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 2025 – 26 for Undergraduate Programme

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

Programme: Bachelor of Computer Applications (BCA)
Programme code: BCA

(Applicable for the Students admitted during the Academic Year 2025-26 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/2025/7960 dated 08/05/2025).

Program Learning Outcomes (PLOs)

The successful completion of the BCA programme shall enable the students to:

PLO1	Understanding the computing processes and algorithmic principles to design Software applications with varying complexity to address the society's requirements.
PLO2	Develop the business related software automation requirements by providing suitable solutions with appropriate provisions for data security, user comfort and Environmental considerations.
PLO3	Develop the ability to adapt with the changing technology landscape and apply Suitable CASE tools to a wide range of software development projects.
PLO4	Demonstrate active involvement in collaborative missions either as a team member as a leader or by multidisciplinary teams to accomplish results of higher order.
PLO5	Practice the Software Engineering Code of Ethics and Professional Practice as recommended by the ACM/IEEE-CS Joint Task Force.

BCA

Distribution of Credits and Hours for all the Semesters

Part	Courses	No. of Courses	Hrs.		Credits	Total		Semester
I	Language – I : Tamil	4	4 X 4	16	3	12	12	1-4
II	Language - II : English	4	4 X 4	16	3	12	12	1-4
III	Core Theory (6 hrs. / week)	4	4 X 6	24	4	16	100	3,6
	Core Theory (5 hrs. / week)	9	9 X 5	45	4	36		1,2,4,5
	Core Lab (4 hrs. / week)	4	4 X 4	16	2	8		1-4
	Core Lab (5 hrs. /week)	3	3 X 5	15	3	9		5,6
	Allied (4 hrs. /week)	4	4 X 4	16	3	12		1-4
	Electives (5 hrs. /week)	2	2 X 5	10	3	6		5,6
	Project	1	1 X 6	6	5	5		6
	SEC : Internship	1	-	-	2	2		5
	Skill Enhancement (SEC)	3	3 X 2	6	2	6		3,4,6
IV	Foundation Course(FC)	2	2 X 2	4	2	4	14	1,2
	Foundation Course(FC)	1	-	-	2	2		3
	Ability Enhancement Compulsory Course(AECC)	3	3 X 2	6	2	6		1,2,4
	Ability Enhancement Compulsory Course(AECC) - MOOC	1	-	-	2	2		3
V	Extension Activity-Liberal Arts (Extra-curricular and co-curricular)	-	-	-	2	2	2	4
	Total	**46**		**180**		**140**	**140**	

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**
Total	**16**	**12**	**16**	**12**	**138**	**100**	**10**	**14**	**-**	**2**	**180**	**140**

BCA
Curriculum

Semester–1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM11L	I	Language-I	Tamil–I	4	3	25	75	100	3
25HIN11L	I		Hindi –I						
25MAL11L	I		Malayalam– I						
25FRE11L	I		French–I						
25ENG12L	II	Language-II	English–I	4	3	25	75	100	3
25BCA13C	III	Core-I	Python Programming	5	3	25	75	100	4
25BCA14P	III	Core Lab- I	Python Programming Lab	4	3	40	60	100	2
25BCA15C	III	Core-II	Foundations in Graphic Design	5	3	25	75	100	4
25BCA16A	III	Allied-I	Numerical Methods and Statistics	4	3	25	75	100	3
25ENV1FC	IV	FC-I	Environmental Studies	2	2	50	-	50	2
25SOF1AE	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	Max Marks			
						CIA	ESE	Total	
25TAM21L	I	Language-I	Tamil–II	4	3	25	75	100	3
25HIN21L	I		Hindi –II						
25MAL21L	I		Malayalam–II						
25FRE21L	I		French–II						
25ENG22L	II	Language-II	English–II	4	3	25	75	100	3
25BCA23C	III	Core - III	Java Programming	5	3	25	75	100	4
25BCA24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
25BCA25C	III	Core - IV	Design Principles and Creative Applications	5	3	25	75	100	4
25BCA26A	III	Allied-II	Discrete Mathematics	4	3	25	75	100	3
25HUM2FC	IV	FC-II	Human Rights	2	2	50	-	50	2
25DIM2FC			Disaster Management						
25IDT2AE/	IV	AECC-II	Innovation & Design Thinking/	2	2	-	50	50	2
25IPR2AE/			Intellectual Property Rights/						
25END2AE			Entrepreneurship Development						
			Total	**30**				**700**	**23**

Semester – 3									
Course Code	Part	Course Category	Course Name	Hours/ Week	Examination				Credits
					Duration in Hours	Max Marks			
						CIA	ESE	Total	
25TAM31L	I	Language – I	Tamil – III	4	3	25	75	100	3
25HIN31L	I		Hindi – III						
25MAL31L	I		Malayalam – III						
25FRE31L	I		French – III						
25ENG32L	II	Language – II	English – III	4	3	25	75	100	3
25BCA33C	III	Core – V	Data Structures	6	3	25	75	100	4
25BCA34P	III	Core Lab – III	Data Structures Lab	4	3	40	60	100	2
25BCA35C	III	Core – VI	Introduction to Data Science	6	3	25	75	100	4
25BCA36A	III	Allied – III	Operations Research	4	3	25	75	100	3
25BCA37P	III	SEC – I	Desktop Publishing with InDesign Lab	2	3	40	60	100	2
25BAT3FC	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
25ADT3FC			Advanced Tamil/						
25IKS2FC			Indian Knowledge Systems(IKS)*						
25MOO3AE	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	Max 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	Digital Marketing	4	3	25	75	100	3
	III	SEC – II	Product Mockups & Brand Visualization Lab	2	3	40	60	100	2
	IV	AECC - IV	Innovation & Design Thinking /	2	2	-	50	50	2
			Intellectual Property Rights /						
			Entrepreneurship Development						
	V	Extra - Curricular and Co-curricular	Liberal Arts	-	-	50	-	50	2
			Total	**30**				**800**	**25**

Semester - 5									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
	III	Core - IX	Artificial Intelligence	5	3	25	75	100	4
	III	Core Lab - V	XD & Figma Lab	5	3	40	60	100	3
	III	Core - X	.NET Programming	5	3	25	75	100	4
	III	Core Lab - VI	.NET Programming Lab	5	3	40	60	100	3
	III	Core - XI	Computer Networks	5	3	25	75	100	4
	III	Elective - I	Machine Learning	5	3	25	75	100	3
			Cryptography & Network Security						
			Multimedia Systems						
	III	SEC-III	Internship	-	-	50	-	50	2
Total				**30**				**650**	**23**

Semester – 6									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours / Week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
	III	Core – XII	Big Data Analytics	6	3	25	75	100	4
	III	Core Lab – VII	Big Data Analytics Lab	5	3	40	60	100	3
	III	Core - XIII	Cloud Computing	6	3	25	75	100	4
	III	Elective - II	Natural Language Processing	5	3	25	75	100	3
			Block Chain Technology						
			Game Development						
	III	SEC - IV	UI/UX Design Lab	2	3	40	60	100	2
	III	Core	Project Work	6	3	40	60	100	5
Total				**30**				**600**	**21**
Grand Total				**180**				**4250**	**140**

Semester - 1

Semester–1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM11L	I	Language-I	Tamil–I	4	3	25	75	100	3
25HIN11L	I		Hindi –I						
25MAL11L	I		Malayalam– I						
25FRE11L	I		French–I						
25ENG12L	II	Language-II	English–I	4	3	25	75	100	3
25BCA13C	III	Core-I	Python Programming	5	3	25	75	100	4
25BCA14P	III	Core Lab- I	Python Programming Lab	4	3	40	60	100	2
25BCA15C	III	Core-II	Foundations in Graphic Design	5	3	25	75	100	4
25BCA16A	III	Allied-I	Numerical Methods and Statistics	4	3	25	75	100	3
25ENV1FC	IV	FC - I	Environmental Studies	2	2	50	-	50	2
25SOF1AE	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
25TAM11L	Tamil - I	Language – I	4	3

Course Objectives

- இலக்கிய வளர்ச்சியை அறிந்து கொள்ளுதல்
- இலக்கியம் படைக்கும் திறன்
- இலக்கிய இலக்கண உரைசெய்தல்
- திறனாய்வு முறையினைக் கற்றுத்தேர்தல்

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 கொள்ளுதல்.	K1, K2
CLO2	சிறந்த மற்றும் வாழும் கவிஞர்களை அறிந்து கொள்ளுதல்.	K2, K3
CLO3	சிறந்த படைப்பாளர்களின் சிறுகதையில் வெளிப்படும் சமூகச் சிந்தனைகளை அறிந்து விழிப்புணர்வைப் பெறுதல்.	K3
CLO4	தற்கால இலக்கியங்களான புதுக்கவிதை, சிறுகதை தோன்றி வளர்ந்த பின்புலத்தை அறிதல்.	K1, K3
CLO5	மொழியைப் பிழையின்றி பேச எழுத கற்கத் தேவையானதமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்தல். நடைமுறை வாழ்வியலுக்குத் தேவைப்படும் ஆங்கிலக் கடிதத்தைத் தமிழாக்கம் செய்தலுக்கான பயிற்சி அடைதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part – I: Language I - Tamil – I

Unit	Content	No. of Hours
I	**நாட்டுப்பற்று** 1. உலகத்தைநோக்கிவினவுதல் - பாரதியார் 2. பாரதிதாசன்கவிதைகள் - பாரதிதாசன் • தமிழ்ப்பேறு 3. ஒற்றுமையேஉயிர்நிலை - நாமக்கல்கவிஞர் 4. தேவதேவன்கவிதைகள் - தேவதேவன் • சாலையும்மரங்களும்செருப்பும் • புதியவீடு 5. ஆலாபனை - கவிக்கோஅப்துல்ரகுமான் • போட்டி • பாதை 6. புத்தகச்சந்தை - கவிஞர்வாலி	14
II	**சமூகம்** 1. எட்டாவதுசீர்..... - ஈரோடு தமிழன்பன் 2. தொலைந்துபோனேன் - கவிஞர்தாமரை 3. திருநங்கைகள் காகிதப் பூக்கள் - நா. காமராசன் 4. மரங்களைப் பாடுவேன் - வைரமுத்து 5. புள்ளிப் பூக்கள் (ஹைக்கூ) - அமுத பாரதி 6. நாட்டுப்புறப் பாடல்கள் (தாலாட்டுப் பாடல் , தெம்மாங்குப் பாடல், உழவுத்தொழில்)	14
III	**சிறுகதை** 1. காஞ்சனை - புதுமைப்பித்தன் 2. சுமைதாங்கி - ஜெயகாந்தன் 3. சோற்றுக் கணக்கு - ஜெயமோகன் 4. ஆறு யானைகள் - எஸ்.ராமகிருஷ்ணன் 5. மரத்தைக்கர்ப்பம்சுமந்தவள் - ஆண்டாள்பிரியதர்சினி	12
IV	**இலக்கியவரலாறு** 1. மரபுக்கவிதையின்தோற்றமும்வளர்ச்சியும் 2. புதுக்கவிதையின்தோற்றமும்வளர்ச்சியும் 3. ஹைக்கூகவிதையின்தோற்றமும்வளர்ச்சியும் 4. சிறுகதையின்தோற்றமும்வளர்ச்சியும்	10

Unit	Content	No. of Hours
V	**இலக்கணம்** 1. எழுத்துகள் (முதல்எழுத்துகள், சார்பெழுத்துகள்) 2. எழுத்துக்களின்பிறப்பு 3. மாத்திரைகள் 4. பயிற்சிக்குரியன - மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்துதமிழுக்குமொழிபெயர்த்தல்)	10
	Total Hours	**60**

Reference Books

1	பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதிபாடல்கள், ஆய்வுப்பாதிப்பு, ,தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.
2	அப்துல்ரகுமான்,(2000), ஆலாபனை, கவிக்கோபதிப்பகம்
3	தாமரைகவிதைகள், (2012), நியூசெஞ்சுரிபுக்ஹவுஸ்
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	பரந்தாமனார் அ.கி. (2002), நல்ல தமிழ் எழுத வேண்டுமா?,அல்லி நிலையம்.
8	ராமகிருஷ்ணன் எஸ் (2006), 100 சிறந்த சிறுகதைகள் (தொகுதி 1 & 2) பதிப்பகம்: தேசாந்திரி பதிப்பகம்
9	குமரன்கோ (2010), தமிழ்இலக்கணம்எளியஅறிமுகம் , சந்தியாபதிப்பகம்
10	சக்திவேல்சு,(2012), நாட்டுப்புறவியல், மணிவாசகர்பதிப்பகம்

Course Code	Course Name	Category	Hours/Week	Credits
25HIN11L	Hindi-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 the thoughts and life of the people of this state.
- Translation knowledge and the ability to read and analyze a message are also available.

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,K2
CLO2	Discuss the content of a reading passage	K2,K3
CLO3	Develop an interest in the appreciation of short stories	K3
CLO4	Comprehend the grammatical structures and sentence making	K1,K3
CLO5	Understand the language and developing English to Hindi translation skill	K2,K3
K1-Remember; **K2** -Understand; **K3** –Apply		

Part–I: Language I - Hindi–I

Unit	Content	Hours
I	**Prose: Nuthan Gadya Sangrah** Lesson 1 – Bharathiya Sanskurthi - Dr.Rajendra Prasad Lesson 3 – Razia - RamavikshaBenipuri Lesson 4 – Makreal - Yespal Lesson 5 – Bahtha Pani Nirmala - 'Ageya' Lesson 6 – Rashtrapitha Mahathma Gandhi - Mukthibodh Lesson 9 – Ninda Ras - Harishankar Parsayi.	14
II	**Non Detailed Text Short Stories: Kahani Kunj** Pareksha - Premchand Mamtha - Jayashankar Prasad Apnaparaya - Jaynendrakumar Admikabachcha - Yespal Bolaramkajeev - Harishankar Parsayi Vapasi - MannuBhandari	14
III	**Grammar: Shabdha Vichar Only** (Noun, Pronoun, Adjective, Verb, Tense, Case, Endings) Theoretical & Applied.	12
IV	**Translation: English –Hindi Only.** Anuvadh Abhyas – III (1 - 15 Lessons Only)	10
V	**Comprehension**: 1 Passage From Anuvadh Abhyas – III (16 - 30)	10
	Total Hours	**60**

Text Books	
1	Jayaprakash, (2009), Nuthan Gadya Sangrah, Publisher: Sumitra Prakashan Sumitravas, 16/4, Hastings Road, Allahabad – 211001.
2	Amithab.V.P.(2011), Kahani Kunj, Publisher: Govind Prakashan Sadhar Bagaar, Mathura, UttarPradesh,–281 001

Course Code	Course Name	Category	Hours/Week	Credits
25MAL11L	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 thoughts and life of the people of this state
- Translation knowledge and the ability to read and analyze a message are also available

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	Hours
I	Novel – Pathummayude Aadu-Vaikam Muhammed Basheer	14
II	Novel - Pathummayude Aadu-Vaikam Muhammed Basheer	14
III	Short Story – Ente Priyappeta Kadhakal – Akbar Kakkattil)	12
IV	Short Story – Ente Priyappeta Kadhakal – Akbar Kakkattil)	10
V	Composition & Translation (English to Malayalam)	10
	Total Hours	**60**

Text Books	
1	Vaikam Muhammed Basheer, (2012), Novel – Pathummayude Aadu, D.C. Books, Kottayam, Kerala
2	Akbar Kakkattil, (2009), Short Story – Ente Priyappeta Kadhakal
Reference Books	
1	Tharakan K.M, (2016), Malayala Novel Sahithya Charitram, N.B.S.Kottayam.
2	Achuyuthan M, (2014), Cherukatha Innale Innu - M.Achuyuthan D.C Books, Kottayam.
3	Dr.George K.M, (2011) Sahithya Charitram Prasthanangalilude, D.C.Books, Kottayam.
4	Sukumar Azheekode, (2015), Malayala Sahithyavimarsam, D.C.Books

Course Code	Course Name	Category	Hours/ Week	Credits
25FRE11L	French–I	Language–I	4	3

Course Objectives

The course intends

To understand, speak, read and write simple, standard speech which is very slow and is carefully articulated and can recognize familiar words and very basic phrases concerning themselves, their family and immediate concrete surroundings when people speak slowly and clearly.

Course Learning Outcomes

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

CLO	Course Outcome	Knowledge Level
CLO1	Comprehend basic vocabulary	K1
CLO2	Understand basic syntax and grammar patterns	K2
CLO3	Converse slowly in known situations	K2
CLO4	Translate small basic sentences	K3
K1-Remember; **K2**-Understand; **K3** –Apply		

Part–I: French–I

Unit	Content	No. of Hours
I	Etape0 Etape1(Lecons1- 3)	14
II	Etape2(Lecons1- 3)	14
III	Etape3 -Leçons1–2	12
IV	Etape3–Leçon3 Etape4–Leçon1	10
V	Etape4 –Leçons2–3	10
	Total Hours	**60**

Text Book	
1	Céline Himber,Corina Brillant, Sophie Erlich, (2008), Adomania1–Methodede francais, Publisher-Hachette Fle
Reference Book	
1.	Yves Loiseau, Régine, (2014), Latitudes1, Merieux Publisher: French and European Publications Inc.

Part - II: English – I

Course Code	Course Name	Category	Hours /Week	Credits
25ENG12L	English - I	Language II	4	3

Course Objectives

The course intends to cover

- Various genres of literature.
- Active and passive vocabulary.
- 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 aesthetic sense and appreciate poetry, enhancing creativity and understanding relevant to professional environments.	K1
CLO2	Understand diverse styles of prose, facilitating versatility in writing and inculcating interpersonal skills.	K2
CLO3	Apply the characters and the narrative techniques in creative writing and content creation ethically.	K3
CLO4	Employ vocabulary and grammatical proficiency in communication to enhance clarity in workplace interactions.	K3
CLO5	Enhance overall communication competence. Practicing these skills in combination reinforces learning and provides students with opportunities to use the language in authentic contexts.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part - II: English – I

Unit	Content	No. of Hours
I	**Poetry** : Nature 1. I Wandered Lonely as a Cloud - William Wordsworth 2. The Sparrow - Paul Laurence Dunbar 3. Stopping by woods on a snowy Evening – Robert Frost	12
II	**Prose :** Friendship 1. The Man in Black - Oliver Goldsmith 2. Of Friendship - Francis Bacon 3. The Blessing of Friends - Sir John Lubbock	12
III	**Short Stories:** Morality 1. The Necklace – Guy de Maupassant 2. The Lottery - Shirley Jackson 3. The Monkey's Paw - W. W. Jacobs	12
IV	**Language Competency** 1. Vocabulary : Synonyms, Antonyms, Word Formation 2. Parts of Speech 3. Error correction	12
V	**English for Communication** 1. Listening for General and Specific Information. 2. Self - Introduction, Introducing others, Greetings. 3. Reading a prose passage, Reading a poem and Reading a short story 4. Descriptive writing – Writing a short descriptive essay of two to three paragraphs.	12
	Total Hours	**60**

Text Books

1.	Zama, M. (2004). Poetry Down the Ages. Orient Blackswan.
2.	Goldsmith, O. (1869). The Works of Oliver Goldsmith. J. Dicks
3.	Bacon, F., & Montagu, B. (1857). The Works of Francis Bacon (Vol. 1). Parry & McMillan.

Reference Books

1.	Kumar,V. T. Bhavani, Durga.K. Srinivas.YL. (2018). English in use - A textbook for College Students. (English, Paperback).
2.	Swan, M. (2005). Practical english usage (Vol. 7). Oxford: Oxford university press.

Web Resources (Swayam / NPTEL)

1.	https://nptel.ac.in/courses/109105205

Core-I: Python Programming

Course Code	Course Name	Category	Hours /Week	Credits
25BCA13C	Python Programming	Core- I	5	4

Course Objectives

This Course intends to cover

- Core syntax and semantics of Python programming language.
- Process of structuring the data using lists, dictionaries, tuples and sets

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember the fundamentals of solving problems with computers and execute simple Python programs.	K1
CLO2	Learn the Basic Programming constructs in Python.	K2
CLO3	Understand the basic functions in Python Programming.	K2
CLO4	Apply Software Objects and databases in Python.	K3
CLO5	Apply OOPs concepts in Python programs.	K3
K1-Remember;**K2**-Understand; **K3**–Apply		

CLO–PLO Mapping

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

Core-I: Python Programming

Unit	Content	No. of Hours
I	**Introduction:** The essence of computational problem solving – Limits of computational problem solving-Computer Algorithms-Computer Hardware-Computer Software-The process of computational problem solving-Python programming language - Literals - Variables and Identifiers - Operators - Expressions and Data types, Input / Output.	15
II	**Control Structures:** Boolean Expressions-Selection Control- If Statement-Indentation in Python- Multi-Way Selection - Iterative Control- While Statement- Infinite loops- Definite vs. Indefinite Loops- Boolean Flag. String, List, Tuple Manipulations, Decorators. - Building blocks of python programs, Understanding and using range - Slicing.	15
III	**Functions:** Program Routines- Defining Functions- More on Functions: Calling Value - Returning Functions - Calling Non-Value - Returning Functions-Parameter Passing - Keyword Arguments in Python - Default Arguments in Python-Variable Scope. **Recursion**: Recursive Functions.Decorators. **Modular Design** : Modules - Top-Down Design - Python Modules.	15
IV	**Objects and their use**: Software Objects - Turtle Graphics – Turtle Attributes. Text Files: Opening, reading and writing text files. **Database Programming**: Connecting to a database, **C**reating Tables, **R**ead, **U**pdate, **D**elete (CRUD) and Insert operations, Transaction Control, Disconnecting from a database, String Processing – Exception Handling.	15
V	**Dictionaries and Sets:** Dictionary type in Python - Set Data type. **Object Oriented Programming using Python:** Encapsulation - Inheritance – Polymorphism. **Python packages**: Simple programs using the built-in functions of packages matplotlib, numpy, pandas etc.	15
	Total Hours	**75**
Text Books		
1.	Charles Dierbach (2022), Introduction to Computer Science using Python - A Computational Problem Solving Focus,Wiley India Edition.	
2.	Wesley J.Chun(2016),Core Python Applications Programming,3rd Edition,Pearson Education.	
Reference Books		
1.	Mark Lutz(2018),Learning Python Powerful Object-Oriented Programming, O'reilly Media, 5th Edition.	
2.	TimothyA.Budd(2011),Exploring Python,Tata MCGraw Hill Education Private Limited, 1st Edition.	
3.	John Zelle(2013), Python Programming: An Introduction to Computer Science, 2nd Edition,CourseTechnology Cengage Learning Publications, ISBN978-1590282410	
Web Resources(Swayam/NPTEL)		
1.	https://onlinecourses.swayam2.ac.in/cec24_cs01/course	
2.	https://onlinecourses.nptel.ac.in/noc24_cs57/preview	

Core Lab - I: Python Programming

Course Code	Course Name	Category	Hours / Week	Credits
25BCA14P	Python Programming Lab	Core Lab-I	4	2

S. No.	List of Programs
1	Sample programs - Lists, Tuples, Dictionaries, Decorators and others.
2	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
3	Program to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4	Write a Python script that prints prime numbers lessthan20.
5	Program to find factorial of the given number using recursive function.
6	Write a Python program to count the number of even and odd numbers from array of N numbers.
	Write a Python class to reverse a string word by word.
8	Given a tuple and a list as input, write a program to count the occurrences of all items of the list in the tuple. (Input : tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output: 3)
9	Create a Savings Account class that behaves just like a Bank Account, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).
10	Write a Python program to construct the following pattern, using a nested loop * *** ***** ******* ***** *** *
11	Read a file content and copy only the contents at odd lines into a new file.
12	Create a Turtle graphics window with specific size.

S. No.	List of Programs	
13	Write a Python program for Towers of Hanoi using recursion	
14	Create a menu driven Python program with a dictionary for word sand their meanings.	
15	Devise a Python program to implement the Hangman Game.	
16	Program to create student database and calculate total marks, percentage and grade of a student. Marks obtained in each of the five subjects are to be input by user. Assign grades according to the following criteria: GradeA:Percentage>=80 GradeB:Percentage>=70and80 GradeC:Percentage>=60and<70 GradeD:Percentage>=40and<60 Grade E: Percentage < 40	
	Capstone Project : "Weather Data Analysis and Visualization" (Using Python libraries like matplotlib, numpy, and pandas to process and visualize weather data)	
	Total Hours	**60**
Text Books		
1.	Charles Dierbach(2022),Introduction to Computer Science using Python-A Computational Problem-Solving Focus, Wiley India Edition.	
2.	Wesley J.Chun (2016),Core Python Applications Programming,3rd Edition, Pearson Education.	
Reference Books		
1.	MarkLutz(2018),Learning Python Powerful Object-Oriented Programming,O"reilly Media, 5th Edition.	
2.	TimothyA.Budd(2011),Exploring Python,Tata MCGrawHill Education Private Limited,1st Edition.	
3.	JohnZelle(2013),Python Programming:An Introduction to Computer Science,2nd Edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410.	
Web Resources(Swayam/NPTEL)		
1.	https://onlinecourses.swayam2.ac.in/cec24_cs01/course	
2.	https://onlinecourses.nptel.ac.in/noc24_cs57/preview	

Core - II: Foundations in Graphic Design

Course Code	Course Name	Category	Hours /Week	Credits
25BCA15C	Foundations in Graphic Design	Core-II	5	4

Course Objectives

This Course intends to cover:

- Understand Design Principles
- Explore Design Elements
- Master Design Tools and Software

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Acquire proficiency in Adobe Photoshop, a popular graphic design tool.	K1,K2
CLO2	Get acquainted with Develop photo retouching and restoration basics.	K3
CLO3	Gain expertise in vector graphics and compositing skills.	K3
CLO4	Learn the skills to edit complex vector shapes and illustrations using advanced techniques.	K2
CLO5	Develop skills in typography and logo creation for various applications.	K2
K1-Remember;**K2**-Understand;**K3**- Apply		

CLO–PLO Mapping

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

Core - II: Foundations in Graphic Design

Unit	Content	No. of
I	**Introduction to Photoshop Interface** - Navigating the Workspace, Customizing Workspaces, Understanding Tools and Panels, Basic File Operations, Importing and Exporting Images. **Working with Layers and Masks** - Understanding Layers and Layer Types, Layer Styles and Effects, Creating and Using Layer Masks, Clipping Masks and Adjustment Layers, Layer Blending Modes. **Hands-on Exercises:** 1. Creating a Digital Photo Collage Using Layers and Masks. 2. Designing a Promotional Poster with Layer Styles and Clipping Masks. 3. Photo Enhancement and Background Replacement with Adjustment Layers.	15
II	**Photo Retouching and Restoration** - Basic Retouching Techniques, Advanced Healing and Cloning Tools, Color Correction and Adjustment, Restoring Old Photographs, Non-destructive Editing Techniques. **Digital Painting and Drawing Techniques** - Brush Tool Basics, Creating Custom Brushes, Using the Pen Tool for Drawing, Working with Paths and Shapes, Advanced Digital Painting Techniques. **Hands-on Exercises:** 1. Photo Retouching and Restoration of Damaged Images Using Healing and Cloning Tools 2. Color Correction and Non-Destructive Editing Using Adjustment Layers 3. Digital Painting and Illustration Using Custom Brushes and the Pen Tool	15
III	**Advanced Compositing and Effects** - Selection Tools and Techniques, Combining Multiple Images, Applying Filters and Effects, Creating Realistic Shadows and Highlights, Finalizing and Exporting Composite Images. **Introduction to Illustrator and Vector Graphics** - Overview of Vector Graphics, Illustrator Interface and Tools, Setting Up New Documents, Working with Artboards, Saving and Exporting Vector Files. **Hands-on Exercises:** 1. Advanced Image Compositing and Realistic Effects Using Selection and Blending Techniques 2. Creating a Multi-Image Fantasy Scene with Filters, Shadows, and Highlights 3. Introduction to Vector Graphics in Adobe Illustrator: Tools, Artboards, and Exporting Files	15
IV	**Creating and Editing Shapes and Paths** - Drawing Basic Shapes, Using the Pen Tool, Editing Paths and Anchor Points, Shape Builder and Pathfinder Tools, Advanced Shape Manipulation. **Advanced Drawing Techniques and Brushes** - Using Brushes and Patterns, Creating Custom Brushes, Working with Gradients and Meshes, Drawing Complex Illustrations, Using the Blob Brush and Eraser Tool. **Hands-on Exercises:** 1. Creating and Manipulating Vector Shapes Using Pen, Pathfinder, and Shape Builder Tools 2. Advanced Path Editing and Anchor Point Techniques for Complex Vector Art 3. Custom Brush Creation and Gradient Mesh Techniques for Detailed Illustrations	15

Unit	Content	No. of
V	**Working with Typography and** Text - Adding and Formatting Text, Text on a Path and Area Type, Working with Fonts and Type Styles, Creating Text Effects, Using Type in Illustrative Design. **Designing Logos and Icons** - Principles of Logo Design, creating Icon Sets, Using Symbols and Reusing Assets, Exporting Assets for Web and Print, Finalizing and Presenting Designs. **Hands-on Exercises:** 1. Creative Typography and Text Effects Using Path and Area Type Tools 2. Designing Scalable Logos and Icon Sets with Reusable Symbols 3. Finalizing and Exporting Professional Logo Designs for Web and Print	15
	Total Hours	**75**

Text Books

1.	Faulkner, A., & Chavez, C. (2023).Adobe Photoshop Classroom in a Book (2023 Release). Adobe Press.ISBN: 9780137966026
2.	Faulkner, A., & Chavez, C. (2023)**.**Adobe Illustrator Classroom in a Book (2023 Release). Adobe Press.ISBN: 9780137965968
3.	Wood, A. (2021)**.**Adobe Photoshop CC for Dummies (3rd ed.). Wiley.ISBN: 9781119716378

Reference Books

1.	Kelby, S. (2020).The Adobe Photoshop CC Book for Digital Photographers. New Riders.ISBN: 9780137966811
2.	Luisa, S. (2021).Digital Painting Techniques: Practical Techniques of Digital Art Masters. 3dtotal Publishing.ISBN: 9781909414970
3.	Nielsen, T. (2012).Designing Logos: The Process of Creating Symbols that Endure. Rockport Publishers.ISBN: 9781592537379

Web Resources(Swayam/NPTEL)

1.	**NPTEL - Digital Image Processing (IIT Kharagpur)** https://nptel.ac.in/courses/117105079
2.	**SWAYAM - Introduction to Graphic Design (IGNOU)** https://swayam.gov.in/nd1_noc23_ae09/preview

Allied - I: Numerical Methods and Statistics

Course Code	Course Name	Category	Hours / Week	Credits
25BCS16A/ 25BCA16A/ 25BIT16A/ 25BCT16A/ 25MSS17A	**Numerical Methods and Statistics**	**Allied**	**4**	**3**

Course Objective

The course intends to cover

- A set of strategies and approaches used to generate approximate solutions to mathematical problems that cannot be solved analytically.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Obtain numerical solutions of algebraic and transcendental equations.	K1
CLO2	Understand the numerical solutions of simultaneous linear equations using different methods.	K2
CLO3	Understand the concept of numerical solutions in differentiation and integration of functions.	K2
CLO4	Apply measures of central tendency and measures of variation to find grouped and ungrouped data.	K3
CLO5	Apply the results of correlation and regression analysis.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply;		

CLO – PLO Mapping

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

Allied - I: Numerical Methods and Statistics

Unit	Content	No. of Hours
I	**The Solution of Numerical Algebraic and Transcendental Equations:** Bisection Method – Iteration Method – Convergence Condition – Regula Falsi Method – Newton - Raphson Method	12
II	**Solution of Simultaneous Linear Algebraic Equations:** Gauss Elimination Method - Gauss Jordan Method- Gauss Jacobi Method - Gauss Seidel Method**.**	12
III	**Numerical Differentiation:** Newton's Forward Difference - Newton's Backward Difference - Derivative using Stirling's formula. **Numerical Integration:** Trapezoidal rule -Simpson's $1/3^{rd}$ and $3/8^{th}$ rules.	12
IV	**Measures of Central Tendency:** Mean- Median-Mode. **Measures of Dispersion:** Range- Standard Deviation- Co-efficient of Variation.	12
V	**Correlation:** Meaning and Definition- Scatter Diagram-Karl Pearson's Co-efficient of correlation-Spearman's Rank Correlation. **Regression:** Meaning and Uses of Regression -Two Regression Lines-Methods of Forming the Regression Equations.	12
	Total Hours	**60**
Text Books		
1	P. Kandasamy, K.Thilagavathy & K. Gunavathi (2007)" Numerical methods", S. Chand and Company Ltd, New Delhi. Unit I : Chapter 3 : Section 3.1 – 3.4 Unit II : Chapter 4 : Section 4.1, 4.2, 4.8, 4.9 Unit III: Chapter 9 : Section 9.1 – 9.4	
II	P.A.Navanitham (2023). "Business Mathematics and Statistics", Jai Publishers.Part II Unit IV: Chapter 7 : Pg. No. 159 – 250 Chapter 8 : Pg. No. 301 – 307, 325 – 368 Unit V: Chapter 12 : Pg. No. 503 – 522, 540 – 578	
Reference Books		
1.	M.K. Venkataraman (1999), "Numerical Methods in Science and Engineering", National Publishing Chapter 12 Pg. No. 503 – 522 company.	
2.	K. Sankara Rao (2018), "Numerical Methods for Scientists and Engineers", Prentice Hall India.	
3	P.R.Vittal (2003), "Business Mathematics", Margham publications 2^{nd} edition.	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/107/111107105/	

Part –IV – Foundation Course

(All Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
25ENV1FC	Environmental Studies	FC-I	2	2

Unit	Content
I	The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.
II	**Natural Resources:** Renewable and non-renewable resources: - Natural resources and associated problems. - Forest resources: Use and Over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems. - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Case studies. - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. - Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit	Content
III	**Ecosystems** - Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem. - Ecological succession. - Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: - 1. Forest ecosystem 2. Grassland ecosystem 3. Desert ecosystem 4. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).
IV	**Bio Conservation** - Introduction – Definition : genetic, species and ecosystem diversity. - Bio geographical classification of India. - Value of bio diversity : consumptive use, productive use, social, ethical, aesthetic and option values. - Bio diversity at global, National and local levels. - India as a mega-diversity nation. - Hot-spots of biodiversity. - Threats to biodiversity: habitalloss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India. - Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.
V	**Environ** **Environmental Pollution Definition** - Causes, effects and control measures of:- a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards - Solid waste Management : Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management : floods, earthquake, cyclone and landslides.

Unit	Content
VI	**Social Issues and the Environment** - From Unsustainable to Sustainable development. - Urban problems related to energy. - Water conservation, rain water harvesting, water shed management. - Resettlement and rehabilitation of people ; its problems and concerns. Case studies. - Environmental ethics : Issues and possible solutions. - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. - Waste land reclamation. - Consumerism and waste products. - Environment Protection Act. - Air (Prevention and Control of Pollution)Act. - Water (Prevention and Control of Pollution)Act. - Wildlife Protection Act.- Forest Conservation Act. - Issues involved in enforcement of environmental legislation.
VII	**Human Population and the Environment** - Population growth, variation among nations. - Population explosion – Family welfare Programme. - Environment and human health. - Human Rights. - Value Education. - HIV/AIDS. - Women and Child Welfare. - Role of information Technology in Environment and human health. - Case Studies. **Bio safety and Bio security** The basic principles of bio safety. - Biological hazards and assess risk in laboratory settings. - Bio safety protocols to minimize risks associated with biological agents. - Role of bio safety in the protection of public health, environment, and national security. The theoretical knowledge as well as practical applications to prepare learners for real-world bio safety challenges. 1. Introduction to Bio safety - Definition and importance of bio safety. - Historical perspective on bio safety incidents. - Bio safety vs. bio security : Key differences. 2. Biological Hazards and Risk Assessment - Classification of biological agents (e.g.,bacteria,viruses,fungi,parasites). - Risk assessment methodology : Identifying hazards, evaluating risks, and control measures. 3. Biological Waste Management - Types of biological waste: Solid, liquid, sharps,etc. - Waste disposal techniques: Autoclaving, incineration, chemical disinfection. - Environmental impact and regulations surrounding waste management. 4. Standard Operating Procedures (SOPs) and Safety Practices - Developing and implementing SOPs for laboratory safety.

Unit	Content
VIII	**Field Work (Practical).** -Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain. -Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. -Study of common plants, insects, birds. -Study of simple ecosystems-pond, river, hill slopes, etc.
	Total Hours. 30

Reference Resources

1.	https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf
2.	Bio safety in Microbiological and Biomedical Laboratories(CDC,NIH).(BMBL) 6th Edition
3.	Sateesh,M.K.(2010).Bio ethics and Biosafety. NewDelhi: I.K.International Pvt Ltd.
4.	Additional Readings: Relevant journal articles, government publications, and guidelines (e.g., WHO, CDC, European Union, etc.). https://www.iberdrola.com/innovation/what-is-biosafety

Part – IV : Ability Enhancement Compulsory Courses(AECC)

Course Code	Course Name	Category	Hours / Week	Credits
25SOF1AE	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
K1 - Remember; **K2** - Understand; **K3** - Apply;		

Part-IV - Ability Enhancement Compulsory Course - I : Soft Skills

Module	Unit	Details	No. of Hours
I			
	1	**Getting to Know You:** 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	**My Day:** 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	**Your World:** Grammar: Possessive determiners. Listening: Positive & negative contractions. Reading & Writing: Personal profile. *Activities:* Talk about countries, nationalities (Vocabulary & Speaking).	
	4	**The World of Work:** Grammar: Yes/No & Wh Questions. Vocabulary & Speaking: Jobs. Listening: Recognize the schwa sound. *Activities:* Opening and closing an email (Reading & Writing).	
	5	**Places and Things:** Grammar: There is / there are, articles. Vocabulary & Speaking: Talk about rooms & furniture. Listening: Directions. Reading & Writing: Imperatives.	
	6	**24 Hours:** 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).	
		Practice: Listening & Speaking Presentations - Talking about how you learn – Understanding key information in a presentation – Writing sentences about you.	
II			
	1	**Clothes and Shopping:** Grammar: Modal verbs/Adverbs of Frequency/Adjectives and Adverbs. Vocabulary & Speaking: Shopping. Reading & Writing: Product Review. *Activities:* Observe & answer *(*Listening).	6
	2	**Travel & Transport:** Grammar: Past simple questions. Vocabulary & Speaking: Talk about holidays. Listening: At the train station. *Activities:* Email - A perfect holiday (Reading & Writing).	
	3	**Health & Fitness:** Grammar: Past simple irregular verbs; Listening: Listen & Answer; Reading & Writing: Time sequencers; *Activities:* Talk about a healthy lifestyle (Vocabulary & Speaking)	
	4	**Music:** Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; *Activities:* Use adjectives and create sentences (Reading)	
	5	**Let's go shopping:** Vocabulary & Speaking: Town Survey; Listening: Listen and answer; Reading & Writing: Read and match; Activities: Countable & Uncountable **(**Grammar)	
		Practice: Writing a personal statement.	

III	**Creativity**		
	1	**Cooking & Eating:** Grammar: Some & Any, Quantifiers. Vocabulary & Speaking about Food & Drink. *Activities* Kitchen conversation (Listening). Reading an article & answering.	6
	2	**Survival:** Grammar: Comparison of adjectives. *Activities* Describing people (Speaking and Vocabulary). Listening to an audio & Answering. Reading & Writing: Read and Answer.	
	3	**Grammar:** Verb + Noun Phrases. Activities: Technology (Vocabulary & Speaking). Listening: Listen & Answer. Reading & Writing: Notice.	
	4	**Music:** 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	**Culture and Arts:** Grammar: Present perfect.Vocabulary & Speaking activity: Speak on the phone. *Activities:* Listen and answer. Reading & Writing activity: Review.	
		Practice: Writing comparison sentences & paragraphs.	
IV	**Problem-Solving**		
	1	**Do's and Don'ts:** Grammar, Modal Verbs. *Activities* Roleplay (Speaking). Holidays in January (Listening). Reading an article & answering.	6
	2	**Body:** Grammar: First conditional. Vocabulary & Speaking about Personality & Appearance. *Activities* Conversations about personality (Listening), Reading & Writing: Read and Answer about your skills.	
	3	**Speed:** Grammar: Present simple passive. Vocabulary & Speaking about relationships. Listening: Listen & Answer. Reading and Error spotting.	
	4	**Work:** Grammar: Adverbs of manner. Vocabulary & Speaking about work advice. Listening: Observe & Answer; Reading: Read & check your ideas.	
		Practice: Writing argumentative and descriptive essays.	
V	**Critical Thinking**		
	1	**Influence:** Grammar: would / past habits. Listening: Sentence correction. *Activities* Your inspiration (Speaking). Picture description (Reading).Rewrite the sentences (Writing).	6
	2	**Money:** Grammar: Second conditional. *Activities:* Radio programme (Listening). Talk about games (Speaking). Reading & Writing: Fill in the blanks.	
	3	**Things that changed the world:** Grammar: articles. *Activities* :Talk about chewing gum (Speaking & Listening). Reading & Writing:Read and write a book review.	
		Practice: 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
100	40	60	Actual	Weightage	Actual	Weightage	Marks	5	40
			50	**10**	60	**15**	**10**		

Examination Pattern

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

Components for Internal Assessment and Distribution of Marks for CIA (Foundation Course -Theory)

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

Question Paper Pattern

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

Components for and Distribution of Marks for ESE (Theory) Ability Enhancement Compulsory Courses (AECC) & Question Paper Pattern

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

Semester 2

Semester– 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM21L	I	Language-I	Tamil–II	4	3	25	75	100	3
25HIN21L	I		Hindi –II						
25MAL21L	I		Malayalam–II						
25FRE21L	I		French–II						
25ENG22L	II	Language-II	English–II	4	3	25	75	100	3
25BCA23C	III	Core - III	Java Programming	5	3	25	75	100	4
25BCA24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
25BCA25C	III	Core - IV	Design Principles and Creative Applications	5	3	25	75	100	4
25BCA26A	III	Allied-II	Discrete Mathematics	4	3	25	75	100	3
25HUM2FC	IV	FC-II	Human Rights	2	2	50	-	50	2
25DIM2FC			Disaster Management						
25IDT2AE/	IV	AECC-II	Innovation & Design Thinking/	2	2	-	50	50	2
25IPR2AE/			Intellectual Property Rights/						
25END2AE			Entrepreneurship Development						
			Total	**30**				**700**	**23**

Part – I: Language – I : தமிழ் – II

(All the UG Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
25TAM21L	Tamil – II	Language - I	4	3

Course Objectives

The Course intends to cover

- தமிழ் இலக்கியம் கற்பதன் மூலம் நாகரிகம் மற்றும் பண்பாட்டைப் புரிந்துகொள்ளுதல்.
- தனிப்பட்ட வளர்ச்சி, படைப்பாற்றல் திறனை வளர்த்தல்.
- வாழ்வியல் அறங்களைக் கற்றல் மற்றும் வாழ்வைச் செழுமையாக்க உதவும் நன்னெறிகளை அறிதல்.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	அற இலக்கியங்கள் வழி வாழ்வியல் ஒழுக்கங்களைப் பின்பற்றுதல்	K1 - K3
CLO2	பக்தி இலக்கியங்கள் வழி பக்தி நெறிகளை உணர்தல்.	K1 - K3
CLO3	உரைநடை இலக்கிய படைப்பாளர்களின் சிந்தனைகளைக் கற்று பின்பற்றுதல்	K1 - K3
CLO4	தமிழ் இலக்கிய வரலாற்றில் அற இலக்கியம் மற்றும் உரைநடையின் தாக்கம் குறித்து அறிதல்	K1- K3
CLO5	இலக்கணங்களைக் கற்று பிழையின்றி எழுதுதல்.	K1 - K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Unit	Content	No. of Hours
I	**(அறம்)** 1. திருக்குறள்(மூன்று அதிகாரங்கள்) • புகழ் • வினை செயல்வகை • நெஞ்சொடு கிளத்தல் 2. திரிகடுகம்(10, 16, 19, 26, 42 பாடல்கள் மட்டும்) 3. பழமொழி நானூறு(2,7,21,54,69,119,130,184,267,375 பாடல்கள் மட்டும்)	14
II	**(பக்தி)** 1. தாயுமானவர் பாடல்கள்(பராபரக் கண்ணி முதல் 10 பாடல்கள்) 2. உமர்கயாம் பாடல்கள் (தனிப்பாடல்கள்) - கவிமணி தேசிகவிநாயகம் பிள்ளை 3. வள்ளலார் பாடல்கள்(திருவருட்பா – வள்ளலார் விண்ணப்பம்) 4. இயேசுகாவியம் - மலைப்பொழிவு - கண்ணதாசன் 5. சித்தர் பாடல் - சிவவாக்கியார் பாடல்	14
III	**(கலை மற்றும் பண்பாடு)** 1. அறம் எனப்படுவது - அமுதன் 2. ஏட்டில் எழுதா இலக்கியம் - ஔவை துரைச்சாமி 3. கீழடி - தொல்லியல் துறை, வெளியீடு 4. மனம் எனும் சொர்க்கவாசல்- டாக்டர் எம்.எஸ்.உதயமூர்த்தி 5. ஆளுமைத் திறன் - அறிவுக்கதிர். அரசுப்பணி சிறப்பிதழ்	12
IV	**(இலக்கிய வரலாறு)** 1. பதினெண் கீழ்க்கணக்கு நூல்கள் 2. உரைநடையின் தோற்றமும் வளர்ச்சியும்	10

Unit	Content	No. of Hours
V	**(இலக்கணம்)** 1. சொல்லின் வகைகள் 2. வேற்றுமைத் தொகைகள் 3. பகுபத உறுப்புகள்	10
	Total Hours	**60**

Reference Books	
1	கவிஞர் கண்ணதாசன், (2006, 6-ஆம் பதிப்பு), இயேசு காவியம், கலைக்காவிரி பதிப்பகம்.
2	நடராசன் தி.சு. (2013, 16-ஆம் பதிப்பு), உரைகளும் உரையாசிரியர்களும், நியூ செஞ்சுரி புக் ஹவுஸ்.
3	முனைவர் சேதுராமன் சி.(2010, முதல் பதிப்பு), அபிராமி அந்தாதி, நியூ செஞ்சுரி புக் ஹவுஸ்.
4	முனைவர் பஞ்சாங்கம் கா. (2017, 4-ஆம் பதிப்பு), தமிழ் இலக்கிய வரலாறு, காவியா பதிப்பகம்.
5	வரதராசன் மு. (2021, 34-வது பதிப்பு), தமிழ் இலக்கிய வரலாறு, சாகித்திய அகாதமி பதிப்பு.
6	செல்வநாயகம் வி.(2003, முதல் பதிப்பு), தமிழ் உரைநடை வரலாறு, அடையாளம் பதிப்பகம்.
7	பேரா. முனைவர் பாக்கியமேரி, (2022, 6-ம் பதிப்பு), வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, நியூசெஞ்சுரி புக் ஹவுஸ்(பி). லிட்.
8	டாக்டர் உதயமூர்த்தி எம். எஸ்.(2016, முதல் பதிப்பு), எண்ணங்கள், வெளியீடு கங்கை புத்தக நிலையம்.
9	புலவர்.பொன்மணிமாறன், (2011, முதல் பதிப்பு) அடோன் தமிழ் இலக்கணத் தொகுப்பு, அருண் பப்ளிஷிங்.
10	குமரன் கோ (2010, முதல் பதிப்பு), தமிழ் இலக்கணம் எளிய அறிமுகம் , சந்தியா பதிப்பகம்.

Part – I: Language – I - Hindi - II

Course Code	Course Name	Category	Hours / Week	Credits
25HIN21L	Hindi - II	Language - I	4	3

Course Objectives

The Course intends to cover :

- A basic understanding of contemporary poetry can be gained and the nature of modern poetry can be realized.
- Realizing the nature of drama and its nature and improving the knowledge of reading and understanding the nature of contemporary plays.
- Understands the benefits of correspondence and can enhance the correspondence you need.
- Translation is especially useful for translating from Hindi to English

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Get a basic understanding of renewal poetry and the essence of the poem	K1
CLO2	It is possible to understand the genre of Drama	K2
CLO3	Translating skill improved specially from English to Hindi	K2, K3
CLO4	Knowledge is gained by using phrases and idioms	K3
CLO5	Learners can express opinion in small sentences	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyse		

Unit	Content	No. of Hours
I	**Modern Poetry :** Panchvati By Mythli Sharan Gupt	14
II	**One Act Play:** Ekaniki Piyush 1. Owrangjeb ki aakirirath– Ramkumar varma 2. Ek din - Lakshminarayan Misra 3. Vapasi - Vishnuprabhakar 4. Badsurath rajkumari – Krishnachandra 5. Aakket – Harijeeth	14
III	**Letter Writing :** (Leave Letter, Job Application, Ordering Books, Letter to Publisher, Personal Letter)	12
IV	**Conversation:**(Doctor & Patient, Teacher & Student, Storekeeper & Buyer, Two Friends, Booking Clerk & Passenger at Railway Station, Auto rickshaw driver and Passenger)Ref : Bolchal Ki Hindi Aur Sanchar by Dr. Madhu Dhavan Vani Prakashan, New Delhi.	10
V	**Translation:** Hindi-English only Lessons – 1-15 only Anuvadh Abyas -III	10
	Total Hours	**60**

Text Book

1. Luca Giachino, Carla Baracco, Romain Chrétien(DELF), (2022), Nouvelle Génération A1, Didier FLE

Reference Books

1. Kavya Parasar, Dr.Bolanath,(2018) Jawahar Pusthakalay, Sadar Bazaar,Mathura-U.P.281001.
2. Sone ki Varsha (2020) Dakshin Bharat Hindi Prachar Sabha, Chennai – 600 017

Part – I: Language – I
French – II

Course Code	Course Name	Category	Hours / Week	Credits
25FRE21L	French - II	Language - I	4	3

Course Objectives

The course intends to

- Understand and use familiar everyday expressions and basic phrases aimed at the satisfaction of concrete needs.
- Recognize key aspects of Francophone cultures such as greetings, etiquette, daily life, and basic geography of French-speaking countries.
- Write short, simple texts such as postcards, emails, or short descriptions about themselves and their immediate environment.
- Construct simple sentences using correct word order and basic vocabulary.
- Develop sensitivity to cross-cultural differences in communication and social practices.
- Read and understand short, simple texts such as personal messages, advertisements, menus, and schedules.

Course Learning Outcomes

On the successful completion of the course, students 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.	K3
CLO5	Developing Communication Skills	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4**-Analyse		

Unit	Content	No. of Hours
I	Portraits(pg 50-60) Grammaire: pg(140-144)	14
II	Communication(pg 61-65) Grammaire: pg(145-146)	14
III	Temps Libre(pg 66-68) Grammaire: pg(147)	12
IV	Mots Et Expressions((pg 69-76) Grammaire: pg(148-151)	10
V	Communication(pg 77-81) Grammaire: pg(152-155)	10
	Total Hours	**60**

Text Book

1. Luca Giachino, Carla Baracco, Romain Chrétien(DELF), (2022), Nouvelle Génération A1, Didier FLE.

Reference Book

1. Nathalie Hirschsprung, Tony Tricot, (2017) Cosmopolite, Hachette.

Part – II: Language-II - English -II

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours /Week	Credits
25ENG22L	English-II	Language - II	4	3

Course Objectives

The course intends to cover

- The literary elements in poetry.
- The critical contemplation and writing in styles of prose texts.
- The modernist techniques and ethics in the narratives of short stories.
- The interpersonal skills essential in the work environment.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify the common techniques underlying free verse and traditional forms of poetry for crafting poems.	K1
CLO2	Understand humour in prose texts psychologically to master the oratory skills.	K2
CLO3	Employ empathy and morale in diplomatic Day-to-day circumstances.	K3
CLO4	Strengthen the writing skills for documentation.	K3
CLO5	Demonstrate flexibility and mobility in the sequel LSRW Skills.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Unit	Content	No. of Hours
I	**Poetry**: Motherhood 1. My Grand Mother's House – Kamala Das 2. Of mother, among others things – A.K Ramanujam 3. Night of the Scorpion – Nissim Ezekiel	12
II	**Prose**: Humour 1. With The Photographer – Stephen Leacock 2. Travel by Train – J.B.Priestley 3. On Forgetting – Robert Lynd	12
III	**Short Stories:** Integrity 1. The taxi driver – K.S. Duggal 2. A Retrieved Reformation- O Henry 3. Kabuliwala - Rabindranath Tagore	12
IV	**Language Competency : Vocabulary** 1. Homonyms, Homophones, Homographs Portmanteau words 2. Verbs and Tenses, Subject Verb Agreement 3. Error Correction Vocabulary : Synonyms, Antonyms, Word Formation	12
V	**English for Communication** 1.Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks 2. Participating in a meeting: face to face and online 3. Reading news and weather reports 4. Preparing first drafts of short assignments .	12
	Total Hours	**60**

Text Books	
1.	Ezekiel Nissim, 1989 .Collected Poems 1952-1988. Oxford University Press.
2.	Hewings, M. (2000). Advanced English Grammar. Cambridge. University Press.
Reference Books	
1.	Bakshi, S.P. & Sharma, R. (2019). Descriptive English. Arihant Publications (India) Ltd.
2.	Cameron S & Dempsey L. (2019). The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing.
3.	Sherman B. (2014) Skimming and Scanning Techniques. Liberty University Press.
Web Resources (Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/109103020

Core-III: Java Programming

Course Code	Course Name	Category	Hours / Week	Credits
25BCA23C	Java Programming	Core-III	5	4

Course Objectives

This Course intends to:

- Fundamentals of Object-Oriented Programming in Java.
- AWTcontrols, Event Handling, Swing and Graphical User Interface (GUI) concepts and Spring Boot.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recall object-oriented features to build simple applications	K1
CLO2	Understand the concept of Inheritance,Packages,Interfaces and Exception Handling	K2
CLO3	Apply multithreaded programming and File Handling Concepts	K3
CLO4	Understand the fundamental concept of AWT Controls and develop GUI Applications using Swing in Java.	K2,K3
CLO5	Learn the basic concepts of JavaFX,Develop simple Application using Spring Boot and Learn the basic concepts of Jython.	K1,K3
K1–Remember;**K2**-Understand;**K3**–Apply		

CLO– PLO Mapping

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

Core-III: Java Programming

Unit	Content	No. of Hours
I	**Introduction:** Review of Object-Oriented concepts – History of Java - Java buzzwords - JVM architecture – Data types – Variables - Scope and lifetime of variables – arrays – operators – control statements – type conversion and casting – Simple Java program – constructors – methods – Static Block - Static Data – Static Method String and String Buffer Classes.	15
II	**Inheritance:** Basic concepts - Types of inheritance - Member access rules - Usage of this and Super keyword - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. Packages: Definition - Access Protection - Importing Packages - Interfaces- Definition - Implementation - Extending. Exception Handling**:** try catch - throw - throws - finally - Built–in exceptions - Creating own Exception classes.	15
III	**Multithreaded Programming:** Thread Class - Runnable interface – Synchronization - Using synchronized methods - Using synchronized statement - Inter thread Communication - Deadlock. I/O Streams: Concepts of streams - Stream classes - Byte and Character stream - Reading console Input and Writing Console output - File Handling.	15
IV	**AWT:** Overview of AWT - **Swing**: Introduction to Swing - Hierarchy of swing components. Containers-Top level containers - JFrame - JWindow - JDialog - JPanel - JButton – JtoggleButton - JCheckBox - JRadioButton - JLabel, JTextField - JTextArea - JList - JComboBox - JScrollPane. **Event Handling** - Events – Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes.	15
V	**JavaFX:** Introduction to JavaFX, Setting the Scene, Hello World- **Spring Boot**: Fundamentals of Spring Boot-Spring vs Spring Boot-Spring Boot Architecture-Develop Spring Boot Application step by step-Run Spring Boot Application-Creating first Spring Boot application.	15
	Total Hours	**75**

Text Books	
1.	Herbert Schildt (2017), The Complete Reference, Tata McGraw Hill, New Delhi, 9th Edition. (Unit – I, II, III, IV, V)
2.	E.Balagurusamy (2023), Programming with Java, Tata McGraw Hill, New Delhi, 7th Edition.
3.	Ashish Sarin,J.Sharma (2017),Getting Started with Spring Framework, Create Space Independent Publishing Platform.
4.	J. F. DiMarzio(2014),Quickstart Guide to JavaFX, https://www.oreilly.com/
Reference Books	
1.	Y.Daniel Liang(2018), Introduction to Java Programming, Pearson Education, India,10th Edition.
2.	Kathy Sierra, Bert Bates, TrishaGee (2022),Head First Java.O.Reilly Publications, 3rd Edition
Web Resources (Swayam/NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2.	https://onlinecourses.nptel.ac.in/noc24_cs40/preview

Core Lab II :Java Programming Lab

Course Code	Course Name	Category	Hours / Week	Credits
25BCA24P	Java Programming Lab	Core Lab-II	4	2

S. No.	List of Programs
1	Basic Java programs.
2	Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer.
3	Java program to multiply two given matrices.
4	Java program that displays the number of characters, lines and words in a text.
5	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated..
6	Java program to do String Manipulation using Character Array and perform the following string operations: a) String length b) Finding a character at a particular position a) c) Concatenating two strings.
7	Java program to perform the following string operations using String class: a) String Concatenation b) Search a substring a) c) To extract substring from the given string.
8	Java program to perform string operations using the String Buffer class: a) Length of a string b) Reverse a string a) c) Delete a substring from the given string.
9	Java program that implements a multi-thread application that has three threads. The first thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
10	Java threading program that uses the same method asynchronously to print the numbers 1 to10 using Thread1 and to print 90 to100 using Thread2.
11	Java program to demonstrate the use of the following exceptions. a) Arithmetic Exception b) Number Format Exception c) Array Index Out of Bounds Exception a) d) Negative Array Size Exception
12	Java program that reads on filename from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file, and the length of the file in bytes

S. No.	List of Programs
13	Java program to accept a text and change its size and font. Include bold italic options. Use frames and controls.
14	Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired.(Use adapter classes).
15	Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +,-,*, and % operations. Add a textfield to display the result. Handle any possible exceptions like divide by zero.
16	Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.
Total Hours	**60**
Text Books	
1.	Herbert Schildt (2017), The Complete Reference, Tata McGraw Hill, New Delhi, 9th Edition.
2.	E.Balagurusamy (2023), Programming with Java, Tata McGraw Hill, New Delhi, 7th Edition.
Reference Books	
1.	Cay S.Horstmann (2007), Gary Cornell, Core Java, Volume I–Fundamentals, Prentice Hall, 8th Edition.
2.	Kathy Sierra, Bert Bates, Trisha Gee(2022), "Head First Java", (Grayscale Indian Edition) ,O’Reilly Publications, 3rd Edition.
Web Resources(Swayam/NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2.	https://onlinecourses.nptel.ac.in/noc24_cs40/preview

Core-IV: Design Principles and Creative Applications

Course Code	Course Name	Category	Hours / Week	Credits
25BCA25C	Design Principles and Creative Applications	Core-IV	5	4

Course Objectives

This Course intends to

- Focusing on brochures and magazine covers that demonstrate visual hierarchy and readability.
- Integrating cultural and modern influences for use in textiles, packaging, and digital media.
- Enhance creative and analytical skills through the study and redesign of logos, packages, and visual communication materials using industry-standard tools.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the concept and mathematical foundation of the Golden Ratio (1.618) in design.	K1
CLO2	Understand how packaging design contributes to brand identity and consumer perception.	K2
CLO3	Understand the principles of visual storytelling and sequential art.	K2
CLO4	Apply grid systems, margins, and visual hierarchy in brochure design.	K3
CLO5	Apply created patterns to various mockups.	K3
K1-Remember; **K2**-Understand; **K3**-Apply		

CLO–PLO Mapping

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

Core-IV: Design Principles and Creative Applications

Unit	Content	No. of Hours
I	**Designing Logo's Using the Golden Ratio -** Understand and apply the Golden Ratio (1.618) in logo design - Explore balance, symmetry, proportion, and grid systems - Analyze famous logos (Apple, Twitter, etc.) using Golden Ratio overlays - Sketch logo concepts using golden circles/spirals - Digitally designing a logo using vector software (e.g.,Illustrator). **Hands-on Exercises:** 1. Analyze and redesign an existing logo using proportional grids 2. Sketch and digitize a logo using the Golden Ratio	15
II	**Package Design and Branding-** Understand how packaging communicates brand identity - Learn elements of branding: logo, color, typography, messaging - Study different packaging types (box, pouch, tube, etc.) - Explore dielines, material considerations, and mockup creation - Design branded packaging for a product, integrating visual identity. **Hands-on Exercises:** 1. Design product packaging using branding principles 2. Create a digital mockup showing brand consistency	15
III	**Story Board Art-** Learn visual storytelling principles and sequential art - Understand framing, shot types, transitions, annotations - Study story structure: beginning, middle, end - View and analyze sample storyboards from film or advertising - Create a 4-panel storyboard including action, direction, and dialogue. **Hands-on Exercises:** 1. Create a storyboard for a short advertisement or scene 2. Illustrate motion and expression using vector drawing	15
IV	**Trifold Brochure and Magazine Cover Page-** Understand layout and print design principles - Learn brochure structure (panels, folds, margins) and visual hierarchy - Explore magazine cover design (masthead, headline, focal image) - Study CMYK color model, resolution, bleed, and print setup - Design a trifold brochure and a magazine cover for a brand or event. **Hands-on Exercises:** 1. Design a Trifold brochure using grids 2. Create a magazine cover with strong visual hierarchy	15
V	**Pattern Creation-** Learn types of patterns: geometric, organic, abstract - Study tile design and seamless pattern techniques - Explore cultural and modern design influences - Create sketches and digitize them into repeating patterns - Apply patterns to mockups (textiles, wallpaper, packaging, etc.) **Hands-on Exercises:** 1. Design seamless repeating patterns 2. Apply created patterns to digital mockups	15
	Total Hours	**75**

Text Books

1.	Faulkner, A., & Chavez, C. (2023). Adobe Photoshop Classroom in a Book (2023 Release). Adobe Press. ISBN: 9780137966026
2.	Faulkner, A., & Chavez, C. (2023). Adobe Illustrator Classroom in a Book (2023 Release) Adobe Press. ISBN: 9780137965968
3.	Wood, A. (2021).Adobe Photoshop CC for Dummies (3rd ed.). Wiley. ISBN: 9781119716378

Reference Books	
1.	Kelby, S. (2020). The Adobe Photoshop CC Book for Digital Photographers. New Riders.ISBN: 9780137966811
2.	Luisa, S. (2021). Digital Painting Techniques: Practical Techniques of Digital Art Masters. 3dtotal Publishing. ISBN: 9781909414970
3.	Nielsen, T. (2012). Designing Logos: The Process of Creating Symbols that Endure. Rockport Publishers': 9781592537379
Web Resources(Swayam/NPTEL Courses)	
1.	**NPTEL - Digital Image Processing (IIT Kharagpur)** https://nptel.ac.in/courses/117105079
2.	**SWAYAM-Introduction to Graphic Design (IGNOU)** https://swayam.gov.in/nd1_noc23_ae09/preview

Part – III: Allied Course

Allied – II: Discrete Mathematics

Course Code	Course Name	Category	Hours / Week	Credits
25BCA26A	Discrete Mathematics	Allied – II	4	3

Course Objectives

The course intends to cover

- The fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Formulate the basic terminology of sets.	K1
CLO2	Design the operations with relations.	K2
CLO3	Apply FSA to find a solution for a computer-based system.	K3
CLO4	Demonstrate the concepts of Connectives and tautological implications in data analysis.	K3
CLO5	Apply the basic terminology of graph theory.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

CLO – PLO Mapping

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

Allied – II: Discrete Mathematics

Unit	Content	No. of Hours
I	**Set Theory:** -Set & its elements-set description-types of sets-venn diagram - set operations & laws of set theory-fundamental products-partitions of sets-minsets-algebra of sets and duality-inclusion and exclusion principle.	12
II	**Relations:** Binary relations – set operation on relations-types of relations – partial order relation – equivalence relation – composition of relations.	12
III	**Languages:** Operations on languages – regular expressions and regular languages – grammar – types of grammars – finite state machine – finite state automata.	12
IV	**Mathematical Logic:** Propositional calculus –basic logical operations-tautologies-contradiction-argument-method of proof- predicate calculus.	12
V	**Graph Theory:** Basic terminology – paths, cycle & connectivity – sub graphs – types of graphs – representation of graphs in computer memory - trees – properties of trees – binary trees – traversing binary trees – computer representation of general trees.	12
	Total Hours	**60**
Text Book		
1.	J.K. Sharma, (2022). Discrete Mathematics (Ed.2), Macmillan India Ltd. Unit I: Chapter 1: Section 1.1 – 1.7, 1.9,1.10,1.12,1.14 Unit II: Chapter 3: Section 3.3 – 3.7, 3.9, 3.11 Unit III: Chapter 15: Section 15.3 – 15.7 Unit IV: Chapter 12: Section 12.1 – 12.3, 12.8 – 12.12, 12.14 Unit V: Chapter 9: Section 9.1 – 9.5, 9.8 Chapter 10: Section 10.1 -10.3, 10.6, 10.8	
Reference Books		
1.	J.P. Tremblay, R. Manohar, (2002). Discrete Mathematics Structures with Applications to Computer Science, McGraw Hill International Edition.	
2.	M.K. Venkataraman., N. Sridharan. & N. Chandrasekaran, (2004). Discrete Mathematics, National Publishing Company, Chennai.	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/106/111106086/	

Part – IV : Foundation Course

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
25HUM2FC	Human Rights	FC - II	2	2

Unit	Content
I	**Concept of Human Values, Value Education Towards Personal Development** Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education. **Personal Development:** Self-analysis and Introspection; Sensitization towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbors, Co-workers. Character Formation towards Positive Personality: Truthfulness, Constructively, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.
II	**Value Education Towards National and Global Development** **National and International Values:** Constitutional or National Values - Democracy, Socialism, Secularism, Equality, Justice, Liberty, Freedom, and Fraternity. Social Values - Pity and Probity, Self-Control, Universal Brotherhood. Professional Values - Knowledge Thirst, Sincerity in Profession, Regularity, Punctuality, and Faith. Religious Values - Tolerance, Wisdom, Character. Aesthetic Values - Love and Appreciation of Literature and Fine Arts and Respect for the Same. National Integration and International Understanding.
III	**Impact of Global Development on Ethics and Values** Conflict of Cross-Cultural Influences, Mass Media, Cross-Border Education, Materialistic Values, Professional Challenges, and Compromise. Modern Challenges of Adolescent Emotions and Behavior; Sex and Spirituality: Comparison and Competition; Positive and Negative Thoughts. Adolescent Emotions, Arrogance, Anger, Sexual Instability, Selfishness, Defiance
IV	**Therapeutic Measures** Control of the Mind through a. Simplified Physical Exercise b. Meditation – Objectives, Types, Effect on Body, Mind and Soul c. Yoga – Objectives, Types, Asanas d. Activities: (i) Moralisation of Desires (ii) Neutralisation of Anger (iii) Eradication of Worries (iv) Benefits of Blessings

Unit	Content
V	**Human Rights** 1. Concept of Human Rights – Indian and International Perspectives a. Evolution of Human Rights b. Definitions under Indian and International Documents 2. Broad Classification of Human Rights and Relevant Constitutional Provisions. a. Right to Life, Liberty and Dignity b. Right to Equality c. Right against Exploitation d. Cultural and Educational Rights e. Economic Rights f. Political Rights g. Social Rights 3. Human Rights of Women and Children a. Social Practice and Constitutional Safeguards (i) Female Feticide and Infanticide (ii) Physical Assault and harassment (iii) Domestic Violence (iv) Conditions of Working Women 4. Institutions for Implementation a. Human Rights Commission b. Judiciary 5. Violations and Redressal a. Violation by State b. Violation by Individuals c. Nuclear Weapons and terrorism d. Safeguards
	Total Hours **30**

Web Resources

1.	https://syllabus.b-u.ac.in/syl_college/ug_ve.pdf

Course Code	Course Name	Category	Hours / Week	Credits
25DIM2FC	Disaster Management	FC - II	2	2

Unit	Content
I	**Unit I:Introduction to Disasters** 1.1. Definition of Concepts 1.2. Difference between hazards and vulnerability 1.3. Types of Disasters 1.4. Natural Disasters 1.5. Human - Made Disasters
II	**Unit II : Disasters Management** 2.1. Disaster Management 2.2. Disaster Management Cycle 2.3. Key Phases of Disaster Management 2.4. Disaster and Development 2.5. Disaster Impacts on Differential Groups
III	**Unit III : Vulnerability Assessment and Reduction** 3.1. Vulnerability 3.2. Vulnerability Assessment 3.3. Early Warning System 3.4. Factors Contributing to Vulnerability 3.5. Vulnerability Reduction 3.6. Impact of Development Projects such as Dams, Embankments, Changes in Land-use etc. 3.7. Climate Change Adaptation
IV	**Unit IV: Disaster Risk Reduction** 4.1. Disaster Risk Reduction (DRR) 4.2. Knowledge Management in Disaster Risk Reduction 4.3. The Knowledge Management Cycle 4.4. Role of Information and Knowledge in Disaster Risk Reduction 4.5. Indigenous Knowledge and Disaster Risk Reduction 4.6. Indigenous Knowledge and Early Warning Indicators 4.7. Indigenous Knowledge and Coping Strategies 4.8. Sendai Framework for Disaster Risk Reduction 4.9. Intergovermental Panel on Climate Change (IPCC) 4.10. IPCC Scenario in the Context of India

Unit	Content
V	**Unit V: Institutional Framework for Disaster Management** 5.1. National Policy on Disaster Management 2009 5.2. The National Disaster Management Authority (NDMA) 5.3. State Disaster Management Authority (SDMA) 5.4. District Disaster Management Authorities (DDMAs) 5.5. Community-Based Disaster Management (CBDM) 5.6. NGOs and Disaster Management 5.7. Other Related Policies, Plans, Programmes and Legislation
Total Hours	**30**

References

1.	Agrawal A. (1995), Dismantling the divide between Indigenous Knowledge and Scientific Knowledge. Development Change 26: 413 – 439.
2.	Mrinalini Pandey (2014), Text Book of Disaster Management, Wiley India Pvt Ltd.
3.	Pradeep K Goyal,Anil K Gupta, Disaster Management, All India Council for Technical Education Nelson Mandela Marg, Vasant Kunj, New Delhi, 110070
4.	Sharma S.C (2020), Disaster Management (1st ed.), Khanna Book Publishing Co. (P) Ltd, New Delhi.
5.	Srivastava A.K (2021), Text Book of Disaster Management, Scientific Publishers, Jodhpur.
6.	Subramanian, (2018), Disaster Management, Vikas Publishing House, Noida.
7.	Tushar Bhattacharya (2015), Text Book of Disaster Science and Management, McGraw Hill Education.
8.	United Nation (2015), Sendai Framework for Disaster Risk Reduction. 2015 – 2030. Geneva: UNISDR
9.	www.EasyEngineering.net

Course Code	Course Name	Category	Hours / Week	Credits
25IDT2AE	**Innovation & Design Thinking**	**AECC - II**	**2**	2

Course Objectives

The course intends to cover

- The principles and practices of innovation and design thinking.
- Creative problem-solving skills, and impactful solutions across diverse contexts.
- The user-centered research techniques, and practical tools to generate, prototype.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the design thinking methodology for solving real-world problems.	K2
CLO2	Generate, prototype, and test innovative ideas.	K3
CLO3	Frame human-centered solutions and present them effectively.	K3
CLO4	Enhance their confidence in collaborative approaches to problem solving.	K3
CLO5	Integrate innovation strategies into business, social, and creative contexts to drive sustainable impact.	K4
K2 - Understand; **K3** – Apply ; **K4** – Evaluate		

Ability Enhancement Compulsory Courses (AECC)-II : Innovation & Design Thinking

Unit	Content	No. of Hours
I	**Principles of Design Thinking:** Usability, Human-centeredness, Empathy, Iteration. **Types of Innovation:** Product, Process, Business Model, Social Innovation.	6
II	**Empathy & Defining The Problem:** Understanding users - observation - ethnographic research - interviews - Empathy maps and personas - Identifying user pain points - Problem framing vs. problem solving.	6
III	**Ideation & Creativity Tools:** Divergent vs. Convergent Thinking - Brainstorming and mind mapping techniques – SCAMPER. Idea selection and prioritization frameworks.	6
IV	**Prototyping & Experimentation:** Low-fidelity vs. High-fidelity prototyping - Storyboarding, sketching, mock-ups, and role-playing - Rapid prototyping with simple materials.	6
V	**Testing & Feedback:** Testing prototypes with users - Iteration and learning from feedback. **Innovation Strategy & Implementation :** Scaling ideas into innovations - Measuring innovation impact - Barriers - Design Thinking for social change and sustainability.	6
	Total Hours	**30**
Text Books		
1	Kelley, T., & Kelley, D. (2013). Creative confidence: Unleashing the Creative Potential within us all. Crown Business.	
2	Dan Saffer, Designing for Interaction, New Riders Publications, 2010.	
Reference Books		
1	Plattner, H., Meinel, C., & Leifer, L. (Eds.). (2018). Design Thinking Research: Making Distinctions: Collaboration versus Cooperation. Springer.	
2	Liedtka, J., & Ogilvie, T. (2011). Designing for Growth: A Design Thinking Tool kit for Managers. Columbia University Press.	
3	Martin, R. (2009). The Design of Business: Why Design Thinking is the Next Competitive Advantage. Harvard Business Press.	
Web Resources (Swayam / NPTEL)		
1	https://onlinecourses.nptel.ac.in/noc22_mg32/preview	
2	https://onlinecourses.swayam2.ac.in/imb23_mg65/preview	
3	https://onlinecourses.nptel.ac.in/noc20_hs08/preview	

Course Code	Course Name	Category	Hours/Week	Credits
25IPR2AE	Intellectual Property Rights	AECC - II	2	2

Course Objectives

This course intends to cover

- Identify the objectives, forms, duration, and scope of protection for different types of intellectual property.
- Understand the global IP framework and India's compliance challenges.
- Recognize the role of IP as a policy tool for national, economic, social, and cultural growth.
- Gain knowledge of substantive laws and procedural mechanisms of IP in India.
- Analyze recent national and global trends in intellectual property rights.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the core principles of intellectual property protection.	K1, K2
CLO2	Identify the key concepts and principles of trademarks.	K2
CLO3	Comprehend the legal implications and rights under copyright law.	K3
CLO4	Understand the legal consequences of patents and trade secrets.	K2
CLO5	Comprehend IP rights for plant varieties and farmers, along with their legal and social aspects.	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** – Analyze		

Ability Enhancement Compulsory Courses(AECC)-II : Intellectual Property Rights

Unit	Content	No. of Hours
I	**Introduction to Intellectual Property:** Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.	6
II	**Trade Marks:** Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.	6
III	**Law of Copy Rights:** Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law**.**	6
IV	**Law of Patents, Trade Secrets:** Foundation of patent law, patent searching process, ownership rights and transfer. Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.	6
V	**Protection of Plant Varieties and Farmers' Rights:** Introduction -Meaning and Definition - Registrable Varieties of Plants - Procedure for Registration - Plant Varieties Protection.	6
	Total Hours	**30**

Text Books	
1	V K Ahuja - Law Relating To Intellectual Property Rights - Lexis Nexis; Third edition , 2017.
2	Elizabeth Verkey - Intellectual Property Law and Practice – Eastern Book Company – 2018.
3	S R Myneni - Law of Intellectual Property - Asia Law House – 2021.
Reference Books	
1	B.L. Wadehra - Law Relating To Intellectual Property – Universal Law Publishing House, New Delhi , 2011.
2	Avtar Singh - Intellectual Property Law - Eastern Book Company – 2015.
Web Resources (Swayam/NPTEL)	
1	https://onlinecourses.nptel.ac.in/noc22_hs59/preview

Course Code	Course Name	Category	Hours / Week	Credits
25END2AE	Entrepreneurship Development	AECC – II	2	2

Course Objectives

This course intends to cover

- Basics of starting and managing entrepreneurial ventures.
- Tools for planning, funding, and entrepreneurial growth.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the concept of entrepreneurship.	K2
CLO2	Gain knowledge on entrepreneurial motivation	K2
CLO3	Apply business idea evaluation	K3
CLO4	Create systematic Business plan	K3
CLO5	Analyse business finance and support	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyse		

Ability Enhancement Compulsory Course – II : Entrepreneurship Development

Unit	Content	No. of Hours
I	**Entrepreneurship:** Meaning of Entrepreneurship - Characteristics, Functions and Types of entrepreneurs - Intrapreneur vs. Entrepreneur - Need for Entrepreneurship in economic development - Contribution to GDP, Employment, Innovation.	5
II	**Entrepreneurial Motivation:** Meaning - Need for Achievement Theory - Risk-taking Behaviour - Innovation and Entrepreneur – Economic & non-economic factors affecting entrepreneurial growth.	5
III	**Business Ideas:** Sources of Business Ideas & Opportunity Identification – Idea generation techniques (Brainstorming, Design Thinking). Business incubation - Technical Assistance for small business – Preparation of Feasibility Reports, Legal Formalities and Documentation	7
IV	**Business Plan:** Meaning and importance of Business Plan – Structure and components – Market Study.	7
V	**Entrepreneurial finance:** Sources of finance (Bank, Angel investors, Venture Capital, Crowdfunding, Mudra Loans) - Institutional support to entrepreneurs (DIC, KVIC, EDII and MSME).	6
	Total Hours	**30**
Text Books		
1	C.B. Gupta and N.P. Srinivasan (2020), Entrepreneurship Development, Sultan Chand and Sons.	
2	Dr. Vasant Desai and Dr. Kulveer Kaur (2021), Entrepreneurship Development and Management, Himalaya Publications.	
Reference Books		
1	Dr. Jayashree Suresh (2021), Entrepreneurial Publications, Margham Publications	
2	S S Khanka (2020), Entrepreneurial Development, Sultan Chand and Sons, New Delhi.	
Web Resources (Swayam/NPTEL)		
1	https://onlinecourses.nptel.ac.in/noc25_mg95/preview	

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

Max Marks	Marks for		Components for CIA						
	CIA	ESE	CIA		Model		Attendance	Active Engagement	Total
100	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
100	40	60	Actual	Weightage	Actual	Weightage	Marks	5	40
			50	**10**	60	**15**	**10**		

Examination Pattern

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

Components for Internal Assessment and Distribution of Marks for CIA (Foundation Course -Theory)

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

Question Paper Pattern

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

Components for and Distribution of Marks for ESE (Theory) Ability Enhancement Compulsory Courses (AECC) & Question Paper Pattern

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

Semester 3

Semester – 3									
Course Code	Part	Course Category	Course Name	Hours/ Week	Examination				Credits
					Duration in Hours	Max Marks			
						CIA	ESE	Total	
25TAM31L	I	Language – I	Tamil – III	4	3	25	75	100	3
25HIN31L	I		Hindi – III						
25MAL31L	I		Malayalam – III						
25FRE31L	I		French – III						
25ENG32L	II	Language – II	English – III	4	3	25	75	100	3
25BCA33C	III	Core – V	Data Structures	6	3	25	75	100	4
25BCA34P	III	Core Lab – III	Data Structures Lab	4	3	40	60	100	2
25BCA35C	III	Core – VI	Introduction to Data Science	6	3	25	75	100	4
25BCA36A	III	Allied – III	Operations Research	4	3	25	75	100	3
25BCA37P	III	SEC – I	Desktop Publishing with InDesign Lab	2	3	40	60	100	2
25BAT3FC	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
25ADT3FC			Advanced Tamil/						
25IKS2FC			Indian Knowledge Systems(IKS)*						
25MOO3AE	IV	AECC - III	Online Course – MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Part –I : Language – I - Tamil – III

(All the Undergraduate Programmes)

பயன்பாட்டுத் தமிழ்

Course Code	Course Name	Category	Hours / Week	Credits
25TAM31L	Tamil - III	Language - I	4	3

Course Objectives

The course intends to cover

- தமிழரின் பிற துறை சார்ந்த சிந்தனைகளைக் கற்பித்தல்.
- இன்றைய அறிவியல் வளர்ச்சி மற்றும் கணினியின் பயன்பாட்டுத் தேவையை உணர்த்துதல்
- இயற்கை பாதுகாப்பு குறித்த விழிப்புணர்வை வளர்த்தல்

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	வணிகத் தமிழ் - கணினித் தமிழின் நுட்பங்கள் மற்றும் பயன்பாடுகளை அறிந்து பின்பற்றுவர்	K1, K2
CLO2	ஊடகம் மற்றும் உளவியல் தன்மை குறித்த சிந்தனைகளை வளர்த்துக் கொள்வர்	K2
CLO3	சுற்றுலா - சுற்றுச்சூழலியல் தேவை மற்றும் மீட்டுருவாக்கம் குறித்து உணர்த்து செயல்படுதல்	K3
CLO4	மேலாண்மை பற்றி அறிதல் மற்றும் சுயக்கற்றல் திறனை வளர்த்துக் கொள்ளுதல்	K1, K3
CLO5	பன்முக ஆளுமைகள் குறித்து அறிந்து தனித்திறன்களை உருவாக்கிக் கொள்வர்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Language – I: Part – I : Tamil – III

பயன்பாட்டுத் தமிழ்

Unit	Content	No. of Hours
I	**வணிகம் மற்றும் கணினித் தமிழ்** தமிழரின் வணிகம் - வணிகக் கடிதங்கள் – உலகமயமாக்கல் - செயற்கை நுண்ணறிவு கற்றல் - இணைய நூலகம் - இணையத் தமிழ் பயன்பாடு	12
II	**ஊடகம் மற்றும் உளவியல் தமிழ்** ஊடகத்தின் இன்றியமையாமை - நிகழ்வுகளைச் செய்திகளாக வடிவமைத்தல் - ஊடகத் துறையில் மொழியின் பங்கு - உளவியல் வரையறை - உளவியல் பிரிவுகள் - வகுப்பறை உளவியல் (ஆசிரியர், மாணவர்)	12
III	**சுற்றுச்சூழலியல் மற்றும் சுற்றுலாவியல்** தமிழரின் சூழலியல் அறிவு - சுற்றுச்சூழல் மாசுபாடு - சுற்றுச்சூழல் பாதுகாப்பு - சுற்றுலா வகைகள் - உலகப் புகழ்பெற்ற சுற்றுலாத் தலங்கள் - சுற்றுலா வளர்ச்சி மற்றும் பயன்கள்	12
IV	**மேலாண்மைத் தமிழ் மற்றும் மொழிப்பயிற்சி** மேலாண்மையும் அணுகுமுறைகளும் - மேலாண்மை செயல்பாடுகள் மற்றும் வகைகள் - வகுப்பறை மேலாண்மை – நேர்காணல் - நூல் திறனாய்வு மற்றும் மதிப்பீடு - படிவங்கள் பூர்த்தி செய்தல் மற்றும் விண்ணப்பங்கள்	12
V	**பன்முக ஆளுமைகள்** ஜி.டி.நாயுடு(அறிவியல்) – பத்மஸ்ரீ டாக்டர் பக்தவத்சலம்(மருத்துவம்) - நா மகாலிங்கம்(தொழில்) - மயில்சாமி அண்ணாதுரை(விஞ்ஞானம்) - என் ஜி ராமசாமி(சமூகம்) - நம்மாழ்வார்(விவசாயம்)	12
	Total Hours	**60**

Reference Books	
1	சுந்தரம்.இல, (2022) கணினித் தமிழ், விகடன் பிரசுரம்
2	மணியரசன்.துரை, (2019), இணையமும் இனியத் தமிழும், இசை பதிப்பகம்
3	பொன்னவைக்கோ.மு, (2015) இணையத் தமிழ் வரலாறு, பாரதிதாசன் பல்கலைக் கழகம்.
4	தங்கமணி இரா.ம, (2018) சுற்றுலாவியல், கொங்கு பதிப்பகம்
5	இலக்கியா க.வி, நந்தினி சா.சு,(2022), விடியல் பதிப்பகம்
6	சின்னத்தம்பி முருகேசன்.பொன்(2016) சுற்றுச் சூழலியல்(உலகம் தழுவிய வரலாறு), எதிர் வெளியீடு
7	இறையன்பு.வெ (2018) இலக்கியத்தில் மேலாண்மை, நியூ செஞ்சுரி புக் ஹவுஸ்
8	ஸ்ரீனிவாசன்.வி, (2009), திருக்குறளில் மேலாண்மை, விகடன் பிரசுரம்
9	பட்டனத்தி மைந்தன், (2018), ஜி.டி நாயுடு, ராமையா பதிப்பகம்
10	டாக்டர் பக்தவத்சலம்.ஜி (2009) இதயம் ஒரு கோவில், விஜயா பதிப்பகம்

Part – I: Language – I- Hindi – III

Course Code	Course Name	Category	Hours / Week	Credits
25HIN31L	Hindi - III	Language - I	4	3

Course Objectives

The course intends to

- Have knowledge of the contents of primitive poetry.
- Learn about contemporary poetry and its techniques.
- Interest in reading poetry and the ability to express social thoughts
- Understand the basics of Hindi literature properly.
- Provide knowledge of the elements of poetry and subtle translation will improve.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Get a basic knowledge of the history of Hindi literature.	K1
CLO2	Enhances the art and taste of Hindi literary works	K2
CLO3	Literary genres can be learned	K3
CLO4	Create an interest to read and enjoy Hindi poetry	K4
CLO5	Get the basic Knowledge of poetry techniques like Anlankar.	K4
K1 - Remember; **K2** - Understand; **K3** – Apply;**K4** - Analyze		

Part – I: Language – I - Hindi – III

Unit	Content	No. of Hours
I	**Poetry:Kavya Tharang – by Dr. Niranjan** **Pracheen Kavitha** 1. Mahatma kabeer – sakhi & padh (2) 2. Goswamy tulsidas – pad(4) 3. Mahatma soordas- pad(3) 4. Kavivar rahim – dohe(6)	12
II	**Modern Poetry : Kavya Tharang- by Dr. Niranjan** 1. Nirjar – Mythili sharan gupth 2. Parichay – Ramdhari singh Dinkar 3. Prethibimb – Sumithra nandan Panth 4. Kavi kaha ththa – Sooryakanth Tripati Nirala 5. Kah de mam Kya ab dekoon – Mahadevi varma 6. Kanu ke prathi – Darmveer Bharathi 7. Loha ka swad – Dhumil 8. Bhanth Kidikkiyon ki Takrahat – Gorakh pande	12
III	**History of Hindi Literature :(Tippaniyan)** 1. Bhakthi kal ka samanya parichaya (Kabeer, Jaysi, Soor, Thulsi, Meera, Raskhan, Rahim)	12
IV	**Ras Chad & Alankar:** 1. Srungar & veer Ras 2. Anupras & Upama 3. Dhoha & Rola	12
V	**Translation : English-Hindi only** 1. Anuvadh Abhyas – III (16-30 Lessons Only)	12
	Total Hours	**60**
Text Books		
1.	Kavya Tharang – by Dr. NIRANJAN, Jawahar Pusthakalay, Sadar Bazaar,Mathura U.P.281001.	
2.	Anuvadh abyas-III,Dakshin Bharath Hindi Prachar Sabha Chennai – 17.	
Reference Books		
1.	Hindi sahithya ka saral ithihaas,by Rajnath sharma, vinod pustak mandir, agra-282	
2.	Kavya Pradeep Rambadri Shukla, Hindi Bhavan, 36, Tagore Town, Allahabad – 211 002.	

Part – I: Language – I- Malayalam – III

Course Code	Course Name	Category	Hours / Week	Credits
25MAL31L	Malayalam - III	Language - I	4	3

Course Objectives

The course intends to cover

- Knowledge of the contents of primitive poetry.
- Learn about contemporary poetry and its techniques.
- Reading poetry and the ability to express social thoughts will improve.
- Basics of Malayalam Poetry and to understand Malayalam literature properly.
- Provide knowledge of the elements of poetry.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Get a basic knowledge of the history of Malayalam literature.	K1
CLO2	Enhances the art and taste of Malayalam literary works	K1
CLO3	Literary genres can be learned	K2
CLO4	Create more to read and enjoy Malayalam poetry	K3
CLO5	Get the basic Knowledge of poetry techniques	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** - Analyze		

Part – I: Language – I - Malayalam – III

Unit	Content	No. of Hours
I	Poetry – Sishyanum makanum - Vallaththol Narayana Menon	12
II	Poetry – Sishyanum makanum - Vallaththol Narayana Menon	12
III	Poetry - Rafeeque Ahammed (Selected poetries Thoramazha, Madhuranarangakal, Athrayum,Umma,Pakaram)	12
IV	Poetry-RafeequeAhammed(Selectedpoetries-Ammathottil,Vidhyalayam,	12
V	Thottakutty,Sivakami,Ithanu prarthana)	12
	Total Hours	**60**

Text Books

1.	Sishyanum makanum - Vallaththol Narayana Menon,Poorna Publishers.
2.	Rafeeque Ahammed – Selected poetries ,Mathrubhumi Books, Kozhikkode
3.	Aayisha – Vayalar Ramavarma - Kerala Book Store Publishers.

Reference Books

1.	Kavitha SahithyaCharitram-Dr.M.Leelavathi (Kerala SahithyaAcademy,Trichur)
2.	Kavitha Dwani-Dr.M.Leelavathi (D.C.Books, Kottayam)
3.	Aadhunika Sahithyacharithram Prasthanangalilude-Dr.K.M.George (D.C.Books, Kottayam)
4.	Padya SahithyaCharithram – T.M.Chummar (Kerala SahithyaAcademy,Trichur)

Part– I: Language – I- French – III

Course Code	Course Name	Category	Hours / Week	Credits
25FRE31L	French - III	Language - I	4	3

Course Objectives

The Course intends to

- Understand and use familiar everyday expressions and basic phrases aimed at the satisfaction of concrete needs.
- Recognize key aspects of Francophone cultures such as greetings, etiquette, daily life, and basic geography of French-speaking countries.
- Write short, simple texts such as postcards, emails, or short descriptions about themselves and their immediate environment.
- Construct simple sentences using correct word order and basic vocabulary.
- Develop sensitivity to cross-cultural differences in communication and social practices.
- Read and understand short, simple texts such as personal messages, advertisements, menus, and schedules.

Course Learning Outcomes

On the successful completion of the course, students 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
K1 - Remember; **K2** - Understand; **K3** – Apply;**K4**- Analyse		

Part – I: Language – I - French – III

Unit	Content	No. of Hours
I	Vendre Et Acheter pg (82-92). Grammaire: pg(156-160)	12
II	Communication(pg 93-97). Grammaire: pg(161-162)	12
III	Tout Le Monde s'amuse(pg 98-100). Grammaire: pg(163)	12
IV	Mots Et Expressions(pg 101-107). Grammaire: pg(164-167)	12
V	Communication(pg 108-120). Grammaire: pg(168-171)	12
Semester III Portions from Textbook « Nouvelle Génération A1» : UNITÉ 5, UNITÉ 6(Pg 82-120) Cahier d'exercices (Pg156-171)		
	Total Hours	**60**

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

Language-II: Part – II: English –III

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
25ENG32L	English III	Language II	4	3

Course Objectives

The course intends to cover

- The values of patriotism, empowerment and social responsibility through Biographies and Speeches.
- The use of grammar for communication.
- The essential interpersonal skills for effective group interaction.
- The analytical reading and ethical digital writing skills.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify key themes in biographies and speeches, and understand the basic structure of the content.	K1
CLO2	Understand the ideas and rhetorical strategies in texts and relate them to social awareness.	K2
CLO3	Apply grammar rules to form clear and accurate sentences in speech and writing.	K3
CLO4	Demonstrate effective listening and speaking skills by participating confidently in group discussions with appropriate body language and voice modulations.	K3
CLO5	Develop reading and writing skills to communicate effectively across different digital platforms with digital integrity.	K3
K1 - Remember; **K2-** Understand; **K3 -** Apply		

Language-II: Part – II: English –III

Unit	Content	No. of Hours
I	**Biographies : Patriotism** 1. Nehru – AF Toynbee 2. Martin Luther King – R N Roy 3. C.V. Raman – H. Kusumakar	12
II	**Renowned Speeches : Empowerment** 1. UN Youth Assembly Speech - Malala Yousafzai 2. Give Us a Role Model - A.P.J. Kalam 3. Inaugural Address Nelson Mandela	12
III	**Grammar** 1. Sentence Structure 2. Types of Sentences (Declarative, Interrogative, Imperative, Exclamatory), Transformation of Sentences 3. Active Voice and Passive Voice 4. Direct and Indirect Speech	12
IV	**Listening and Speaking Skills:** 1. **Group Discussion**: Structure of Group Discussion , Types of Group Discussion, Phrases for participating in a Group Discussion ,Do's and Don'ts in a Group Discussion. 2. **Group Dynamics (Nonverbal and Behavioural Aspects)**: Body Language, Personal Appearance, Posture, Gestures, Facial Expression, Eye Contact, Space Distancing 3. **Paralinguistic Cues:** Tone, Pitch, Volume, Speed (rate of speech), Pauses, Stress and Intonation.	12
V	**Reading and Writing Skills : Digital Communication** 1. **Reading and Understanding Digital Texts**: Skills for Analysing Digital Texts (connotative and denotative skills). 2. **Introduction to Digital Writing**: Types of Digital Writing, Website content, Blog Writing, Social Media Writing, SEO Writing, Review and Opinion Writing 3. Editing Digital Content, Digital Integrity and Ethics in Writing.	12
	Total Hours	**60**

Reference Books

1.	Rengasamy, P. Ed.(2012). Paths of Glory An Anthology of Biographies. Macmillan Publishers India Ltd.
2.	Yousafzai, M. (2013, July 12). Speech at the United Nations Youth Assembly. United Nations. https://www.un.org/en/events/malalayousafzaispeech
3.	A.P.J. Abdul Kalam.(2012). Ignited Minds - Unleashing the Power within India. Penguin Books.
4.	Mandela, N. (1994). Inaugural Address. In Long Walk to Freedom. Little, Brown and Company.
5.	Raymond Murphy. (2016). English Grammar in Use : A Self-study Reference and Practice Book for Intermediate Learners of English. Cambridge University Press.
6.	Kumar, S., & Lata, P. (2018). Communication Skills: A Workbook. Oxford University Press India.
7.	Mitra, B. K. (2012). Personality Development and Soft Skills (3rd ed.). Oxford University Press India.
8.	Butterfield, J. (2023). Written Communication: Soft Skills for a Digital Workplace (3rd ed.). Cengage India.

Web Resources (Swayam / NPTEL)

1.	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_hs08
2.	https://onlinecourses.nptel.ac.in/noc26_hs111/preview

Core - V: Data Structures

Course Code	Course Name	Category	Hours / Week	Credits
25BCA33C	Data Structures	Core-V	6	4

Course Objectives

The course intends to cover

- Various data structures algorithms.
- Data representation techniques such as Stack, Queue, List, Trees, Graphs.
- Hash Tables, Hashing Functions
- Sorting and searching methods.

Course Learning Outcomes

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

CLO	Content	Knowledge Level
CLO1	Remember the basics of algorithm and elementary data structures.	K1
CLO2	Understand the various types of linked lists and dynamic storage management.	K2
CLO3	Infer the concepts of trees, binary tree traversal and graph	K3
CLO4	Understand Static and Dynamic Symbol Tables, Hashing and apply different Hashing Functions	K3
CLO5	Apply sorting and searching techniques to organize and process data efficiently for various computational problems	K3
K1- Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

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

Core - V: Data Structures

Unit	Content	No. of Hours
I	**Introduction:** Introduction of Algorithms – Analyzing Algorithms. Abstract Data Type. **Arrays:** The Sparse Matrices-Representation of Arrays.**Stacks and Queues:**The Stack Abstract Data Type - The Queue Abstract Data Type - Evaluation of Expressions – Infix to Postfix Conversion, Multiple Stacks and Queues.	18
II	**Linked List:** Singly Linked List – Linked Stacks and Queues –Representing Polynomials as Singly Linked List– Polynomial Addition - Doubly Linked List and Dynamic Storage Management, More on Linked Lists – Garbage Collection and Compaction.	18
III	**Trees:** Basic Terminology – Binary Tree Representations - Binary Trees – Traversal.**Binary Search Trees**: Introduction - Searching a Binary Search Tree - Inserting into a Binary Search Tree - Deletion from a Binary Search Tree - Height of a Binary Search Tree,**Graphs:** Terminology and Representations-Traversals-State Space Representation in AI-Shortest Paths, Transitive Closure.	18
IV	**Symbol Tables:** Static Tree Tables-Dynamic Tree Tables. **Hash Tables:** Hashing Functions -Overflow Handling, Dynamic Hashing using Directories.	18
V	**Sequential Search**: Binary Search- Definitions. Insertion Sort- Radix Sort, Quick Sort-2Way Merge Sort, Heap Sort. **Case Study**: Analysis of various Sorting Techniques.	18
	Total Hours	**90**
Text Books		
1.	Ellis Horowitz, SartajSahni, Susan Anderson-Freed (1993), Fundamentals of Data Structures in C	
2.	Samanta, D. (2017). Classic data structures (2nd ed.). PHI Learning.	
Reference Books		
1.	Mark Allen Weiss,Data Structures and Algorithm Analysis in C,2nd Edition,Pearson Education Asia.	
2.	Ellis Horowitz, Sartaj Sahani and Dinesh Mehta (2008),Fundamentals of Data Structures in C++, 2nd Edition, University Press.	
Web Resources (Swayam / NPTEL/Others)		
1.	https://onlinecourses.swayam2.ac.in/nou24_cs06/preview	
2.	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview	
3.	https://onlinecourses.nptel.ac.in/noc21_cs79/preview	
4.	https://www.geeksforgeeks.org/artificial-intelligence/state-space-search-in-ai/	

Course Code	Course Name	Category	Hours /Week	Credits
25BCA34P	Data Structures Lab	Core Lab - III	4	2

Core Lab – III : Data Structures Lab

S.No	List of Programs
1	Implementation of Array Operations.
2	Implementation of Stack using arrays.
3	Implementation of Queue using arrays.
4	Implementation of Singly Linked List
5	Conversion of Infix to Postfix Expression.
6	Evaluation of Postfix Expression.
7	Polynomial Addition.
8	Implementation of Binary Tree and Binary tree traversal techniques.
9	Searching Techniques: Linear search and Binary search
10	Sorting Techniques: Insertion Sort, Quick Sort, Radix Sort, Heap Sort.
	Total Hours **60**

Text Books

1.	Ellis Horowitz, SartajSahni, Susan Anderson-Freed (1993), Fundamentals of Data Structures in C
2.	Samanta, D. (2017). Classic data structures (2nd ed.). PHI Learning.

Reference Books

1.	Mark Allen Weiss,Data Structures and Algorithm Analysis in C,2nd Edition,Pearson Education Asia.
2.	Ellis Horowitz, Sartaj Sahani and Dinesh Mehta (2008),Fundamentals of Data Structures in C++, 2nd Edition, University Press.

Web Resources (Swayam / NPTEL)

1.	https://onlinecourses.swayam2.ac.in/nou24_cs06/preview
2.	https://onlinecourses.swayam2.ac.in/cec19_cs04/preview
3.	https://onlinecourses.swayam2.ac.in/aic20_sp06/preview

Core – VI : Introduction to Data Science

Course Code	Course Name	Category	Hours / Week	Credits
25BCA35C	Introduction to Data Science	Core-V	6	4

Course Objectives

The course intends to cover

- Introduce the concepts, techniques, and tools in Data Science.
- Understand the various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modelling, descriptive modelling, and effective communication.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Acquire fundamental knowledge of Data Science and Big Data.	K1
CLO2	Understand the overview and building process in Data Science.	K2
CLO3	Demonstrate the use of basic data pre-processing procedures.	K3
CLO4	Understand various algorithms in Data Science.	K3
CLO5	Gain knowledge of Data Science applications in different domains.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

CLO – PLO Mapping

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

Core - VI : Introduction to Data Science

Unit	Content	No. of Hours
I	**Introduction to Data Science** – Evolution of Data Science – Data Science Roles – Benefits and uses – Facets of Data – Data Science Process – Big Data ecosystem and Data Science.	18
II	**Overview of the Data Science Process** – Research Goals – Retrieving Data – Data Integration and Transformation – Exploratory Data Analysis – Data Reduction – Model Building.	18
III	**Data Preprocessing-Feature Engineering:** Creating New Features – Feature Selection Techniques – Automating Data Preparation with Scikit.	18
IV	**Machine Learning Algorithms** – Modeling Process and Types - Predictive models – Classification –SVM- Supervised – Unsupervised - Semi-supervised.	18
V	**Data Visualization in Different Domains:** Healthcare, Retail, Finance and Social Media – Introduction to Hadoop – Spark – Text Analytics and NLP – Introduction to Tableau and Power BI- AI-driven NLP Systems.	18
	Total Hours	**90**

Text Books

1.	Davy Cielen(2016), Arno D. B. Meysman, Mohamed Ali, Introducing Data Science, manning publications
2.	Davy Cielen(2016), Arno D.B. Meysman, Mohamed Ali,Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools, Dreamtech Press
3.	Tom White, Hadoop: The definitive Guide.

Reference Books

1.	DipanjanSarkar, Text Analytics with Python: A Practitioner’s guide to NLP
2.	Cathy O'Neil, Rachel Schutt, Doing Data Science Straight Talk from the Frontline, O'Reilly Media 2013

Web Resources (Swayam / NPTEL/Others)

1.	https://nptel.ac.in/courses/10610617
2.	https://www.akamai.com/glossary/what-are-ai-and-nlp

Course Code	Course Name	Category	Hours / Week	Credits
25BCA36A	Operations Research	Allied III	4	3

Course Objectives

The course intends to cover

- Optimization methods such as linear programming, transportation and game theory.
- The maximin - minimax principles and models of queuing theory.
- The project scheduling techniques like PERT/CPM and replacement models.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recall the concepts of linear programming, including mathematical formulation, graphical method, and simplex method.	K1
CLO2	Understand transportation and assignment problems, feasible solutions and the traveling salesman problem.	K2
CLO3	Apply two-person zero-sum games using the maximin and minimax principles.	K3
CLO4	Apply the models of queuing theory in the real-world Applications	K3
CLO5	Analyze project network models for effective quantitative project evaluation	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	1	2	3	2
CLO3	2	2	2	3	2
CLO4	1	1	3	2	3
CLO5	3	2	3	3	2
3 - Substantial (high)		**2** - Moderate (medium)			**1** - Slight (low)

Allied III: Operations Research

Unit	Content	No. of Hours
I	**Linear Programming Problems:** Introduction to Linear Programming - Mathematical Formulation of Linear Programming Problem – Graphical Method - Simplex Method	12
II	**Transportation Problems:** Introduction to Transportation Problem – The Transportation Table – Solution of Transportation Problem – Methods for Finding Initial Basic Feasible Solution – North West Corner Rule - Least Cost Method- Vogel's Approximation Method – Transportation Algorithm (Modified Distribution Method) AI Planning and Logistics**. Assignment Problems:** Introduction – Mathematical Formulation – Solution Methods – Special Case – The Traveling Salesman Problem.	12
III	**Game Theory:** Introduction – Two Person Zero – Sum Games – The Maximin – Minimax Principle and basic terms – Games without Saddle Points – Mixed Strategies – Graphical Solution of 2 x n and m x 2 Games - Dominance Property.	12
IV	**Queuing Theory:** Introduction – Queuing System- Elements of Queuing System- Operating Characteristics of Queuing System- Classification of Queuing Models- Model I (M/M/1):(∞/FIFO), Model II (M/M/1):(N/FIFO).	12
V	**Network Scheduling by PERT / CPM:** Introduction – Network -Basic Components – Logical Sequencing – Rules of Network Construction – Critical Path Analysis – Probability Consideration in PERT – Distinction between PERT and CPM – Applications of Network Techniques.	12
	Total Hours	**60**
Theory - 20 % & Problems - 80%		
Text Book		
1.	Manmohan, P.K. Gupta, Kanthiswarup (2022), Operations Research, S. Chand & Sons. Unit I : Chapter 2 : Section 2.1 – 2.4, Chapter 3 : Section 3.2, Chapter 4 : Section 4.3 Unit II : Chapter 10 : Section 10.5, 10.8, 10.9,Chapter 11 : Section 11.1 – 11.4, 11.7 Unit III: Chapter 17 : Section 17.1 – 17.7 Unit IV: Chapter 21 : Section 21.1 – 21.9 Unit V: Chapter 25 : Section 25.1 – 25.9	
Reference Books		
1.	Hamdy A Taha (2022), Operations Research Pearson Education, 7th edition.	
2.	Gupta, P. K., & Hira, D. S. (2010). Problems in operations research: Principles and solutions (3rd ed.). S. Chand & Company Ltd.	
Web Resources (Swayam / NPTEL/Others)		
1.	https://archive.nptel.ac.in/courses/111/107/111107128/	
2	https://www.scaleai.ca/about-us/publications/ai-in-the-real-world-transportation-and-logistics-ai-in-the-real-world-manufacturing	

SEC Lab - I : Desktop Publishing with InDesign

S.No	List of Programs
1	Simple Programs, Layout Design Principles for Print and Digital Media.
2	Developing and Managing Multi-Page Documents
3	Exploring Advanced Typography in Page Layouts.
4	Integrating Text and Visual Elements in Design.
5	Preparing Documents for Print and Digital Publishing.
6	File Optimization for Print and Digital Output.
7	Creating and Managing Master Pages, Spreads, and Page Sections.
8	Applying Object, Paragraph, and Character Styles for Design Consistency.
9	Designing Interactive PDFs and EPUBs for Digital Platforms.
10	Efficient Asset Management Using Libraries and Templates.
	Total Hours **30**

Text Books	
1.	Anton, K. K., &DeJarld, T. (2024). Adobe InDesign classroom in a book (2024 release). Adobe Press.
2.	Rydberg, T. (2014). Exploring InDesign. Cengage Learning.
Reference Books	
1.	Lupton, E. (2010). Thinking with type: A critical guide for designers, writers, editors, & students (2^{nd} ed.). Princeton Architectural Press.
2.	Joyce, M. (2019). Designing for print: An insider's guide. CreateSpace Independent Publishing.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc25_de12/preview

Part – IV – Foundation Course

(All the Undergraduate Programmes)

Course Code	Course Name	Course Category	Hours/Week	Credits
25IKS3FC	Indian Knowledge Systems (IKS)	FC-III	-	2

Unit	Content
1	**Indian Knowledge Systems (IKS) Basic Concepts** - Introduction - Journey of Indian Culture and Civilization - Hindu Philosophical System - Contribution of Indian Knowledge System in Science and Arts - Indian Knowledge System and Way of Life - The Implicit Concepts in Indian Knowledge System - Social Viewpoint in Indian Knowledge system - Idea of Vasudhaiva Kutumbakam.
2	**Indian Culture, Art & Architecture** - Introduction - Concept of Culture - Culture and Heritage - General Characteristics of Culture - Indian Culture - Indian Culture during the Modern and Contemporary Period -The Factors of Unity in Diversity - Aspects of Indian culture - Indian Architecture - Architecture of Tamil Nadu.
3	**Vedic Mathematics** - Introduction - History of Vedic Mathematics - Addition - Subtraction - Base Method - Sub Base Method - Multiplication by numbers consisting of all 9s - Division - Special Methods of Division - Straight Division.
4	**Science and Technology in Indian Knowledge System -** Introduction - The Indian S & T Heritage - Metals and Metalworking Technology - Lost wax casting of Idols and Artefacts - Literary sources for Science and Technology - Technology in Ancient India - Significant Science and Technology Discovery in Ancient India - Council of Scientific and Industrial Research - Animal Science in Ancient India - Biodiversity and folk traditions.
5	**History of Trade and Commerce in Ancient India** - Introduction - Indigenous Banking System - Rise of Intermediaries - Transport - Major Trade Centres - Major Exports and Imports - Position of Indian Subcontinent in World Economy.

Unit	Content
6	**Indigenous Agriculture in IKS** - Introduction - History of Indian Agriculture - Indigenous Knowledge - Organic Farming and Natural Fertilization - Mixed Cropping and Crop Rotation - Ecological and Socioeconomic Impacts of Indigenous Farming - Challenges and Future Directions.
7	**Traditional Water Management Systems of India** - Introduction - Traditional Water Management Systems - Northern Region - North Western Region - North Eastern Region - Central Indian Region - Southern Indian Region.
8	**Traditional Foods and Festival of India** - History - Introduction - Foods Consumed in Different Regions of India - Eating Styles of India - Traditional Equipment's used for Cooking - Changes in Consumption of Traditional Foods - Traditional Foods/Modern Functions - The Future of Traditional Foods - Traditional Festivals of India.
9	**Sports in India-From Ancient Period to Modern Period** - Introduction - Indus Valley Civilization - Early Hindu Period/ Epic Period - Traditional Indoor and Outdoor Games - British Period - Post Independence - Modern Period.
10	**Nobel Laureates of Indian Origin & Inspiring Scientists of India and their Contributions** - History of the Nobel Prize - Nobel Prize Insignia - Indian Nobel Prize winners and their Biography - Inspiring Scientists and their Contributions.

Reference Resources	
1.	https://www.education.gov.in/shikshakparv/docs/background_note_Stimulating_Indian_Knowledge_Systems_Arts_Culture.pdf
2.	Singh, R. K., King, C. A., & Barrett, D. A. (2010). Traditional ecological knowledge and agricultural sustainability in India. Indian Journal of Traditional Knowledge, 9(2), 231- 243

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
100	40	60	Actual	Weightage	Actual	Weightage	Marks	5	40
			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**

Components for Internal Assessment and Distribution of Marks for CIA (Foundation Course -Theory)*

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

*FC-III: Indian Knowledge Systems(IKS) – A self-study course with open book assessment.

Question Paper Pattern

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

Components for and Distribution of Marks for ESE (Theory) Ability Enhancement Compulsory Courses (AECC) & Question Paper Pattern

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

Components of Internship (Internal Assessment Only)

Components	Marks
Submission of Internship Report	20
Performance in viva-voce	30
Total Marks	**50**

***Certification of Completion is Mandatory for the award of Internal Marks and to avail the credits**