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

(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 B.Sc. CS (AI & DS) Programme shall enable the students to:

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

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

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

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM11L	I	Language-I	Tamil-I	4	3	25	75	100	3
25HIN11L	I		Hindi-I						
25FRE11L	I		Malayalam-I						
25MAL11L	I		French-I						
25ENG12L	II	Language-II	English-I	4	3	25	75	100	3
25BAI13C	III	Core – I	Python Programming	5	3	25	75	100	4
25BAI14P	III	Core Lab – I	Python Programming Lab	4	3	40	60	100	2
25BAI15C	III	Core – II	Data Literacy & Fundamentals of Data Science	5	3	25	75	100	4
25BAI16A	III	Allied – I	Linear Algebra and Discrete Mathematics	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						
25FRE21L	I		Malayalam – II						
25MAL21L	I		French – II						
25ENG22L	II	Language – II	English – II	4	3	25	75	100	3
25BAI23C	III	Core – III	Java Programming	5	3	25	75	100	4
25BAI24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
25BAI25C	III	Core – IV	Advanced Excel for Data Analytics	4	3	25	75	100	4
25BAI26A	III	Allied – II	Optimization Techniques	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**	
	I	Language – I	Tamil – III	4	3	25	75	100	3
	I		Hindi – III						
	I		Malayalam – III						
	I		French – III						
	II	Language – II	English – III	4	3	25	75	100	3
	III	Core – V	Data Structures & Algorithms	6	3	25	75	100	4
	III	Core Lab – III	Data Structures & Algorithms Lab	4	3	40	60	100	2
	III	Core – VI	Foundations of Artificial Intelligence	6	3	25	75	100	4
	III	Allied – III	Probability and Statistics	4	3	25	75	100	3
	III	SEC – I	Advanced Generative Models and Ethics Lab	2	3	40	60	100	2
	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
			Advanced Tamil						
			Indian Knowledge Systems IKS)						
	IV	AECC – III	Online Course - MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Semester – 4									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**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	Fuzzy logic	4	3	25	75	100	3
	III	SEC – II	Machine Learning & Advanced SQL Lab	2	3	40	60	100	2
	IV	AECC – IV	Quantitative Aptitude	2	2	-	50	50	2
	V	Extra Curricular & Co-Curricular	Liberal Arts	-	-	50	-	50	2
Total				**30**				**800**	**25**

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

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

Semester 1

Curriculum

B.Sc. Computer Science (Artificial Intelligence & Data Science)

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hrs. / 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						
25FRE11L	I		Malayalam-I						
25MAL11L	I		French-I						
25ENG12L	II	Language-II	English-I	4	3	25	75	100	3
25BAI13C	III	Core – I	Python Programming	5	3	25	75	100	4
25BAI14P	III	Core Lab – I	Python Programming Lab	4	3	40	60	100	2
25BAI15C	III	Core – II	Data Literacy & Fundamentals of Data Science	5	3	25	75	100	4
25BAI16A	III	Allied – I	Linear Algebra and Discrete Mathematics	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**

Curriculum

B.Sc. Computer Science (Artificial Intelligence & Data Science)

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 தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்தல். நடைமுறை வாழ்வியலுக்குத் தேவைப்படும் ஆங்கிலக் கடிதத்தைத் தமிழாக்கம் செய்தலுக்கான பயிற்சி அடைதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part – I: Tamil – I

Unit	Content	No. of Hours
I	**நாட்டுப்பற்று** 1. உலகத்தை நோக்கி வினவுதல் - பாரதியார் 2. பாரதிதாசன் கவிதைகள் - பாரதிதாசன் • தமிழ்ப்பேறு 3. ஒற்றுமையே உயிர்நிலை - நாமக்கல் கவிஞர் 4. தேவதேவன் கவிதைகள் -தேவதேவன் • சாலையும் மரங்களும் செருப்பும் • புதிய வீடு 5. ஆலாபனை - கவிக்கோ அப்துல் ரகுமான் • போட்டி • பாதை 6. புத்தகச் சந்தை -கவிஞர் வாலி	14
II	**சமூகம்** 1. எட்டாவது சீர்..... - ஈரோடு தமிழன்பன் 2. தொலைந்து போனேன் - கவிஞர் தாமரை 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. மரத்தைக் கர்ப்பம் சுமந்தவள் - ஆண்டாள் பிரியதர்சினி	12

Unit	Content	No. of Hours
IV	**இலக்கிய வரலாறு** 1. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 3. ஹைக்கூ கவிதையின் தோற்றமும் வளர்ச்சியும் 4. சிறுகதையின் தோற்றமும் வளர்ச்சியும்	10
V	**இலக்கணம்** 1. எழுத்துகள் (முதல் எழுத்துகள், சார்பெழுத்துகள்) 2. எழுத்துக்களின் பிறப்பு 3. மாத்திரைகள் 4. பயிற்சிக்குரியன - மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழுக்கு மொழிபெயர்த்தல்)	10
	Total Hours	**60**

Reference Books

1	பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதி பாடல்கள், ஆய்வுப் பாதிப்பு, , தமிழ்ப் பல்கலைக் கழகம், தஞ்சாவூர்.
2	அப்துல் ரகுமான்,(2000), ஆலாபனை, கவிக்கோ பதிப்பகம்
3	தாமரை கவிதைகள், (2012), நியூ செஞ்சுரி புக் ஹவுஸ்
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.	குமரன் கோ (2010), தமிழ் இலக்கணம் எளிய அறிமுகம் , சந்தியா பதிப்பகம்
10.	சக்திவேல் சு,(2012), நாட்டுப்புறவியல், மணிவாசகர் பதிப்பகம்

Course Code	Course Name	Category	Hours / Week	Credits
25HIN11L	Hindi – I	Language – I	4	3

Course Objectives:

The course intends to

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

Unit	Content	Hours
I	**Prose : Nuthan Gadya Sangrah** Lesson 1 – Bharathiya Sanskurthi - Dr.Rajendra Prasad Lesson 3 – Razia - Ramaviksha Benipuri 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 Apna paraya - Jaynendrakumar Admi ka bachcha - Yespal Bolaram ka jeev - Harishankar Parsayi Vapasi - Mannu Bhandari	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, Uttar Pradesh,–281 001

Course Code	Course Name	Category	Hours / Week	Credits
25MAL11L	Malayalam - I	Language – I	4	3

Course Objectives

The course intends to

- Improves grammatical knowledge
- Will continue to read and learn about articles and think about them
- It is possible to read and understand short stories and understand the thoughts and life of the people of this state
- Translation knowledge and the ability to read and analyze a message are also available
- Translation knowledge and the ability to read and analyze a message are also

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 – Malayalam

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- PathummayudeAadu, D.C.Books, Kottayam, Kerala
2	Akbar Kakkattil, (2009), Short Story - Ente Priyappeta Kadhakal
Reference Books	
1	Tharakan K.M , (2016), Malayala Novel SahithyaCharitram, N.B.S.Kottayam.
2	Achuyuthan M, (2014), Cherukatha Innale Innu-M.Achuyuthan D.C Books, Kottayam.
3	Dr George K.M,(2011) Sahithya CharitramPrasthanangalilude, 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 Outcomes:

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	Etape 0 Etape1 (Lecons 1 - 3)	14
II	Etape2 (Lecons 1 - 3)	14
III	Etape 3 - Leçons 1 – 2	12
IV	Etape 3 – Leçon 3 Etape 4 – Leçon 1	10
V	Etape 4 – Leçons 2 – 3	10
Total		**60**

Text Book	
1	Céline Himber, Corina Brillant, Sophie Erlich, (2008), Adomania 1 – Methode de francais, Publisher - Hachette Fle.
Reference Book	
1	Yves Loiseau, Régine, (2014), Latitudes 1, 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**

Course Code	Course Name	Category	Hours / Week	Credits
25BAI13C	Python Programming	Core - I	5	4

Course Objectives

The 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	1
CLO2	3	3	2	1	1
CLO3	3	2	2	2	1
CLO4	3	2	2	2	1
CLO5	3	2	2	2	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 - 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. 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. (Unit – I, II, III, IV)
2	Wesley J. Chun (2016), Core Python Applications Programming, 3rd Edition, Pearson Education. (Unit – V)

Reference Books

1.	Mark Lutz (2018), Learning Python Powerful Object Oriented Programming, O"Reilly Media, 5th Edition.
2.	Timothy A. Budd (2011), Exploring Python, Tata MCGraw Hill Education Private Limited, 1st Edition.
3.	John Zelle (2016), Python Programming: An Introduction to Computer Science, 3rd Edition, Course Technology Cengage Learning Publications, ISBN 978- 1590282410.

Web Resources(Swayam / NPTEL)

1.	https://onlinecourses.nptel.ac.in/noc20_cs07/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BAI14P	Lab : Python Programming	Core Lab - I	4	2

S.No.	Programs
1	Sample Programs using Lists, Tuples , Dictionaries and Decorators.
	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2	Program to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from the user.
3	Write a Python script that prints prime numbers less than 20.
4	Program to find factorial of the given number using recursive function.
5	Write a Python program to count the number of even and odd numbers from array of N numbers.
6	Write a Python class to reverse a string word by word.
7	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)
8	Create a Savings Account class that behaves just like a BankAccount, but also has an interest rate and a method that increases the balance by the appropriate amount of interest (Hint: use Inheritance).
9	Write a Python program to construct the following pattern, using nested loop * ** *** **** ***** **** *** ** *
10	Read a file content and copy only the contents at odd lines into a new file.

S.No.	Programs
11	Create a Turtle graphics window with a specific size.
12	Write a Python program for Towers of Hanoi using recursion
13	Create a menu driven Python program with a dictionary for words and their meanings.
14	Devise a Python program to implement the Hangman Game.
15	Program to create a 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: Grade A: Percentage >=80 Grade B: Percentage >=70 and 80 Grade C: Percentage >=60 and <70 Grade D: Percentage >=40 and <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 (2015), Introduction to Computer Science using Python - A computational Problem-solving Focus, Wiley India Edition.
2	Wesley J. Chun (2016), Core Python Applications Programming, Pearson Education, 3rd Edition.
Reference Books	
1.	Mark Lutz (2018), Learning Python Powerful Object Oriented Programming, O'reilly Media,5th Edition.
2	John Zelle (2013), Python Programming: An Introduction to Computer Science.Course Technology Cengage Learning Publications, 2nd Edition, ISBN 978- 1590282410 .
3	Timothy A. Budd (2011), Exploring Python, Tata McGraw Hill Education Private Limited,1st Edition.
Web Resources (SWAYAM / NPTEL Courses)	
1	https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
2	https://onlinecourses.nptel.ac.in/noc21_cs32/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BAI15C	Data Literacy & Fundamentals of Data Science	Core - II	5	4

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

CLO – PLO Mapping

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

Core I: Data Literacy & Fundamentals of Data Science

Unit	Content	No. of Hours
I	**Understanding Data and Data Literacy:** What is Data? Types of Data (Structured, Unstructured, Semi-structured) - Importance of Data Literacy in the Modern World - Data Collection Methods and Sources - Data Quality and Ethics. **Basics of Data Science:** What is Data Science? Overview and Applications - The Data Science Lifecycle: Collection, Cleaning, Analysis, Visualization, and Interpretation - Introduction to Key Tools & Technologies (Excel, Python, R, SQL) - Overview of Data Science Roles and Skills. **Data Analysis and Visualization:** Introduction to Data Analysis Concepts: Descriptive Statistics - Data Visualization Basics: Charts, Graphs, and Dashboards - Introduction to Visualization Tools (Excel Charts, Tableau, or Power BI basics). **Introduction to Data Science Workflow:** Data Cleaning and Pre-processing - Exploratory Data Analysis (EDA) - Basic Introduction to Machine Learning Concepts (Supervised vs Unsupervised) - Ethics and Responsible Use of Data. **Hands-on Exercises:** Lab 1: Exploring and Cleaning Real-World Datasets Lab 2: Visualizing Data with Charts and Graphs Using Excel or Tableau Lab 3: Conducting Basic Statistical Analysis and Interpretation Using Python or Excel	15
II	**Introduction to Data Collection in Excel:** Overview of Data Collection and Its Importance - Methods of Data Entry and Importing Data (CSV, Text files, Web Queries) - Data Validation and Creating Drop-down Lists - Using Forms for Data Collection. **Data Cleaning Basics:** Identifying and Handling Missing Data - Removing Duplicates and Inconsistent Entries - Using Text Functions for Cleaning (TRIM, CLEAN, SUBSTITUTE, LEFT, RIGHT, MID) - Working with Dates and Numbers: Correcting Formats. **Advanced Data Cleaning Techniques:** Using Conditional Formatting to Identify Errors - Using Filters and Sorting to Detect Issues - Introduction to Excel's Power Query for Data Cleaning. **Best Practices and Automation:** Creating Data Cleaning Checklists - Using Macros for Repetitive Cleaning Tasks - Tips for Maintaining Clean and Accurate Data. **Hands-on Exercises:** Lab 1: Importing and Validating Data Sets in Excel Lab 2: Cleaning and Transforming Raw Data Using Excel Functions Lab 3: Using Power Query and Macros for Efficient Data Cleaning	15
III	**Introduction to Data Analysis and Excel Basics:** Overview of Data Analysis Concepts - Navigating Excel Interface and Basic Features - Data Entry and Formatting Tips - Understanding Data Types and Structures. **Descriptive Statistics and Data Summarization:** Using Functions: SUM, AVERAGE, MEDIAN, MODE, MIN, MAX - Calculating Variance and Standard Deviation - Using COUNT, COUNTA, COUNTIF, COUNTIFS for Data Counting - Creating Pivot Tables for Data Summarization. **Data Visualization and Interpretation:** Creating Charts: Column, Bar, Pie, Line, Scatter Plots - Customizing Charts for Better Insights - Conditional Formatting for Data Highlights - Basic Dashboard Creation. **Introduction to Data Analysis Tools:** Using Excel's Data Analysis Toolpak - Introduction to What-If Analysis: Goal Seek, Scenario Manager - Basic Correlation and Regression Analysis. **Hands-on Exercises:** Lab 1: Calculating Descriptive Statistics and Using Pivot Tables Lab 2: Creating and Customizing Charts for Data Visualization Lab 3: Using Data Analysis Toolpak and What-If Analysis	15

Unit	Content	No. of Hours
IV	**Fundamentals of Data Visualization:** Importance and Principles of Data Visualization - Types of Visualizations: Charts, Graphs, Maps, and Infographics - Choosing the Right Visualization for Your Data. **Creating Visualizations in Tools:** Using Excel for Basic Visualizations (Bar, Line, Pie, Scatter) - Introduction to Advanced Tools (Tableau / Power BI) - **Customizing Visual Elements:** Colors, Labels, Legends, and Filters - Using Interactive Elements: Slicers and Filters. Dashboard Design and Best Practices: Components of an Effective Dashboard - Layout and User Experience Design - Storytelling with Data. **Building Dashboards:** Creating a Dashboard in Excel or Tableau/Power BI - Incorporating Multiple Visuals and Interactivity - Publishing and Sharing Dashboards. **Hands-on Exercises:** Lab 1: Building Basic Charts and Visualizations in Excel Lab 2: Designing Interactive Dashboards Using Tableau or Power BI Lab 3: Creating a Comprehensive Dashboard with Filters and Slicers	15
V	Understanding Data-Driven Decision Making: Concepts and Importance of Data-Driven Decisions - Identifying Business/Real-World Problems to Solve with Data - Overview of Data Sources and Collection Methods. Data Preparation and Analysis: Data Cleaning and Pre-processing - Exploratory Data Analysis (EDA) - Using Descriptive Statistics and Visualization to Derive Insights. Decision Modeling and Interpretation: Applying Basic Analytical Models (What-If Analysis, Simple Forecasting) - Interpreting Results for Decision Making - Presenting Data-Driven Recommendations. **Hands-on Exercises:** Lab 1: Problem Identification and Data Collection for Decision Making Lab 2: Data Cleaning, Analysis, and Visualization Lab 3: Building Decision Models and Presenting Insights	15
	Total Hours	**75**

Text Books	
1	Marr, B. (2016). Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things. Kogan Page.
2	Provost, F., & Fawcett, T. (2013). Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. O'Reilly Media.
3	McKinney, W. (2018). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (2nd ed.). O'Reilly Media.
Reference Books	
1	Walkenbach, J. (2015). Excel 2016 Bible. Wiley.
2	Few, S. (2013). Data Visualization: A Practical Introduction. Analytics Press.
3	Knaflic, C. N. (2015). Storytelling with Data: A Data Visualization Guide for Business Professionals. Wiley.
Web Resources (Swayam / NPTEL)	
1	https://nptel.ac.in/courses/106/106/106106212/
2	https://swayam.gov.in/nd1_noc21_mg47/preview

Part – III: Allied Course

Course Code	Course Name	Category	Hours / Week	Credits
25BAI16A	Linear Algebra and Discrete Mathematics	Allied	4	3

Course Objectives

The Course intends to cover

- The computational techniques and algebraic skills essential for the study of systems of linear equations and matrix algebra.
- 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	Remember the concept and basic operations of matrices.	K1
CLO2	Describe various types of graphs and their representations in computer memory.	K2
CLO3	Apply the concepts of connectives and tautological implications in data analysis.	K3
CLO4	Apply the concepts of Boolean algebra and lattices.	K3
CLO5	Develop regular expressions and finite automata for recognizing regular languages.	K3
K1- Remember; **K2** - Understand; **K3** -Apply;		

CLO – PLO Mapping

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

Allied I- Linear Algebra and Discrete Mathematics

Unit	Details	No. of Hours
I	**Matrix:** Introduction- Transpose- Properties of Transpose-Determinants- Inverse of a Matrix- Solving Simultaneous linear equations by matrix method-Rank of a Matrix- Characteristics roots and vectors.	12
II	**Graph Theory:** Basic terminology - Paths, cycle and 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
III	**Mathematical Logic:** Propositional calculus - Basic logical operations - Tautologies- Contradiction- Argument- Method of proof- Predicate calculus.	12
IV	**Boolean algebra and Lattices:** Boolean algebra – Basics theorems on Boolean Algebra – Lattices -Duality-Types of lattices -join reducible elements.	12
V	**Languages:** Operations on languages - Regular Expressions and regular languages - Grammar – Types of grammars - Finite state machine - Finite state automata.	12
	Total Hours	**60**
Text Books		
1.	Navanitham, P.A(2023), “Business Mathematics & Statistics”, Jai Publishers, Trichy. Unit I: Chapter 4 P.No. :147-190 P.R.Vittal (2012) “Allied Mathematics”, 6th Edition, Margham Publishers. Unit I: Chapter 5: P.No.: 5.50-5.75	
2	J.K. Sharma, (2022),” Discrete Mathematics”,2nd Edition, Macmillan India Ltd. Unit II: Chapter 9 Section 9.1 – 9.5, 9.8 Chapter 10 Section 10.1 -10.3, 10.6, 10.8 Unit III: Chapter 12 Section 12.1 – 12.3, 12.8 ,12.9,12.11,12.12, 12.14 Unit IV: : Chapter13 Section 13.1-13.3 Chapter14 Section 14.1 -14.5 Unit V: Chapter 15 Section 15.3 – 15.7	
Reference Books		
1	K. Sankara Rao (2018), “Numerical Methods for Scientists and Engineers”, Prentice Hall India.	
2	J. P. Tremblay, R. Manohar (2002), “Discrete Mathematics Structures with Applications to Computer Science”, McGraw Hill International Edition.	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/106/111106086/	

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.
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: - .Forest ecosystem a.Grassland ecosystem b.Desert ecosystem c.Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit	Content
IV	**Biodiversity and its Conservation** - Introduction-Definition: genetic, species and ecosystem diversity. - Bio geographical classification of India. - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. - Biodiversity at global, National and local levels. - India as a mega-diversity nation. - Hot-spots of biodiversity. - Threats to biodiversity: habital loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India. - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
V	**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.
VI	**Social Issues and the Environment** - From Unsustainable to Sustainable development. - Urban problems related to energy. - Water conservation, rain water harvesting, watershed 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. - Wasteland 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. - Public awareness.

Unit	Content
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. **Biosafety and Biosecurity** The basic principles of biosafety. - Biological hazards and assess risk in laboratory settings. - Biosafety protocols to minimize risks associated with biological agents. - Role of biosafety in the protection of public health, environment, and nationalsecurity. The theoretical knowledge as well as practical applications to prepare learners for real-world biosafety challenges. 1. Introduction to Biosafety - Definition and importance of biosafety. - Historical perspective on biosafety incidents. - Biosafety vs. biosecurity: 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. - Practices for handling, storing, and disposing of biological materials.
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**

Web Resources

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

Part – IV : Ability Enhancement Compulsory Courses(AECC)

(All the Undergraduate Programmes)

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;		

Ability Enhancement Compulsory Course - I : Soft Skills

Unit		Details	No. of Hours
I		**Presentation Skills**	
	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		**Confidence**	
	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.	

Unit		Content	No. of Hours
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	**Working Together:** 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						
	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**	50	**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				
	CIA	ESE	CIA		Model		Total
			Actual	Weightage	Actual	Weightage	
50	50	-	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						
25FRE21L	I		Malayalam – II						
25MAL21L	I		French – II						
25ENG22L	II	Language – II	English – II	4	3	25	75	100	3
25BAI23C	III	Core – III	Java Programming	5	3	25	75	100	4
25BAI24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
25BAI25C	III	Core – IV	Advanced Excel for Data Analytics	4	3	25	75	100	4
25BAI26A	III	Allied – II	Optimization Techniques	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

Course Code	Course Name	Category	Hours /Week	Credits
25BAI23C	Java Programming	Core-III	5	4

Course Objectives

The Course intends to cover:

- Fundamentals of Object-Oriented Programming in Java.
- AWT controls, 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	Remember 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 concepts of AWT controls, layouts and events to demonstrate the user-driven interactive applications.	K2, K3
CLO5	Develop GUI Applications using Swing in Java, develop simple Applications using Spring Boot.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	2	2	2	1
CLO2	3	2	2	2	1
CLO3	3	3	3	3	1
CLO4	3	3	2	3	1
CLO5	3	3	3	3	1
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 - Datatypes – 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 – Interthread Communication – Deadlock. **I/O Streams:** Concepts of streams - Stream classes - Byte and Character stream - Reading console Input andWriting 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. **Introduction to Jython –**Basics of Jython.	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, CreateSpace 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, 10th Edition, Pearson Education India.
2.	Kathy Sierra, Bert Bates, Trisha Gee (2022), Head First Java. O.Reilly Publications, 3rd Edition.

Web Resources (SWAYAM / NPTEL Courses)

1.	https://onlinecourses.nptel.ac.in/noc20_cs58/preview
2.	https://onlinecourses.nptel.ac.in/noc24_cs40/preview.

Course Code	Course Name	Category	Hours / Week	Credits
24BAI24P	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 c) Concatenating two strings.
7	Java program to perform the following string operations using String class: a) String Concatenation b) Search a substring c) To extract substring from the given
8	Java program to perform string operations using the String Buffer class: a) Length of a string b) Reverse a string 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	Threading program that uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2.
11	Java program to demonstrate the use of the following exceptions. a) ArithmeticException b) NumberFormatException c) ArrayIndexOutofBoundException d) NegativeArraySizeException
12	Java program that reads on file name 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 text field 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/noc22_cs47/preview
2.	https://onlinecourses.nptel.ac.in/noc20_cs84/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BAI25C	Advanced Excel for Data Analytics	Core-IV	5	4

Course Objectives

The course intends to cover

- Apply advanced data cleaning and transformation techniques to prepare high-quality datasets for analysis.
- Utilize advanced Excel formulas, functions, and Power Query for comprehensive data analysis and problem-solving.
- Use Pivot Tables, forecasting models, and Solver tools to make data-driven decisions.
- Automate data cleaning, reporting, and visualization processes using Macros and VBA.
- Design and present interactive dashboards in Excel or Power BI/Tableau for effective data visualization and business insights.

Course Learning Outcomes (CLOs)

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify, evaluate, and handle data quality issues through advanced cleaning, imputation, and transformation techniques using Excel and Power Query.	K1
CLO2	Understand and apply advanced Excel formulas and functions (logical, lookup, text, and statistical) to analyze and interpret data.	K2
CLO3	Apply analytical tools such as Pivot Tables, Forecasting, and Solver to model scenarios and make data-driven decisions.	K3
CLO4	Develop and automate Excel tasks using Macros and VBA to streamline data preparation and reporting processes.	K3
CLO5	Design and present interactive dashboards using Excel or Power BI/Tableau, incorporating KPIs, slicers, and effective visual elements.	K3
K1 – Remember; **K2** – Understand; **K3** – Apply		

CLO – PLO Mapping

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

Unit	Content	No. of Hours
I	**Advanced Data Cleaning Techniques:** Handling Missing Data: Imputation Methods and Strategies - Detecting and Resolving Outliers and Anomalies - Working with Complex Text Cleaning: Regex, Parsing, and Standardization - Dealing with Inconsistent Data and Data Normalization. **Data Transformation and Integration:** Data Type Conversion and Formatting - Combining and Merging Datasets: Joins and Concatenation - Reshaping Data: Pivot, Unpivot, and Transpose - Using Power Query and Advanced Excel Functions for Transformation. **Automation and Best Practices:** Automating Cleaning Processes with Macros and VBA - Creating Reusable Cleaning Pipelines - Documentation and Maintaining Data Quality - Introduction to ETL Concepts and Tools. **Hands-on Exercises:** Lab 1: Advanced Techniques for Handling Missing and Anomalous Data Lab 2: Data Reshaping and Integration Using Power Query and Excel Functions Lab 3: Automating Data Cleaning with Macros and VBA	15
II	**Advanced Excel Formulas Fundamentals:** Nested IFs and Logical Functions (AND, OR, NOT) - **Lookup Functions: XLOOKUP, XMATCH, CHOOSECOLS - Text Functions**: CONCATENATE, TEXT, LEFT, RIGHT, MID, FIND, SEARCH **- Date and Time Functions: SEQUENCE, EDATE, NETWORKDAYS.INTL**. **Statistical and Mathematical Functions:** S**tatistical Functions: LET, LAMBDA, FILTER, UNIQUE – dynamic array functions: ROUND, CEILING, FLOOR, MOD** - Array Formulas and Dynamic Arrays (FILTER, UNIQUE, SORT) - Error Handling Functions: IFERROR, ISERROR. **Data Analysis Using Complex Functions:** Combining Functions for Complex Calculations - Creating Dynamic Ranges and Named Ranges - **Using DAX measures and calculated columns in Power Pivot for dashboards** - Introduction to Advanced Formula Auditing and Troubleshooting. **Hands-on Exercises:** Lab 1: Using Lookup and Logical Functions for Data Retrieval and Filtering Lab 2: Applying Statistical and Mathematical Functions in Data Analysis Lab 3: Building Complex Nested Formulas and Dynamic Arrays for Real-World Scenarios	15

Unit	Content	No. of Hours
III	**Pivot Tables Essentials: Introduction to Pivot Tables: Concepts and Uses - Building interactive pivot tables with Power Pivot relationships and pivot charts - Using natural language and AI-driven filters for interactive analysis. Forecasting and Solver optimization tools: Solver & Scenario Manager**: Setting Targets and Finding Inputs - Scenario Manager: Creating and Comparing Scenarios - Data Tables: One-Variable and Two-Variable Analysis. **Introduction to Forecasting:** Basics of Forecasting and Trend Analysis - Using Excel's Forecast Sheet and Functions - Simple Moving Averages and Exponential Smoothing - Interpreting Forecast Results and Confidence Intervals. **Hands-on Exercises:** Lab 1: Creating and Customizing Pivot Tables with Interactive Filters Lab 2: Applying What-If Analysis Tools: Goal Seek, Scenario Manager, and Data Tables Lab 3: Building Forecast Models Using Excel's Forecast Functions and Tools	15
IV	**Introduction to Macros and VBA:** What is VBA? Differences Between Macros and VBA - Recording Macros and Running Them - Introduction to the VBA Editor and Code Window - Macro Security and Trust Center Settings. **Writing Basic VBA Code: Understanding the VBA Language:** Syntax, Variables, and Data Types - Creating Procedures and Functions - Using Loops (For, While) and Conditional Statements (If…Then…Else) - Debugging and Error Handling Basics. **Automating Excel Tasks:** Automating Data Cleaning and Formatting - Automating Reports and Pivot Table Refresh - Creating Buttons and Form Controls to Run Macros - Reusable Macros for Repetitive Tasks. **Hands-on Exercises:** Lab 1: Recording and Editing Basic Macros for Task Automation Lab 2: Writing VBA Code to Automate Data Cleaning and Formatting Lab 3: Creating Interactive Buttons and Automating Pivot Table Reports	15
V	**Principles of Interactive Dashboards:** Key Elements of Effective Dashboards - Interactivity vs Static Visuals - KPIs, Filters, Slicers, and Navigation Controls - Dashboard Design Best Practices (Clarity, Layout, Color Usage). **Building Interactive Dashboards:** Creating Dashboards in Excel or Power BI/Tableau - Using Slicers, Timelines, and Linked Charts - Creating Dynamic Text and KPI Cards - Integrating Pivot Tables and Conditional Formatting - Linking Data Sources and Enabling Real-Time Refresh. **Case Study-Based Learning:** Case Study 1: Sales Dashboard for Business Insights - Case Study 2: HR Dashboard for Employee Analytics - Case Study 3: Student Performance Dashboard in Education - Peer Review and Presentation of Dashboard Outcomes - Discussion on Challenges, Interpretation, and Recommendations. **Hands-on Exercises:** Lab 1: Designing an Interactive Sales Dashboard Using Slicers and KPIs Lab 2: Creating a Multi-Sheet Dashboard for HR or Academic Data Lab 3: Case Study Implementation – Building and Presenting a Real-World Dashboard	15
	Total Hours	**75**

Text Books	
1	McKinney, W. (2022). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (3rd ed.). O'Reilly Media.
2	Conrad Carlberg. (2017). Predictive Analytics: Microsoft Excel. Que Publishing.
3	Alexander, M., & Kusleika, R. (2016). Excel 2016 Power Programming with VBA. Wiley.
4	Walkenbach, J. (2015). Excel 2016 Bible. Wiley.
Reference Books	
1	Harvey, G. (2018). Excel Dashboards and Reports for Dummies (3rd ed.). Wiley.
2	Umanath, N. S., & Scamell, R. W. (2006). Data Modeling and Database Design. Cengage Learning.
Web Resources (SWAYAM / NPTEL Courses)	
1	**NPTEL - Data Analytics with Python** https://nptel.ac.in/courses/106/106/106106212
2	**SWAYAM - Data Analytics using Excel** https://swayam.gov.in/nd1_noc20_mg25

Course Code	Course Name	Category	Hour / Week	Credits
25BAI26A	Optimization Techniques	Allied-II	4	3

Course Objectives

The Course intends to cover

- Optimization methods such as linear programming, transportation problems, and game theory to address complex decision-making challenges in real-world scenarios.
- Employ analytical and computational techniques like PERT/CPM and replacement models to effectively manage resources and optimize project scheduling.

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	Calculate Transportation and Assignment Problems, feasible solutions and the Traveling Salesman Problem.	K2
CLO3	Apply the models of queuing theory in real-world applications.	K3
CLO4	Illustrate the knowledge of drawing project networks for quantitative analysis of projects.	K3
CLO5	Solve Two-Person Zero-Sum Games using the Maximin and Minimax Principles.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

CLO - PLO Mapping

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

Allied II: Optimization Techniques

Unit	Content	No. of Hours
I	**Linear Programming Problems:** Introduction to linear programming mathematical formulation of linear programming problem – graphical method – simplex method only.	12
II	**Transportation Problems:** Introduction to transportation problem – the transportation table – solution of transportation problem – finding an initial basic feasible solution. **Assignment Problems:** Introduction – mathematical formulation – solution methods – special case – the traveling salesman problem.	12
III	**Queuing Theory:** Introduction – queuing system – elements of queuing system – transient and steady states – Kendal's notation for representing queuing models – Model I (M/M/1) : (∞/FIFO), Model II (M/M/I): (N/FCFS).	12
IV	**Network Scheduling:** Introduction – network – basic components – rules of network construction – network computations – critical path analysis – floats – programming evaluation review technique – probability consideration in programming evaluation review technique – distinction between programming evaluation review technique and critical path method – applications of network techniques.	12
V	**Game Theory:** Introduction – two person zero – sum games – some basic terms – the maximin – minimax principle – games without saddle points – mixed strategies – graphical solution of 2 x n and m x 2 games – dominance property.	12
	Total Hours	**60**

Text Books

1	Sundaresan.V, Ganapathy Subramanian. K.S, Ganesan .K (2013), "Resource Management Techniques (Operations Research)", A.R.S. publications. Unit I : Chapter 2 : Section 2.1 – 2.5 Chapter 3 : Section 3.1.1-3.1.3 Unit II : Chapter 7 : Section 7.1 Chapter 8 : Section 8.1 – 8.9 Unit III: Chapter 13 : Section 13.1 – 13.4,13.6,13.7 Unit IV: Chapter 15 : Section 15.1 – 15.7 Unit V : Chapter 16 : Section 16.1 – 16.4,16.6,16.7

Reference Books

1.	Hamdy A Taha(2002), "Operations Research", Pearson Education, 7th edition.
2	P.K. Gupta, D.S. Hira(2015), "Problems in Operations Research", S. Chand Publishers

Web Resources (SWAYAM/NPTEL)

1	https://archive.nptel.ac.in/courses/111/107/111107128/

Part – IV : Foundation Courses

(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						
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				
	CIA	ESE	CIA		Model		Total
			Actual	Weightage	Actual	Weightage	
50	50	-	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