KG COLLEGE OF ARTS AND SCIENCE
Autonomous Institution | Affiliated to Bharathiar University
Accredited with A++ Grade by NAAC
ISO 9001:2015 Certified Institution
KGiSL Campus, Saravanampatti, Coimbatore – 641 035

Regulations 2026-27 for Undergraduate Programme

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

Programme: B.Sc. Computer Science with Cyber Security
Programme Code: BCY

(Applicable for the Students Admitted During the Academic Year 2026 - 27 Onwards)

Eligibility

The Student should have passed Higher Secondary Examination and wherever the students have not studied mathematics knowledge be imparted through Residential/Bridge Course.(As per the eligibility condition given Ref. BU/R/B3-B4/Eligibility Condition/2026/7425 dated 15/05/2026).

Program Learning Outcomes (PLOs)

The successful completion of B.Sc. CS With Cyber Security Programme shall enable the students to

PLO1	Design, implement, and evaluate a computer network and information security needs of a organization
PLO2	Analyze and evaluate the cyber security needs of an organization and society and apply th knowledge for sustainable solutions
PLO3	Explore Current and emerging techniques and technologies to formulate solutions for system and organizations.
PLO4	Develop ethical solutions by applying of Artificial Intelligence, Machine learning, Clou Computing, Big Data and Cyber Security.
PLO5	Demonstrate comprehensive knowledge in IT solution development to achieve professiona excellence and support higher education and research.

B.Sc. Computer Science with Cyber Security
Distribution of Credits and Hours for all the Semesters

Part	Courses	No. of Courses	Hours		Credits	Total		Semester
I	Language – I	4	4 X 4	16	3	12	12	1-4
II	Language - II	4	4 X 4	16	3	12	12	1-4
III	Core Theory(6 hrs / week)	2	4 X 6	24	4	16	100	3,6
	Core Theory(5 hrs / week)	11	9 X 5	45	4	36		1,2,4,5
	Core Lab (4 hrs / week)	4	4 X 4	16	2	8		1-4
	Core Lab (5 hrs /week)	3	3 X 5	15	3	9		5,6
	Allied	4	4 X 4	16	3	12		1-4
	Electives	2	2 X 5	10	3	6		5,6
	Project	1	1 X 6	6	5	5		6
	SEC : Internship	1	-	-	2	2		5
	Skill Enhancement (SEC)	3	3 X 2	6	2	6		3,4,6
IV	Foundation Course(FC)	2	2 X 2	4	2	4	14	1,2
	Foundation Course(FC) - Self-study	1	-	-	2	2		3
	Ability Enhancement Compulsory Course(AECC)	3	3 X 2	6	2	6		1,2,4
	Ability Enhancement Compulsory Course(AECC) - MOOC	1	-	-	2	2		3
V	Extension Activity-Liberal Arts Extra curricular and co-curricular activities	-	-	-	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**
I	4	3	4	3	18	13	4	4	-	-	**30**	**23**
II	4	3	4	3	18	13	4	4	-	-	**30**	**23**
III	4	3	4	3	22	15	-	4	-	-	**30**	**25**
IV	4	3	4	3	20	15	2	2	-	2	**30**	**25**
V	-	-	-	-	30	23	-	-	-	-	**30**	**23**
VI	-	-	-	-	30	21	-	-	-	-	**30**	**21**
Total	**16**	**12**	**16**	**12**	**138**	**100**	**10**	**14**	**-**	**2**	**180**	**140**

Curriculum

B.Sc. Computer Science with Cyber Security

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours /Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
26TAM11L	I	Language-I	Tamil-I	4	3	25	75	100	3
26HIN11L	I		Hindi-I						
26MAL11L	I		Malayalam-I						
26FRE11L	I		French-I						
26ENG12L	II	Language-II	English-I	4	3	25	75	100	3
26BCS13C	III	Core – I	Computing Fundamentals and C Programming	5	3	25	75	100	4
26BCY14P	III	Core Lab – I	C Programming Lab	4	3	40	60	100	2
26BCT15C	III	Core – II	Foundations of Networking and Cybersecurity	5	3	25	75	100	4
26BMA1AA	III	Allied – I	Linear Algebra	4	3	25	75	100	3
26ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
26SOF1AE	IV	AECC – I	Soft Skills	2	2	-	50	50	2
			Total	**30**				**700**	**23**

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours /Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
26TAM21L	I	Language - I	Tamil – II	4	3	25	75	100	3
26HIN21L	I		Hindi – II						
26MAL21L	I		Malayalam – II						
26FRE21L	I		French – II						
26ENG22L	II	Language - II	English – II	4	3	25	75	100	3
26BCT23C	III	Core – III	Object Oriented Programming with Java	5	3	25	75	100	4
26BCY24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
26BCY25C	III	Core – IV	Operating System and Security	5	3	25	75	100	4
26BMA2CA	III	Allied – II	Optimization Techniques	4	3	25	75	100	3
26HUM2FC/	IV	FC – II	**Human Rights**	2	2	50	-	50	2
26DIM2FC			Disaster Management						
26IDT2AE/	IV	AECC – II	Innovation and Design Thinking	2	2	-	50	50	2
26IPR2AE/			Intellectual Property Rights						
26END2AE			**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	6	3	25	75	100	4
	III	Core Lab – III	Data Structures Lab	4	3	40	60	100	2
	III	Core – VI	Cyber Law	6	3	25	75	100	4
	III	Allied – III	Number Theory	4	3	25	75	100	3
	III	SEC – I	Ethical Hacking Lab	2	3	40	60	100	2
	IV	FC – III	Basic Tamil / Advanced Tamil	-	2	50	-	50	2
			Indian Knowledge System (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	Linux and Shell Programming	5	3	25	75	100	4
	III	Core Lab – IV	Linux and Shell Programming lab	4	3	40	60	100	2
	III	Core – VIII	Block Chain Technology	5	3	25	75	100	4
	III	Allied – IV	Statistical Methods and Their Applications	4	3	25	75	100	3
	III	SEC – II	Web Programming	2	3	40	60	100	2
	IV	AECC – IV	Quantitative Aptitude	2	2	-	50	50	2
	V	Extra-Curricular & Co-Curricular Activities	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	Cyber Crime Investigation and Digital Forensics	5	3	25	75	100	4
	III	Core Lab – V	Cyber Crime Investigation and Digital Forensics lab	5	3	40	60	100	3
	III	Core – X	Relational Database Management System	5	3	25	75	100	4
	III	Core Lab – VI	RDBMS lab	5	3	40	60	100	3
	III	Core – XI	Data Analytics for Fraud Detection	5	3	25	75	100	4
	III	Elective – I	Cloud Security	5	3	25	75	100	3
			Data Communication and Networking						
			Biometric Security						
	III	SEC- III	Internship	-	-	50	-	50	2
Total				**30**				**650**	**23**

Semester – 6									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
	III	Core – XII	Cyber Security	6	3	25	75	100	4
	III	Core Lab- VII	Cyber Security Lab	5	3	40	60	100	3
	III	Core – XIII	Artificial Intelligence & Machine Learning	6	3	25	75	100	4
	III	Elective – II	Internet of Things	5	3	25	75	100	3
			Intrusion Detection and Prevention System						
			Network Security & Cryptography						
	III	SEC – III	Network Management Systems and Operations Lab	2	3	40	60	100	2
	III	Core – XIV	Project with viva Voce	6	3	40	60	100	5
Total				**30**				**700**	**21**
Grand Total				**180**				**4200**	**140**

Semester I

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours /Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
26TAM11L	I	Language-I	Tamil-I	4	3	25	75	100	3
26HIN11L	I		Hindi-I						
26MAL11L	I		Malayalam-I						
26FRE11L	I		French-I						
26ENG12L	II	Language-II	English-I	4	3	25	75	100	3
26BCS13C	III	Core – I	Computing Fundamentals and C Programming	5	3	25	75	100	4
26BCY14P	III	Core Lab – I	C Programming Lab	4	3	40	60	100	2
26BCT15C	III	Core – II	Foundations of Networking and Cybersecurity	5	3	25	75	100	4
26BMA1AA	III	Allied – I	Linear Algebra	4	3	25	75	100	3
26ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
26SOF1AE	IV	AECC – I	Soft Skills	2	2	-	50	50	2
			Total	**30**				**700**	**23**

Part – I: Language I – Tamil – I

(All the Undergraduate Programmes)

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

Course Objectives

The Course intends to cover

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

Course Learning Outcomes

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

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

Part – I: Language – I: தமிழ் - I

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

Unit	Content	No. of Hours
V	**இலக்கணம் மற்றும் படைப்பாற்றல்** 1. எழுத்துகள் (முதல் எழுத்துகள், சார்பெழுத்துகள்) 2. எழுத்துக்களின் பிறப்பு 3. மாத்திரைகள் 4. படைப்பாற்றல் திறன்(சிறுகதை மற்றும் புதுக்கவிதைப் படைத்தல்)	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, (1995), ஒரு கதவும் கொஞ்சம் கள்ளிப்பாலும் கவிதை தொகுப்பு, காந்தளகம் பதிப்பகம், சென்னை.
4	வரதராசனார் மு, (2021), தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாடமி பதிப்பு.
5	முனைவர் பஞ்சாங்கம் கா, (2017), தமிழ் இலக்கிய வரலாறு, காவ்யா பதிப்பகம்.
6	முனைவர் வேங்கடராமன் கா. கோ (2008), தமிழ் இலக்கிய வரலாறு, கலையக வெளியீடு.
7	ஜெயமோகன், (2024), அறம் (சிறுகதை), விஷ்ணுபுரம் பதிப்பகம்.
8	இரா.நடராசன், (2022) ஆயிஷா, பாரதி புத்தகாலயம்.
9	குமரன் கோ (2010), தமிழ் இலக்கணம் எளிய அறிமுகம் , சந்தியா பதிப்பகம்.
10	சக்திவேல் சு,(2012), நாட்டுப்புறவியல், மணிவாசகர் பதிப்பகம்.

Part – I: Language I – Hindi – I

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

Course Objectives

The course intends to

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

Course Learning Outcomes

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

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

Part – I: Language – I - Hindi - I

Unit	Content	No. of Hours
I	**Prose : Bharthi Gadya Sangrah** 1.Sanskurthi hai kya? (Lalith nibandh)- Ramdhari singh Dinkar 2. Voh cheeni Bhayi (Rekha chitra) – Mahadevi varma 3. Badthe shor ka gahratha sankat (pradoshan) - Rajendrakumr ray & Ravindra Varma 4. Ghar Loutthe huye – (Athma katha) – Harivamshraai Bacchan 5. Paramanu urja evam khadya padarth samrakshan (vaigyanik lek) - Parmaanu urja vibhag (Bharth sarkar) 6. Cinema (film) – Manmohan Chdda	14
II	**Non Detailed Text Short Stories: Aat Kahaniyan** 1. Vrath-bang - Jayashankar Prasad 2. Sath gathi - Premchand 3. parda - Yespal 4. Apna apna bhagya - Jaynendrakumar 5. Bhrammarakshas ka shishya - Mukthibhodh 6. Dana-bhusa - Markandeya	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	Bharathi gadya sangrah, editor: Madhudhavan, publisher: Vani prakashan, 4697/5,Daryaganch, New Delhi – 110002.
2	Aatt Kahaniyan, Editor : Dr. H.R. Mihir, Publisher : Jaya bharthi prakashan, 267 B, Maya press Road, Allahabad–211 003
Reference Book	
1	Naveenhindivyakaran, 2002,Dakshin Bharat Hindi Prachar, Sabha,Chennai–600017

Part – I: Language – I - Malayalam – I

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

Course Objectives

The Course intends to

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

Course Learning Outcomes

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

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

Part – I: Language – I - Malayalam – I

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

Text Books

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

Reference Books

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

Part – I: Language I – French - I

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

Course Objectives

The Course intends to cover

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

Course Outcomes

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

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

Part – I: Language – I French – I

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

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

Part – II: Language – II - English –I

(All the Undergraduate Programmes)

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

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

Language II : Part II - English-I

Unit	Content	No. of Hours
I	**Poetry** : **Nature** 1. I Wandered Lonely as a Cloud - William Wordsworth 2. The Bird Sanctuary - Sarojini Naidu 3. Stopping by Woods on a Snowy Evening – Robert Frost	12
II	**Short Stories: Morality** 1. The Necklace – Guy de Maupassant 2. The Taxi Driver – K.S. Duggal 3. The Monkey's Paw - W. W. Jacobs	12
III	**Grammar** 1. **Nouns:** Types, Singular vs. Plural forms, Case and Gender, Common errors with nouns 2. **Pronouns:** Types, Personal, Possessive, Reflexive, Intensive (Emphatic), Demonstrative, Relative, Interrogative, Indefinite, and Reciprocal pronouns, Common errors with pronouns 3. **Verbs:** Action verbs and linking verbs, Transitive and intransitive verbs, Auxiliary verbs and Modal verbs, Verb tenses, Common errors with verbs	12
IV	**Language Competency: Vocabulary** 1. **Vocabulary:** Synonyms, Antonyms, Guessing meaning from context, 2. **Word Formation**: Homonyms, Homophones, Homographs, Portmanteau words, Collocations, Compounding Words, Root Words, Prefixes and Suffixes, Clipping, Acronym, Abbreviations, Reduplication	12
V	**English for Communication** 1. Listening for General and Specific Information. 2. Self - Introduction, Introducing others, Greetings. 3. Intensive Reading - a prose passage, a poem and a short story 4. Descriptive writing – writing descriptive essays in two to three paragraphs.	12
	Total Hours	**60**

Reference Books

1. Carter, R., McCarthy, M., Mark, G., & O'Keeffe, A. (2016). English Grammar Today. Cambridge University Press.
2. Swan, M. (2021). Practical English Usage (4th ed.). Oxford University Press.
3. McCarthy, M., & O'Dell, F. (2017). English Vocabulary in Use: Advanced (3rd ed.). Cambridge University Press.
4. Ramazani, J., Ellmann, R., & O'Clair, R. (Eds.). (2003). The Norton Anthology of Modern and Contemporary Poetry (Vols. 1–2). W. W. Norton & Company.
5. Wren, P. C., & Martin, H. (2015). High School English Grammar and Composition (50th ed.). S. Chand & Company.
6. Jones, L. (2015). Cambridge English for Life Skills. Cambridge University Press.

Web Resources (Swayam/NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credits
26BCS13C	Computing Fundamentals and C Programming	Core-I	5	4

Course Objectives

The Course intends to cover

- The knowledge about Computer fundamentals.
- The concepts and techniques in C Programming.
- Problem solving in C.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Learn about the Computer fundamentals and the Problem solving.	K1
CLO2	Understand the basic concept s of C Programming	K2
CLO3	Describe the reason why different decision making and loop constructs are available for iteration in C	K2
CLO4	Demonstrate the concept of user defined Functions, Recursions, Scope and Lifetime of Variables, Structures and Unions.	K2
CLO5	Develop C programs using Pointers Arrays and file management	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

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

Core – I: Computing Fundamentals and C Programming

Unit	Content	No. of Hours
I	**Fundamentals of Computers & Problem Solving in C:** Introduction - History of Computers - Generations of Computers - Classification of Computers - Basic Anatomy of a Computer System -Input Devices - Processor - Output Devices - Memory Management - AI Memory System - Types of Software - Overview of Operating System - Programming Languages - Translator Programs - Problem Solving Techniques.	15
II	**Overview of C:** Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - Precedence of arithmetic operators - Type conversion in expression - Operator precedence & associativity - Mathematical Functions - Reading & Writing a character - Formatted input and output.	16
III	**Decision Making, Looping and Arrays:** Introduction - if, if…. else, Nesting of, if…else statements - elseif ladder - the switch statement, The ?: operator - the goto Statement. **Decision Making and Looping:** Introduction - the while statement - the do statement - the for statement - jumps in loops. **Arrays**: Character Arrays and Strings.	14
IV	**User - defined Functions, Structures and Unions:** Introduction - need and elements of user - defined functions -Definition - Return Values and their types - Function Calls - Declarations - Category of Functions - Nesting of Functions – Recursion - Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables - Multifile Programs- Structures and Unions - Dynamic Memory Allocation – malloc(), calloc(), free().	15
V	**Pointers & File Management: Pointers :** Introduction - Understanding Pointers - Accessing the address of a variable - Declaration and Initialization of pointer variable - Accessing a variable through its pointer - Chain of Pointers - Pointer Expressions - Pointer Increments and Scale factor - Pointers and Arrays - Pointers and Strings - Array of Pointers - Pointers as Function Arguments - Functions returning Pointers - Pointers to Functions - Pointers and Structures. File Management in C.	15
	Total Hours	**75**

Text Books

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

Reference Books

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

Web Resources (Swayam/NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credits
26BCY14P	C Programming Lab	Core Lab-I	4	2

S. No.	List of Programs
Sample Programs.	
1.	Write a C program to find the sum, average, standard deviation for a given set of numbers.
2.	Write a C program to generate n prime numbers.
3.	Write a C program to generate Fibonacci series.
4.	Write a C program to check whether a number is an Armstrong number.
5.	Write a C program to reverse a number.
6.	Write a C program to print magic square of order n where n>3 and n is odd.
7.	Write a C program to display day of the week using switch case.
8.	Write a C program to sort the given set of numbers in ascending order.
9.	Write a C program to check whether the given string is a palindrome or not using pointers.
10.	Write a C program to count the number of vowels in the given sentence.
11.	Write a C program to find the factorial of a given number using recursive function.
12.	Write a C program to print the students mark sheet assuming roll no, name, and marks in 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.
13.	Write a function using pointers to add two matrices and to return the resultant matrix to the calling function.
14.	Write a C program which receives two filenames as arguments and check whether the file Contents are same or not. If same delete the second file
15.	Write a program which takes a file as command line argument and copy it to another file. At The end of the second file write the total i) no of chars ii) no. of words and iii) no. of lines.
	Total Hours **60**
Text Books	
1.	E.Balagurusamy (2017), Computing Fundamentals & C Programming – 2nd Edition, Tata McGraw-Hill.
2.	Yeswanth P Kanetkar, (2022), Let us C, 19th Edition, BPB Publications.
Reference Books	
1.	Ashok N Kamthane(2002), Programming with ANSI and Turbo C, Pearson.
2.	Henry Mullish & Hubert L. Cooper(1996), The Spirit of C, Jaico.
3.	Deitel & Deitel (2022), C How to Program, 9th Edition, PHI/Pearson Education Asia.
Web Resources (Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/106106210
2.	https://nptel.ac.in/courses/106105171

Course Code	Course Name	Category	Hours / Week	Credits
26BCT15C	Foundations of Networking and Cybersecurity	Core - II	5	4

Course Objectives

The course intends to cover

- The basics of networking, OSI model and key protocols
- Different types of networking devices and their uses
- Tools to simulate network scenarios.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand basic networking concepts and protocols.	K1,K2
CLO2	Understand network device functions and recognize common security threats.	K2
CLO3	Understand and detect the cyber-attacks like spoofing and tunneling.	K3
CLO4	Analyze static and dynamic routing, WAN Technologies	K4
CLO5	Analyze and configure Access Control Lists.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply;**K4** - Analyze		

CLO – PLO Mapping

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

Core - II: Foundations of Networking and Cybersecurity

Unit	Content	No. of Hours
I	**Introduction to Networking:** What is a Network?- Local Area Network (LAN)- Wide Area Network (WAN)-Types of Mode. **Open Systems Interconnection (OSI) Model:** Why we Need Open Systems Interconnection (OSI)- Open Systems Interconnection (OSI) Layers-Transmission Control Protocol (TCP) / User Datagram Protocol (UDP)- Way Hand Shake-Real-World Attack Examples at each OSI layer-Packet Sniffing using Wireshark. **TCP/IP Model:** Need of Transmission Control Protocol (TCP) / Internet Protocol (IP) Model- Transmission Control Protocol (TCP) / Internet Protocol (IP) Layer-TCP 3-Way Handshake with attack simulation. 1. Real-world attack examples at each OSI layer. 2. Packet sniffing using Wireshark. 3. TCP 3-Way Handshake with attack simulation .	15
II	**Sub Netting:** Subnetting-Classless Inter Domain Routing (CIDR)- Create Subnets Understanding Variable Length Subnet Masks (VLSM)- Private Internet Protocol (IP) Addresses-How subnetting helps with network segmentation for Zero Trust. **Packet Flow in Same & Different Network:** Domain Name System (DNS) and Working - Map Hostnames to Internet Protocol (IP) Addresses-Configure Cisco Device as Domain Name System (DNS) Client-How to Configure a Cisco Router as a DNS Server? - No Internet Protocol (IP) - Domain-lookup Command-Address Resolution Protocol (ARP)-Analyze DNS tunneling, DNS spoofing attacks. **Information about Networking Device:** Network Devices-Hubs-Switch-Carrier Sense Multiple Access with Collision Detection (CSMA CD)- Collision & Broadcast DomainHow Switches Work? - Layer 2 Switching- Router-Layer 3 Switch and working threat detection. 1. Design a segmented network for HR, IT, DevOps, and isolate with firewall rules. 2. Use Wireshark to detect a suspicious DNS 3. Simulate port mirroring and analyze mirrored traffic.	15

Unit	Content	No. of Hours
III	**Internet Protocol (IP) / Internet Control Message Protocol (ICMP):** What is Internet Control Message Protocol- How Ping process works-How Extended Ping Command works- What is Traceroute-How Traceroute Command works-show processes Command in detailed to map protocols-What is Ping sweeps Cyber Attacks-what is ICMP tunneling-Cyber Attacks- How to Detect ICMP misuse in Cyber Security Industry. **Automatic Private IP Addressing (APIPA):** What is APIPA- why do we need of APIPA-How APIPA works. **Address Resolution Protocol (ARP):** What is Address Resolution Protocol (ARP)-Need and type of (ARP)- What is ARP poisoning & spoofing, Perform demo for Cyber Industry. **Routing Protocols (Static & Dynamic):** What are Routing Protocols-Comparing Internal Routing Protocols (IGPs)- Administrative Distance & Metric-Equal Cost Multi-Path (ECMP) Explanation & Configuration - Understanding Loopback Interfaces and Loopback Addresses - Passive-interface Command-Security risks in routing protocols (BGP hijack, OSPF poisoning)- How attackers use static routes to pivot within the network. 1. Simulate ICMP scanning with Nmap and monitor traffic. 2. Analyze ARP poisoning in a test environment.	15
IV	**Static - Next Hop / Exit Interface:** What is IP Routing- Local Routes and How they Appear in the Routing Table - Connected, Static, & Dynamic Routes - Floating Static Route - Explanation and Configuration - Default Static Route - Create a Static Host Route. **WAN Technologies:** What is Wide Area Network - Cisco VPN- WAN Connection Types- Leased Line Definition and Explanation - Multiprotocol Label Switching (MPLS)- VPN and split tunneling risks in Cyber Industry. **Network Address Translation (NAT):** Static Network Address Translation (NAT)-Dynamic Static Network Address Translation (NAT)- Port Address Translation (PAT) Configuration- Secure site-to-site connections with IPsec. 1.Simulate a compromised router path 2.Analyze a PCAP of a VPN session.	15

Unit	Content	No. of Hours
V	**Access Control List (ACL):** Access Control List and its types - Configuring Standard and Extended Access Control List (ACL)- Configuring Named Access Control List (ACL) - NAT traversal and how malwares use it – What are ACLs in firewalls – Work with Palo Alto/Cisco ASA for ACLs- AI Based IDS. **Dynamic Host Configuration Protocol:** Configure Cisco Router as Dynamic Host Configuration Protocol (DHCP) Server-DHCP Relay Agent- Configure Cisco Router as a DHCP Client- Automatic Private IP Addressing (APIPA)- Rogue DHCP server detection in Cyber Industry- MITM Cyber-attacks using DHCP starvation.**Telnet & Secure Shell (SSH):** Need of Telnet & Secure Shell (SSH)- Telnet & Secure Shell (SSH)- Setting Up Telnet- Setting Up Secure Shell (SSH)- SSH b DHCP attack simulation using Yersinia or better capture-force tools and how to detect them in logs for Cyber Industry. 1. Configure ACLs to prevent port scanning. 2. DHCP attack simulation using Yersinia or bettercap. 3. Simulate brute-force login and analyze logs in Fail2Ban/syslog 4. Simulate VLAN separation and test access control.	15
	Total Hours	**75**
Text Books		
1.	James F. Kurose and Keith W. Ross (2013), Computer Networking: A Top-Down Approach, Pearson Education, 6th Edition.	
2.	Behrouz A. Forouzan (2007), Data Communications and Networking, McGraw-Hill Companies, Incorporated.	
3.	Andrew S. Tanenbaum & David J. Wetherall (2011), Computer Networks, Prentice Hall, 5th Edition	
4.	Lisa Bock (2019), Learn Wireshark: Confidently navigate the Wireshark interface and solve realworld networking problems, Packt Publishing Ltd.	
5.	William Stallings (2007), Network Security Essentials, Prentice Hall, 3rd Edition	
6.	Kevin R. Fall and Martin L. Stevens (2019), TCP/IP Illustrated, Volume 1: The Protocols AddisonWesley Professional,2nd Edition.	
7.	Gary A. Donahue (2011), Network Warrior, O'Reilly Media, 2nd Edition.	
8.	Jazib Frahim, Omar Santos, Andrew Ossipov (2019), Cisco ASA: All-in-one Next-Generation Firewall, IPS, and VPN Services, CISCO Press, 3rd Edition.	
Reference Books		
1.	Wendell Odom (2013), CCNA Routing and Switching 200-120 Official Cert Guide Library, CISCO Press,1st Edition	
2.	Chris Sanders (2011), Practical Packet Analysis: Using Wireshark to Solve Real-World Network Problems, No Starch Press, 2nd Edition	
3.	Laura Chappell (2012), Wireshark Network Analysis, 2nd Edition.	
4.	Doug Barth, Evan Gilman (2017), Zero Trust Networks, O'Reilly Media, 1st Edition	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_ee46/preview	
3.	https://www.simplilearn.com/ai-intrusion-detection-systems-article	

Course Code	Course Name	Category	Hours / Week	Credits
26BMA1AA	Linear Algebra	Allied - I	4	3

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

CLO - PLO Mapping

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

Allied I: Linear Algebra

Unit	Content	No. of Hours
I	**Matrix Algebra:** Introduction–types of matrices–Operations of Matrices– Transpose – Properties of Transpose–Determinants–Inverse of a Matrix–Solving Simultaneous linear equations by matrix method–Rank of a Matrix. Matrix Operations in Neural Networks and Machine Learning Connection.	12
II	**Special Matrices:** Symmetric and Skew–Symmetric Matrices–Hermitian and Skew–Hermitian Matrices–Orthogonal and Unitary Matrices–Characteristics Roots and Vectors–Cayley-Hamilton's Theorem.	12
III	**Solution of Simultaneous Linear Algebraic Equations:** Gauss Elimination Method – Gauss Jordan Method– Gauss Jacobi Method – Gauss Seidel Method.	12
IV	**Vector Spaces:** Introduction of Real Vector Space – Subspaces – Linear Combination and Spanning Sets –Linear Dependence and Independence–Basis and Dimensions–Row Space, Column Space, Null Space, Rank and Nullity.	12
V	**Linear Transformations and Inner Product Spaces:** Linear Transformation and Examples–Sum, Scalar Multiple and Composition of Linear Transformation. Inner Product Spaces–Dot Product of Euclidean Inner Product in R^n–General Inner Product–Orthogonality–Orthonormal Basis–Gram–Schmidt Process.	12
	Total Hours	**60**
Problems - 80% & Theory – 20%		
Text Books		
1.	Navanitham, P.A(2023), Business Mathematics & Statistics, Jai Publishers, Trichy. Unit I: Chapter 4 P.No. :147-190.	
2.	Vittal, P.R(2012) Allied Mathematics", 6th Edition, Margham Publishers. Unit II: Chapter 5: P.No.: 5.8-5.24 & 5.50-5.75**.**	
3.	Kandasamy, P,Thilagavathy,K & Gunavathy,K(2007), Numerical Methods, S. Chand and Company Ltd, New Delhi. Unit III : Chapter 4 : Section 4.1, 4.2, 4.8, 4.9.	
4.	Rangrao, S.Bhamare, Pravin S.Waldhe & Anagha R.Medhekar (2017), Linear Algebra", 1st EditionNirali Prakashan Publishers,Pune.Unit IV: Chapter 3 : Section 3.1-3.6 Unit V: Chapter 5 : Section 5.1-5.3,Chapter 6 : Section 6.1-6.5	
Reference Books		
1.	Seymour Lipschutz and Marc Lipson(2001), Linear Algebra 3rd Edition.	
2.	David C. Lay, Steven R. Lay, and Judi J. McDonald (2014). Linear Algebra and its Applications. 5th Edition. Pearson.	
Web Resources (Swayam / NPTEL / Others)		
1.	https://nptel.ac.in/courses/111106135	
2.	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma21	
3.	https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/	

Part – IV: Foundation Course

(All the Undergraduate Programmes)

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

Unit	Content
I	The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.
II	**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: - a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. 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
26SOF1AE	Soft Skills	AECC - I	2	2

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

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

Unit	Module	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	Module	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 (CIA & ESE)

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

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

Question Paper Pattern

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

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

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

Examination Pattern

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

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

Max Marks	Marks for		Components for CIA				
	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	50 X 1=50



Semester 2

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours /Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
26TAM21L	I	Language - I	Tamil – II	4	3	25	75	100	3
26HIN21L	I		Hindi – II						
26MAL21L	I		Malayalam – II						
26FRE21L	I		French – II						
26ENG22L	II	Language - II	English – II	4	3	25	75	100	3
26BCT23C	III	Core – III	Object Oriented Programming with Java	5	3	25	75	100	4
26BCY24P	III	Core Lab - II	Java Programming Lab	4	3	40	60	100	2
26BCY25C	III	Core – IV	Operating System and Security	5	3	25	75	100	4
26BMA2CA	III	Allied – II	Optimization Techniques	4	3	25	75	100	3
26HUM2FC/	IV	FC – II	**Human Rights**	2	2	50	-	50	2
26DIM2FC			Disaster Management						
26IDT2AE/	IV	AECC – II	Innovation and Design Thinking	2	2	-	50	50	2
26IPR2AE/			Intellectual Property Rights						
26END2AE			**Entrepreneurship Development**						
Total				**30**				**700**	**23**

Course Code	Course Name	Category	Hours/Week	Credits
26TAM21L	Tamil - II	Language - I	4	3

Course Objectives

The Course intends to cover

- சங்க இலக்கியங்கள் மற்றும் சிலப்பதிகாரம் வழியாகத் தமிழர்களின் வீரம், கொடை, வாழ்வியல் நெறிகள் மற்றும் நீதிநெறியை மாணவர்களுக்கு எடுத்துரைத்தல்.
- திருக்குறள், திருவருட்பா, சித்தர் மற்றும் கவிமணி, கண்ணதாசனின் படைப்புகள் வழியாக உழவின் சிறப்பு, ஆன்மீக ஒருமைப்பாடு, தத்துவச் சிந்தனைகள் மற்றும் வாழ்வியல் அறங்களை மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- உரைநடையின் வழியாக மாணவர்களிடம் அறநெறி, தமிழர் தொல்லியல் வரலாறு, நட்பு மற்றும் மனவளப் பண்புகளை உணர்த்துதல்.
- சங்க இலக்கியங்கள், காப்பியங்கள் மற்றும் உரைநடையின் தோற்றம், வரலாற்று பின்புலத்தை மாணவர்களுக்கு எடுத்துரைத்தல்.
- சொல்லின் வகைகள், வேற்றுமைத் தொகைகள் மற்றும் பகுபத உறுப்பிலக்கணம் ஆகியவற்றின் வழியாகத் தமிழ் இலக்கண விதிகளை அறிமுகப்படுத்தி, பிழையின்றி எழுதக் கற்றுக் கொடுத்தல்.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	கரிகாலனின் கொடைத்திறனையும் கண்ணகியின் அறச்சீற்றத்தையும் அறிவதன் மூலம், மாணவர்கள் தமிழர் பண்பாட்டையும் நீதியின் வலிமையையும் அறிந்து கொள்வர்.	K1, K2
CLO2	பல்வேறு சமய மற்றும் தத்துவப் பாடல்களைக் கற்பதன் மூலம், சமூக நல்லிணக்கம், அறநெறி வாழ்க்கை, பகுத்தறிவு மற்றும் மனிதநேயப் பண்புகளை வளர்த்துக் கொள்வர்.	K2
CLO3	வரலாற்றுப் பெருமிதத்தை உணர்ந்து, மன ஒழுக்கத்துடனும் நேர்மறைச் சிந்தனையுடனும் மாணவர்கள் சமூகத்தில் சிறந்த குடிமக்களாக வாழும் தகுதியைப் பெறுவார்கள்.	K3
CLO4	தமிழ் இலக்கிய வடிவங்களின் கால மாற்றங்களை உணர்ந்து, இலக்கிய வரலாற்றுப் பின்புலத்தை தெளிவாகப் புரிந்து கொள்வர்.	K3
CLO5	சொற்களின் அமைப்பையும் உறுப்பிலக்கண விதிகளையும் அறிவதன் மூலம், மாணவர்கள் மொழிப்புலமையில் ஆளுமை மிக்கவர்களாகத் திகழ்வர்.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part –I - Language – I : தமிழ் - II

Unit	Content	No. of Hours
I	**சமூகம் மற்றும் வாழ்வியல்** 1. புறநானூறு - பாடல் எண் – 182, 192 2. பொருநராற்றுப்படை – கரிகாலன் கொடைச்சிறப்பு (53-73, 129-177 அடிகள் மட்டும்) 3. சிலப்பதிகாரம் – வழக்குரைக்காதை	14
II	**அறம் மற்றும் பக்தி** 1. திருக்குறள் – உழவு 2. வள்ளலார் பாடல்கள்(திருவருட்பா – வள்ளலார் விண்ணப்பம்) 3. உமர்கயாம் பாடல்கள் (தனிப்பாடல்கள்) - கவிமணி தேசிக விநாயகம் பிள்ளை 4. இயேசுகாவியம் - மலைப்பொழிவு - கண்ணதாசன் 5. சித்தர் பாடல் - சிவவாக்கியார் பாடல்	14
III	**கலை மற்றும் பண்பாடு** **(IKS - Indian Knowledge System** - அலகு முழுவதும்) 1. அறம் எனப்படுவது - அமுதன் 2. கலைகள் - உ.வே.சாமிநாத ஐயர் 3. கீழடி - தொல்லியல் துறை, வெளியீடு 4. நட்பு நலம் - வேதாத்திரி மகரிஷி 5. மனம் எனும் சொர்க்கவாசல் – டாக்டர் எம்.எஸ்.உதயமூர்த்தி	12
IV	**இலக்கிய வரலாறு** 1. சங்க இலக்கிய வரலாறு 2. காப்பியங்களின் வரலாறு 3. உரைநடையின் தோற்றமும் வளர்ச்சியும்	10
V	**இலக்கணம்** 1. சொல்லின் வகைகள் 2. வேற்றுமைத் தொகைகள் 3. பகுபத உறுப்புகள்	10
	Total Hours	**60**

Unit Mapping with SDGs

Unit	Primary SDG
Unit I - சமூகம் மற்றும் வாழ்வியல்	SDGs 2, 3, 16
Unit II - அறம் மற்றும் பக்தி	SDGs 2, 3, 10

Reference Books	
1	சுப்பிரமணியன் ச.வே, (2010, இரண்டாம் பதிப்பு), சங்க இலக்கியம் தொகுதி – 3, மணிவாசகர் பதிப்பகம்.
2	சுப்பிரமணியன் ச.வே, (2010, இரண்டாம் பதிப்பு), பத்துப்பாட்டு முழுவதும், மணிவாசகர் பதிப்பகம்.
3	புலியூர்க்கேசிகன் உரை, (2021,முதல் பதிப்பு), சிலப்பதிகாரம், குமரன் பதிப்பகம்.
4	பரிமேலழகர் உரை, (2005, முதற் பதிப்பு) திருக்குறள், ஸ்ரீ செண்பகா பதிப்பகம்.
5	முனைவர் பஞ்சாங்கம் கா. (2017, 4-ஆம் பதிப்பு), தமிழ் இலக்கிய வரலாறு, காவியா பதிப்பகம்.
6	வரதராசன் மு. (2021, 34-வது பதிப்பு), தமிழ் இலக்கிய வரலாறு, சாகித்திய அகாதமி பதிப்பு.
7	கவிஞர் கண்ணதாசன், (2006, 6-ஆம் பதிப்பு), இயேசு காவியம், கலைக்காவிரி பதிப்பகம்.
8	செல்வநாயகம் வி.(2003, முதல் பதிப்பு), தமிழ் உரைநடை வரலாறு, அடையாளம் பதிப்பகம்.
9	பேரா. முனைவர் பாக்கியமேரி, (2022, 6-ம் பதிப்பு), வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, நியூசெஞ்சுரி புக் ஹவுஸ்(பி). லிட்.
10	டாக்டர் உதயமூர்த்தி எம். எஸ்.(2016, முதல் பதிப்பு), எண்ணங்கள், வெளியீடு கங்கை புத்தக நிலையம்.
11	புலவர்.பொன்மணிமாறன், (2011, முதல் பதிப்பு) அடோன் தமிழ் இலக்கணத் தொகுப்பு, அருண் பப்ளிஷிங்.

Course Code	Course Name	Category	Hours / Week	Credits
26HIN21L	Hindi - II	Language - I	4	3

Course Objectives

The course intends to cover

- Contemporary poetry .
- The nature of drama and its nature and improving the knowledge of reading and understanding the nature of contemporary plays.
- Letter writing for personal and professional purposes.
- Simple Conversation in everyday situations.
- Translation 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	Understand the essence of the poem, its poetic expression and theme.	K1, K2
CLO2	Understand the moral and human values conveyed in the plays.	K2
CLO3	Draft formal and informal letters in Hindi for personal and professional purposes.	K3
CLO4	Apply Hindi dialogues in everyday social and professional situations.	K3
CLO5	Translate the prescribed lessons between Hindi and English using appropriate vocabulary and grammar.	K3
K1 - Remember; **K2** - Understand; **K3** – Draft, Apply, Translate		

Part – I: Language – I : Hindi – II

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

Course Code	Course Name	Category	Hours / Week	Credits
26MAL21L	Malayalam - II	Language - I	4	3

Course Objectives

The course intends to cover

- Genre of travel writing and its ability to convey cultural and experiential narrative.
- The descriptive techniques used to portray places and experiences.
- Autobiographical writing and its reflection of an individual's life and experiences.
- The inspirational aspects of the autobiography and their relevance to personal growth.
- Translation from Malayalam to English.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand and appreciate travel literature, focusing on descriptive language and personal reflections.	K1, K2
CLO2	Identify cultural differences	K2
CLO3	Reflect on social and cultural issues by interpreting the life experiences presented in Chirikku Pinnil	K3
CLO4	Explore the personal history and anecdotes shared by the author.	K3
CLO5	Translate English passages into Malayalam using appropriate vocabulary and grammar.	K3
K1 - Remember; **K2** – Understand, Identify; **K3** - Reflect, Explore, Translate		

Part – I: Language – I : Malayalam - II

Unit	Content	No. of Hours
I	Travelogue - Pravasiyude kurippukal - Babu Bharadwaj	14
II	Travelogue - Pravasiyude kurippukal - Babu Bharadwaj	14
III	Autobiography- Chirikku pinnil - Innocent	12
IV	Autobiography- Chirikku pinnil - Innocent	10
V	Translation (English to Malayalam)	10
	Total Hours	**60**

Text Books

1.	Pravasiyude Kurippukal, Babu Bharadwaj, (2019), Mathrubhumi Books, Kochi, Kerala.
2.	Chirikku Pinnil, (2016), Innocent, Mathrubhumi Books, Kochi, Kerala

Reference Books

1.	Dr.Vijayalam Jayakumar (2005),Athmakathasahithyam Malayalathil. (N.B.S.Kottayam)
2.	K.M.Tharakan (2011), Malayala Novel Sahithya Charitram (N.B.S.Kottayam)
3.	Dr.K.M George, (2009), Sahithya Charitram Prasthanangalilude, (D.C.Books Kottayam)
4.	Sukumar Azheekode (2016), Malayala Sahithyavimarsam . (D.C.books)

Course Code	Course Name	Category	Hours / Week	Credits
26FRE21L	French - II	Language - I	4	3

Course Objectives

The course intends to cover

- Everyday expressions and basic phrases aimed at the satisfaction of concrete needs.
- Francophone cultures such as greetings, etiquette, daily life, and basic geography of French-speaking countries.
- Short, simple texts such as postcards, emails, or short descriptions about themselves and their immediate environment.
- Constructing simple sentences using correct word order and basic vocabulary.
- 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	Identify and use French vocabulary and grammatical structures	K1, K2
CLO2	Apply French communication skills in everyday conversations.	K3
CLO3	Recognise and use French vocabulary related to leisure activities.	K3
CLO4	Use French words and expressions in appropriate contexts.	K3
CLO5	Communicate effectively in French in everyday situations using appropriate vocabulary and grammatical structures.	K3
K1, **K2** - Identify; **K3** – Apply, Recognise, Use, Communicate		

Part – I: Language – I : French – II

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	

Course Code	Course Name	Category	Hours / Week	Credits
26ENG22L	English - II	Language - II	4	3

Course Objectives

The course intends to cover

- The literary elements in poetry, fostering reflection on women's roles and motherhood values.
- Experience of Humour , satire and irony in different social contexts.
- The application of parts of speech in core grammatical structures for effective communication.
- Essential vocabulary rules, word relationships, and corporate terminology to enhance precision in professional communication.
- Interactive communication skills, public speaking, critical reading, and letter writing to develop comprehensive professional and personal expression.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand and respect gender dynamics and intergenerational relationships in the family.	K1, K2
CLO2	Understand how humor, satire, and irony are used in prose to appreciate social commentary and human nature.	K2
CLO3	Construct grammatically correct written and spoken sentences using appropriate parts of speech.	K3
CLO4	Draft relevant business communication by using general vocabulary mechanics and corporate terminology.	K3
CLO5	Demonstrate communication skills in meetings, speeches, and writing with contextual comprehension**.**	K3
K1 – Remember **; K2** - Understand; **K3** – Construct, Draft, Demonstrate		

Language II : Part II : English II

Unit	Content	No. of Hours
I	**Poetry** - Motherhood 1.1 My Grand Mother's House – Kamala Das 1.2 Of Mothers,among other things – A.K Ramanujam 1.3 Night of the Scorpion – Nissim Ezekiel	12
II	**Prose** - Humour 2.1 With The Photographer – Stephen Leacock 2.2 Travel by Train – J.B.Priestley 2.3 On Forgetting – Robert Lynd	12
III	**Grammar:** 3.1 **Adjectives** -Types of adjectives, Degrees of comparison, Order of adjectives in a sentence, Common errors with adjectives 3.2 **Adverbs -** Types, Position of adverbs in sentences, Common errors with adverbs 3.3 **Prepositions –** Simple, Compound and Phrasal Prepositions**,** Correct usage in time and place expressions, Common errors with prepositions 3.4 **Conjunctions -** Coordinating conjunctions, Subordinating conjunctions, Correlative conjunctions, Common errors with Conjunctions 3.5 **Interjections -** Common interjections, Expressing emotions, Usage in formal vs. informal contexts	12
IV	**Language Competency -Vocabulary** 4.1 Spelling of words, Correct usage of words, One word substitution, Singular and plural (including Zero plural), Verbal Analogy 4.2 Business and Corporate Vocabulary - Marketing and Sales, Human Resource, Finance and Operation, Organization and Management, Office Procedures and Documents.	12
V	**English for Communication** 5.1. Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks 5.2. Participating in a meeting: face to face and online, Persuasive speaking, Making short speeches 5.3. Reading Comprehension – Unseen Passages (News Paper, Headlines, Editorials, Government related News) 5.4. Letter writing – Types of Letters (formal and informal)	12
	Total Hours	**60**

Unit Mapping with SDGs

Units	Primary SDG
Unit – I: Poetry	SDG 5
Unit – II: Prose	SDG 3

Reference Books	
1.	Aarti, V., & Bansal, R. K. (2019). Developing Communication Skills ,2nd ed., Macmillan Publishers.
2.	Bakshi, S. P., & Sharma, R. (2020). Descriptive English , 2nd ed., Arihant Publications (India) Ltd.
3.	Cameron, S., & Dempsey, L. (2019). The Reading Book: A Complete Guide to Teaching Reading. 1st ed., S & L Publishing.
4.	Hewings, M. (2013). Advanced Grammar in Use ,3rd ed., Cambridge University Press.
5.	Leacock, S. (1913). With the photographer. Behind the Beyond, and other Contributions to Human Knowledge,1st ed., John Lane Company.
6.	Lynd, R. (1921). In the Pleasures of Ignorance , 1st ed., Methuen & Co.
7.	Narasimhaiah, C.D.(Ed.)(1990). An Anthology of Commonwealth Poetry, 1st ed., Macmillan India.
8.	Parthasarathy, R. (Ed.).(1976). Ten twentieth-century Indian Poets., 1st ed., Oxford University Press.
9.	Priestley, J. B. (1922). Travel by Train. In Papers from Lilliput.,1st ed., Bowes & Bowes.
10.	Sherman, B. (2014). Skimming and Scanning Techniques.,1st ed., Liberty University Press.
Web Resources(Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/109106116

Course Code	Course Name	Category	Hours /Week	Credits
26BCT23C	Object Oriented Programming with Java	Core - III	5	4

Course Objectives

This course intends to cover

- Object-Oriented Programming (OOP) and basics of Java.
- Decision-making and branching, looping statements.
- Arrays, interfaces, packages and concepts of multithreading.
- Java applications using exception handling, AWT and Swing.
- Java I/O, file handling and concepts and architecture of Spring Boot.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Illustrate the fundamental concepts of Object- Oriented Programming, structure and execution environment of Java.	K1, K2
CLO2	Solve programming problems applying decision-making and branching statements.	K3
CLO3	Develop Java programs using arrays, interfaces, packages, and multithreading.	K3
CLO4	Design graphical user interfaces using AWT and Swing components.	K3
CLO5	Implement file handling and Spring Boot features in Java applications.	K3
K1, K2 - Illustrate; **K3 -** Solve, Develop, Design, Implement.		

CLO – PLO Mapping

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

Core – III : Object Oriented Programming with Java

Unit	Content	No. of Hours
I	**Fundamentals of Object-Oriented Programming:** Object-Oriented Paradigm - Basic concepts of Object-Oriented Programming - Benefits of Object-Oriented Programming - Application of Object-Oriented Programming. **Java Evolution:** History - Features - How Java differs from C and C++ - Java and Internet - Java and www - Web Browsers. **Overview of Java:** simple Java program - Structure - Java Tokens - Statements - Java Virtual Machine, Command Line Arguments, Programming Style. Java for AI	15
II	**Constants, Variables, Data Types:** Operators and Expressions. **Decision Making and Branching:** if, if...else, nested if, switch, ? : Operator. **Decision Making and Looping:** while, do, for - Jumps in Loops - Labeled Loops - Classes, Objects and Methods.	15
III	**Arrays and Interface:** Arrays, Strings and Vectors. **Interfaces:** Multiple Inheritance. **Packages:** Putting Classes together - Multithreaded Programming.	13
IV	**Exception Handling:** Managing Errors and Exceptions - Applet Programming - Graphics Programming. **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.	16
V	**Managing Input/Output files in Java:** Concepts of Streams-Stream Classes - Byte Stream classes - Character stream classes - Using streams - I/O Classes–File Class - I/O exceptions - Creation of files - Reading/Writing characters, Byte-Handling - Primitive data Types - Random Access Files. **Spring Boot:** Fundamentals of Spring Boot - Spring vs Spring Boot - Spring Boot Architecture.	16
	Total Hours	**75**
Text Books		
1.	Balagurusamy E, (2015). Programming with Java: A Primer, 5th edition, McGraw Hill Education (India) Private Limited.	
2.	Schildt, H, (2018), Java: The Complete Reference,10th edition, McGraw-Hill Education.	
Reference Books		
1.	Naughton, P., & Schildt, H, (1999). Java 2: The Complete Reference,3rd edition, McGraw-Hill.	
2.	Hubbard, J. R, (2004), Programming with Java, 2nd edition, McGraw-Hill.	
Web Resources (Swayam / NPTEL/Others)		
1.	https://nptel.ac.in/courses/106105191	
2.	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_cs162	
3.	https://www.danvega.dev/blog/can-you-use-java-for-ai	

Course Code	Course Name	Category	Hours /Week	Credits
26BCY24P	Java Programming Lab	Core Lab - II	4	2

S. No.	List of Programs	
Basic Java Programs		
1	Write a Java Program for Factorial of a number using command-line arguments.	
2	Write a Java Program to create a switch statement to print the day according to their equivalent number.	
3	Write a Java program to sort the array integer elements in descending order.	
4	Write a Java program to implement method overloading.	
5	Write a Java program to implement method overriding.	
6	Write a Java program to implement Abstract class with an abstract method.	
7	Write a program to count the Characters, Digits and Special Characters from the given String.	
8	Write a Java program to implement Vector Operations.	
9	Write a Java Program to implement the concept of Multiple Inheritance using Interfaces.	
10	Write a Java program to implement a Arithmetic and Array Index Out Of Bound Exception.	
11	Write a Java Program to create an user define Exception called Pay Out Of Bound and throw the Exception.	
12	Write a Java Program to implement the concept of Multithreading with the use of any three multiplication tables and assign three different priorities to them.	
13	Write a Java Applet Program to draw several shapes using Paint method.	
14	Write a Java Program to draw circle, square, ellipse and rectangle at the mouse click positions.	
15	Write a Java Program which open an existing file and append text to that file.	
16	Write a Java program to find the IP address of a particular website and check whether it is reachable or not using isReachable() method.	
17	Write a Java program to display the components of a URL - Protocol, Host Name, Port Number, File Name and Path.	
	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.	
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)		
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
25BCY25C	Operating System and Security	Core - IV	5	4

Course Objectives

The Course intends to cover

- Operating system fundamental ideas and features for an efficient system.
- Process management and CPU scheduling techniques for effective process execution and CPU utilization.
- Process synchronization and deadlock management techniques for concurrent processing.
- Memory management techniques, including paging, virtual memory, and page replacement, for optimal memory utilization.
- Operating system security techniques for identifying threats and protecting systems against attacks.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the basic concepts, components, services, system calls and types of operating systems.	K1, K2
CLO2	Apply process management and CPU scheduling techniques, including real-time scheduling.	K3
CLO3	Manage concurrent processes through synchronization mechanisms and deadlock handling techniques.	K3
CLO4	Apply memory management, paging and virtual memory for memory allocation and utilization.	K3
CLO5	Ensure the protection and reliability of digital systems by applying operating system security techniques.	K3
K1 - Remember; **K2 -** Understand**; K3 -** Apply, Manage, Ensure.		

CLO-PLO Mapping

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

Core - IV: Operating System and Security

Unit	Content	No. of. Hours
I	**Introduction to Operating System:** Introduction - Mainframe Systems - Desktop Systems - Multiprocessor Systems - Distributed Systems - Clustered Systems - Real-Time Systems - Handheld Systems - Hardware Protection - System Components - Operating System Services - System Calls - System Programs - Linkers and Loaders - Operating-System Design and Implementation - Operating System Debugging. Artificial Intelligence as an Operating System **(AI-as-OS)** - Basic Operating System Principles and Security.	17
II	**Process And Scheduling:** Process Concept - Process Scheduling - Operations on Processes - Cooperating Processes - Inter-Process Communication. **Threads:** Threads Overview - Threading Issues - CPU Scheduling - Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Thread Scheduling - Multiple-Processor Scheduling - Real-Time Scheduling - Algorithm Evaluation - AI-Enhanced CPU Scheduling - Process Protection - Process Isolation.	13
III	**Deadlock:** The Critical-Section Problem - Synchronization Hardware - Semaphores - Classic Problems of Synchronization - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlocks. **Starvation and Aging:** Causes of Starvation - Starvation vs. Deadlock - Aging Technique - Prevention of Starvation - Resource Protection - Threats to Resource Availability.	14
IV	**Storage And Paging:** Storage Management - Swapping - Contiguous Memory Allocation - Paging - Segmentation - Segmentation with Paging. Virtual Memory - Demand Paging - Process Creation - Page Replacement - Allocation of Frames - Thrashing. **Memory Compression:** Concept - Compression Techniques - Benefits and Performance Considerations.	14
V	**Secure Operating Systems:** Operating System Security Fundamentals - Security Requirements and Risk Management - OS Threats, Vulnerabilities and Attacks – Authentication and Password Security - Access Control and Protection - Security Policies and Models - Security Auditing and Monitoring - Security Kernels and Trusted Systems - Malware and Malicious Software - OS Attacks and Penetration Testing.	17
	Total Hours	**75**

Text Books	
1.	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, (2018), Operating System Concepts, 10th Edition, John Wiley & Sons (Asia) Pvt. Ltd.
2.	Pfleeger, Charles P., Shari Lawrence Pfleeger, and Lizzie Coles-Kemp, (2023), Security in Computing, 6th Edition, Addison-Wesley Professional.
3.	H.M. Deitel, (2003), Operating Systems, 2nd Edition, Pearson.
4.	William Stallings, (2018), Operating Systems: Internals and Design Principles (2018), 9th Edition, Pearson.
Reference Books	
1.	William Stallings (2003), Operating System, 4th Edition, Prentice Hall of India.
2.	Pramod Chandra P. Bhatt (2019), An Introduction to Operating Systems, Concepts and Practice.
3.	Ramez Elmasri, A.G.Carrick and David Levine (2010), Operating Systems-A Spiral Approach.
Web Resources (Swayam / NPTEL/Others)	
1.	https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_cs88
2.	https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_cs72
3.	https://www.cyberagentur.de/en/programs/aiasos/?utm_source.
4.	https://medium.com/@nausheenemthias/ai-enhanced-cpu-scheduling-e68ee52d0b9f

Course Code	Course Name	Category	Hours / Week	Credits
26BMA2CA	Optimization Techniques	Allied - II	4	3

Course Objectives

The Course intends to cover

- The mathematical formulation and algorithmic resolution of linear programming problems utilizing graphical and simplex methodologies.
- The operational mechanics of transportation tables and assignment algorithms for optimizing the allocation of resources and routing tasks.
- The structural analysis of waiting-line systems and the application of Kendall's notation across foundational queuing models.
- The analytical frameworks required for network construction, critical path identification, and probabilistic scheduling via CPM and PERT.
- Strategic decision-making in competitive environments by integrating traditional zero-sum game theories with AI-driven minimax and alpha-beta pruning algorithms.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify the optimal solution of a linear programming problem by explaining its mathematical formulation through the graphical and simplex methods.	K1
CLO2	Interpret optimal allocation of resources, goods and tasks through transportation, assignment and Traveling Salesman problems. .	K2
CLO3	Compute the waiting time and queue length in real-world service systems using queuing models.	K3
CLO4	Construct project networks to compute the critical path, project duration and float using CPM and PERT.	K3
CLO5	Solve Two-Person Zero-Sum Games using the Maximin and Minimax Principles, Dominance properties, and AI-based Alpha-Beta pruning techniques.	K3
K1 - Identify**; K2 -** Interpret; **K3 -** Compute, Construct, Solve.		

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 – (M/M/1):(∞/FCFS), (M/M/1): (N/FCFS), (M/M/S) : (FCFS/N) and Stochastic Processes and its Classification.	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 - AI Minimax Algorithm and Alpha–Beta Pruning in Two-Player Games.	12
	Total Hours	**60**

Text Books

1.	Sundaresan.V, Ganapathy Subramanian. K.S, Ganesan .K (2017), 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, 13.8-13.10. 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/Others)

1.	https://nptel.ac.in/courses/110106062
2.	https://www.hackerearth.com/blog/minimax-algorithm-alpha-beta-pruning

Part – IV : Foundation Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
26HUM2FC	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
26DIM2FC	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**

Reference Resources	
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

Ability Enhancement Compulsory Course (AECC)-II : Innovation and Design Thinking

Course Code	Course Name	Category	Hours / Week	Credits
26IDT2AE	Innovation and Design Thinking	AECC - II	2	2

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, (2010) Designing for Interaction, New Riders Publications.	
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	

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

Course Code	Course Name	Category	Hours / Week	Credits
26IPR2AE	Intellectual Property Rights	AECC - II	2	2

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

Ability Enhancement Compulsory Course – II: Entrepreneurship Development

Course Code	Course Name	Category	Hours / Week	Credits
26END2AE	Entrepreneurship Development	AECC – II	2	2

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 (2026), Entrepreneurship Development and Management, Himalaya Publications.	
Reference Books		
1.	Dr. Jayashree Suresh (2021), Entrepreneurial Publications, Margham Publications	
2.	S S Khanka (2026), Entrepreneurial Development, Sultan Chand and Sons, New Delhi.	
Web Resources (Swayam/NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc25_mg95/preview	

Components of Assessment (CIA & ESE)

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 (CIA & ESE)

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

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

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

Examination Pattern

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

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

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

Question Paper Pattern

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

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

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