



## KG COLLEGE OF ARTS AND SCIENCE

Autonomous Institution | Affiliated to Bharathiar University

Accredited with A++ Grade by NAAC

ISO 9001:2015 Certified Institution

KGiSL Campus, Saravanampatti, Coimbatore – 641 035

### Regulations 2026 -29 for Undergraduate Programme

**Learning Outcomes Based Curriculum Framework- (LOCF) model with  
Choice Based Credit System (CBCS)**

**Programme: B.Sc. Computer Science (AI&DS)**

**Programme Code: BAI**

**(Applicable for the Students Admitted During the Academic Year 2026 – 29 Onwards)**

#### Eligibility

The Student should have passed Higher Secondary Examination and wherever the students have not studied mathematics knowledge be imparted through Residential/Bridge Course.

(As per the eligibility condition given Ref. BU/R/B3-B4/Eligibility Condition/2026/7425 dated 15/05/2026).

#### Program Learning Outcomes (PLOs)

The successful completion of B.Sc. CS (AI & DS) Programme shall enable the students to

|      |                                                                                                                                                                                                                                                                                                                                               |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PLO1 | Graduates in Artificial Intelligence and Data Science should be able to develop AI-based and domain-specific processes for efficient decision making in a variety of domains, including business and governance.                                                                                                                              |
| PLO2 | Solve complicated issues; apply the technical and analytical abilities found in the fields of Data Science and Artificial Intelligence.                                                                                                                                                                                                       |
| PLO3 | Develop and create, choose, implement, and manage complex societal issues by combining real-world industrial tools and processes with theoretical understanding of AI and Data Analytics.                                                                                                                                                     |
| PLO4 | Understand the need of continuing education independently throughout life, and possess the skills necessary to do so in the present context of technological development and meet society's most pressing demands.                                                                                                                            |
| PLO5 | Recognize the effects of expert technical solutions in social and environmental contexts and exhibit a consciousness of the necessity of environmentally friendly growth. Utilize moral precepts and make a commitment to professional responsibilities, ethics, and technological norms in new business ventures and hospitality industries. |

**B.Sc. Computer Science (Artificial Intelligence & Data Science)**  
**Distribution of Credits and Hours for all the Semesters**

| Part         | Course Category                                                    | No. of Courses | Hours |            | Credits | Total      |            | Semester |
|--------------|--------------------------------------------------------------------|----------------|-------|------------|---------|------------|------------|----------|
| I            | Language – I                                                       | 4              | 4 X 4 | 16         | 4 X 3   | 12         | 12         | 1 – 4    |
| II           | Language – II                                                      | 4              | 4 X 4 | 16         | 4 X 3   | 12         | 12         | 1 – 4    |
| III          | Core Theory (6 hrs./Week)                                          | 4              | 4 X 6 | 24         | 4 X 4   | 16         | 100        | 3,6      |
|              | Core Theory (5 hrs./Week)                                          | 9              | 9 X 5 | 45         | 9 X 4   | 36         |            | 1,2,4,5  |
|              | Core Lab (4 hrs./Week)                                             | 4              | 4 X 4 | 16         | 4 X 2   | 8          |            | 1 – 4    |
|              | Core Lab (5 hrs./Week)                                             | 3              | 3 X 5 | 15         | 3 X 3   | 9          |            | 5,6      |
|              | Allied                                                             | 4              | 4 X 4 | 16         | 4 X 3   | 12         |            | 1 – 4    |
|              | Electives                                                          | 2              | 2 X 5 | 10         | 2 X 3   | 6          |            | 5,6      |
|              | Project                                                            | 1              | 1 X 6 | 6          | 1 X 5   | 5          |            | 6        |
|              | SEC : Internship                                                   | 1              | -     | -          | 1 X 2   | 2          |            | 5        |
|              | Skill Enhancement (SEC)                                            | 3              | 3 X 2 | 6          | 3 X 2   | 6          |            | 3, 4, 6  |
| IV           | Foundation Course (FC)                                             | 2              | 2 X 2 | 4          | 3 X 2   | 6          | 14         | 1 - 2    |
|              | Foundation Course (FC)                                             | 1              | -     | -          | 2 X 2   | 4          |            | 3        |
|              | Ability Enhancement Compulsory Course (AECC)                       | 3              | 3 X 2 | 6          | 3 X 2   | 6          |            | 1, 2, 4  |
|              | Ability Enhancement Compulsory Course (AECC) - Online Course -MOOC | 1              | -     | -          | 1 X 2   | 2          |            | 3        |
| V            | Liberal Arts (Extra-curricular and Co-curricular)                  | -              | -     | -          | 2       | 2          | 2          | 4        |
| <b>Total</b> |                                                                    | <b>46</b>      |       | <b>180</b> |         | <b>140</b> | <b>140</b> |          |

**Consolidated Semester wise and Component wise  
Hours and Credits Distribution**

| Semester     | Part I    |           | Part II   |           | Part III   |            | Part IV   |           | Part V   |          | Total      |            |
|--------------|-----------|-----------|-----------|-----------|------------|------------|-----------|-----------|----------|----------|------------|------------|
|              | Hrs.      | Credits   | Hrs.      | Credits   | Hrs.       | Credits    | Hrs.      | Credits   | Hrs.     | Credits  | Hrs.       | Credits    |
| 1            | 4         | 3         | 4         | 3         | 18         | 13         | 4         | 4         | -        | -        | 30         | 23         |
| 2            | 4         | 3         | 4         | 3         | 18         | 13         | 4         | 4         | -        | -        | 30         | 23         |
| 3            | 4         | 3         | 4         | 3         | 22         | 15         | -         | 4         | -        | -        | 30         | 25         |
| 4            | 4         | 3         | 4         | 3         | 20         | 15         | 2         | 2         | -        | 2        | 30         | 25         |
| 5            | -         | -         | -         | -         | 30         | 23         | -         | -         | -        | -        | 30         | 23         |
| 6            | -         | -         | -         | -         | 30         | 21         | -         | -         | -        | -        | 30         | 21         |
| <b>Total</b> | <b>16</b> | <b>12</b> | <b>16</b> | <b>12</b> | <b>138</b> | <b>100</b> | <b>10</b> | <b>14</b> | <b>-</b> | <b>2</b> | <b>180</b> | <b>140</b> |

## Semester – 1

| Course Code | Part | Course Category | Course Name                                    | Hours/ Week | Examination       |               |     |       | Credits |
|-------------|------|-----------------|------------------------------------------------|-------------|-------------------|---------------|-----|-------|---------|
|             |      |                 |                                                |             | Duration in Hours | Maximum Marks |     |       |         |
|             |      |                 |                                                |             |                   | CIA           | ESE | Total |         |
| 26TAM11L    | I    | Language-I      | Tamil-I                                        | 4           | 3                 | 25            | 75  | 100   | 3       |
| 26HIN11L    | I    |                 | Hindi-I                                        |             |                   |               |     |       |         |
| 26MAL11L    | I    |                 | Malayalam-I                                    |             |                   |               |     |       |         |
| 26FRE11L    | I    |                 | French-I                                       |             |                   |               |     |       |         |
| 26ENG12L    | II   | Language-II     | English-I                                      | 4           | 3                 | 25            | 75  | 100   | 3       |
| 26BAI13C    | III  | Core – I        | Computing Fundamentals and C Programming       | 5           | 3                 | 25            | 75  | 100   | 4       |
| 26BAI14P    | III  | Core Lab – I    | C Programming Lab                              | 4           | 3                 | 40            | 60  | 100   | 2       |
| 26BAI15C    | III  | Core – II       | Data Literacy and Fundamentals of Data Science | 5           | 3                 | 25            | 75  | 100   | 4       |
| 26BAI16A    | III  | Allied – I      | Linear Algebra                                 | 4           | 3                 | 25            | 75  | 100   | 3       |
| 26ENV1FC    | IV   | FC – I          | Environmental Studies                          | 2           | 2                 | 50            | -   | 50    | 2       |
| 26SOF1AE    | IV   | AECC – I        | Soft Skills                                    | 2           | 2                 | -             | 50  | 50    | 2       |
| Total       |      |                 |                                                | 30          |                   |               |     | 700   | 23      |

| Semester – 2 |      |                 |                                   |             |                   |               |     |       |         |
|--------------|------|-----------------|-----------------------------------|-------------|-------------------|---------------|-----|-------|---------|
| Course Code  | Part | Course Category | Course Name                       | Hours/ Week | Examination       |               |     |       | Credits |
|              |      |                 |                                   |             | Duration in Hours | Maximum Marks |     |       |         |
|              |      |                 |                                   |             |                   | CIA           | ESE | Total |         |
|              | I    | Language - I    | Tamil – II                        | 4           | 3                 | 25            | 75  | 100   | 3       |
|              | I    |                 | Hindi – II                        |             |                   |               |     |       |         |
|              | I    |                 | Malayalam – II                    |             |                   |               |     |       |         |
|              | I    |                 | French – II                       |             |                   |               |     |       |         |
|              | II   | Language – II   | English – II                      | 4           | 3                 | 25            | 75  | 100   | 3       |
|              | III  | Core – III      | Java Programming                  | 5           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Core Lab - II   | Java Programming Lab              | 4           | 3                 | 40            | 60  | 100   | 2       |
|              | III  | Core – IV       | Advanced Excel for Data Analytics | 4           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Allied – II     | Optimization Techniques           | 4           | 3                 | 25            | 75  | 100   | 3       |
|              | IV   | FC – II         | Human Rights /                    | 2           | 2                 | 50            | -   | 50    | 2       |
|              |      |                 | Disaster Management               |             |                   |               |     |       |         |
|              | IV   | AECC – II       | Innovation and Design Thinking/   | 2           | 2                 | -             | 50  | 50    | 2       |
|              |      |                 | Intellectual Property Rights /    |             |                   |               |     |       |         |
|              |      |                 | Entrepreneurship Development      |             |                   |               |     |       |         |
| Total        |      |                 |                                   | 30          |                   |               |     | 700   | 23      |

| Semester – 3 |      |                 |                               |              |                   |               |     |       |         |
|--------------|------|-----------------|-------------------------------|--------------|-------------------|---------------|-----|-------|---------|
| Course Code  | Part | Course Category | Course Name                   | Hours / Week | Examination       |               |     |       | Credits |
|              |      |                 |                               |              | Duration in Hours | Maximum Marks |     |       |         |
|              |      |                 |                               |              |                   | CIA           | ESE | Total |         |
|              | I    | Language – I    | Tamil – III                   | 4            | 3                 | 25            | 75  | 100   | 3       |
|              | I    |                 | Hindi – III                   |              |                   |               |     |       |         |
|              | I    |                 | Malayalam – III               |              |                   |               |     |       |         |
|              | I    |                 | French – III                  |              |                   |               |     |       |         |
|              | II   | Language – II   | English – III                 | 4            | 3                 | 25            | 75  | 100   | 3       |
|              | III  | Core – V        | Data Structures               | 6            | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Core Lab – III  | Data Structures Lab           | 4            | 3                 | 40            | 60  | 100   | 2       |
|              | III  | Core – VI       | Foundations of Generative AI  | 6            | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Allied – III    | Probability and Statistics    | 4            | 3                 | 25            | 75  | 100   | 3       |
|              | III  | SEC – I         | Generative AI Lab             | 2            | 3                 | 40            | 60  | 100   | 2       |
|              | IV   | FC – III        | Basic Tamil /                 | -            | 2                 | 50            | -   | 50    | 2       |
|              |      |                 | Advanced Tamil                |              |                   |               |     |       |         |
|              |      |                 | Indian Knowledge Systems IKS) |              |                   |               |     |       |         |
|              | IV   | AECC – III      | Online Course - MOOC          | -            | -                 | 50            | -   | 50    | 2       |
| Total        |      |                 |                               | 30           |                   |               |     | 800   | 25      |

## Semester – 4

| Course Code | Part | Course Category                  | Course Name                           | Hours/ Week | Examination       |               |     |       | Credits |
|-------------|------|----------------------------------|---------------------------------------|-------------|-------------------|---------------|-----|-------|---------|
|             |      |                                  |                                       |             | Duration in Hours | Maximum Marks |     |       |         |
|             |      |                                  |                                       |             |                   | CIA           | ESE | Total |         |
|             | I    | Language - I                     | Tamil – IV                            | 4           | 3                 | 25            | 75  | 100   | 3       |
|             | I    |                                  | Hindi – IV                            |             |                   |               |     |       |         |
|             | I    |                                  | Malayalam – IV                        |             |                   |               |     |       |         |
|             | I    |                                  | French – IV                           |             |                   |               |     |       |         |
|             | II   | Language - II                    | English – IV                          | 4           | 3                 | 25            | 75  | 100   | 3       |
|             | III  | Core – VII                       | Database Management System            | 5           | 3                 | 25            | 75  | 100   | 4       |
|             | III  | Core Lab – IV                    | Database Management System Lab        | 4           | 3                 | 40            | 60  | 100   | 2       |
|             | III  | Core – VIII                      | Software Engineering                  | 5           | 3                 | 25            | 75  | 100   | 4       |
|             | III  | Allied – IV                      | Fuzzy logic                           | 4           | 3                 | 25            | 75  | 100   | 3       |
|             | III  | SEC – II                         | Machine Learning and Advanced SQL Lab | 2           | 3                 | 40            | 60  | 100   | 2       |
|             | IV   | AECC – IV                        | Quantitative Aptitude                 | 2           | 2                 | -             | 50  | 50    | 2       |
|             | V    | Extra-Curricular & Co-Curricular | Liberal Arts                          | -           | -                 | 50            | -   | 50    | 2       |
| Total       |      |                                  |                                       | 30          |                   |               |     | 800   | 25      |

## Semester – 5

| Semester – 5 |      |                 |                                                             |             |                   |               |     |       |         |
|--------------|------|-----------------|-------------------------------------------------------------|-------------|-------------------|---------------|-----|-------|---------|
| Course Code  | Part | Course Category | Course Name                                                 | Hours/ Week | Examination       |               |     |       | Credits |
|              |      |                 |                                                             |             | Duration in Hours | Maximum Marks |     |       |         |
|              |      |                 |                                                             |             |                   | CIA           | ESE | Total |         |
|              | III  | Core – IX       | R Programming                                               | 5           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Core Lab – V    | R Programming with Statistical Methods and Applications Lab | 5           | 3                 | 40            | 60  | 100   | 3       |
|              | III  | Core – X        | Tensor Flow                                                 | 5           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Core Lab – VI   | Tensor Flow Lab                                             | 5           | 3                 | 40            | 60  | 100   | 3       |
|              | III  | Core – XI       | Social Network Analysis                                     | 5           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Elective – I    | Data Mining and Data Warehousing                            | 5           | 3                 | 25            | 75  | 100   | 3       |
|              |      |                 | Big Data Analytics                                          |             |                   |               |     |       |         |
|              |      |                 | Data Visualization                                          |             |                   |               |     |       |         |
|              | III  | Internship      | Internship                                                  | -           | -                 | 50            | -   | 50    | 2       |
| Total        |      |                 |                                                             | 30          |                   |               |     | 650   | 23      |

| Semester – 6 |      |                 |                                      |             |                   |               |     |       |         |
|--------------|------|-----------------|--------------------------------------|-------------|-------------------|---------------|-----|-------|---------|
| Course Code  | Part | Course Category | Course Name                          | Hours/ Week | Examination       |               |     |       | Credits |
|              |      |                 |                                      |             | Duration in Hours | Maximum Marks |     |       |         |
|              |      |                 |                                      |             |                   | CIA           | ESE | Total |         |
|              | III  | Core – XII      | Soft Computing in Data Science       | 6           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Core Lab– VII   | Soft Computing in Data Science Lab   | 5           | 3                 | 40            | 60  | 100   | 3       |
|              | III  | Core – XIII     | Embedded Systems                     | 6           | 3                 | 25            | 75  | 100   | 4       |
|              | III  | Elective – II   | Neural Network and Deep Leaning      | 5           | 3                 | 25            | 75  | 100   | 3       |
|              |      |                 | Robotic Process Automation           |             |                   |               |     |       |         |
|              |      |                 | Text and Speech Analysis             |             |                   |               |     |       |         |
|              | III  | SEC – III       | Data Visualization using Tableau Lab | 2           | 3                 | 40            | 60  | 100   | 2       |
|              | III  | Core            | Project Work                         | 6           | 3                 | 40            | 60  | 100   | 5       |
| Total        |      |                 |                                      | 30          |                   |               |     | 700   | 21      |
| Grand Total  |      |                 |                                      | 180         |                   |               |     | 4250  | 140     |

# Semester 1

| Semester – 1 |      |                 |                                                |             |                   |           |     |       |         |
|--------------|------|-----------------|------------------------------------------------|-------------|-------------------|-----------|-----|-------|---------|
| Course Code  | Part | Course Category | Course Name                                    | Hours/ Week | Examination       |           |     |       | Credits |
|              |      |                 |                                                |             | Duration in Hours | Max Marks |     |       |         |
|              |      |                 |                                                |             |                   | CIA       | ESE | Total |         |
| 26TAM11L     | I    | Language-I      | Tamil-I                                        | 4           | 3                 | 25        | 75  | 100   | 3       |
| 26HIN11L     | I    |                 | Hindi-I                                        |             |                   |           |     |       |         |
| 26MAL11L     | I    |                 | Malayalam-I                                    |             |                   |           |     |       |         |
| 26FRE11L     | I    |                 | French-I                                       |             |                   |           |     |       |         |
| 26ENG12L     | II   | Language-II     | English-I                                      | 4           | 3                 | 25        | 75  | 100   | 3       |
| 26BAI13C     | III  | Core – I        | Computing Fundamentals and C Programming       | 5           | 3                 | 25        | 75  | 100   | 4       |
| 26BAI14P     | III  | Core Lab – I    | C Programming Lab                              | 4           | 3                 | 40        | 60  | 100   | 2       |
| 26BAI15C     | III  | Core – II       | Data Literacy and Fundamentals of Data Science | 5           | 3                 | 25        | 75  | 100   | 4       |
| 26BAI16A     | III  | Allied – I      | Linear Algebra                                 | 4           | 3                 | 25        | 75  | 100   | 3       |
| 26ENV1FC     | IV   | FC – I          | Environmental Studies                          | 2           | 2                 | 50        | -   | 50    | 2       |
| 26SOF1AE     | IV   | AECC – I        | Soft Skills                                    | 2           | 2                 | -         | 50  | 50    | 2       |
| Total        |      |                 |                                                | 30          |                   |           |     | 700   | 23      |

**Part – I: Language I – Tamil – I**

| Course Code | Course Name | Category     | Hours / Week | Credits |
|-------------|-------------|--------------|--------------|---------|
| 26TAM11L    | Tamil - I   | Language – I | 4            | 3       |

**Course Objectives**

The Course intends to cover

- இலக்கியத்தின் வளர்ச்சி நிலைகளைக் கற்பித்தல்
- மொழியியல் அடிப்படையில் இலக்கணம் கற்பித்தல்
- திறனாய்வு முறையினை ஊக்குவித்தல்
- படைப்பாக்கத் திறன் பயிற்சி அளித்தல்

**Course Learning Outcomes**

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

| CLO                                        | CLO Statements                                                                                            | Knowledge Level |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                       | புதுக்கவிதையின் மூலம் வாழ்வியல் விழுமியங்களை உணர்ந்து கொள்வர்.                                            | K1, K2          |
| CLO2                                       | சிறந்த மற்றும் வாழும் கவிஞர்களின் கவிதை வழியாக தர்மம், அன்பு, ஈகை போன்ற மனித மாண்புகளை அறிந்து கொள்வர்.   | K2, K3          |
| CLO3                                       | சிறந்த படைப்பாளர்களின் சிறுகதைகள் மற்றும் குறுநாவலில் வெளிப்படும் சமூகச் சிந்தனைகளை அறிந்து ஒழுகுதல்.     | K3              |
| CLO4                                       | தற்கால இலக்கியங்களான புதுக்கவிதை, சிறுகதை தோன்றி வளர்ந்த பின்புலத்தை அறிதல்.                              | K1, K3          |
| CLO5                                       | மொழித்திறனைக் கற்றலின் வாயிலாக நடைமுறை வாழ்வியலுக்குத் தேவையான சிறுகதை மற்றும் புதுக்கவிதைகளைப் படைத்தல். | K2, K3          |
| K1 - Remember; K2 - Understand; K3 – Apply |                                                                                                           |                 |

**Part – I: Language – I: தமிழ் - I**

| Unit | Content                                                                                                                                                                                                                                                                                                           | No. of Hours |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | <b>நாட்டுப்பற்று</b><br>1. பாரதியார் - உலகத்தை நோக்கி வினவுதல்<br>2. பாரதிதாசன் - தமிழ்ப்பேறு<br>3. கவிமணி - ஒற்றுமையே உயிர்நிலை<br>4. தேவதேவன் - சாலையும் மரங்களும் செருப்பும், புதிய வீடு<br>5. அப்துல் ரகுமான் - போட்டி, பாதை<br>6. கவிஞர் வாலி - புத்தகச் சந்தை                                               | 14           |
| II   | <b>சமூகம்</b><br>1. ஈரோடு தமிழன்பன் - எட்டாவது சீர்...<br>2. கவிஞர் தாமரை - தொலைந்து போனேன்<br>3. நா. காமராசன் - திருநங்கைகள் காகிதப் பூக்கள்<br>4. வைரமுத்து - மரங்களைப் பாடுவேன்<br>5. அமுத பாரதி - புள்ளிப் பூக்கள் (ஹைக்கூ)<br>6. நாட்டுப்புறப் பாடல்கள் (தாலாட்டுப் பாடல் , தெம்மாங்கு பாடல் , உழவுத்தொழில்) | 14           |
| III  | <b>வாழ்வியல்</b><br><b>சிறுகதை</b><br>1. காஞ்சனை - புதுமைப்பித்தன்<br>2. சோற்றுக் கணக்கு - ஜெயமோகன்<br>3. மரத்தைக் கர்ப்பம் சுமந்தவள் - ஆண்டாள் பிரியதர்சினி குறுநாவல்<br>• ஆயிஷா – இரா.நடராசன்                                                                                                                   | 12           |
| IV   | <b>இலக்கிய வரலாறு</b><br>1. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும்<br>2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்<br>3. ஹைக்கூ கவிதையின் தோற்றமும் வளர்ச்சியும்<br>4. சிறுகதையின் தோற்றமும் வளர்ச்சியும்                                                                                                            | 10           |

| Unit               | Content                                                                                                                                                                                                   | No. of Hours |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| V                  | <b>இலக்கணம் மற்றும் படைப்பாற்றல்</b><br>1. எழுத்துகள் (முதல் எழுத்துகள், சார்பெழுத்துகள்)<br>2. எழுத்துக்களின் பிறப்பு<br>3. மாத்திரைகள்<br>4. படைப்பாற்றல் திறன்(சிறுகதை மற்றும் புதுக்கவிதைப் படைத்தல்) | 10           |
| <b>Total Hours</b> |                                                                                                                                                                                                           | <b>60</b>    |

**Reference Books**

|    |                                                                                                       |
|----|-------------------------------------------------------------------------------------------------------|
| 1  | பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதி பாடல்கள், ஆய்வுப் பாதிப்பு, தமிழ்ப் பல்கலைக் கழகம், தஞ்சாவூர். |
| 2  | அப்துல் ரகுமான்,(2000), ஆலாபனை, கவிக்கோ பதிப்பகம்.                                                    |
| 3  | தாமரை, (1995), ஒரு கதவும் கொஞ்சம் கள்ளிப்பாலும் கவிதை தொகுப்பு, காந்தளகம் பதிப்பகம், சென்னை.          |
| 4  | வரதராசனார் மு, (2021), தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாடமி பதிப்பு.                                  |
| 5  | முனைவர் பஞ்சாங்கம் கா, (2017), தமிழ் இலக்கிய வரலாறு, காவ்யா பதிப்பகம்.                                |
| 6  | முனைவர் வேங்கடராமன் கா. கோ (2008), தமிழ் இலக்கிய வரலாறு, கலையக வெளியீடு.                              |
| 7  | ஜெயமோகன், (2024), அறம் (சிறுகதை), விஷ்ணுபுரம் பதிப்பகம்.                                              |
| 8  | இரா.நடராசன், (2022) ஆயிஷா, பாரதி புத்தகாலயம்.                                                         |
| 9  | குமரன் கோ (2010), தமிழ் இலக்கணம் எளிய அறிமுகம் , சந்தியா பதிப்பகம்.                                   |
| 10 | சக்திவேல் சு,(2012), நாட்டுப்புறவியல், மணிவாசகர் பதிப்பகம்.                                           |

**Part – I: Language I – Hindi – I**

| Course Code | Course Name | Category     | Hours / Week | Credits |
|-------------|-------------|--------------|--------------|---------|
| 26HIN11L    | Hindi - I   | Language - I | 4            | 3       |

**Course Objectives**

The Course intends to

- Improve grammatical knowledge
- Continue to read and learn about articles and think about them
- Read and understand short stories and understand the thoughts and life of the people of this country
- Provide translation knowledge and the ability to read and analyse a message are also gained

**Course Learning Outcomes**

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

| CLO                                                           | CLO Statements                                                             | Knowledge Level |
|---------------------------------------------------------------|----------------------------------------------------------------------------|-----------------|
| CLO1                                                          | Understand the text styles and grammatical elements.                       | K1              |
| CLO2                                                          | Discuss the content of a reading passage.                                  | K2              |
| CLO3                                                          | Develop an interest in the appreciation of short stories.                  | K2, K3          |
| CLO4                                                          | Comprehend the grammatical structures and sentence making.                 | K3              |
| CLO5                                                          | Understand the language and developing English to Hindi translation skill. | K4              |
| <b>K1 - Remember; K2 - Understand; K3 – Apply; K4-Analyse</b> |                                                                            |                 |

**Part – I: Language – I - Hindi - I**

| Unit               | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                          | No. of Hours |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I                  | <b>Prose : Bharthi Gadya Sangrah</b><br>1. Sanskurthi hai kya? (Lalith nibandh)- Ramdhari singh Dinkar<br>2. Voh cheeni Bhayi (Rekha chitra) – Mahadevi varma<br>3. Badthe shor ka gahratha sankat (pradoshan) - Rajendrakumr ray & Ravindra Varma<br>4. Ghar Loutthe huye – (Athma katha) – Harivamshraai Bacchan<br>5. Paramanu urja evam khadya padarth samrakshan (vaigyanik lek) - Parmaanurja vibhag ( Bharth sarkar)<br>6. Cinema (film) – Manmohan Chdda | 14           |
| II                 | <b>Non Detailed Text Short Stories: Aat Kahaniyan</b><br>1. Vrat-bang - Jayashankar Prasad<br>2. Sath gathi - Premchand<br>3. parda - Yespal<br>4. Apna apna bhagya - Jaynendrakumar<br>5. Bhrammarakshas ka shishya - Mukthibhodh<br>6. Dana-bhusa - Markandeya                                                                                                                                                                                                 | 14           |
| III                | <b>Grammar : Shabdha Vichar only</b><br>(Noun, Pronoun, Adjective, Verb, Tense, Case Endings)<br>Theoretical & Applied.                                                                                                                                                                                                                                                                                                                                          | 12           |
| IV                 | <b>Translation : English – Hindi only</b><br>Anuvadh Abhyas – III (1-15 Lessons only)                                                                                                                                                                                                                                                                                                                                                                            | 10           |
| V                  | <b>Comprehension:</b><br>1 Passage From Anuvadh Abhyas–III (16-30)                                                                                                                                                                                                                                                                                                                                                                                               | 10           |
| <b>Total Hours</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>60</b>    |

**Text Books**

- |   |                                                                                                                        |
|---|------------------------------------------------------------------------------------------------------------------------|
| 1 | Bharathi gadya sangrah, editor: Madhudhavan, publisher: Vani prakashan, 4697/5, Daryaganch, New Delhi – 110002.        |
| 2 | Aatt Kahaniyan, Editor : Dr. H.R. Mihir, Publisher : Jaya bharthi prakashan, 267 B, Maya press Road, Allahabad–211 003 |

**Reference Book**

- |   |                                                                                |
|---|--------------------------------------------------------------------------------|
| 1 | Naveenhindivyakaran, 2002, Dakshin Bharat Hindi Prachar, Sabha, Chennai–600017 |
|---|--------------------------------------------------------------------------------|

**Part – I: Language – I - Malayalam – I**

| Course Code | Course Name   | Category     | Hours / Week | Credits |
|-------------|---------------|--------------|--------------|---------|
| 26MAL11L    | Malayalam - I | Language - I | 4            | 3       |

**Course Objectives**

The Course intends to

- Improve grammatical knowledge
- Read and learn about articles and think about them
- Read and understand short stories and understand the thoughts and life of the people of this state
- Provide translation knowledge and the ability to read and analyze a message

**Course Learning Outcomes**

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

| CLO                                                      | CLO Statements                                                                | Knowledge Level |
|----------------------------------------------------------|-------------------------------------------------------------------------------|-----------------|
| CLO1                                                     | Understand the text styles and grammatical elements                           | K1              |
| CLO2                                                     | Discuss the content of a reading passage                                      | K1              |
| CLO3                                                     | Develop an interest in the appreciation of short stories                      | K2              |
| CLO4                                                     | Comprehend the grammatical structures and sentence making                     | K3              |
| CLO5                                                     | Understand the language and developing English to Malayalam translation skill | K4              |
| K1 - Remember; K2 - Understand; K3 – Apply ; K4-Analyse. |                                                                               |                 |

**Part – I: Language – I - Malayalam – I**

| Unit | Content                                              | No. of Hours |
|------|------------------------------------------------------|--------------|
| I    | Novel – Njanabharam - E. Santhoshkumar               | 14           |
| II   | Novel – Njanabharam - E. Santhoshkumar               | 14           |
| III  | Short Story - Ente Priyapetta Kadhakal – Sara Joseph | 12           |
| IV   | Short Story - Ente Priyapetta Kadhakal – Sara Joseph | 10           |
| V    | Composition & Translation (English to Malayalam)     | 10           |
|      | <b>Total Hours</b>                                   | <b>60</b>    |

**Text Books**

- 1 Novel -Njanabharam - E. (2018) Santhoshkumar, Mathrubhumi Books, Kochi, Kerala.
- 2 Short Story-Ente Priyappeta Kadhakal -Sara Joseph, (2005) D.C.Books,Kottayam, Kerala.
- 3 Expansion of ideas, General Essay and Translation. (A Simple passage).

**Reference Books**

- 1 Malayala Novel SahithyaCharitram-K.M.Tharakan (2018) (N.B.S.Kottayam)
- 2 Cherukatha Innale Innu-M.Achuyuthan (2020) (D.C Books, Kottayam)
- 3 Sahithya Charitram Prasthanangalilude- Dr.K.M George, (2017) (D.C.Books Kottayam)
- 4 Malayala Sahithyavimarsam- Sukumar Azheekode (2022) (D.C.books)

**Part – I: Language I – French - I**

| Course Code | Course Name | Category     | Hours / Week | Credits |
|-------------|-------------|--------------|--------------|---------|
| 26FRE11L    | French - I  | Language - I | 4            | 3       |

**Course Objectives**

The Course intends to cover

- Familiar everyday expressions and basic phrases aimed at the satisfaction of concrete needs.
- Key aspects and recognize of Francophone cultures such as greetings, etiquette, daily life, and basic geography of French-speaking countries.
- Short, simple texts such as postcards, emails, or short descriptions about themselves and their immediate environment.
- Construction of simple sentences using correct word order and basic vocabulary.
- The developing of sensitivity to cross-cultural differences in communication and social practices.
- The reading and understanding of short, simple texts such as personal messages, advertisements, menus, and schedules.

**Course Learning Outcomes**

On the successful completion of the course, student will be able to

| CLO                                                           | CLO Statements                                                                                                     | Knowledge Level |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                                          | Improve all the four French language skills (speaking, listening, reading, and writing) (Effective communicators). | K1              |
| CLO2                                                          | Comprehend French and other Francophone nations' cultures and civilizations.                                       | K2              |
| CLO3                                                          | Comprehend the fundamentals of language structure, vocabulary, grammar, and phonetics (language skill).            | K3              |
| CLO4                                                          | The French DELF-A1 Certification is appreciated.                                                                   | K4              |
| <b>K1 - Remember; K2 - Understand; K3 – Apply; K4-Analyse</b> |                                                                                                                    |                 |

**Part – I: Language – I French – I**

| <b>Unit</b>                                                                                                              | <b>Content</b>                                           | <b>No. of Hours</b> |
|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------|
| I                                                                                                                        | Grammaire: pg(122-124)<br>Bienvenue (pg 10-17)           | 14                  |
| II                                                                                                                       | Contacts(pg 18-28)<br>Grammaire: pg(125-128)             | 14                  |
| III                                                                                                                      | Communication pg(29-33)<br>Grammaire: pg(129-130)        | 12                  |
| IV                                                                                                                       | Qu'est-ce qu'il font pg(34-44)<br>Grammaire: pg(131-136) | 10                  |
| V                                                                                                                        | Communication pg( 45-49)<br>Grammaire: pg(137-139)       | 10                  |
| Semester I Portions from Textbook « Nouvelle Génération A1» :UNITÉ 1, UNITÉ 2 (Pg 10-49). Cahier d'exercices (Pg122-139) |                                                          |                     |
| <b>Total Hours</b>                                                                                                       |                                                          | <b>60</b>           |

**Reference Books**

|   |                                                                                                  |
|---|--------------------------------------------------------------------------------------------------|
| 1 | Luca Giachino, Carla Baracco, Romain Chrétien (DELF), (2022) Nouvelle Génération A1, Didier FLE. |
| 2 | Nathalie Hirschsprung, Tony Tricot, 2017, Cosmopolite, Hachette.                                 |

| Course Code | Course Name | Category    | Hours / Week | Credits |
|-------------|-------------|-------------|--------------|---------|
| 26ENG12L    | English-I   | Language-II | 4            | 3       |

### Course Objectives

The course intends to cover

- Textual analysis of poetry and short stories that explore themes of nature and morality.
- Vocabulary through contextual guessing, lexical relations and diverse word formation processes.
- Usage of Grammar and Communication

### Course Learning Outcomes

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

| CLO                                                    | CLO Statements                                                                                                                                                       | Knowledge Level |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                                   | Identify and interpret poetic elements in nature poetry to nurture aesthetic sensibility, creativity, and cultural awareness.                                        | K1, K2          |
| CLO2                                                   | Apply characterization and narrative techniques to appreciate literary qualities in short stories and to comprehend ethical responsibility through textual analysis. | K2, K3          |
| CLO3                                                   | Employ grammatical proficiency in nouns, pronouns, and verbs to enhance clarity and correctness in academic and workplace communication.                             | K3, K4          |
| CLO4                                                   | Apply vocabulary strategies to enhance clarity in diverse communicative situations.                                                                                  | K3              |
| CLO5                                                   | Demonstrate effective communication skills that support professional growth and lifelong learning.                                                                   | K3              |
| K1 - Remember; K2 - Understand; K3 – Apply; K4-Analyse |                                                                                                                                                                      |                 |

**Language II: Part II - English-I**

| Unit                                | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No. of Hours |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I                                   | <b>Poetry : Nature</b><br>1. I Wandered Lonely as a Cloud - William Wordsworth<br>2. The Bird Sanctuary - Sarojini Naidu<br>3. Stopping by Woods on a Snowy Evening – Robert Frost                                                                                                                                                                                                                                                                                         | 12           |
| II                                  | <b>Short Stories: Morality</b><br>1. The Necklace – Guy de Maupassant<br>2. The Taxi Driver – K.S. Duggal<br>3. The Monkey’s Paw - W. W. Jacobs                                                                                                                                                                                                                                                                                                                            | 12           |
| III                                 | <b>Grammar</b><br>1. <b>Nouns:</b> Types, Singular vs. Plural forms, Case and Gender, Common errors with nouns<br>2. <b>Pronouns:</b> Types, Personal, Possessive, Reflexive, Intensive (Emphatic), Demonstrative, Relative, Interrogative, Indefinite, and Reciprocal pronouns, Common errors with pronouns<br>3. <b>Verbs:</b> Action verbs and linking verbs, Transitive and intransitive verbs, Auxiliary verbs and Modal verbs, Verb tenses, Common errors with verbs | 12           |
| IV                                  | <b>Language Competency: Vocabulary</b><br>1. <b>Vocabulary:</b> Synonyms, Antonyms, Guessing meaning from context,<br>2. <b>Word Formation:</b> Homonyms, Homophones, Homographs, Portmanteau words, Collocations, Compounding Words, Root Words, Prefixes and Suffixes, Clipping, Acronym, Abbreviations, Reduplication                                                                                                                                                   | 12           |
| V                                   | <b>English for Communication</b><br>1. Listening for General and Specific Information.<br>2. Self - Introduction, Introducing others, Greetings.<br>3. Intensive Reading - a prose passage, a poem and a short story<br>4. Descriptive writing – writing descriptive essays in two to three paragraphs.                                                                                                                                                                    | 12           |
| <b>Total Hours</b>                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>60</b>    |
| <b>Reference Books</b>              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |
| 1.                                  | Carter, R., McCarthy, M., Mark, G., & O’Keeffe, A. (2016). English Grammar Today. Cambridge University Press.                                                                                                                                                                                                                                                                                                                                                              |              |
| 2.                                  | Swan, M. (2021). Practical English Usage (4 <sup>th</sup> ed.). Oxford University Press.                                                                                                                                                                                                                                                                                                                                                                                   |              |
| 3.                                  | McCarthy, M., & O’Dell, F. (2017). English Vocabulary in Use: Advanced (3 <sup>rd</sup> ed.). Cambridge University Press.                                                                                                                                                                                                                                                                                                                                                  |              |
| 4.                                  | Ramazani, J., Ellmann, R., & O’Clair, R. (Eds.). (2003). The Norton Anthology of Modern and Contemporary Poetry (Vols. 1–2). W. W. Norton & Company.                                                                                                                                                                                                                                                                                                                       |              |
| 5.                                  | Wren, P. C., & Martin, H. (2015). High School English Grammar and Composition (50 <sup>th</sup> ed.). S. Chand & Company.                                                                                                                                                                                                                                                                                                                                                  |              |
| 6.                                  | Jones, L. (2015). Cambridge English for Life Skills. Cambridge University Press.                                                                                                                                                                                                                                                                                                                                                                                           |              |
| <b>Web Resources (Swayam/NPTEL)</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |
| 1.                                  | <a href="https://nptel.ac.in/courses/109105205">https://nptel.ac.in/courses/109105205</a>                                                                                                                                                                                                                                                                                                                                                                                  |              |

| Course Code | Course Name                              | Category | Hours / Week | Credits |
|-------------|------------------------------------------|----------|--------------|---------|
| 26BAI13C    | Computing Fundamentals and C Programming | Core – I | 5            | 4       |

### Course Objectives

The course intends to cover

- The fundamentals of Computer Programming.
- The techniques in C Programming.
- Usage of C Programming for Problem solving.

### Course Learning Outcomes

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

| CLO                                        | CLO Statements                                                                                                         | Knowledge Level |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                       | Understand the Computer fundamentals and techniques for problem solving.                                               | K1              |
| CLO2                                       | Understand the basic concepts of C Programming.                                                                        | K2              |
| CLO3                                       | Summarize different decision making and looping statements available in C.                                             | K2              |
| CLO4                                       | Demonstrate the concept of user defined Functions, Recursions, Scope and Lifetime of Variables, Structures and Unions. | K2              |
| CLO5                                       | Construct C programs using Pointers, Arrays and file management.                                                       | K3              |
| K1 - Remember; K2 - Understand; K3 – Apply |                                                                                                                        |                 |

### CLO – PLO Mapping

| CLOs/PLOs              | PLO1 | PLO2                  | PLO3 | PLO4             | PLO5 |
|------------------------|------|-----------------------|------|------------------|------|
| CLO1                   | 3    | 3                     | 3    | 2                | 2    |
| CLO2                   | 3    | 2                     | 3    | 3                | 2    |
| CLO3                   | 3    | 3                     | 3    | 2                | 1    |
| CLO4                   | 3    | 3                     | 3    | 1                | 1    |
| CLO5                   | 3    | 3                     | 3    | 1                | 1    |
| 3 - Substantial (high) |      | 2 - Moderate (medium) |      | 1 - Slight (low) |      |

**Core – I: Computing Fundamentals and C Programming**

| Unit               | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | No. of Hours |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I                  | <b>Fundamentals of Computers &amp; Problem Solving in C:</b> Introduction - History of Computers - Generations of Computers - Classification of Computers - Basic Anatomy of a Computer System -Input Devices - Processor - Output Devices - Memory Management - AI Memory System - Types of Software - Overview of Operating System - Programming Languages - Translator Programs - Problem Solving Techniques.                                                                                                                                                                          | 15           |
| II                 | <b>Overview of C:</b> Introduction - 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 - Mathematical Functions - Reading & Writing a character - Formatted input and output. | 16           |
| III                | <b>Decision Making, Looping and Arrays:</b> Introduction - if, if... else, Nesting of, if...else statements - elseif ladder - the switch statement, The ?: operator - the goto Statement. <b>Decision Making and Looping:</b> Introduction - the while statement - the do statement - the for statement - jumps in loops. <b>Arrays:</b> Character Arrays and Strings.                                                                                                                                                                                                                    | 14           |
| IV                 | <b>User - defined Functions, Structures and Unions:</b> Introduction - need and elements of user - defined functions -Definition - Return Values and their types - Function Calls - Declarations - Category of Functions - Nesting of Functions – Recursion - Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables - Multifile Programs- Structures and Unions - Dynamic Memory Allocation – malloc(), calloc(), free().                                                                                                                             | 15           |
| V                  | <b>Pointers &amp; File Management: Pointers :</b> 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 and Strings - Array of Pointers - Pointers as Function Arguments - Functions returning Pointers - Pointers to Functions - Pointers and Structures. File Management in C.                                                                   | 15           |
| <b>Total Hours</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>75</b>    |

**Text Books**

1. E.Balagurusamy (2017), Computing Fundamentals & C Programming – 2<sup>nd</sup> Edition, Tata McGraw-Hill.
2. Yeswanth P Kanetkar, (2022), Let us C, 19<sup>th</sup> Edition, BPB Publications.

**Reference Books**

1. Ashok N Kamthane (2002), Programming with ANSI and Turbo C, Pearson.
2. Henry Mullish & Hubert L. Cooper(1996), The Spirit of C, Jaico.
3. Deitel & Deitel (2022), C How to Program, 9<sup>th</sup> Edition, PHI/Pearson Education Asia.

**Web Resources(NPTEL/Swayam)**

1. <https://nptel.ac.in/courses/106106210>
2. <https://nptel.ac.in/courses/106105171>

| Course Code | Course Name       | Category     | Hours /Week | Credits |
|-------------|-------------------|--------------|-------------|---------|
| 26BAI14P    | C Programming Lab | Core Lab - I | 4           | 2       |

| S. No.                         | List of Programs                                                                                                                                                                                     |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                             | Sample programs.<br>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 numbers.                                                                                                                                                       |
| 3.                             | Write a C program to generate Fibonacci series.                                                                                                                                                      |
| 4.                             | Write a C program to check whether a number is an Armstrong number.                                                                                                                                  |
| 5.                             | Write a C program to reverse a number.                                                                                                                                                               |
| 6.                             | Write a C program to print magic square of order n where n>3 and n is odd.                                                                                                                           |
| 7.                             | Write a C program to display day of the week using switch case.                                                                                                                                      |
| 8.                             | Write a C program to sort the given set of numbers in ascending order.                                                                                                                               |
| 9.                             | Write a C program to check whether the given string is a palindrome or not using pointers.                                                                                                           |
| 10.                            | Write a C program to count the number of vowels in the given sentence.                                                                                                                               |
| 11.                            | Write a C program to find the factorial of a given number using recursive function.                                                                                                                  |
| 12.                            | 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. |
| 13.                            | Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.                                                                                      |
| 14.                            | 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                                                      |
| 15.                            | 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 Hours                    |                                                                                                                                                                                                      |
| 60                             |                                                                                                                                                                                                      |
| Text Books                     |                                                                                                                                                                                                      |
| 1.                             | E.Balagurusamy (2017), Computing Fundamentals & C Programming – 2 <sup>nd</sup> Edition, Tata McGraw-Hill.                                                                                           |
| 2.                             | Yeswanth P Kanetkar, (2022), Let us C, 19 <sup>th</sup> Edition, BPB Publications.                                                                                                                   |
| Reference Books                |                                                                                                                                                                                                      |
| 1.                             | Ashok N Kamthane(2002), Programming with ANSI and Turbo C, Pearson.                                                                                                                                  |
| 2.                             | Henry Mullish & Hubert L. Cooper(1996), The Spirit of C, Jaico.                                                                                                                                      |
| 3.                             | Deitel & Deitel (2022), C How to Program, 9 <sup>th</sup> Edition, PHI/Pearson Education Asia.                                                                                                       |
| Web Resources (Swayam / NPTEL) |                                                                                                                                                                                                      |
| 1.                             | <a href="https://nptel.ac.in/courses/106106210">https://nptel.ac.in/courses/106106210</a>                                                                                                            |
| 2.                             | <a href="https://nptel.ac.in/courses/106105171">https://nptel.ac.in/courses/106105171</a>                                                                                                            |

| Course Code | Course Name                                    | Category  | Hours / Week | Credits |
|-------------|------------------------------------------------|-----------|--------------|---------|
| 26BAI15C    | Data Literacy and Fundamentals of Data Science | Core - II | 5            | 4       |

## Course Objectives

The course intends to cover

- Apply data validation techniques such as creating drop-down lists and using forms for structured data.
- Understanding the foundational concepts of data, types of data, and the importance of data literacy input.
- Design and customize charts and visualizations to enhance data insights.
- Incorporate design elements such as color, labels, legends, and filters to enhance readability and user engagement.
- Learn the steps involved in preparing and analyzing data to support insights.

## Course Learning Outcomes

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

| CLO                                        | CLO Statements                                                                                             | Knowledge Level |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                       | Identify and evaluate data sources and collection methods while considering quality and ethical standards. | K1              |
| CLO2                                       | Design and use Excel data collection forms                                                                 | K2              |
| CLO3                                       | Identify and apply appropriate data types (numeric, text, date) and structures (tables, ranges).           | K3              |
| CLO4                                       | Use advanced tools like Tableau or Power BI to build more interactive and insightful visualizations.       | K3              |
| CLO5                                       | Identify practical problems that can be solved using a data-centric approach.                              | K3              |
| K1 - Remember; K2 - Understand; K3 - Apply |                                                                                                            |                 |

## CLO – PLO Mapping

| CLOs/PLOs              | PLO1 | PLO2                  | PLO3 | PLO4             | PLO5 |
|------------------------|------|-----------------------|------|------------------|------|
| CLO1                   | 3    | 2                     | 3    | 2                | 2    |
| CLO2                   | 3    | 2                     | 2    | 3                | 2    |
| CLO3                   | 2    | 2                     | 3    | 2                | 1    |
| CLO4                   | 2    | 2                     | 2    | 2                | 1    |
| CLO5                   | 2    | 2                     | 2    | 2                | 1    |
| 3 - Substantial (high) |      | 2 - Moderate (medium) |      | 1 - Slight (low) |      |

### Core I: Data Literacy and Fundamentals of Data Science

| Unit | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No. of Hours |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | <p><b>Understanding Data and Data Literacy:</b> What is Data? Types of Data (Structured, Unstructured, Semi-structured) - Importance of Data Literacy in the Modern World - Data Collection Methods and Sources - Data Quality and Ethics. <b>Basics of Data Science:</b> What is Data Science? Overview and Applications - The Data Science Lifecycle: Collection, Cleaning, Analysis, Visualization, and Interpretation - Introduction to Key Tools &amp; Technologies (Excel, Python, R, SQL) - Overview of Data Science Roles and Skills. <b>Data Analysis and Visualization:</b> Introduction to Data Analysis Concepts: Descriptive Statistics - Data Visualization Basics: Charts, Graphs, and Dashboards - Introduction to Visualization Tools (Excel Charts, Tableau, or Power BI basics). <b>Introduction to Data Science Workflow:</b> Data Cleaning and Pre-processing - Exploratory Data Analysis (EDA) - Basic Introduction to Machine Learning Concepts (Supervised vs Unsupervised) - Ethics and Responsible Use of Data.</p> <p><b>Hands-on Exercises:</b><br/>           Lab 1: Exploring and Cleaning Real-World Datasets<br/>           Lab 2: Visualizing Data with Charts and Graphs Using Excel or Tableau<br/>           Lab 3: Conducting Basic Statistical Analysis and Interpretation Using Python or Excel</p> | 15           |
| II   | <p><b>Introduction to Data Collection in Excel:</b> Overview of Data Collection and Its Importance - Methods of Data Entry and Importing Data (CSV, Text files, Web Queries) - Data Validation and Creating Drop-down Lists - Using Forms for Data Collection. <b>Data Cleaning Basics:</b> Identifying and Handling Missing Data - Removing Duplicates and Inconsistent Entries - Using Text Functions for Cleaning (TRIM, CLEAN, SUBSTITUTE, LEFT, RIGHT, MID) - Working with Dates and Numbers: Correcting Formats. <b>Advanced Data Cleaning Techniques:</b> Using Conditional Formatting to Identify Errors - Using Filters and Sorting to Detect Issues - Introduction to Excel's Power Query for Data Cleaning. <b>Best Practices and Automation:</b> Creating Data Cleaning Checklists - Using Macros for Repetitive Cleaning Tasks - Tips for Maintaining Clean and Accurate Data.</p> <p><b>Hands-on Exercises:</b><br/>           Lab 1: Importing and Validating Data Sets in Excel<br/>           Lab 2: Cleaning and Transforming Raw Data Using Excel Functions Lab 3: Using Power Query and Macros for Efficient Data Cleaning</p>                                                                                                                                                                                         | 15           |

| Unit               | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | No. of Hours |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| III                | <p><b>Introduction to Data Analysis and Excel Basics:</b> Overview of Data Analysis Concepts - Navigating Excel Interface and Basic Features - Data Entry and Formatting Tips - Understanding Data Types and Structures. <b>Descriptive Statistics and Data Summarization:</b> Using Functions: SUM, AVERAGE, MEDIAN, MODE, MIN, MAX - Calculating Variance and Standard Deviation - Using COUNT, COUNTA, COUNTIF, COUNTIFS for Data Counting - Creating Pivot Tables for Data Summarization. <b>Data Visualization and Interpretation:</b> Creating Charts: Column, Bar, Pie, Line, Scatter Plots - Customizing Charts for Better Insights - Conditional Formatting for Data Highlights - Basic Dashboard Creation. <b>Introduction to Data Analysis Tools:</b> Using Excel's Data Analysis Toolpak - Introduction to What-If Analysis: Goal Seek, Scenario Manager - Basic Correlation and Regression Analysis. <b>Hands-on Exercises:</b></p> <p>Lab 1: Calculating Descriptive Statistics and Using Pivot Tables</p> <p>Lab 2: Creating and Customizing Charts for Data Visualization</p> <p>Lab 3: Using Data Analysis Toolpak and What-If Analysis</p> | 15           |
| IV                 | <p><b>Fundamentals of Data Visualization:</b> Importance and Principles of Data Visualization - Types of Visualizations: Charts, Graphs, Maps, and Infographics - Choosing the Right Visualization for Your Data. <b>Creating Visualizations in Tools:</b> Using Excel for Basic Visualizations (Bar, Line, Pie, Scatter) - Introduction to Advanced Tools (Tableau / Power BI) - <b>Customizing Visual Elements:</b> Colors, Labels, Legends, and Filters - Using Interactive Elements: Slicers and Filters. <b>Dashboard Design and Best Practices:</b> Components of an Effective Dashboard - Layout and User Experience Design - Storytelling with Data. <b>Building Dashboards:</b> Creating a Dashboard in Excel or Tableau/Power BI - Incorporating Multiple Visuals and Interactivity - Publishing and Sharing Dashboards. <b>Hands-on Exercises:</b></p> <p>Lab 1: Building Basic Charts and Visualizations in Excel</p> <p>Lab 2: Designing Interactive Dashboards Using Tableau or Power BI</p> <p>Lab 3: Creating a Comprehensive Dashboard with Filters and Slicers</p>                                                                         | 15           |
| V                  | <p>Understanding Data-Driven Decision Making: Concepts and Importance of Data-Driven Decisions - Identifying Business/Real-World Problems to Solve with Data - Overview of Data Sources and Collection Methods. <b>Data Preparation and Analysis:</b> Data Cleaning and Pre-processing - Exploratory Data Analysis (EDA) - Using Descriptive Statistics and Visualization to Derive Insights. <b>Decision Modeling and Interpretation:</b> Applying Basic Analytical Models (What-If Analysis, Simple Forecasting) - Interpreting Results for Decision Making - Presenting Data-Driven Recommendations.- Using AI to analyze data and identify patterns, inspired by Pingala's method of counting and arranging patterns (Binary numbers &amp; Pattern generation) <b>Hands-on Exercises:</b></p> <p>Lab 1: Problem Identification and Data Collection for Decision Making</p> <p>Lab 2: Data Cleaning, Analysis, and Visualization</p> <p>Lab 3: Building Decision Models and Presenting Insights</p>                                                                                                                                                       | 15           |
| <b>Total Hours</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>75</b>    |

| <b>Text Books</b>                     |                                                                                                                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                                     | Marr, B. (2016). Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things. Kogan Page.                                                             |
| 2                                     | Provost, F., & Fawcett, T. (2013). Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. O'Reilly Media.                                     |
| 3                                     | McKinney, W. (2018). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (2 <sup>nd</sup> ed.). O'Reilly Media.                                                  |
| <b>Reference Books</b>                |                                                                                                                                                                                       |
| 1                                     | Walkenbach, J. (2015). Excel 2016 Bible. Wiley.                                                                                                                                       |
| 2                                     | Few, S. (2013). Data Visualization: A Practical Introduction. Analytics Press.                                                                                                        |
| 3                                     | Knafllic, C. N. (2015). Storytelling with Data: A Data Visualization Guide for Business Professionals. Wiley.                                                                         |
| <b>Web Resources (Swayam / NPTEL)</b> |                                                                                                                                                                                       |
| 1                                     | <a href="https://nptel.ac.in/courses/106/106/106106212/">https://nptel.ac.in/courses/106/106/106106212/</a>                                                                           |
| 2                                     | <a href="https://swayam.gov.in/nd1_noc21_mg47/preview">https://swayam.gov.in/nd1_noc21_mg47/preview</a>                                                                               |
| 3                                     | <a href="https://www.ijcrt.org/papers/IJCRT2601284.pdf">https://www.ijcrt.org/papers/IJCRT2601284.pdf</a>                                                                             |
| 4                                     | <a href="https://chandrahasblogs.wordpress.com/2020/05/18/pingalas-algorithm-for-binary-conv">https://chandrahasblogs.wordpress.com/2020/05/18/pingalas-algorithm-for-binary-conv</a> |

| Course Code | Course Name    | Category | Hour / Week | Credits |
|-------------|----------------|----------|-------------|---------|
| 26BAI16A    | Linear Algebra | Allied-I | 4           | 3       |

### Course Objectives

The course intends to cover

- The fundamental concepts of matrix algebra, including operations, determinants, inverses, and methods for solving systems of linear equations.
- The concept of linear transformations, their algebraic operations and applications.

### Course Learning Outcomes

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

| CLO                                                      | CLO Statements                                                                                            | Knowledge Level |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                                     | Remember the concept and basic operations of matrices.                                                    | K1              |
| CLO2                                                     | Understand the structure and characteristics of Hermitian and skew-Hermitian matrices.                    | K2              |
| CLO3                                                     | Apply suitable direct or iterative methods to solve real-life problems modeled as linear systems.         | K3              |
| CLO4                                                     | Analyze the rank–nullity relationship to interpret the solution structure of systems of linear equations. | K4              |
| CLO5                                                     | Analyze the Gram–Schmidt process to transform linearly independent sets into orthonormal sets.            | K4              |
| K1 - Remember; K2 - Understand; K3 – Apply; K4 - Analyze |                                                                                                           |                 |

### CLO – PLO Mapping

| CLOs/PLOs              | PLO1                  | PLO2 | PLO3             | PLO4 | PLO5 |
|------------------------|-----------------------|------|------------------|------|------|
| CLO1                   | 2                     | 2    | 2                | 2    | 3    |
| CLO2                   | 2                     | 2    | 2                | 3    | 2    |
| CLO3                   | 2                     | 2    | 2                | 1    | 2    |
| CLO4                   | 3                     | 3    | 2                | 2    | 2    |
| CLO5                   | 3                     | 3    | 2                | 2    | 2    |
| 3 - Substantial (High) | 2 - Moderate (Medium) |      | 1 - Slight (Low) |      |      |

**Allied I: Linear Algebra**

| Unit                                                   | Content                                                                                                                                                                                                                                                                                                              | No. of Hours |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I                                                      | <b>Matrix Algebra:</b> Introduction–types of matrices–Operations of Matrices–Transpose –Properties of Transpose–Determinants–Inverse of a Matrix–Solving Simultaneous linear equations by matrix method–Rank of a Matrix. Matrix Operations in Neural Networks and Machine Learning Connection.                      | 12           |
| II                                                     | <b>Special Matrices:</b> Symmetric and Skew–Symmetric Matrices–Hermitian and Skew–Hermitian Matrices–Orthogonal and Unitary Matrices–Characteristics Roots and Vectors– Cayley-Hamilton’s Theorem.                                                                                                                   | 12           |
| III                                                    | <b>Solution of Simultaneous Linear Algebraic Equations:</b> Gauss Elimination Method – Gauss Jordan Method– Gauss Jacobi Method – Gauss Seidel Method.                                                                                                                                                               | 12           |
| IV                                                     | <b>Vector Spaces:</b> Introduction of Real Vector Space – Subspaces – Linear Combination and Spanning Sets –Linear Dependence and Independence–Basis and Dimensions–Row Space, Column Space, Null Space, Rank and Nullity.                                                                                           | 12           |
| V                                                      | <b>Linear Transformations and Inner Product Spaces:</b> Linear Transformation and Examples–Sum, Scalar Multiple and Composition of Linear Transformation. Inner Product Spaces–Dot Product of Euclidean Inner Product in $\mathbb{R}^n$ –General Inner Product–Orthogonality–Orthonormal Basis–Gram–Schmidt Process. | 12           |
| <b>(Problems - 80% &amp; Theory – 20%) Total Hours</b> |                                                                                                                                                                                                                                                                                                                      | <b>60</b>    |
| <b>Text Books</b>                                      |                                                                                                                                                                                                                                                                                                                      |              |
| 1                                                      | Navanitham, P.A(2023), “Business Mathematics & Statistics”, Jai Publishers, Trichy. Unit I: Chapter 4 P.No. :147-190.                                                                                                                                                                                                |              |
| 2                                                      | Vittal, P.R(2012) “Allied Mathematics”, 6 <sup>th</sup> Edition, Margham Publishers. Unit II: Chapter 5: P.No: 5.8-5.24 & 5.50-5.75.                                                                                                                                                                                 |              |
| 3                                                      | Kandasamy, P,Thilagavathy,K & Gunavathy,K(2007), Numerical methods, S. Chand and Company Ltd, New Delhi. Unit III: Chapter 4: Section 4.1, 4.2, 4.8, 4.9.                                                                                                                                                            |              |
| 4                                                      | Rangrao,S.Bhamare ,Pravin S.Waldhe & Anagha R.Medhekar (2017)“Linear Algebra”, 1 <sup>st</sup> Edition Nirali Prakashan Publishers,Pune. Unit IV: Chapter 3 : Section 3.1-3.6<br>Unit V: Chapter 5 : Section 5.1-5.3,Chapter 6 : Section 6.1-6.5                                                                     |              |
| <b>Reference Books</b>                                 |                                                                                                                                                                                                                                                                                                                      |              |
| 1                                                      | Seymour Lipschutz and Marc Lipson (2001), Linear Algebra, 3 <sup>rd</sup> Edition.                                                                                                                                                                                                                                   |              |
| 2                                                      | David C. Lay, Steven R. Lay, and Judi J. McDonald (2014). Linear Algebra and Its Applications. 5 <sup>th</sup> Edition. Pearson.                                                                                                                                                                                     |              |
| <b>Web Resources (SWAYAM/NPTEL/Others)</b>             |                                                                                                                                                                                                                                                                                                                      |              |
| 1                                                      | Linear Algebra - Course                                                                                                                                                                                                                                                                                              |              |
| 2                                                      | Basic Linear Algebra - Course                                                                                                                                                                                                                                                                                        |              |
| 3                                                      | <a href="https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/">https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/</a>                                                                                                                                                                            |              |

**Part – IV: Foundation Courses**  
(All the Undergraduate Programmes)

| Course Code | Course Name           | Category | Hours / Week | Credits |
|-------------|-----------------------|----------|--------------|---------|
| 26ENV1FC    | Environmental Studies | FC- I    | 2            | 2       |

| Unit | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I    | The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| II   | <p><b>Natural Resources:</b><br/>Renewable and non-renewable resources:<br/>Natural resources and associated problems.</p> <ul style="list-style-type: none"> <li>- Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.</li> <li>- Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.</li> <li>- Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.</li> <li>- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.</li> <li>- Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies.</li> <li>- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</li> </ul> <p>Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.</p> |
| III  | <p><b>Ecosystems</b></p> <ul style="list-style-type: none"> <li>- Concept of an ecosystem.</li> <li>- Structure and function of an ecosystem.</li> <li>- Producers, consumers and decomposers.</li> <li>- Energy flow in the ecosystem.</li> <li>- Ecological succession.</li> <li>- Food chains, food webs and ecological pyramids.</li> <li>- Introduction, types, characteristic features, structure and function of the following ecosystem: -               <ol style="list-style-type: none"> <li>a. Forest ecosystem</li> <li>b. Grassland ecosystem</li> <li>c. Desert ecosystem</li> <li>d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).</li> </ol> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| Unit | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IV   | <b>Biodiversity and its Conservation</b> <ul style="list-style-type: none"> <li>- Introduction-Definition: genetic, species and ecosystem diversity.</li> <li>- Bio geographical classification of India.</li> <li>- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.</li> <li>- Biodiversity at global, National and local levels.</li> <li>- India as a mega-diversity nation.</li> <li>- Hot-spots of biodiversity.</li> <li>- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.</li> <li>- Endangered and endemic species of India.</li> <li>- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.</li> </ul>                                                                                                                                                                                                                                        |
| V    | <b>Environmental Pollution Definition</b> <ul style="list-style-type: none"> <li>- Causes, effects and control measures of: -               <ol style="list-style-type: none"> <li>a. Air pollution</li> <li>b. Water pollution</li> <li>c. Soil pollution</li> <li>d. Marine pollution</li> <li>e. Noise pollution</li> <li>f. Thermal pollution</li> <li>g. Nuclear hazards</li> </ol> </li> <li>- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.</li> <li>- Role of an individual in prevention of pollution.</li> <li>- Pollution case studies.</li> <li>- Disaster management: floods, earthquake, cyclone and landslides.</li> </ul>                                                                                                                                                                                                                                                                                     |
| VI   | <b>Social Issues and the Environment</b> <ul style="list-style-type: none"> <li>- From Unsustainable to Sustainable development.</li> <li>- Urban problems related to energy.</li> <li>- Water conservation, rain water harvesting, watershed management.</li> <li>- Resettlement and rehabilitation of people; its problems and concerns. Case studies.</li> <li>- Environmental ethics: Issues and possible solutions.</li> <li>- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.</li> <li>- Wasteland reclamation.</li> <li>- Consumerism and waste products.</li> <li>- Environment Protection Act.</li> <li>- Air (Prevention and Control of Pollution) Act.</li> <li>- Water (Prevention and Control of Pollution) Act.</li> <li>- Wildlife Protection Act. - Forest Conservation Act.</li> <li>- Issues involved in enforcement of environmental legislation.</li> <li>- Public awareness</li> </ul> |

| Unit                | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VII                 | <b>Human Population and the Environment</b> <ul style="list-style-type: none"><li>- Population growth, variation among nations.</li><li>- Population explosion-Family welfare Programme.</li><li>- Environment and human health.</li><li>- Human Rights.</li><li>- Value Education.</li><li>- HIV/AIDS.</li><li>- Women and Child Welfare.</li><li>- Role of information Technology in Environment and human health.</li><li>- Case Studies.</li></ul> <b>Biosafety and Biosecurity</b> <p>The basic principles of biosafety.</p> <ul style="list-style-type: none"><li>- Biological hazards and assess risk in laboratory settings.</li><li>- Biosafety protocols to minimize risks associated with biological agents.</li><li>- Role of biosafety in the protection of public health, environment, and national security.</li></ul> <p>The theoretical knowledge as well as practical applications to prepare learners for real-world biosafety challenges.</p> <p>1. Introduction to Biosafety</p> <ul style="list-style-type: none"><li>- Definition and importance of biosafety.</li><li>- Historical perspective on biosafety incidents.</li><li>- Biosafety vs. biosecurity: Key differences.</li></ul> <p>2. Biological Hazards and Risk Assessment</p> <ul style="list-style-type: none"><li>- Classification of biological agents (e.g., bacteria, viruses, fungi, parasites).</li><li>- Risk assessment methodology: Identifying hazards, evaluating risks, and control measures.</li></ul> <p>3. Biological Waste Management</p> <ul style="list-style-type: none"><li>- Types of biological waste: Solid, liquid, sharps, etc.</li><li>- Waste disposal techniques: Autoclaving, incineration, chemical disinfection.</li><li>- Environmental impact and regulations surrounding waste management.</li></ul> <p>4. Standard Operating Procedures (SOPs) and Safety Practices</p> <ul style="list-style-type: none"><li>- Developing and implementing SOPs for laboratory safety.</li><li>- Practices for handling, storing, and disposing of biological materials.</li></ul> |                                                                                                                                                                                                                                                                                                                                                                                   |
|                     | VIII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Field Work (Practical).</b> <ul style="list-style-type: none"><li>- Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.</li><li>- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.</li><li>- Study of common plants, insects, birds.</li><li>- Study of simple ecosystems-pond, river, hill slopes, etc.</li></ul> |
| Total Hours         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 30                                                                                                                                                                                                                                                                                                                                                                                |
| Reference Resources |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                   |
| 1.                  | <a href="https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf">https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                   |
| 2.                  | Biosafety in Microbiological and Biomedical Laboratories (CDC, NIH). (BMBL) 6 <sup>th</sup> Edition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                   |
| 3.                  | Sateesh, M. K. (2010). Bioethics and Biosafety. New Delhi: I. K. International Pvt Ltd.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                   |
| 4.                  | Additional Readings: Relevant journal articles, government publications, and guidelines (e.g., WHO, CDC, European Union, etc.). <a href="https://www.iberdrola.com/innovation/what-is-biosafety">https://www.iberdrola.com/innovation/what-is-biosafety</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                   |

## Part – IV: Ability Enhancement Compulsory Courses (AECC)

### (All the Undergraduate Programmes)

| Course Code | Course Name | Category | Hours / Week | Credits |
|-------------|-------------|----------|--------------|---------|
| 26SOF1AE    | Soft Skills | AECC - I | 2            | 2       |

### Course Objectives

The course intends to cover

- The essential soft skills that is crucial for success in today's dynamic and interconnected workplace.

### Course Learning Outcomes

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

| CLO                                                | CLO Statements                                                                                                                                      | Knowledge Level |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| CLO1                                               | Understand the comprehensive skills to participate actively in conversation, writing short texts with expression                                    | K1, K2, K3      |
| CLO2                                               | Infer the cohesive devices to describe and discuss any objects, pictures using compound, complex sentence forms.                                    | K2, K3          |
| CLO3                                               | Comprehend the logic in the given situation to organize the ideas to write formal and informal letters.                                             | K2, K3          |
| CLO4                                               | Understand the given material to organize it in a logical sequence to present a paragraph with main and supporting ideas with concluding sentences. | K3              |
| CLO5                                               | Present valuable ideas in conversation to emulate the main ideas and key points in short essays.                                                    | K3              |
| <b>K1 - Remember; K2 - Understand; K3 - Apply;</b> |                                                                                                                                                     |                 |

**Ability Enhancement Compulsory Course (AECC) - I: Soft Skills**

| Unit | Module                     | Details                                                                                                                                                                                                                                     | No. of Hours |
|------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| I    | <b>Presentation Skills</b> |                                                                                                                                                                                                                                             |              |
|      | 1                          | <b>Getting to Know You:</b> Grammar: Introduction to Tenses, Everyday English, Role-Play. Reading Activity: Different ways of communication. Activities: Fill in the blanks (Listening), Self Introduction (Speaking).                      | 6            |
|      | 2                          | <b>My Day:</b> Grammar: Present simple positive & negative/Adverbs of Frequency, Vocabulary & Speaking about Daily Activities. Listening: Observe and Answer/ Telling the time. Activities: Reading & Writing: Describe where you live.     |              |
|      | 3                          | <b>Your World:</b> Grammar: Possessive determiners. Listening: Positive & negative contractions. Reading & Writing: Personal profile. Activities: Talk about countries, nationalities (Vocabulary & Speaking).                              |              |
|      | 4                          | <b>The World of Work:</b> Grammar: Yes/No & Wh Questions. Vocabulary & Speaking: Jobs. Listening: Recognize the schwa sound. Activities: Opening and closing an email (Reading & Writing).                                                  |              |
|      | 5                          | <b>Places and Things:</b> Grammar: There is / there are, articles. Vocabulary & Speaking: Talk about rooms & furniture. Listening: Directions. Reading & Writing: Imperatives.                                                              |              |
|      | 6                          | <b>24 Hours:</b> Grammar: Likes & Dislikes. Vocabulary & Speaking: Speak about hobbies and interests. Reading: Match the photos with descriptions. Writing: Write complete sentence using prompt. Activities: Observe & answer (Listening). |              |
|      |                            | <b>Practice:</b> Listening & Speaking Presentations - Talking about how you learn – Understanding key information in a presentation – Writing sentences about you.                                                                          |              |
| II   | <b>Confidence</b>          |                                                                                                                                                                                                                                             |              |
|      | 1                          | <b>Clothes and Shopping:</b> Grammar: Modal verbs/Adverbs of Frequency/Adjectives and Adverbs. Vocabulary & Speaking: Shopping. Reading & Writing: Product Review. Activities: Observe & answer (Listening).                                | 6            |
|      | 2                          | <b>Travel &amp; Transport:</b> Grammar: Past simple questions. Vocabulary & Speaking: Talk about holidays. Listening: At the train station. Activities: Email - A perfect holiday (Reading & Writing).                                      |              |
|      | 3                          | <b>Health &amp; Fitness:</b> Grammar: Past simple irregular verbs; Listening: Listen & Answer; Reading & Writing: Time sequencers; Activities: Talk about a healthy lifestyle (Vocabulary & Speaking)                                       |              |
|      | 4                          | <b>Music:</b> Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; Activities: Use adjectives and create sentences (Reading)                                          |              |
|      | 5                          | <b>Let's go shopping:</b> Vocabulary & Speaking: Town Survey; Listening: Listen and answer; Reading & Writing: Read and match; Activities: Countable & Uncountable (Grammar)                                                                |              |
|      |                            | <b>Practice:</b> Writing a personal statement.                                                                                                                                                                                              |              |

|             |                   |                                                                                                                                                                                                              |    |
|-------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| III         | Creativity        |                                                                                                                                                                                                              |    |
|             | 1                 | <b>Cooking &amp; Eating:</b> Grammar: Some & Any, Quantifiers. Vocabulary & Speaking about Food & Drink. Activities Kitchen conversation (Listening). Reading an article & answering.                        | 6  |
|             | 2                 | <b>Survival:</b> Grammar: Comparison of adjectives. Activities Describing people (Speaking and Vocabulary). Listening to an audio & Answering. Reading & Writing: Read and Answer.                           |    |
|             | 3                 | <b>Working Together:</b> Grammar: Verb + Noun phrases. Activities Technology (Vocabulary & Speaking). Listening: Listen & Answer. Reading & Writing: Notice.                                                 |    |
|             | 4                 | <b>Music:</b> Grammar: Present perfect simple. Activities Survey about music (Vocabulary & Speaking). Listen to two people talking about music (Listening). Reading: Use adjectives and create sentences.    |    |
|             | 5                 | <b>Culture and Arts:</b> Grammar: Present perfect. Vocabulary & Speaking activity: Speak on the phone. Activities: Listen and answer. Reading & Writing activity: Review.                                    |    |
|             |                   | <b>Practice:</b> Writing comparison sentences & paragraphs.                                                                                                                                                  |    |
| IV          | Problem-Solving   |                                                                                                                                                                                                              |    |
|             | 1                 | <b>Do's and Don'ts:</b> Grammar, Modal Verbs. Activities Roleplay (Speaking). Holidays in January (Listening). Reading an article & answering.                                                               | 6  |
|             | 2                 | <b>Body:</b> Grammar: First conditional. Vocabulary & Speaking about Personality & Appearance. Activities Conversations about personality (Listening), Reading & Writing: Read and Answer about your skills. |    |
|             | 3                 | <b>Speed:</b> Grammar: Present simple passive. Vocabulary & Speaking about relationships. Listening: Listen & Answer. Reading and Error spotting.                                                            |    |
|             | 4                 | <b>Work:</b> Grammar: Adverbs of manner. Vocabulary & Speaking about work advice. Listening: Observe & Answer; Reading: Read & check your ideas.                                                             |    |
|             |                   | <b>Practice:</b> Writing argumentative and descriptive essays.                                                                                                                                               |    |
| V           | Critical Thinking |                                                                                                                                                                                                              |    |
|             | 1                 | <b>Influence:</b> Grammar: would / past habits. Listening: Sentence Correction. Activities Your inspiration (Speaking). Picture description (Reading).Rewrite the sentences (Writing).                       | 6  |
|             | 2                 | <b>Money:</b> Grammar: Second conditional. Activities: Radio programme (Listening). Talk about games (Speaking). Reading & Writing: Fill in the blanks.                                                      |    |
|             | 3                 | <b>Things that changed the world:</b> Grammar: articles. Activities: Talk about chewing gum (Speaking & Listening). Reading & Writing: Read and write a book review.                                         |    |
|             |                   | <b>Practice:</b> Writing Emails, reports and proposals.                                                                                                                                                      |    |
| Total Hours |                   |                                                                                                                                                                                                              | 30 |

### Components for Internal Assessment and Distribution of Marks for CIA and ESE (Theory)

| Max Marks | Marks for |     | Components for CIA |           |        |           |            |                   |       |
|-----------|-----------|-----|--------------------|-----------|--------|-----------|------------|-------------------|-------|
| 100       | CIA       | ESE | CIA                |           | Model  |           | Attendance | Active Engagement | Total |
|           | 25        | 75  | Actual             | Weightage | Actual | Weightage | 5          | 5                 | 25    |
|           |           |     | 50                 | 5         | 75     | 10        |            |                   |       |

### Question Paper Pattern

| Component        | Duration in Hours | Section A        |                  |         | Section B        |                  |        | Section C        |                  |        | Total |
|------------------|-------------------|------------------|------------------|---------|------------------|------------------|--------|------------------|------------------|--------|-------|
|                  |                   | Type of Question | No. of Questions | Marks   | Type of Question | No. of Questions | Marks  | Type of Question | No. of Questions | Marks  |       |
| CIA              | 2                 | MCQ              | 8                | 8x1=8   | Either or        | 3                | 3x6=18 | Either or        | 3                | 3x8=24 | 50    |
| Model Exam / ESE | 3                 | MCQ              | 10               | 10x1=10 | Either or        | 5                | 5x5=25 | Either or        | 5                | 5x8=40 | 75    |

### Components for Internal Assessment and Distribution of Marks for CIA (Lab)

| Max Marks | Marks for |     | Components for CIA |           |        |           |                        |             |       |
|-----------|-----------|-----|--------------------|-----------|--------|-----------|------------------------|-------------|-------|
|           | CIA       | ESE | Test               |           | Model  |           | Experiments / Programs | Observation | Total |
|           | 40        | 60  | Actual             | Weightage | Actual | Weightage | Marks                  | 5           | 40    |
| 100       |           |     | 50                 | 10        | 60     | 15        | 10                     |             |       |

### Examination Pattern

| Component             | Duration in Hours | Marks          |        |             | Weightage |
|-----------------------|-------------------|----------------|--------|-------------|-----------|
|                       |                   | Practical Exam | Record | Total Marks |           |
| Test                  | 2                 | 50             | -      | 50          | 10        |
| Model                 | 3                 | 60             | -      | 60          | 15        |
| Experiments Completed | -                 | -              | -      | 10          | 10        |
| Observation Note      | -                 | -              | -      | 05          | 05        |
| Total Marks - CIA     |                   |                |        |             | 40        |
| ESE                   | 3                 | 50             | 10     | -           | 60        |

| Max Marks | Marks for |     | Components for CIA |           |        |           |       |
|-----------|-----------|-----|--------------------|-----------|--------|-----------|-------|
| 50        | CIA       | ESE | CIA                |           | Model  |           | Total |
|           |           |     | Actual             | Weightage | Actual | Weightage |       |
|           | 50        | -   | 50                 | 25        | 50     | 25        | 50    |

| Duration in Hours | Mode of Exam | Type of Questions | No. of Questions | Marks     |
|-------------------|--------------|-------------------|------------------|-----------|
| 2                 | Offline      | Open Choice       | 5 (Out of 8)     | 5 x 10=50 |

| Duration in Hours | Mode of Exam | Type of Questions | No. of Questions | Marks   |
|-------------------|--------------|-------------------|------------------|---------|
| 2                 | Online       | MCQ               | 50               | 50x1=50 |

