	-	3	3	-	-	-	3	-	-	-	-	-	-	-	-	2
CO4	3	-	-	3	-	2	-	3	-	-	-	-	-	-	-	-	2
CO5	-	-	3	3	-	-	-	1	-	-	-	-	-	-	-	-	2
Average	3	-	3	3	-	2	-	2.5	-	-	1	-	-	-	-	-	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required**COURSE OBJECTIVES(CO):**

- To Install, Configure, and Administer Windows Server Environments.
- To Automate Server Administration Using PowerShell.
- To Manage Linux Server Operations and Services
- To Deploy and Maintain Virtual Machines on Hypervisors.
- To Implement and Manage Cloud Infrastructure and Services

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Install and configure Windows Server (Core/GUI) and Linux systems with user accounts, ACLs, and network settings	Apply
CO2	Implement Active Directory, group policies, and enforce security controls across domain environments.	Apply
CO3	Develop PowerShell scripts for task automation	Create
CO4	Configure and manage virtualization platforms like VMware and Hyper-V, including VM creation and snapshots.	Apply
CO5	Monitor Linux services and manage system updates using tools like YUM, top, systemctl.	Apply

List of Programs**Windows Server**

1. **Windows Server Installation & Configuration**
 - Install Windows Server (Core & GUI).
 - Patching
2. **Install & Configure Active Directory Domain Services (AD DS)**
 - Promote server to DC, join clients to the domain.
 - Enforce password policy, restrict drives, desktop configuration.
3. **Implement Failover Cluster and Network Load Balancing (NLB)**
 - Build a high-availability cluster for file share service.
 - Cluster Troubleshooting – High Availability, Fail-Over

4. PowerShell Scripting for Automation Tasks

Write scripts for backup, log rotation, monitoring, Patching, Checking stale records

Linux Server

5. Install Linux (RHEL/CentOS) and Set Up Users & ACLs

- Partitioning, user creation, chmod, setfacl, etc.
- Patching
- Configuring Network interfaces – NMTUI/NMCLI
- Server Troubleshooting – Boot, Package, Services, Discover services

6. Service Monitoring and Patch Management using YUM

Enable repo, install updates, monitor with top, systemctl.

7. Create and Manage VMs in VMware / Hyper-V

Install hypervisor, create VM, snapshot, clone, Delete

Cloud Computing

8. Launch and Access EC2 Instances on AWS

Key pair creation, EC2 instance launch, inbound rules, remote access.

9. Configure S3 Bucket and Lifecycle Policies

Create bucket, enable versioning, lifecycle rule to archive/delete.

10. Create and Manage VPC with Subnets and Security Groups (AWS)

Design private/public subnets, attach IGW, and route tables.

11. Azure VM Deployment and Storage Blob Configuration

Create VM, configure VNet, attach a blob container for backup.

12. IAM Role and Policy Creation in AWS

Create custom IAM roles and attach to EC2 instance for access control.

13. Configure Cloud Backup using AWS/Azure Services

Snapshot of EC2 instance / Azure VM backup vault.

TOTAL: 60 HOURS

REFERENCES:

1. Mustafa Toroman , "Hands-On Cloud Administration in Azure" , Packt, 2020.
2. Sara Perrott, "Windows Server 2019 & PowerShell All-in-One For Dummies", Wiley, 2021.
3. Sander van Vugt, "Red Hat RHCSA 8 Cert Guide: EX200", Pearson IT Certification, 2021.
4. Nick Marshall, "Mastering VMware vSphere 7", Wiley, 2021.

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	3	2	3	1	2	3	2	2	1	2	3	-	-	-	-	2
CO1	3	3	3	3	1	2	3	2	3	1	3	2	-	-	-	-	2
CO3	3	3	2	3	2	3	3	3	3	2	2	3	-	-	-	-	2
CO4	3	3	3	3	2	3	3	3	2	2	3	3	-	-	-	-	2
CO5	3	3	2	3	3	3	3	3	3	2	2	2	-	-	-	-	2
Average	3	3	2.4	3	1.8	2.6	3	2.6	2.6	1.6	2.4	2.6	-	-	-	-	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Bachelor of Computer Applications

2025-2026

Semester V

25CAU591

Internship - II

0H - 2C

Instruction Hours/week: L:0 T:0 P:2

Marks: Internal:100 External:0 Total:100

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To understand the fundamental principles of neural networks and their architectures.
- To explore deep learning algorithms, optimization methods, and training techniques.
- To apply neural networks in real-world applications such as image processing, time series prediction, and natural language processing.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand the basic concepts, types, and structures of neural networks	Understand
CO2	Apply backpropagation and optimization techniques to train neural networks	Apply
CO3	Design and implement CNN and RNN models for image and sequence data.	Create
CO4	Analyze neural network architectures and evaluate their performance using metrics.	Analyze
CO5	Compare different neural network models and justify their use in specific data science tasks	Analyze

UNIT - I INTRODUCTION TO NEURAL NETWORKS

13 HOURS

Biological Neural Networks vs Artificial Neural Networks - Perceptron and Multilayer Perceptron (MLP) - Activation Functions: Sigmoid, Tanh, ReLU, Leaky ReLU, Softmax - Loss Functions: MSE, Cross-Entropy - Feedforward Neural Networks - Backpropagation Algorithm - Gradient Descent and its Variants (SGD, Mini-batch, Momentum).

UNIT - II DEEP NEURAL NETWORKS AND OPTIMIZATION 14 HOURS

Deep Neural Networks (DNNs) Architecture - Vanishing and Exploding Gradients - Weight Initialization Techniques - Batch Normalization - Regularization: L1, L2, Dropout - Optimizers: Adam, RMSProp, Adagrad - Hyperparameter Tuning: Grid Search, Random Search.

UNIT - III CONVOLUTIONAL NEURAL NETWORKS (CNNs) 15 HOURS

Introduction to CNNs - Convolution and Pooling Layers - Padding and Stride Concepts - Architectures: LeNet, AlexNet, VGG, ResNet - Transfer Learning and Fine-tuning - Applications: Image Classification, Object Detection.

UNIT - IV RECURRENT NEURAL NETWORKS (RNNs) AND SEQUENCE MODELS 15 HOURS

Introduction to RNNs - Vanishing Gradient in RNNs - Long Short-Term Memory (LSTM) Networks - Gated Recurrent Unit (GRU) - Bidirectional RNNs - Applications: Sentiment Analysis, Time Series Forecasting, Language Modeling.

UNIT - V ADVANCED NEURAL NETWORKS 15 HOURS

Generative Adversarial Networks (GANs): Architecture and Applications - Autoencoders and Variational Autoencoders (VAEs) - Neural Network Interpretability and Explainability (LIME, SHAP) - Ethical Considerations in Neural Network Design - Use Cases in Healthcare, Finance, and NLP - Neural Network Deployment (ONNX, TensorFlow Lite).

TOTAL: 72 HOURS

Neural Networks: Lab Programs 60 HOURS

1. Implement Perceptron Algorithm for binary classification.
2. Build a Feedforward Neural Network with backpropagation from scratch.
3. Train a MLP Classifier using TensorFlow/Keras on the Iris dataset.
4. Apply ReLU and Softmax Activations to a dense neural network.
5. Implement Dropout and Regularization in a neural network.
6. Build a CNN for MNIST Digit Classification using Keras.
7. Image Classification using Transfer Learning (e.g., MobileNet or VGG16).
8. Time Series Forecasting with LSTM (e.g., stock price data).
9. Build a Sentiment Analysis Model using RNN or GRU with IMDB dataset.
10. Autoencoder for Image Denoising.

11. Create and Train a Simple GAN to generate digits similar to MNIST.

12. Deploy a Neural Network **Model** using TensorFlow Lite

TEXT BOOKS:

1. Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.
2. Haykin, S. (2009). *Neural networks and learning machines* (3rd ed.). Pearson Education.

REFERENCE BOOKS:

1. Nielsen, M. (2015). *Neural networks and deep learning*. Determination Press.
2. Géron, A. (2019). *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow* (2nd ed.). O’Reilly Media.
3. Aggarwal, C. C. (2018). *Neural networks and deep learning: A textbook*. Springer.

WEBSITES:

1. <https://www.tensorflow.org>
2. <https://pytorch.org>
3. <https://keras.io>
4. <https://deeplearning.ai>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To study the basic concepts of Data Science and data lifecycle.
- To understand the theoretical and mathematical aspects of Data Science models.
- To learn common random variables and their uses, and with the use of empirical distributions.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Illustrate the key concepts in data science, including tools and approaches.	Understand
CO2	Identify and apply the concepts in data collection, sampling and probabilistic models	Apply
CO3	Relate the various techniques in data science.	Understand
CO4	Select the mathematical formulation of machine learning and statistical models to visualize the data in various methods.	Apply
CO5	Develop a suitable data science technique to solve an information analytics problem	Apply

UNIT - I INTRODUCTION

10 HOURS

The Big Picture: What is Data Science? –The data life cycle: pre-processing, analysis, postprocessing
Preprocessing: Data gathering, cleansing, visualization, and understanding (Mean, Variance, Standard

Deviation. Percentiles)–Data Storage (Relational databases, e.g. MySQL)

UNIT - II SAMPLING 10 HOURS

Sampling – Probability Models for Statistical Methods: Discrete and continuous probability distributions, density functions. Random variables, expected values, variance, correlation

UNIT - III DATA NORMALIZATION 10 HOURS

Data Normalization (z-values, transforms) –Random processes –Data Management: Tools for Data Analysis, Case Study: Data analysis using Python-Arrays, Visualization.

UNIT - IV MAJOR TECHNIQUES IN DATA SCIENCE 09 HOURS

Major Techniques in Data Science: Data mining, Data warehousing, Data mining vs Data warehouse–Machine Learning-Supervised Learning, Unsupervised Learning.

UNIT - V BUSINESS INTELLIGENCE 09 HOURS

Business Intelligence–Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytics–Cloud computing-definition, Cloud services, types of clouds, some of commercial and non-commercial cloud service providers.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Myatt, G. J., & Johnson, W. P. (2014). *Making sense of data I: A practical guide to exploratory data analysis and data mining* (2nd ed.). John Wiley & Sons
2. Saltz, J. S. (2019). *An introduction to data science* (2nd ed.). Sage Publications, Inc.
3. Haider, M. (2015). *Getting started with data science: Making sense of data with analytics* (1st ed.). IBM Press

REFERENCE BOOKS:

1. Bruce, P., & Bruce, A. (2017). *Practical statistics for data scientists* (1st ed.). O'Reilly Media.
2. Griffiths, D. (2008). *Head first statistics* (1st ed.). O'Reilly Media.

WEBSITES:

1. <https://www.inferentialthinking.com/chapters/intro>
2. <https://www.openintro.org/stat>
3. https://swayam.gov.in/nd1_noc19_cs60/preview
4. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-0002-introduction->

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To understand the fundamental concepts of time series data and its components, including trend, seasonality, and noise.
- To apply statistical and machine learning methods to model, analyze, and forecast time-dependent data.
- To develop and evaluate advanced models including ARIMA, SARIMA, LSTM, and use forecasting tools such as Prophet

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Identify and describe the components of time series data and visualize them effectively.	Understand
CO2	Perform time series decomposition and apply smoothing techniques for trend and seasonality analysis.	Apply
CO3	Test for stationarity and apply ARIMA-based models for accurate time series forecasting.	Evaluate
CO4	Implement advanced modeling techniques including seasonal, multivariate, and volatility models.	Apply
CO5	Build and evaluate deep learning-based models like LSTM and utilize modern tools like Facebook Prophet for real-world forecasting applications.	Create

UNIT - I INTRODUCTION TO TIME SERIES ANALYSIS

10 HOURS

Time series – definition, characteristics, and scope - Applications of time series – finance, weather forecasting, healthcare, retail - Components of time series – trend, seasonality, cyclic variation, irregularity - Types of time series – univariate vs multivariate - Time series data structure – index, timestamp, frequency - Data preprocessing – handling missing values, outliers, and scaling - Visualization techniques – line plots, seasonal plots, lag plots using matplotlib/seaborn.

UNIT - II TIME SERIES DECOMPOSITION AND SMOOTHING 10 HOURS
TECHNIQUES

Time series decomposition – additive and multiplicative models - Smoothing techniques – moving average and exponential smoothing - Types of exponential smoothing – simple, Holt’s linear trend, Holt-Winters seasonal method - Seasonal decomposition – using statsmodels and pandas - Case study – decomposition and trend-seasonality analysis of real-world datasets

UNIT - III STATIONARITY AND FORECASTING MODELS 10 HOURS

Stationarity – concept, importance, and types (strict and weak stationarity) - Stationarity testing – Augmented Dickey-Fuller (ADF) test, KPSS test - Techniques to achieve stationarity – differencing, logarithmic and power transformations - Autocorrelation – ACF and PACF plots for identifying lag values - Time series models – AR (AutoRegressive), MA (Moving Average), ARMA, ARIMA - Model implementation – parameter tuning, residual diagnostics, forecasting using statsmodels

UNIT - IV ADVANCED TIME SERIES MODELING 09 HOURS

Seasonal models – SARIMA (Seasonal ARIMA) and its parameters - Multivariate time series – Vector AutoRegression (VAR) models - Volatility models – ARCH (Autoregressive Conditional Heteroskedasticity), GARCH (Generalized ARCH) - State Space Models – concept and use in dynamic systems - Kalman Filter – introduction and application in time series prediction - Model evaluation – AIC, BIC, MSE, RMSE, and residual error analysis.

UNIT - V DEEP LEARNING AND APPLICATIONS IN TIME SERIES 09 HOURS

Deep learning overview – role in time series forecasting - Recurrent Neural Networks (RNN) – architecture and use cases - Long Short-Term Memory (LSTM) networks – handling long-term dependencies in sequences - Feature engineering – creating lag features, rolling windows, and time-based features - Forecasting frameworks – Facebook Prophet and AutoTS for automated time series modeling - Real-world application – build and evaluate LSTM and Prophet models using Python.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Chatfield, C. (2003). *The analysis of time series: An introduction* (6th ed.). Chapman and Hall/CRC.
2. Wei, W. W. S. (2006). *Time series analysis: Univariate and multivariate methods* (2nd ed.). Pearson Education.

REFERENCE BOOKS:

1. Box, G. E. P., Jenkins, G. M., Reinsel, G. C., & Ljung, G. M. (2015). *Time series analysis: Forecasting and control* (5th ed.). Wiley.

2. Hyndman, R. J., & Athanasopoulos, G. (2021). *Forecasting: Principles and practice* (3rd ed.). OTexts. <https://otexts.com/fpp3/>
3. Shumway, R. H., & Stoffer, D. S. (2017). *Time series analysis and its applications: With R examples* (4th ed.). Springer

WEBSITES:

1. <https://otexts.com/fpp3/> – *Forecasting: Principles and Practice* by Hyndman & Athanasopoulos
2. <https://machinelearningmastery.com/start-here/#timeseries> – Jason Brownlee’s tutorials on Time Series
3. <https://www.statsmodels.org/> – Python library for statistical modeling
4. <https://facebook.github.io/prophet/> – Official documentation for Facebook Prophet
5. <https://towardsdatascience.com/> – Blogs and tutorials on time series and forecasting with real-world datasets

CO, PO, PSO Mapping

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PS O1	PS O2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Not Required

COURSE OBJECTIVES(CO):

- To understand the various characteristics of Intelligent agents
- To learn about the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different ways of designing software agents
- To know about the various applications of AI.
- Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.

COURSE OUTCOMES(COs) :

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Identify problems that are amenable to solution by AI methods	Understand
CO2	Identify appropriate AI methods to solve a given problem.	Understand
CO3	Formalize a given problem in the language/framework of different AI methods.	Understand
CO4	Implement basic AI algorithms.	Apply
CO5	Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.	Create

UNIT I : INTRODUCTION TO AI**10 HOURS**

Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem solving methods – Problem graphs, Matching. Heuristic functions - Hill Climbing-Depth first and Breadth first search, A* Algorithm, Simulated Annealing, Constraints

satisfaction.

UNIT II REPRESENTATION OF KNOWLEDGE **10 HOURS**

Game playing –Predicate logic – Representing Instance and Isa Relationship, Introduction to predicate calculus, Resolution, Knowledge representation -Production based system, Frame based system

UNIT III : KNOWLEDGE INFERENCE & PLANNING **10 HOURS**

Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning – Certainty factors -Basic plan generation systems – Strips -Advanced plan generation systems – K strips.

UNIT IV : LEARNING AND EXPERT SYSTEMS **9 HOURS**

Learning- Machine learning, Adaptive Learning.Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition – Meta knowledge. Typical expert systems– MYCIN, DART, XOON, Expert systems shells.

UNIT V : PROLOG **9 HOURS**

Programming in Logic (PROLOG): Introduction, Prolog variables, Syntax, Using rules, Input and Output predicates, Procedural and declarative meanings, Arithmetic operation, unification, lists, control structures, use of fail, CUT, Not.

TOTAL: 48 HOURS

TEXT BOOKS:

1. Kevin Knight and Elaine Rich, Nair B.,(2018). *Artificial Intelligence (SIE)*, Mc Graw Hill
2. Dan W. Patterson, (2017). *Introduction to AI and ES*, Pearson Education
3. Ivan Brako, (2017). *PROLOG: Programming for Artificial Intelligence*,3rd edition Pearson.

REFERENCE BOOKS:

1. Peter Jackson, (2016). *Introduction to Expert Systems*, 3rd Edition, Pearson Education.
2. Stuart Russel and Peter Norvig (2016). *AI – A Modern Approach*, 2nd Edition, Pearson Education.
3. Deepak Khemani (2015). *Artificial Intelligence*, Tata Mc Graw Hill Education.

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	3	-	-	-	-	3	-	-	1	-
CO2	3	-	-	-	-	-	3	-	1	-	-	-	3	-	-	-	2
CO3	3	-	-	-	3	-	-	-	-	-	-	-	3	-	-	2	1
CO4	3	-	2	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	3	-	1	-	-	-	-	-	-	-	-	-	3	-	-	2	1
Average	3	-	1.5	-	3	-	3	3	1	-	-	-	3	-	-	1.7	1.3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

Course Objectives

- To represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology.
- To understand the semantic relationships among these data elements using Resource.
- To design and implement a web services application that “discovers” the data and/or other Description Framework (RDF).
- To understand the capabilities and limitations of semantic web technology for many applications.
- To learn the framework of JENA

Course Outcomes

Upon completion of the course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Analyze fundamental concepts, advantages and limits of the semantic web	Analyze
CO2	Implement ontologies in the context of developing semantic web	Apply
CO3	Implement RDF framework and associated technologies for developing semantic web	Apply
CO4	Examine the various languages and properties of Web Ontologies	Analyze
CO5	Implement semantic Web Tools like Jena and SPARL for developing architecture for semantic web	Apply

UNIT-I Introduction

8 HOURS

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Metadata for web information - The semantic web architecture and technologies –Contrasting Semantic with Conventional Technologies –Semantic Modeling - Potential of semantic web solutions and challenges of adoption

UNIT-II Ontological Engineering

8 HOURS

Ontologies – Taxonomies –Topic Maps – Classifying Ontologies – Terminological aspects: concepts, terms, relations

between them – Complex Objects –Subclasses and Sub-properties definitions – Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT-III Structuring and Describing Web Resources

8 HOURS

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing - RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modeling for Combinations and Patterns- Transitivity

UNIT-IV Web Ontology Language

8 HOURS

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – Owl Logic.

UNIT-V Semantic Web Tools and Applications

8 HOURS

Development Tools for Semantic Web – Jena Framework – SPARL –Querying semantic web - Semantic Wikis - Semantic Web Services – Modeling and aggregating social network data - Ontological representation of social relationships, Aggregating and reasoning with social network data Understand semantic web basics, architecture and technologies

TOTAL HOURS: 48 HOURS

SUGGESTED BOOKS

1. Grigoris Antoniou, Frank van Harmelen. 3rd Edition (2012), A Semantic Web Primer.,MIT Press, USA
2. Liyang Yu (2011), “A Developer's Guide to the Semantic Web”, First Edition ,Springer.
3. John Hebel, Matthew Fisher, Ryan Blace and Andrew Perez-Lopez (2009), “Semantic Web Programming”, First Edition Wiley.
4. Robert M. Colomb(2007), “Ontology and the Semantic Web”, Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOS Press.
5. Dean Allemang and James Hendler(2011), “Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL, Second Edition, Morgan Kaufmann..
6. Karin Breitman, Marco Antonio Casanova and Walt Truszkowski,(2010), “Semantic Web: Concepts, Technologies and Applications (NASA Monographs in Systems and Software Engineering)”, Springer.

CO, PO, PSO Mapping

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PS O1	PS O2
CO1	-	3	-	-	-	-	-	3	-	-	-	-	3	-	-	1	-
CO2	-	3	-	-	-	-	-	-	1	3	-	-	3	-	-	-	2
CO3	-	3	-	-	-	3	-	-	-	-	-	-	3	-	-	2	1
CO4	-	3	-	2	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	3	-	1	-	-	-	-	-	-	-	-	3	-	-	2	1
Average	-	3	-	1.5	-	3	-	3	1	3-	-	-	3	-	-	1.7	1.3

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Concepts and management principles

COURSE OBJECTIVES(CO):

- Explain entrepreneurship concepts and how entrepreneurs handle business situations.
- Analyze various aspects, scope, and challenges of entrepreneurial ventures, and understand the objectives of entrepreneurs.
- Discuss venture development steps, new trends in entrepreneurship, and analyze the role of government in entrepreneurship development.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Categorize the foundation of Entrepreneurship Development and its theories.	Analyze
CO2	Learners will explore entrepreneurial skills and management function of a company with special reference to SME sector	Understand
CO3	Identify the type of entrepreneur and the steps involved in an entrepreneurial venture.	Remember
CO4	Apply the new trends in entrepreneurship& starting a venture and to explore marketing methods	Apply
CO5	Examine the Entrepreneurship Development and Government	Apply

UNIT I INTRODUCTION TO ENTREPRENEURSHIP

15 HOURS

Introduction - Entrepreneur - meaning- Importance-Qualities, nature, types, traits, culture, similarities and economic and differences between Entrepreneur and Intrapreneur. Entrepreneurship development-its importance- Role of Entrepreneurship -Entrepreneurial environment

UNIT II EVOLUTION OF ENTREPRENEURS

15 HOURS

Entrepreneurial promotion. Training and developing motivation: factors - mobility of Entrepreneurs - Entrepreneurial change - occupational mobility-factors in mobility - Role of consultancy organizations in promoting Entrepreneurs-Forms of business for Entrepreneurs.

UNIT III CORPORATE ENTREPRENEURSHIP

15 HOURS

Creating and starting the venture - Steps for starting a small industry - selection of types of organization - International entrepreneurship opportunities. Need for corporate entrepreneurship, domain of corporate

entrepreneurship, conditions favourable for Corporate entrepreneurship, benefits of Corporate entrepreneurship.

UNIT IV FAMILY AND NON FAMILY ENTREPRENEUR & WOMEN ENTREPRENEURS

14 HOURS

Managing, growing and ending the new venture - Family and Non Family Entrepreneur & Women entrepreneurs: Role of Professionals, Professionalism vs family entrepreneurs, Role of Woman entrepreneur, Factors influencing women entrepreneur, Challenges for women entrepreneurs, Growth and development of women entrepreneurs in India

UNIT V ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT ROLE 13 HOURS

Entrepreneurship Development and Government: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available. Women Entrepreneurs Reasons for low / no women Entrepreneurs their Role, Problems and Prospects.

TOTAL: 72 HOURS

TEXT BOOKS:

- 1 Desai, V. (2009). *Dynamics of entrepreneurial development and management*. Himalaya Publishing House.
- 2 Srinivasan, N. P., & Gupta, G. P. (2020). *Entrepreneurial development*. Sultanchand & Sons
- 3 Burns, P. (2020). *Corporate entrepreneurship and innovation*. Bloomsbury Academic.

REFERENCE BOOKS::

- 1 Unni. (2021). *Women entrepreneurship in Indian middle class*. Orient Blackswan Pvt. Ltd.
- 2 Kumar, S. A., Poornima, S. C., Abraham, M. K., & Jayshree, K. (2021). *Entrepreneurship development* (1st ed.). New Age International Pvt. Ltd.

WEBSITES

- 1 <https://www.udemy.com/topic/cyber-security/>
- 2 <https://www.coursera.org/courses?query=cybersecurity>
- 3 <https://www.simplilearn.com/cyber-security>
- 4 https://onlinecourses.swayam2.ac.in/cec21_ge10/preview

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
CO1	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	1
CO3	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	1
CO4	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-	-	1
Average	1	-	-	3	3	-	2	2	-	-	-	-	2	-	-	-	1

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Bachelor of Computer Applications

2025-2026

25CAU691

Project and Viva Voce

Semester VI

9H - 6C

Instruction Hours/week: L:9 T:0 P:0

Marks: Internal:40 External:60 Total:100

I YEAR

Orientation – NSS origin – motto – symbol – NSS administration at different levels – programme planning – Rural Projects – Urban projects – Government schemes – Career guidance – Self help groups – Environment protection – Use of natural energy – Conventional energy resources – Soil and Water conservation – Community health programmes – Women and child welfare – Education for all.

II YEAR

Popularization of agro techniques – Self employment opportunities – Animal health, Dairy and Poultry farming – Road safety – Training on First aid and emergency cell. Popularization of small savings – communal harmony and National integration – Care of Senior citizens – Personality development – meditation, Yoga Art of living – Activities on the preservation of National monuments, cultural heritage and folklore – special camp activities

PRACTICAL SCHEDULE**Semester-I**

1. Orientation of NSS volunteers and programme coordinator and Programme officers.
2. Origin of NSS in India and its development
3. NSS motto, symbol and NSS awards
4. Organizational set up of NSS at Central, State University and college levels.
5. Programme planning – Theme of the year – planning implementation at PC, PO and NSS volunteer level.
6. Visit to selected village - gathering basic data on socio economic status.
7. Participatory rural appraisal – studying the needs of the target group.
8. Visit of urban slum and gathering data on socio economic status.
9. Self involvement and methods of creating rapport with the target group.
10. Awareness campaign on welfare schemes of the central and state government.
11. Formation career guidance group with NSS volunteers and students welfare unit

12. Cycle rally on environmental protection.
13. Campus development activities – clean environment campaign, formation of plastic free zones.
14. Campus development,
15. Tree planting maintenance and greening
16. Campus cleaning.
17. Final Examination.

Semester - II

1. Motivation of rural and urban youth for formation of SHG (Self Help Groups) in collaboration with Government machineries and NGOs.
2. Campaign on ill effects of plastics in the adjoining campus areas – Villages / urban areas.
3. Campaign on *Parthenium* eradication.
4. Cycle rally on air pollution – Vehicle exhaust and other means.
5. Popularization of biogas and smokeless chulah.
6. Demonstration on the use of wind energy and solar energy.
7. Demonstration of water harvesting techniques.
8. Demonstration on soil conservation techniques wherever possible.
9. Campaign on Community health programmes of central and state Government – involving Health department officials.
10. AIDS awareness campaign ; campaign on diabetes and healthy food habits and drug abuse
11. Planing formation of blood donors club – involving NGOs.
12. Campaign on gender equality and women empowerment.
13. Campaign on child health care – immunization, food habits and child labour abolition.

Semester - III

1. Conducting field days with KVK to popularize improved agro techniques.
2. Conducing seminar / workshop in a nearby village to motivate the youth on agribusiness (involving DEE, KVK, NGO and local agripreneurs).
- 3–5 Campaign on self employment opportunities like Apiculture, mushroom cultivation, Food processing and value addition, production of biocontrol agents and biofertilizers, nursery techniques, seed production, tissue culture, vermicompost, manufacture of small gadgets and agricultural implements as per local needs and feasibility.
6. Animal health care campaign – Dairy and poultry farming - Forage

production techniques and silage making.

7. Training the NSS volunteers on road safety measures in involving traffic wardens and RTO.
8. Training NSS volunteers on First AID and emergency call involving NGOs and organizations like St. John's Ambulance, Red Cross, etc.,
9. Organizing Road safety rally.
10. Motivating NSS Volunteers on small savings concept and conveying the message to the public through them.
11. Observation of National integration and communal harmony. 12 – 16 : Campus development and greening activities
- 17.Examination.

Semester - IV

1 – 3 : Visit to orphanages and old age homes to look after their needs.

4. Personality development programmes – Building up self confidence in youth.

5– 7 : Teaching NSS volunteers on mediation Yoga and art of healthy living with trained teachers

8 – 9 : Visit of nearby National Monument / Places of tourist importance and campaign on cleanliness and preservation.

10–11 : Exploration of hidden talents of village youth and public on folklore, traditional art, sports, martial arts and cultural heritage.

12–13. Campus improvement activities

14–16 : Visit to special camp village and pre camp planning.

17.Examination

- ◆ Besides the above NSS volunteers will attend work during important occasions like Convocation, Farmers day, Sports meet and other University / College functions. NSS Volunteers will attend one special camp in the selected village for a duration of 10 days and undertake various activities based on the need of that village people.
- ◆ For all out door regular activities villages / slums nearby the campus may be selected to avoid transport cost (Cyclable distance)
- ◆ Special camp activity may be carried out in a village situated within a radius of 15 – 20 KM.

EVALUATION

A. Regular activities	Marks(60)
I Semester	15
II Semester	15
III Semester	15
IV Semester	15

* (Written test 10 marks and attendance 5 marks) 80% attendance compulsory

B. Special camping activities	Marks(40)
a. Attendance in daily activities (marks During special camp)	30
b.Special camp activity report	5
Viva - voce on the 7 th day(special camp)	5

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- To introduce the concepts, characteristics, and challenges of Big Data and its importance in real-world applications.
- To introduce the tools required to manage and analyze bigdata like Hadoop, No Sql Map Reduce.
- To teach the fundamental techniques and principles in achieving bigdata analytics with scalability and streaming capability.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Work with bigdata tools and its analysis techniques	Understand
CO2	Analyze data by utilizing clustering and classification algorithms	Analyze
CO3	Analyze bigdata using Hadoop, No Sql Map Reduce.	Analyze
CO4	Apply different mining algorithms and recommendation systems for large volumes of data	Apply
CO5	Understand No SQL databases and management	Understand

UNIT - I INTRODUCTION TO BIG DATA

15 HOURS

Definition and characteristics of Big Data – Volume, Velocity, Variety, Veracity, and Value - Types of data – Structured, semi-structured, unstructured - Challenges in Big Data – Storage, processing, analysis, and security - Traditional vs Big Data architecture – Data warehouse vs data lake - Introduction to Hadoop ecosystem – HDFS, MapReduce - Applications of Big Data in various domains – Healthcare, Retail, Finance, Social Media

UNIT - II HADOOP FRAMEWORK AND HDFS 15 HOURS

Hadoop architecture – Master-slave structure - HDFS – architecture, blocks, replication, NameNode and DataNode - Hadoop installation modes – Standalone, pseudo-distributed, and fully-distributed - Input/output formats in Hadoop - Hadoop streaming and data ingestion tools – Sqoop, Flume- MapReduce and YARN – MapReduce Programming Model

UNIT - III CLUSTERING AND CLASSIFICATION 15 HOURS

Advanced Analytical Theory and Methods: Overview of Clustering – K-means – Use Cases – Overview of the Method–Determining the Number of Clusters– Diagnostics–Reasons to Choose and Cautions- Classification: Decision Trees – Overview of a Decision Tree – The General Algorithm–Decision Tree Algorithms–Evaluating a Decision Tree–Decision Trees in R–Naïve Bayes–Bayes‘Theorem–Naïve Bayes Classifier.

UNIT - IV ASSOCIATION AND RECOMMENDATION SYSTEM 14 HOURS

Advanced Analytical Theory and Methods: Association Rules – Overview – Apriori Algorithm – Evaluation of Candidate Rules – Applications of Association Rules – Finding Association & finding similarity – Recommendation System: Collaborative Recommendation- Content Based Recommendation–Knowledge Based Recommendation-Hybrid Recommendation Approaches.

UNIT - V NO SQL DATA MANAGEMENT FOR BIG DATA AND VISUALIZATION 13 HOURS

NoSQL Databases: Schema-less Models: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores – Tabular Stores – Object Data Stores – Graph Databases Hive – Sharding–Hbase–Integration of Hadoop with NoSQL databases

TOTAL: 72 HOURS

List of Programs

72 HOURS

1. Install Hadoop and run basic HDFS commands to check file operations.
2. Upload and download files in HDFS.
3. Write a MapReduce program to count words in a text file.
4. Use Sqoop to import data from MySQL to Hadoop.
5. Set up Flume to collect and store logs in HDFS.

6. Implement K-Means clustering on a dataset using Python or R.
7. Create a Decision Tree model using R.
8. Build a Naïve Bayes classifier in R.
9. Generate association rules using the Apriori algorithm in R.
10. Create a simple content-based recommendation system.
11. Perform CRUD operations with MongoDB using Python.
12. Visualize data from E-Commerce site using R.

TEXT BOOKS:

1. EMC Education Services. (2018). *Data science and big data analytics: Discovering, analyzing, visualizing and presenting data*. Wiley Publishers.
2. Baesens, B. (2017). *Analytics in a big data world: The essential guide to data science and its applications*. Wiley Publishers.
3. Jannach, D., & Zanker, M. (2017). *Recommender systems: An introduction*. Cambridge University Press.

REFERENCE BOOKS:

1. Pries, K. H., & Dunnigan, R. (2016). *Big data analytics: A practical guide for managers*. CRC Press.
2. Loshin, D. (2016). *Big data analytics: From strategic planning to enterprise integration with tools, techniques, NoSQL, and graph*. Morgan Kaufmann/Elsevier Publishers.
3. Lin, J., & Dyer, C. (2015). *Data intensive text processing with MapReduce*. Synthesis Lectures on Human Language Technologies, 3(1), 1-177. Morgan & Claypool Publishers.

WEBSITES:

1. <https://www.ibm.com/analytics/big-data-analytics>
2. <https://www.simplilearn.com/what-is-big-data-analytics-article>
3. <https://www.youtube.com/watch?v=AMRDgIKcjjU>

CO, PO, PSO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	3	-	-	-	-	2	-	-	-	-	-	-	1	-
Average	3	-	3	3	-	-	-	-	2	2	-	-	-	-	-	1.5	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Automata Theory Concepts, Compiler Design Basics

COURSE OBJECTIVES (CO):

- To Integrate generative AI with other modalities such as images, audio, or video to create To multimodal outputs.
- To Explore cross-modal generation tasks such as image captioning or audio-to-text synthesis.
- To Utilize generative AI to personalize content recommendations or user interfaces based on individual preferences and behaviors.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Understand Fundamentals of Fine Tuning, Types of fine-tuning Techniques.	Understand
CO2	Reinforcement learning and LLM-powered applications.	Apply
CO3	Improve efficiency and scalability in producing large volumes of high-quality content.	Create
CO4	Implement generative AI for tasks such as language translation, summarization, or paraphrasing.	Analyze
CO5	Provide seamless interactions and maintain context over extended conversations.	Apply

UNIT I INTRODUCTION TO GENERATIVE AI **12 HOURS**

Introduction Generative AI & LLMs - LLM use cases and tasks - Text generation before transformers - Transformers architecture - Generating text with transformers - Prompting and prompt engineering (CoT) – RAG Technique for retrieval .

UNIT II Generative AI **12 HOURS**

Generative configuration - Generative AI project lifecycle - Pre-training large language models - Computational challenges of training LLMs.

UNIT III FINE TUNING AND EVALUATION **12 HOURS**

Instruction fine-tuning - Fine-tuning on a single task - multi-task instruction fine-tuning - Model evaluation – Benchmarks -Parameter efficient fine-tuning (PEFT) -PEFT techniques 1: LoRA – PEFT techniques 2: Soft prompts.

UNIT IV REINFORCEMENT LEARNING **12 HOURS**

Aligning models with human values - Reinforcement learning from human feedback (RLHF) - RLHF: Obtaining feedback from humans - Reward model - Fine-tuning with reinforcement learning - Model optimizations for deployment.

UNIT V LLM-POWERED APPLICATIONS **12 HOURS**

Generative AI Project Lifecycle - Using the LLM in applications - Interacting with external applications - Helping LLMs reason and plan with chain-of-thought - Program-aided language models (PAL) - ReAct: Combining reasoning and action - LLM application architectures.

TOTAL: 60 HOURS

TEXT BOOKS:

- 1 Deforest, E. R. (2024). *Prompt Engineering with Transformers and LLM*. Kindle.
- 2 Rehmani, A. (2024). *Generative AI for Everyone* (1st ed.). Altaf Rehmani.

REFERENCE BOOKS:

- 1 Foster, D. (2024). *Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play*.

- 2 Gupta, D., & Srivastava, A. (2024). *The Potential of Generative AI: Transforming Technology, Business, and Art through Innovative AI Applications.*

WEBSITES:

- 1 <https://www.techtarget.com/searchenterpriseai/definition/generative-AI>
- 2 <https://ai.google/discover/generativeai/>
- 3 <https://generativeai.net/>

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO 1	PSO 2
CO1	3	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
CO2	3	-	3	2	3	1	-	1	2	1	-	-	-	-	-	1	-
CO3	3	-	3	-	3	1	-	1	2	1	-	-	-	-	-	-	-
CO4	3	-	3	1	3	1	-	1	2	1	1	-	-	-	-	-	-
CO5	3	-	1	-	-	-	-	-	2	-	-	-	-	-	-	-	1
Average	3	0	2.5	1.5	3	1	0	1	1.8	1	1	0	0	0	0	1	1

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

- To develop the statistical skills in the areas of sampling and test of hypothesis.
- To understand statistical techniques as powerful tool in scientific computing.
- To learn chi-square test for independence as well as to understand the concept of quality, process and product control using control chart techniques and sampling inspection plan.

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Explain the principles of census and sample surveys and to become competent for conducting sample surveys.	Understand
CO2	Select the information about the population on the basis of a random sample taken from that population and also to choose an appropriate test procedure under the test of significance	Apply
CO3	Identify the difference between parametric and non-parametric tests.	Apply
CO4	Experiment with the difference between one way and two-way ANOVA.	Apply
CO5	Examine the basic of Statistical Quality Control and its tools	Analyze

UNIT - I

15 HOURS

Sample Survey Basic Concept of Sample Survey - Census and Sample Survey - Population and Sample – Parameter and Statistic – Preparation of Questionnaire and Schedules – Principle steps in Sample Survey – Pilot survey – Sampling Distribution - Standard Error - Sampling and Non-sampling Errors – Advantages over Complete Enumeration – Limitations of Sampling.

UNIT - II**15 HOURS**

Test of Significance Sampling Distribution - Standard Error – Test of Hypothesis: Simple Hypothesis, Null Hypothesis and Alternative Hypothesis – Test of Significance: Large Sample Test based on Mean, Differences of Means, Proportion and Difference of Proportions - Small Sample Test based on Mean, Difference of Means, Paired ‘t’ Test.

UNIT - III**14 HOURS**

Analysis of Variance F-test – Analysis of Variance (ANOVA) – Test procedure for One way and Two way classifications – Simple Problems.

UNIT - IV**14 HOURS**

Introduction of Non-parametric Test – Difference between Non-parametric and Parametric Test – Advantage and Limitations of Non-parametric Tests – Comparison of One and Two Populations Test for Randomness – Run Test – Test for Rank Correlation Coefficient – Sign Test. Comparison of Two Populations Median Test – Mann Whitney U Test.

UNIT - V**14 HOURS**

Meaning and Concepts of Quality – Quality of Design – Standardization for Quality – Quality Movement – Quality Management – Quality of Conformance – Need for Statistical Quality Control Techniques in Industry – Causes of Quality Variations – Process Control and Product Control – Statistical basis for Control Charts – Uses of Shewart’s Control Charts - R Charts - Charts for Defectives p and np Charts.

TOTAL: 72 HOURS**TEXT BOOKS:**

- 1 Gupta, S.P. (2001). *Statistical Methods*, Sultan Chand & Sons, New Delhi.
- 2 Gupta, S.C. (1974). *Statistical Quality Control*, Khanna Publishing Co, New Delhi.
- 3 Mahajan, M. (2009). *Statistical Quality Control*, Dhanpat Rai & Co. (P) Ltd., Educational & Technical Publishers, New Delhi.

WEBSITES:

- 1 <http://www2.ing.unipi.it/lanzetta/stat/Chapter20.pdf>
- 2 <https://www.statisticshowto.com/parametric-and-non-parametric-data/>
- 3 <http://onlinestatbook.com/2/introduction/inferential.html>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	3	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-
CO2	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
CO4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Average	3	-	-	2	2	1	-	1	-								

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

Instruction Hours/week: L:0 T:0 P:6

Marks: Internal:40 External:60 Total:100

End Semester Exam: 3 Hours

PREREQUISITE:

- Basics of python libraries

COURSE OBJECTIVES (CO):

- To investigate various applications of LLMs in natural language processing tasks, including text generation, summarization, translation, and conversational agents.
- To gain practical experience in fine-tuning LLMs for specific tasks and mastering prompt engineering to elicit desired responses.
- To learn methods for Evaluate and optimizing the performance of LLMs, focusing on metrics such as accuracy, relevance, coherence, and ethical considerations.

COURSE OUTCOMES (COs):

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Demonstrate a thorough understanding of the principles, architecture, and training processes of large language models.	Apply
CO2	Capable of evaluating and optimizing the performance of LLMs, ensuring high-quality and reliable outputs.	Evaluate
CO3	Develop and deploy applications that utilize LLMs for tasks such as text generation, summarization, and conversational AI.	Evaluate
CO4	Understand and be able to address ethical and societal implications of using LLMs, promoting responsible AI practices.	Understand
CO5	Implementing real-world projects that showcase the practical applications and benefits of large language models.	Apply

LIST OF PROGRAMS

- 1 Present your POV on the evolution of Large Language Models. Articulate their growth, architecture changes and application landscape
- 2 Present your POV on the different fine-tuning methodologies. Articulate the differences, the advantages, and disadvantages of each approach.
- 3 Present your POV on the constitutional AI, how it's different from RLHF.
- 4 Present your POV on the Quantization of LLMs, different techniques that are available, performance of the Quantized Models in comparison to the Original Models
- 5 Present your POV on innovative architectures in transformer model that can lead to savings in training or inference time. As an example, MoE from Mistral is one such unique architecture. Articulate the performance of new architectures compared to the original architectures and come up with some new architecture that can lead to savings
- 6 Present your POV on the Sustainable AI, Ethical AI, Trustworthy AI

TOTAL: 72 HOURS

TEXT BOOKS:

- 1 Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.
- 2 Rothman, D. (2021). *Transformers for natural language processing: Build state-of-the-art NLP systems with transformer models*. Packt Publishing.

REFERENCE BOOKS:

- 1 Honnibal, M., & Montani, I. (2020). *Advanced NLP with spaCy: A practical guide to building real-world NLP systems*. O'Reilly Media.
- 2 Clark, A., Fox, C., & Lappin, S. (Eds.). (2020). *Handbook of natural language processing* (2nd ed.). CRC Press.

WEBSITES:

- 1 <https://www.sri.inf.ethz.ch/research/llm>

- 2 <https://www.media.mit.edu/publications/latent-lab-large-language-models-for-knowledge-exploration/>
- 3 <https://labs.iitgn.ac.in/lingo/large-language-models/>

CO, PO, PSO Mapping

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO1	PSO2
CO1	-	3	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-
CO2	-	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
CO4	-	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Average	-	3	-	2	2	1	-	-	-	-	-	-	-	-	-	1	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE: Not Required

COURSE OBJECTIVES(CO):

The objectives of this course are:

- Understand the concepts and architecture of Business Intelligence (BI) systems and data-driven decision-making.
- Apply data analysis and visualization techniques to extract insights from business data.
- Use modern BI tools and platforms to develop dashboards, reports, and analytics solutions.

COURSE OUTCOMES(COs) :

At the end of this course, students will be able to

COs	Course Outcomes	Blooms Level
CO1	Explain the fundamentals of business intelligence and analytics processes.	Understand
CO2	Apply data preparation and analytical techniques to real-world business scenarios.	Apply
CO3	Analyze data using OLAP, dashboards, and visualization tools.	Analyze
CO4	Evaluate the effectiveness of different BI strategies and tools in decision-making processes.	Evaluate
CO5	Design and develop interactive BI dashboards and reports using tools like Power BI or Tableau.	Create

UNIT - I INTRODUCTION TO BUSINESS INTELLIGENCE 15 HOURS

Introduction to BI and its evolution-BI architecture and components-BI vs. Data Analytics vs. Data Science-Applications and benefits of BI-Decision support systems and data-driven decision making.

UNIT - II DATA WAREHOUSING AND DATA INTEGRATION 15 HOURS

Data warehouse architecture (Star, Snowflake schema)-ETL processes: Extraction, Transformation, Loading-Data quality and data governance-Data marts and OLAP (MOLAP, ROLAP, HOLAP)-Real-time and near-real-time data processing.

UNIT - III BUSINESS ANALYTICS AND DATA MINING 15 HOURS

Descriptive, predictive, and prescriptive analytics-Classification, clustering, association rule mining-Time series analysis and forecasting-Business performance management (BPM)-KPI and metrics development.

UNIT - IV DATA VISUALIZATION AND DASHBOARD DESIGN 15 HOURS

Principles of effective data visualization-Types of visualizations: bar, line, pie, heatmap, scatter-Storytelling with data-Designing interactive dashboards-Use of Power BI/Tableau for dashboard development.

UNIT - V BI TOOLS, PLATFORMS, AND APPLICATIONS 12 HOURS

Overview of popular BI tools (Power BI, Tableau, QlikView, SAP BI)-BI implementation lifecycle-BI in various sectors: finance, marketing, healthcare, retail-Cloud BI and self-service BI-Ethical and privacy considerations in BI.

TOTAL: 72 HOURS

Business Intelligence & Analytics: Lab Programs 72 HOURS

1. Write a program to load a business dataset using Pandas and explore its structure.
2. Write a program to clean and preprocess data (null values, duplicates, and formatting).
3. Write a program to perform descriptive analysis using group-by and pivot tables.
4. Write a program to visualize sales or financial data using Matplotlib/Seaborn.
5. Write a program to build an OLAP cube simulation using Python and perform roll-up/drill-down operations.
6. Write a program to implement basic classification using decision trees or logistic regression.
7. Write a program to perform clustering analysis (e.g., customer segmentation using K-Means).
8. Write a program to analyze time-series sales data and forecast future values.
9. Develop a basic dashboard using Power BI (or Tableau) with at least 3 charts and 1 slicer.
10. Connect Power BI to an external data source (Excel/SQL Server) and refresh data dynamically.

11. Perform KPI tracking and dashboard enhancement in Power BI/Tableau.
12. Mini Project: Build a complete BI solution for a business case (e.g., sales, HR, marketing).

TEXT BOOKS:

1. Sharda, R., Delen, D., & Turban, E. (2020). *Business intelligence, analytics, and data science: A managerial perspective* (5th ed.). Pearson.
2. Luhn, H. P. (1958). *A business intelligence system*. IBM Journal of Research and Development, 2(4), 314-319.

REFERENCE BOOKS:

1. Provost, F., & Fawcett, T. (2013). *Data science for business: What you need to know about data mining and data-analytic thinking*. O'Reilly Media.
2. Kimball, R., & Ross, M. (2013). *The data warehouse toolkit: The definitive guide to dimensional modeling* (3rd ed.). Wiley.
3. Few, S. (2009). *Now you see it: Simple visualization techniques for quantitative analysis*. Analytics Press.

WEBSITES:

1. Microsoft Power BI. (n.d.). <https://powerbi.microsoft.com>
2. Tableau Public. (n.d.). <https://public.tableau.com>
3. Kaggle. (n.d.). <https://www.kaggle.com>
4. Towards Data Science. (n.d.). <https://towardsdatascience.com>

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO 1	PSO 2
CO1	3	2	2	-	3	-	-	3	3	-	1	-	-	-	-	3	2
CO2	3	1	1	-	3	-	-	2	3	-	-	-	-	-	-	2	1
CO3	3	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO4	3	2	-	-	3	-	-	1	2	-	1	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Average	3	1.5	1.5	-	3	-	-	2	2.7	-	1.5	-	-	-	-	2.5	1.5

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES (CO):

- To discuss how NoSQL databases are designed to handle large volumes of structured, semi- structured, and unstructured data more efficiently than traditional SQL databases.
- To ensure high availability and fault tolerance, often through distributed architecture and data replication strategies.
- To provide examples of typical use cases where NoSQL databases excel, such as content management systems, IoT data storage, real-time analytics, and large-scale e-commerce platforms.

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Compare different types of NoSQL Databases	Analyze
CO2	Compare and contrast RDBMS with different NoSQL databases	Analyze
CO3	Analyze the detailed performance tune of Document-oriented NoSQL databases.	Analyze
CO4	Summarize the Column-oriented NoSQL Databases	Understand
CO5	Analyze performance tune of Key-Value Pair NoSQL databases	Analyze

UNIT I OVERVIEW OF NOSQL

13 HOURS

Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points.

UNIT II COMPARISON OF RDBMS

14 HOURS

Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases. Replication and sharding, MapReduce on databases. Distribution Models, Single Server, Sharding, Master- Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.

UNIT III DATABASE AND WEB ANALYTICS

15 HOURS

NoSQL Key/Value databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E- Commerce Applications, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

UNIT IV COLUMN ORIENTED NOSQL

15 HOURS

Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging.

UNIT V KEY VALUES

15 HOURS

NoSQL Key/Value databases using Riak, Key-Value Databases, Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets. Graph NoSQL databases using Neo4, NoSQL database development tools and programming languages, Graph Databases, Graph Database. Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Sadalage, P. & Fowler, (2019). *NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence*, 1st Edition, Wiley Publications.

WEBSITE LINKS:

1. <https://www.ibm.com/cloud/learn/nosql-databases>

2. <https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp>
3. <https://www.geeksforgeeks.org/introduction-to-nosql/>
4. <https://www.javatpoint.com/nosql-database>

CO, PO, PSO Mapping

CO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1	2
CO1	3	-	2	-	3	-	-	3	3	-	1	-	-	-	-	3	2
CO2	3	-	1	-	3	-	-	2	3	-	-	-	-	-	-	2	1
CO3	3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO4	3	-	-	-	3	-	-	1	2	-	1	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Average	3	-	1.5	-	3	-	-	2	2.7	-	1.5	-	-	-	-	2.5	1.5

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

- Management Principles

COURSE OBJECTIVES(CO):

- Understand the basic concepts of organizational behavior and individual behavior traits for effective performance.
- Develop perceiving skills for assessing situations and communicating ideas effectively.
- Learn how to perform in teams, manage power, politics, and conflict, and recognize the importance of organizational culture and change.

COURSE OUTCOMES(COs):

Upon completion of this course the students will be able to:

COs	Course Outcomes	Blooms Level
CO1	Analyse organizational behavior issues in the context of the organizational behavior theories and concepts.	Analyze
CO2	Apply the behavior of the individuals and groups in organization and manage the stress.	Apply
CO3	Analyse manage team, power, politics and conflict arising between the members	Analyze
CO4	Understand how organizational change and culture affect the working relationship within organizations	Understand
CO5	Understand and exhibit the communication skills to convey the thoughts and ideas of case analysis to the individuals and group.	Understand

UNIT I: ORGANIZATION BEHAVIOUR : INTRODUCTION**15 HOURS**

Organization Behavior: Meaning and definition - Fundamental concepts of OB - Contributing disciplines to the OB field – OB Model - Significance of OB in the organization success - Challenges and Opportunities for OB.

UNIT II : BEHAVIOUR AND PERSONALITY**15 HOURS**

Attitudes – Sources - Types - Functions of Attitudes. Values – Importance - Types of Values. Personality – Determinants of personality- Theories of Personality - psycho-analytical, social learning, job-fit, and trait theories.

UNIT III: PERCEPTION**15 HOURS**

Perception – factors influencing perception - Person Perception – Attribution Theory – Frequently Used Shortcuts in Judging Others- Perceptual Process- Perceptual Selectivity - Organization Errors of perception – Linkage between perception and Decision making.

UNIT IV: GROUP AND STRESS MANAGEMENT

14 HOURS

Foundation of Group Behavior - Types of Groups - Stages of Group Development - Group Norms - Group Cohesiveness – Stress – Causes of stress – Effects of Occupational Stress- Coping Strategies for Stress.

UNIT V: ORGANIZATION CULTURE AND CHANGE

13 HOURS

Organizational culture- Characteristics of Culture- Types of Culture – Creating and Maintaining an Organizational Culture. Organizational change – Meaning - Forces for Change - Factors in Organizational Change - Resistance to change- Overcoming resistance to change.

TOTAL: 72 HOURS

TEXT BOOKS:

1. Stephen P. Robbins & Timothy A. Judge, (2012) "*Organizational Behavior*" 15th Edition, Pearson Education India.
2. Mary Uhl-Bien, John R. Schermerhorn Jr., Richard N. Osborn, (2015) "*Organizational Behavior*", 13th Edition, Wiley India.

REFERENCE BOOKS:

1. McShane, (2023) "*Organizational Behavior*" 10th Edition, McGraw Hill.
2. Robert Konopaske, John M. Ivancevich, Michael T. Matteson, (2023) "*Organizational Behavior and Management*", 12th Edition, McGraw-Hill Education.

WEBSITE

1. <https://nptel.ac.in/courses/110/105/110105033/>

CO, PO, PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PSO 1	PSO 2
CO1	3	-	2	-	2	-	-	-	-	-	-	-	-	-	-	1	-
CO1	3	-	-	2	-	-	2	-	1	-	-	-	-	-	-	1	-
CO3	-	-	-	2	2	-	2	-	-	-	-	-	-	-	-	1	-
CO4	3	-	2	-	-	-	-	1	-	-	-	1	-	-	-	1	-
CO5	-	1		-	-	-	-	-	-	-	-		1	1	-	1	-
Average	3	1	2	2	2	-	2	1	1	-	-	1	1	1	-	1	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required.

COURSE OBJECTIVES (CO):

- To explore different types of NoSQL databases (document-based, key-value, column-family, graph-based) and their use cases.
- To implement SSL/TLS encryption and role-based access control (RBAC) to secure data.
- To optimize database configurations and indexes based on performance metrics.

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Create indexes on fields in your database to improve query performance	Create
CO2	Implement different concurrency control mechanisms	Create
CO3	Experiment with transactions or atomic operations to ensure data integrity	Create
CO4	Evaluate performance metrics	Evaluate
CO5	Design to handle scalability and fault tolerance.	Create

List of Programs

72 HOURS

1. Install a NoSQL database of your choice (such as MongoDB, Cassandra, Redis, Neo4j, etc.) on your local machine.
2. Practice creating, reading, updating, and deleting data in your chosen NoSQL database. Get comfortable with the syntax and APIs provided by the database.
3. Design a simple data model for a sample application and implement it in your NoSQL database. Consider the structure of your data and how it will be queried.
4. Experiment with creating indexes on fields in your database to improve query performance. Analyze query execution plans to understand optimization opportunities.
5. Set up a clustered environment or replica set in your NoSQL database to understand how it handles scalability and fault tolerance.
6. Practice backing up and restoring data in your NoSQL database. Understand the different backup strategies supported by the database.
7. Explore how your chosen NoSQL database handles concurrent writes and reads. Experiment with different concurrency control mechanisms if applicable.
8. Experiment transactions or atomic operations with NoSQL database to understand how they work and their limitations.
9. Configure authentication and authorization mechanisms in your NoSQL database to ensure data security. Explore features like SSL/TLS encryption and role-based access control.
10. Write scripts to simulate various workloads (read-heavy, write-heavy, mixed) and measure the performance of your NoSQL database under different scenarios.
11. Develop a sample application (web, mobile, or desktop) that interacts with your NoSQL database. Implement CRUD operations and other features using the database's API.
12. Set up monitoring and alerting for your NoSQL database to track performance metrics, detect issues, and take proactive action when necessary

TOTAL: 60 HOURS

TEXT BOOKS:

1. Sadalage, P. & Fowler, (2019). *NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence*, 1st Edition, Wiley Publications.

WEBSITE LINKS:

1. <https://www.ibm.com/cloud/learn/nosql-databases>
2. <https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp>
3. <https://www.geeksforgeeks.org/introduction-to-nosql/>
4. <https://www.javatpoint.com/nosql-database>

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO 1	PSO 2
CO1	3	-	3	3	-	2	-	2	3	1	2	-	-	-	-	2	-
CO2	3	-	3	3	-	2	-	2	3	2	2	-	-	-	-	-	2
CO3	3	-	3	3	3	3	-	3	3	-	-	-	-	-	-	-	-
CO4	3	-	3	3	3	3	-	3	3	-	1	-	-	-	-	-	2
CO5	3	-	1	1	1	2	-	2	3	-	-	-	-	-	-	-	-
Average	3	-	2.6	2.6	2.3	2.4	-	2.4	3	1.5	1.7	-	-	-	-	2	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required

COURSE OBJECTIVES (CO):

- To select appropriate research methods based on the nature of their research questions and objectives.
- To learn techniques for conducting literature reviews and critically evaluating existing research.
- To communicate research findings effectively through written reports, presentations, and academic papers.

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes (COs)	Blooms Level
CO1	Summarize the various research designs and techniques.	Understand
CO2	Compare various sources of information for literature review and data collection.	Analyze
CO3	Analyze the data and generate the report.	Analyze
CO4	Illustrate the concept of Intellectual Property Rights.	Understand
CO5	Summarize scientific writing skills, academic writing, patenting and avoid the common mistakes in the field of research methodology.	Understand

UNIT I RESEARCH DESIGN**12 HOURS**

Overview of research process and design, Use of Secondary and exploratory data to answer the research question, Qualitative research, Observation studies, Experiments and Surveys.

UNIT II DATA COLLECTION AND SOURCES**12 HOURS**

Measurements, Measurement Scales, Questionnaires and Instruments, Sampling and methods. Data - Preparing, Exploring, examining and displaying.

UNIT III DATA ANALYSIS AND REPORTING**12 HOURS**

Overview of Multivariate analysis, Hypothesis testing and Measures of Association. Presenting Insights and findings using written reports and oral presentation.

UNIT IV INTELLECTUAL PROPERTY RIGHTS**12 HOURS**

Intellectual Property – The concept of IPR, Evolution and development of concept of IPR, IPR development process, Trade secrets, utility Models, IPR & Bio diversity, Role of WIPO and WTO in IPR establishments, Right of Property, Common rules of IPR practices, Types and Features of IPR Agreement, Trademark, Functions of UNESCO in IPR maintenance.

UNIT V PATENTS 12 HOURS

Patents – objectives and benefits of patent, Concept, features of patent, Inventive step, Specification, Types of patent application, process E-filing, Examination of patent, Grant of patent, Revocation, Equitable Assignments, Licenses, Licensing of related patents, patent agents, Registration of patent agents.

TOTAL: 60 HOURS**TEXT BOOKS:**

1. Cooper Donald R, Schindler Pamela S and Sharma JK, (2012). *Business Research Methods*, Tata McGraw Hill Education, 11th Edition.
2. Catherine J. Holland, (2012). *Intellectual property: Patents, Trademarks, Copyrights, Trade Secrets*, Entrepreneur Press, 3rd Edition.

REFERENCE BOOKS:

1. David Hunt, Long Nguyen, Matthew Rodgers, (2007). *Patent searching: tools & techniques*, Wiley.
2. The Institute of Company Secretaries of India, Statutory body under an Act of parliament, (2013). *Professional Programme Intellectual Property Rights, Law and practice*.

WEBSITE LINKS:

1. <https://esu.desire2learn.com/>
2. <https://www.reading.ac.uk/research-services/research-data-management/data-management-planning/intellectual-property-rights-and-research-data>
3. https://en.wikipedia.org/wiki/Intellectual_property

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO 1	PSO 2
CO1	3	-	1	-	-	1	-	-	-	1	-	-	-	-	-	3	-
CO2	3	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-
CO3	3	-	2	3	3	2	-	1	3	-	-	-	-	-	-	-	2
CO4	3	-	-	-	1	-	-	-	1	-	-	-	2	2	-	-	-
CO5	3	-	1	2	-	1	-	1	-	-	2	-	-	3	-	-	-
Average	3	-	1.3	2.5	1.7	1.3	-	1	1.7	1	2	-	2	2.5	-	3	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

PREREQUISITE:

Not Required.

COURSE OBJECTIVES (CO):

- To Understand and apply fundamental statistical concepts such as descriptive statistics.
- To import, clean, and manipulate data for effective analysis using R.
- To Perform exploratory data analysis and create visualizations using R's plotting tools.
- To Conduct statistical tests and build regression models to analyze relationships in data.
- To Generate reproducible reports combining R code, analysis, and interpretation for clear communication of results.

COURSE OUTCOMES (COs):

Upon completion of this course, the student will be able to:

COs	Course Outcomes	Blooms Level
CO1	Apply R programming and understand different data sets	Create
CO2	Apply R Programme and construct graphs and charts	Create
CO3	Analyze the data and know descriptive statistics by using R Programming	Create
CO4	Apply R Programming to test the hypothesis of the study	Evaluate
CO5	Predict the data and take decisions through R programming.	Create

List of Programs

72 HOURS

1. Download and install R-Programming environment and install basic packages using `install.packages()` command in R.
2. Learn all the basics of R-Programming (Data types, Variables, Operators etc.)
3. Implement R-Loops with different examples.
4. Learn the basics of functions in R and implement with examples.
5. Implement data frames in R. Write a program to join columns and rows in a data frame using `cbind()` and `rbind()` in R
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, Data Frames).
8. Write a program to read a csv file and analyze the data in the file in R
9. Create pie charts and bar charts using R
10. Create a data set and do statistical analysis on the data using R

CO, PO, PSO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13	PO 14	PO 15	PSO 1	PSO 2
CO1	3	-	-	-	-	1	-	-	-	1	-	-	-	-	-	3	-
CO2	3	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-
CO3	3	-	-	3	3	2	-	1	3	-	-	-	-	-	-	-	2
CO4	3	-	-	-	1	-	-	-	1	-	-	-	-	2	-	-	-
CO5	3	-	-	2	-	1	-	1	-	-	2	-	-	3	-	-	-
Average	3	-	-	2.5	1.7	1.3	-	1	1.7	1	2	-	-	2.5	-	3	2

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

25CAU891

**Research Project / Preparation of
Research Project**

18H - 12C

Instruction Hours/week: L:0 T:0 P:18

Marks: Internal:120 External:180 Total:300

End Semester Exam: 3 Hours