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

Regulations 2025 - 26 for Undergraduate Programme

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

Programme : B.Sc. Electronics and Communication Systems (B.Sc. ECS)
Programme Code : BEC

(Applicable for the Students Admitted During the Academic Year 2025 - 26 Onwards)

Eligibility

Students should have passed Higher Secondary Examination and wherever the students have not studied Mathematics knowledge be imparted through Residential / Bridge Course to be conducted. (As per the eligibility condition given by Bharathiar University Ref. BU / R / B3 – B4 / Eligibility Condition / 2025 / 7960 dated 08/05/2025).

Program Learning Outcomes (PLOs)

The successful completion of the "B.Sc. Electronics and Communication Systems" programme shall enable the students to

PLO1	Develop a strong foundation in electronics and communication, preparing graduates to become technical engineers in the ever-evolving technological landscape.
PLO2	Demonstrate proficiency in software development methodologies, tools, and languages relevant to the IT field, enabling them to pursue career as software developers.
PLO3	Innovate novel solutions to existing problems in areas like Healthcare, R&D and industrial settings applying wireless communication and embedded systems.
PLO4	Gain knowledge with digital fluency to integrate with the related disciplines.
PLO5	Promote lifelong learning, uphold ethical and professional responsibilities to ensure sustainability in society and the environment.

B.Sc. Electronics and Communication Systems

Distribution of Credits and Hours for all the Semesters

Part	Course Category	No. of Courses	Hours		Credits		Total Credits	Semester
I	Language – I	4	4 X 4	16	4 X 3	12	12	1,2,3,4
II	Language - II	4	4 X 4	16	4 X 3	12	12	1,2,3,4
III	Core Theory (4 Hours / Week)	2	2 X 4	8	2 X 4	8	100	1
	Core Theory (5 Hours / Week)	5	5 X 5	25	5 X 4	20		2,5
	Core Theory (6 Hours / Week)	5	5 X 6	30	5 X 4	20		3,4,6
	Core Lab (3 Hours / Week)	2	2 X 3	6	2 X 2	4		1
	Core Lab (4 Hours / Week)	1	1 X 4	4	1 X 3	3		2
	Core Lab (4 Hours / Week)	2	2 X 4	8	2 X 2	4		3,4
	Core Lab (5 Hours / Week)	3	3 X 5	15	3 X 3	9		5,6
	Allied (4 Hours / Week)	4	4 X 4	16	4 X 3	12		1,2,3,4
	Allied Lab (4 Hours / Week)	1	1 X 4	4	1 X 2	2		4
	Electives (5 Hours / Week)	2	2 X 5	10	2 X 3	6		5,6
	Core : Project Work	1	1 X 6	6	1 X 4	4		6
	SEC : Internship	1	-	-	1 X 2	2		5
	Skill Enhancement Courses (SEC)	3	3 X 2	6	3 X 2	6		3,4, 6
IV	Foundation Course S(FC)	2	2 X 2	4	2 X 2	4	14	1 – 2
	Foundation Course (FC)	1	-	-	1 X 2	2		3
	Ability Enhancement Compulsory Course (AECC)	3	3 X 2	6	3 X 2	6		1, 2, 4
	Ability Enhancement Compulsory Course (AECC) – Online Course – MOOC	1	-	-	1 X 2	2		3
V	Liberal Arts – Extra Curricular & Co- Curricular	1	-	-	1 X 2	2	2	4
Total		**48**		**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	
	Hours	Credits	Hours	Credits	Hours	Credits	Hours	Credits	Hours	Credits	**Hours**	**Credits**
1	4	3	4	3	18	15	4	4	-	-	**30**	**25**
2	4	3	4	3	18	14	4	4	-	-	**30**	**24**
3	4	3	4	3	22	15	-	4	-	-	**30**	**25**
4	4	3	4	3	20	13	2	2	-	2	**30**	**23**
5	-	-	-	-	30	23	-	-	-	-	**30**	**23**
6	-	-	-	-	30	20	-	-	-	-	**30**	**20**
Total	**16**	**12**	**16**	**12**	**138**	**100**	**10**	**14**	**-**	**2**	**180**	**140**

Curriculum
B.Sc. Electronics and Communication Systems

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM11L	I	Language - I	Tamil – I	4	3	25	75	100	3
25HIN11L	I		Hindi – I						
25MAL11L	I		Malayalam – I						
25FRE11L	I		French – I						
25ENG12L	II	Language - II	English – I	4	3	25	75	100	3
25BEC13C	III	Core - I	Basic Electronics	4	3	25	75	100	4
25BEC14C	III	Core - II	Semiconductor Devices	4	3	25	75	100	4
25BEC15P	III	Core Lab – I	Basic Electronics Lab	3	3	40	60	100	2
25BEC16P	III	Core Lab – II	Semiconductor Devices Lab	3	3	40	60	100	2
25BEC17A	III	Allied – I	Mathematics – I	4	3	25	75	100	3
25ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
25SOF1AE	IV	AECC - I	Soft Skills	2	2	-	50	50	2
Total				**30**				**800**	**25**

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours / Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM21L	I	Language – I	Tamil – II	4	3	25	75	100	3
25HIN21L	I		Hindi – II						
25MAL21L	I		Malayalam – II						
25FRE21L	I		French – II						
25ENG22L	II	Language – II	English – II	4	3	25	75	100	3
25BEC23C	III	Core – III	Digital Principles and Applications	5	3	25	75	100	4
25BEC24C	III	Core – IV	Electronic Circuits	5	3	25	75	100	4
25BEC25P	III	Core Lab– III	Digital Electronics Lab	4	3	40	60	100	3
25BEC26A	III	Allied – II	Mathematics – II	4	3	25	75	100	3
25HUM2FC/	IV	FC – II	Human Rights/	2	2	50	-	50	2
25DIM2FC			Disaster Management						
25IDT2AE/	IV	AECC – II	Innovation & Design Thinking/	2	2	-	50	50	2
25IPR2AE/			Intellectual Property Rights /						
25END2AE			Entrepreneurship Development						
Total				**30**				**700**	**24**

Semester – 3									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM31L	I	Language - I	Tamil – III	4	3	25	75	100	3
25HIN31L			Hindi – III						
25MAL31L			Malayalam – III						
25FRE31L			French – III						
25ENG32L	II	Language - II	English – III	4	3	25	75	100	3
25BEC33C	III	Core – V	Analog and Digital Communication	6	3	25	75	100	4
25BEC34C	III	Core - VI	IC's and Instrumentation	6	3	25	75	100	4
25BEC35P	III	Core Lab - IV	Electronic Communication Lab	4	3	40	60	100	2
25BEC36A	III	Allied - III	Programming in C	4	3	25	75	100	3
25BEC37P	III	SEC – I	Arduino Programming Essentials Lab	2	3	40	60	100	2
25BAT3FC	IV	FC – III	Basic Tamil/	-	2	50	-	50	2
25ADT3FC			Advanced Tamil/						
25IKS3FC			Indian Knowledge Systems(IKS)*						
25MOO3AE	IV	AECC - III	Online Course – MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Semester – 4									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM41L	I	Language - I	Tamil – IV	4	3	25	75	100	3
25HIN41L			Hindi – IV						
25MAL41L			Malayalam – IV						
25FRE41L			French – IV						
25ENG42L	II	Language - II	English – IV	4	3	25	75	100	3
25BEC43C	III	Core – VII	Microprocessor and Embedded Systems	6	3	25	75	100	4
25BEC44P	III	Core Lab – V	Microprocessor and Embedded Systems Lab	4	3	40	60	100	2
25BEC45A	III	Allied – IV	Python Programming	4	3	25	75	100	3
25BEC46P	III	Allied Lab – I	Python Programming Lab	4	3	40	60	100	2
25BEC47P	III	SEC – II	IC’s and Instrumentation Lab	2	3	40	60	100	2
25QUA4AE	IV	AECC - IV	Quantitative Aptitude	2	2	-	50	50	2
25EXC4LA	IV	Extra-Curricular & Co- Curricular	Liberal Arts	-	2	50	-	50	2
Total				**30**				**800**	**23**

Semester – 5									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
	III	Core – IX	Industrial and Power Electronics	5	3	25	75	100	4
	III	Core – X	Internet of Things	5	3	25	75	100	4
	III	Core – XI	Programmable Logic Control	5	3	25	75	100	4
	III	Core Lab – VI	Industrial and Power Electronics Lab	5	3	40	60	100	3
	III	Core Lab - VII	Internet of Things Lab	5	3	40	60	100	3
	III	Elective- I	Satellite and Network Communication	5	3	25	75	100	3
			Automotive Electronics						
			Virtual Instrumentation						
	III	SEC	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	Robotics and Automation	6	3	25	75	100	4
	III	Core - XIII	Embedded IoT Application Integrated with Cloud	6	3	25	75	100	4
	III	Core Lab - VIII	Embedded IoT Application Integrated with Cloud Lab	5	3	40	60	100	3
	III	Elective - II	Mobile Computing Medical Electronics VLSI Design	5	3	25	75	100	3
	III	SEC – IV	Raspberry Pi Essentials Lab	2	3	40	60	100	2
	III	Core	Project Work	6	3	40	60	100	4
Total				**30**				**600**	**20**

Semester - 1

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM11L	I	Language - I	Tamil – I	4	3	25	75	100	3
25HIN11L	I		Hindi – I						
25MAL11L	I		Malayalam – I						
25FRE11L	I		French – I						
25ENG12L	II	Language - II	English – I	4	3	25	75	100	3
25BEC13C	III	Core - I	Basic Electronics	4	3	25	75	100	4
25BEC14C	III	Core - II	Semiconductor Devices	4	3	25	75	100	4
25BEC15P	III	Core Lab – I	Basic Electronics Lab	3	3	40	60	100	2
25BEC16P	III	Core Lab – II	Semiconductor Devices Lab	3	3	40	60	100	2
25BEC17A	III	Allied – I	Mathematics – I	4	3	25	75	100	3
25ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
25SOF1AE	IV	AECC - I	Soft Skills	2	2	-	50	50	2
Total				**30**				**800**	**25**

Part – I : Language I –Tamil I

Course Code	Course Name	Category	Hours / Week	Credits
25TAM11L	Tamil - I	Language – I	4	3

Course Objectives

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

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	புதுக்கவிதையின் மூலம் வாழ்வியல் விழுமியங்களை உணர்ந்து கொள்ளுதல்.	K1, K2
CLO2	சிறந்த மற்றும் வாழும் கவிஞர்களை அறிந்து கொள்ளுதல்.	K2, K3
CLO3	சிறந்த படைப்பாளர்களின் சிறுகதையில் வெளிப்படும் சமூகச் சிந்தனைகளை அறிந்து விழிப்புணர்வைப் பெறுதல்.	K3
CLO4	தற்கால இலக்கியங்களான புதுக்கவிதை, சிறுகதை தோன்றி வளர்ந்த பின்புலத்தை அறிதல்.	K1, K3
CLO5	மொழியைப் பிழையின்றி பேச எழுத கற்கத் தேவையானதமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்தல். நடைமுறை வாழ்வியலுக்குத் தேவைப்படும் ஆங்கிலக் கடிதத்தைத் தமிழாக்கம் செய்தலுக்கான பயிற்சி அடைதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part – I: Language I - Tamil – I

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

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

Reference Books

1	பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதிபாடல்கள், ஆய்வுப்பாதிப்பு, ,தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.
2	அப்துல்ரகுமான்,(2000), ஆலாபனை, கவிக்கோபதிப்பகம்
3	தாமரைகவிதைகள், (2012), நியூசெஞ்சுரிபுக்ஹவுஸ்
4	வரதராசனார் மு, (2021), தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாடமி பதிப்பு.
5	முனைவர் பஞ்சாங்கம் கா, (2017), தமிழ் இலக்கிய வரலாறு, காவ்யா பதிப்பகம்.
6	முனைவர் வேங்கடராமன் கா. கோ (2008), தமிழ் இலக்கிய வரலாறு, கலையக வெளியீடு.
7	பரந்தாமனார் அ.கி. (2002), நல்ல தமிழ் எழுத வேண்டுமா?,அல்லி நிலையம்.
8	ராமகிருஷ்ணன் எஸ் (2006), 100 சிறந்த சிறுகதைகள் (தொகுதி 1 & 2) பதிப்பகம்: தேசாந்திரி பதிப்பகம்
9	குமரன்கோ (2010), தமிழ்இலக்கணம்எளியஅறிமுகம் , சந்தியாபதிப்பகம்
10	சக்திவேல்சு,(2012), நாட்டுப்புறவியல், மணிவாசகர்பதிப்பகம்

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

Course Objectives

The course intends to

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

Course Learning Outcomes

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

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

Part–I: Language I - Hindi–I

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

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

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

Course Objectives

The course intends to

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

Course Learning Outcomes

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

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

Part–I: Language I - Malayalam–I

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

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

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

Course Objective

The course intends

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

Course Learning Outcomes

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

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

Part–I: French–I

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

Text Book

1	Céline Himber,Corina Brillant, Sophie Erlich, (2008), Adomania1–Methodede francais, Publisher-Hachette Fle

Reference Book

1.	Yves Loiseau, Régine, (2014), Latitudes1, Merieux Publisher: French and European Publications Inc.

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

Course Objectives

The course intends to cover

- Various genres of literature.
- Active and passive vocabulary.
- Usage of Grammar and Communication.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify aesthetic sense and appreciate poetry, enhancing creativity and understanding relevant to professional environments.	K1
CLO2	Understand diverse styles of prose, facilitating versatility in writing and inculcating interpersonal skills.	K2
CLO3	Apply the characters and the narrative techniques in creative writing and content creation ethically.	K3
CLO4	Employ vocabulary and grammatical proficiency in communication to enhance clarity in workplace interactions.	K3
CLO5	Enhance overall communication competence. Practicing these skills In combination reinforces learning and provides students with opportunities to use the language in authentic contexts.	K3
K1-Remember; **K2**-Understand; **K3**–Apply		

Part-II: English–I

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

Text Books	
1.	Zama,M. (2004). Poetry Down the Ages. Orient Blackswan.
2.	Goldsmith,O. (1869). The Works of Oliver Goldsmith. J. Dicks
3.	Bacon,F., & Montagu,B. (1857). The Works of Francis Bacon (Vol. 1). Parry & McMillan.
Reference Books	
1.	Kumar,V.T. Bhavani, Durga.K. Srinivas.YL.(2018). English in use –A text book for College Students. (English, Paperback).
2.	Swan,M.(2005).Practical English usage (Vol.7). Oxford: Oxford university press.
Web Resources (Swayam/NPTEL)	
1.	https://nptel.ac.in/courses/109105205

Course Code	Course Name	Category	Hours/ Week	Credits
25BEC13C	Basic Electronics	Core - I	4	4

Course Objectives

The course intends to cover

- Fundamentals of electronic components.
- Handling of common electronic components.
- Construction of electronic circuits to perform realistic tasks.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recall the classification and characteristics of resistors and inductors.	K1
CLO2	Apply the knowledge to explain capacitor behavior and predict circuit effects.	K3
CLO3	Explore Kirchhoff's Current and Voltage Laws to analyze resistor behavior in series, parallel, and combined circuits.	K3
CLO4	Summarize various network theorems for simplifying complex DC circuits and solving for voltages and currents.	K2
CLO5	Apply the understanding of sinusoidal waves (RMS and average values) to analyze AC circuits containing resistors, inductors, and capacitors in series, parallel, and combined configurations, and calculate real power.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

CLO – PLO Mapping

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

Core - I: Basic Electronics

Unit	Content	No. of Hours
I	**Resistors & Inductors:** Types of Resistors: Fixed, Variable - Brief mention of their Construction and Characteristics - Color Coding of Resistors - Connecting Resistors in Series and Parallel. Types of Inductors: Fixed, Variable-Self and Mutual Inductance-Faraday's Law and Lenz's Law of Electromagnetic Induction-Inductance in Series and Parallel - Testing of Resistance and Inductance using Multimeter.	12
II	**Capacitors**: Principles of Capacitance-Parallel Plate Capacitor-Permittivity-Definition of Dielectric Constant - Dielectric Strength-Energy Stored in a Capacitor-Types of Capacitors: Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic- Construction and Application-Connecting Capacitors in Series and Parallel.	12
III	**Electrical Elements and Circuits:** Potential Difference- Electric Current-Electromotive Force-Ohms Law- Kirchoff's Voltage Law- Kirchoff's Current Law-Analysis of Resistance in Series Circuits, Parallel Circuits and Series Parallel Circuits-Concept of Voltage Source and Current Source-Voltage Source in Series and Current Source in Parallel-Simple Problems in DC Circuits.	12
IV	**Network Theorems:** Superposition Theorem - Thevenin Theorem-Thevenizing a Circuit with Two Voltage Sources - Bridge Circuit - Norton's Theorem - Thevenin Norton Conversion - Conversion of Voltage and Current Sources-Millman's Theorem-Maximum Power Transfer Theorem - Simple Problems in DC Circuits.	12
V	**AC Circuits:** Introduction to Sinusoidal Wave - RMS Value - Average Value - AC Circuits with Resistance-Circuits with XL Alone–Circuits with XC Alone-Series Reactance and Resistance - Parallel Reactance and Resistance - Series Parallel Reactance and Resistance - Real Power.	12
	Total Hours	**60**

Text Books

1.	Sedha, R. S (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.
2.	Mehta, V. K., Rohit Mehta (2015) Principles of Electronics. S. Chand Publishing.
3.	Chakrabarti A (2018) Circuit Theory and Networks: Analysis and Synthesis. Hodder & Stoughton Publication.

Reference Books

1.	Bernard Grob (2009) Basic Electronics -Tata McGraw-Hill Publishing Company Limited.
2.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.

Web Resources (Swayam / NPTEL)

1.	https://nptel.ac.in/courses/108/104/108104139/
2.	https://nptel.ac.in/courses/108/101/108101091/

Course Code	Course Name	Category	Hours/ Week	Credits
25BEC14C	Semiconductor Devices	Core - II	4	4

Course Objectives

The course intends to cover

- Operating principles, characteristics and applications of semiconductor devices such as diodes, bipolar junction transistors (BJTs) and field-effect transistors (FETs).
- Construction of electronic circuits incorporating semiconductor devices.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Define semiconductor material, energy band theory and diode.	K1
CLO2	Summarize various types of special-purpose diodes based on their characteristics and applications.	K2
CLO3	Apply the understanding of transistor construction and biasing to analyze the operation of Bipolar Junction Transistors (BJTs) and Field-Effect Transistors (FETs) in different configurations.	K3, K4
CLO4	Experiment the operation and applications of various thyristor devices based on their construction and electrical characteristics.	K3
CLO5	Apply the knowledge of optoelectronic devices to explain their operating principles and functions in various applications.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze		

CLO – PLO Mapping

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

Core - II: Semiconductor Devices

Unit	Content	No. of Hours
I	**Semiconductor Theory:** Introduction - Structure of Semiconductor Materials – Energy Band Theory – Types of Semiconductor: Intrinsic and Extrinsic Semiconductor – Formation of PN Junction diode and characteristics - Application: Clipping and clamping circuit	12
II	**Special Diodes:** Zener Diode - VI Characteristics – Zener diode as a voltage regulator - Backward Diode – Varactor Diode - Step Recovery Diode - Point Contact Diode – Schottky Diode - Tunnel Diode - Gunn Diode - IMPATT Diode - PIN Diode	12
III	**Transistor and FET Operation:** Introduction – Transistor Construction and Operation – CB, CE & CC Configurations –Transistor Comparison - Transistor Biasing: Self bias-feedback bias and voltage divider bias- FET: N – Channel JFET Construction, Operation and Characteristics - FET as a Voltage Variable Resistor – MOSFET: Depletion Type MOSFET - Enhancement Type MOSFET	12
IV	**Power Electronics:** Silicon Controlled Rectifier (SCR) – construction – SCR operation – VI characteristics of SCR – DIAC: construction – VI characteristics of DIAC. TRIAC: construction – VI characteristics of TRIAC – Applications of SCR, DIAC, TRIAC. Unijunction Transistor (UJT): construction – operation – VI characteristics of UJT – UJT Relaxation Oscillator.	12
V	**Optoelectronic Devices:** LDR – Photo Diode - Photo Transistor – Solar Cell – Photo Multiplexer – LED – LCD - Seven Segment Display - IR Emitter – Optocouplers	12
	Total Hours	**60**

Text Books

1.	Mehta, V. K., Rohit Mehta (2015) Principles of Electronics. S. Chand Publishing.
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2018) Electronic devices and circuits, TMH publishing company Ltd.

Reference Books

1.	Sedha, R. S. (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.
2.	Robert L. Boylestad, Louis Nashelsky (2023) Electronic Devices and Circuit Theory, Pearson Prentice Hall.

Web Resources (Swayam / NPTEL)

1.	https://onlinecourses.nptel.ac.in/noc24_ee02/preview
2.	https://onlinecourses.nptel.ac.in/noc24_ee27/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BEC15P	Basic Electronics Lab	Core Lab - I	3	2

Basic Electronics Lab (Any 10 Practical's)

1. Introduction to Basic Electronics Lab
2. Measurement of Amplitude, Frequency & Phase Difference using CRO
3. Resistance in Series, Parallel and Series –Parallel
4. Capacitance in Series, Parallel and Series –Parallel
5. Voltage Sources in Series, Parallel and Series –Parallel
6. Voltage and Current Dividers
7. Verification of Ohm's Law
8. Verification of Kirchoff's Voltage Law and Current Law
9. Verification of Norton's Theorem
10. Verification of Thevenin's Theorem
11. Verification of Millman's Theorem
12. Verification of Superposition Theorem
13. Verification of Maximum Power Transfer Theorem
14. Filter Circuits

Total Hours	**45**

Text Books

1.	Sedha, R. S. (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.
2.	Mehta, V. K., Rohit Mehta (2015) Principles of Electronics. S. Chand Publishing.
3.	Chakrabarti A (2012) Circuit Theory and Networks: Analysis and Synthesis. Hodder & Stoughton Publication.

Reference Books

1.	Bernard Grob (2009) Basic Electronics -Tata McGraw-Hill Publishing Company Limited.
2.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.

Web Resources (Swayam / NPTEL)

1.	https://nptel.ac.in/courses/108/104/108104139/
2.	https://nptel.ac.in/courses/108/101/108101091/

Course Code	Course Name	Category	Hours / Week	Credits
25BEC16P	Semiconductor Devices Lab	Core Lab - II	3	2

Semiconductor Devices Lab (Any 10 Practical's)

1. Introduction to Semiconductor Devices Lab
2. V-I Characteristics of Junction Diode
3. Clipping and Clamping Circuits
4. V-I Characteristics of Zener Diode
5. Zener diode as a Voltage regulator
6. Transistor Characteristics of CE Configuration
7. Transistor Characteristics of CB Configuration
8. Stability Factor of Fixed Bias and Self bias
9. V-I Characteristics of JFET
10. V-I Characteristics of UJT
11. UJT as Relaxation Oscillator
12. Characteristics of SCR and TRIAC
13. Characteristics of LDR and Solar Cell
14. Study of LED and 7 Segment display

Total Hours	**45**

Text Books

1.	Mehta V. K., Rohit Mehta (2015) Principles of Electronics. S. Chand Publishing.
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2018) Electronic devices and circuits, TMH publishing company Ltd.

Reference Books

1.	Sedha, R. S (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.
2.	Robert L. Boylestad, Louis Nashelsky (2023) Electronic Devices and Circuit Theory, Pearson Prentice Hall.

Web Resources (Swayam / NPTEL)

1.	https://onlinecourses.nptel.ac.in/noc24_ee02/preview
2.	https://onlinecourses.nptel.ac.in/noc24_ee27/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BEC17A	Mathematics – I	Allied – I	4	3

Course Objectives

The course intends to cover

- The fundamental concepts of Mathematics by exploration.
- Mathematical ideas in electronic circuits by acquainting knowledge.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember the concepts of Matrix and its types.	K1
CLO2	Understand the concept of Gradient, Solenoidal, Curl.	K2
CLO3	Apply Laplace transforms in circuit problems.	K3
CLO4	Analyze Fourier Series in real time problems.	K4
CLO5	Analyze the ideas learnt in the complex numbers.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze		

CLO – PLO Mapping

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

Allied - I: Mathematics -I

Unit	Content	No. of Hours
I	**Matrices:** Different types of matrices- Inverse of matrix- Rank of Matrix- Consistency of a system of simultaneous Linear Equations -Properties of unitary and orthogonal matrices - Characteristics equation and Characteristics roots.	12
II	**Vector Calculus:** Concepts of vector and scalar fields-the Del operator- Divergence of a vector-curl of a vector- Laplacian operator	12
III	**Laplace Transforms:** Definition of Laplace transform-properties of Laplace Transform, Inverse Laplace transform - Convolution theorem.	12
IV	**Fourier Series:** General Fourier series - change of length of Interval - Fourier cosine and sine series- Half range Series - Fourier series in complex form.	12
V	**Fourier Transforms:** Definition of Fourier Transform- Properties of Fourier Transform- Inverse Fourier Transform - Convolution Theorem.	12
	Total Hours	**60**
Text Books		
1.	Dr. G. Balaji (2021), "Matrices and Calculus", Balaji Publishers. Unit I: Chapter 1: Section: 1.1 – 1.67.	
2.	P. R. Navnitham (2015), "Business Mathematics and Statistics", Jai Publishers. Unit I: Chapter 2: Section: 10-11	
3.	Dr. M.K. Venkatraman. (2012), "Engineering Mathematics", Vol II. Unit II: Chapter 2: Section: 1.1 – 1.6 Chapter 2 Section: 3.1-3.3, 3.5-3.7, 3.9, 3.11, 3.12, 3.15.	
4.	Dr. Venkatraman. M.K. (2000), "Engineering Mathematics III A". Unit III: Chapter 1: Section: 1 – 20	
5.	Dr. G. Balaji., (2021), "Transforms and Partial Differential Equations", Balaji Publishers. Unit IV: Chapter 2: Section: 2.1 – 2.4 Unit V: Chapter 4: Section: 4.2 – 4.3	
Reference Books		
1.	Dr. G. Balaji (2019), "Vector Calculus", Balaji Publishers.	
2.	Dr. M. K. Venkatraman (2010), "Higher Mathematics for Engineering & Science".	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/105/111105122/	
2.	https://archive.nptel.ac.in/courses/111/101/111101164/	

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

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

Course Code	Course Name	Category	Hours / Week	Credits
25SOF1AE	Soft Skills	AECC - I	2	2

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

Ability Enhancement Compulsory Course - I : Soft Skills

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

Unit	Module	Details	No. of Hours
Creativity			
III	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.	
Problem-Solving			
IV	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.	
Critical Thinking			
V	1	**Influence:** Grammar: would / past habits. Listening: Sentence Correction. *Activities* Your inspiration (Speaking).Picture description (Reading).Rewrite the sentences (Writing).	6
	2	**Money:** Grammar: Second conditional. *Activities:* Radio programme (Listening). Talk about games (Speaking). Reading & Writing: Fill in the blanks.	
	3	**Things that changed the world:** Grammar: articles. *Activities* :Talk about chewing gum (Speaking & Listening). Reading & Writing:Read and write a book review.	
		Practice: Writing Emails, reports and proposals.	
		Total Hours	**30**

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

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

Question Paper Pattern

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

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

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

Examination Pattern

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

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

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

Question Paper Pattern

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

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

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

Semseter 2

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours / Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM21L	I	Language – I	Tamil – II	4	3	25	75	100	3
25HIN21L	I		Hindi – II						
25MAL21L	I		Malayalam – II						
25FRE21L	I		French – II						
25ENG22L	II	Language – II	English – II	4	3	25	75	100	3
25BEC23C	III	Core – III	Digital Principles and Applications	5	3	25	75	100	4
25BEC24C	III	Core – IV	Electronic Circuits	5	3	25	75	100	4
25BEC25P	III	Core Lab– III	Digital Electronics Lab	4	3	40	60	100	3
25BEC26A	III	Allied – II	Mathematics – II	4	3	25	75	100	3
25HUM2FC	IV	FC – II	Human Rights	2	2	50	-	50	2
25IDT2AE/	IV	AECC – II	Innovation & Design Thinking/	2	2	-	50	50	2
25IPR2AE/			Intellectual Property Rights /						
25END2AE			Entrepreneurship Development						
Total				**30**				**700**	**24**

Part – I: Language – I : தமிழ் – II

(All the UG Programmes)

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

Course Objectives

The Course intends to cover

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

Course Learning Outcomes

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

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

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

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

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

Part – I: Language – I - Hindi – II

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

Course Objectives

The Course intends to cover :

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

Course Learning Outcomes

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

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

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

Text Book

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

Reference Books

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

Part – I: Language – I
French – II

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

Course Objectives

The course intends to

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

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Improve all the four French language skills (speaking, listening, reading, and writing) (Effective communicators)	K1
CLO2	Comprehend French and other Francophone nations' cultures and civilizations.	K2
CLO3	Comprehend the fundamentals of language structure, vocabulary, grammar, and phonetics (language skill).	K3
CLO4	The French DELF-A1 Certification is appreciated.	K3
CLO5	Developing Communication Skills	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4**-Analyse		

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

Text Book

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

Reference Book

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

Part – II: Language-II - English -II

(All the Undergraduate Programmes)

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

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

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

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

Course Code	Course Name	Category	Hours / Week	Credits
25BEC23C	Digital Principles and Applications	Core – III	5	4

Course Objectives

The course intends to cover

- Fundamental principles of digital electronics, including binary numbers, boolean algebra, logic gates and truth tables.
- Implementation of boolean functions using logic gates and create complex logic circuits such as adders, multiplexers and decoders.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify the different number systems used in digital electronics and basic conversion methods.	K1
CLO2	Classify the basic building blocks of digital logic and their symbolic representations.	K2
CLO3	Apply the understanding of binary arithmetic and digital circuits to perform addition, subtraction, and data manipulation using various combinational logic circuits.	K3
CLO4	Analyze and construct sequential circuits using various flip-flops and apply them to construct counters and registers for digital systems.	K4
CLO5	Illustrate the functionalities of various analog-to-digital converter (ADC) architectures and identify the key factors to consider when selecting an ADC for a specific application.	K3
K1 – Remember **K2 –** Understand **K3 –** Apply **K4 -** Analyze		

CLO – PLO Mapping

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

Core - III: Digital Principles and Applications

Unit	Content	No. of Hours
I	**Number Systems and Codes: Introduction -** Digital Vs Analog- Number Systems: Binary, Octal, Decimal and Hexa Decimal Numbers – Conversion – Binary Coded Decimal (BCD) – Excess Three – Grey Code – ASCII Codes	15
II	**Logic Gates and Boolean Algebra:** AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates – Boolean Algebra – Commutative, Associative and Distributive Laws – Duality Theorem – De-Morgans Theorem – Sum of Products and Products of Sums – Karnaugh map	15
III	**Combinational Logic Circuits:** Binary Addition, Subtraction– Addition of 1's and 2's Complements - Half Adder – Full Adder – Half Subtractor – Full Subtractor – 4-bit Binary Adder / Subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Magnitude Comparators	15
IV	**Sequential Logic Circuits:** Flip Flops – RS, Clocked RS, JK, JK Master Slave, D and T Flip Flops – Shift Registers–Ring Counters–Synchronous Counter–Asynchronous Counter - Up Down counter – Mod-3, Mod-5 Counters – Decade Counter	15
V	**Digital to Analog Converters:** Resistive Divider Type - Ladder Type – Analog to Digital Converters: Simultaneous Conversion – Counter Type – Successive Approximation Type – Single Slope Type – Dual Slope Type – Accuracy and Resolution.	15
	Total Hours	**75**

Text Books	
1.	Morris Mano (2022) Computer System Architecture, Pearson Education.
2.	Albert Paul Malvino and Donald P. Leech (2019) Digital Principles and Applications, McGraw Hill Company.
Reference Books	
1.	Puri V K (2017) Digital Electronics: Circuits and Systems, McGraw Hill Education.
2.	Salivahanan S (2012) Digital Circuits and Design, McGraw Hill Education.
Web Resources (Swayam / NPTEL)	
1.	https://nptel.ac.in/courses/108105132
2.	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BEC24C	Electronic Circuits	Core – IV	5	4

Course Objectives

The course intends to cover

- Construction of analog electronic circuits, including amplifiers, filters, oscillators, and power supplies.
- Fundamentals of different transistor amplifier configurations and their characteristics.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Identify the different types of rectifiers and basic filter circuits used in DC power supplies, along with their key functions.	K1
CLO2	Compare and contrast the characteristics of different single-stage transistor amplifier configurations (CE, CB, CC).	K2
CLO3	Apply the understanding of amplifier class operation (A, B, AB, C) to analyze their efficiency, distortion characteristics, and suitability for different power amplifier applications.	K3, K4
CLO4	Explain the effects of negative feedback on amplifier performance, including gain, bandwidth, distortion and noise.	K3
CLO5	Illustrate the understanding of oscillator design principles and analyze the functionalities of various oscillator circuits and multivibrator circuits.	K3, K4
K1 – **Remember** K2 – **Understand** K3 – **Apply** K4 - **Analyze**		

CLO – PLO Mapping

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

Core - IV: Electronic Circuits

Unit	Content	No. of Hours
I	**Rectifiers and Regulators:** Half-wave, Full-wave and Bridge Rectifiers – Calculation of RMS Value – Average Value - Ripple Factor – Efficiency – Transformer Utility Factor – Peak Inverse Voltage - Inductor Filter, Capacitor Filter, LC Filter and Pi Filter – Voltage Doubler – Voltage Regulator – Zener Diode Shunt Regulator – Transistor Shunt and Series Regulator – Overload Protection - Construction of DC Power Supply.	15
II	**Small Signal Amplifiers:** CE, CB, CC Amplifiers – Calculation of I/P Resistance, O/P Resistance – Current Gain – Voltage Gain – Power Gain - Single Stage Transistor Amplifier – DC and AC Load Line - RC Coupled Amplifier – Gain Frequency Response – Bandwidth - Transformer Coupled Amplifier – Impedance Matching - FET Amplifier.	15
III	**Power Amplifiers:** Operation and Graphical Representation of Class A, Class B, Class C and Class AB Amplifiers – Maximum Collector Efficiency of Class A Power Amplifier – Collector Dissipation Curve – Harmonic Distortion – Class B Push Pull Amplifier – Crossover Distortion - Complementary Symmetry Push Pull Amplifier.	15
IV	**Feedback Amplifiers:** Basic concepts of Feedback – Positive feedback – Negative feedback – Effects of Negative feedback on Gain – Bandwidth – Distortion – Noise. Voltage Series Feedback – Voltage Shunt Feedback – Current Series Feedback – Current Shunt Feedback	15
V	**Oscillators and Multivibrators:** Barkhausen Criterion – Hartley oscillator – Colpitt's Oscillator– Phase Shift Oscillator – Wien Bridge Oscillator – Piezo Electric Crystal and its Effects - Crystal Oscillator. Multivibrators: Astable Multivibrator – Monostable Multivibrator – Bistable Multivibrator – Schmitt Trigger.	15
	Total Hours	**75**
Text Books		
1.	Mehta, V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.	
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2012) Electronic devices and circuits, TMH publishing company Ltd.	
Reference Books		
1.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc24_ee12/preview	
2.	https://onlinecourses.swayam2.ac.in/nou24_ec04/preview	

Course Code	Course Name	Category	Hours / Week	Credits
25BEC25P	Digital Electronics Lab	Core Lab - III	3	2

Digital Electronics Lab (Any 10 Practical's)

1. Introduction to Digital Electronics Lab
2. Verification of Basic Gates and Realize Basic gates from universal gates
3. Verification of Demorgan's Theorem
4. 2-bit Comparator using Gates
5. Half Adder and Full Adder
6. Half Subtractor and Full Subtractor
7. 4-bit Binary Adder
8. Multiplexer and Demultiplexers
9. Encoder and Decoder
10. Study of Flip flops
11. Binary to Gray and Gray to Binary Conversion
12. Shift Registers and Ring Counter
13. Analog to Digital Converter
14. Digital to Analog Converter
15. Implementation of Basic Gates Using Universal Gates (NAND & NOR) in Simulation
16. Design and Simulation of Half Adder and Full Adder Circuits
17. Design and Simulation of Half Subtractor and Full Subtractor Circuits

Total Hours	**45**

Text Books

1.	Morris Mano (2022) Computer System Architecture, Pearson Education.
2.	Albert Paul Malvino and Donald P. Leech. (2019) Digital Principles and Applications, McGraw Hill Company.

Reference Books

1.	Puri V K (2017) Digital Electronics: Circuits and Systems, McGraw Hill Education.
2	Salivahanan S (2012) Digital Circuits and Design, McGraw Hill Education.

Web Resources (Swayam/NPTEL)

1.	https://nptel.ac.in/courses/108105132
2.	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BEC26A	Mathematics - II	Allied - II	4	3

Course Objectives

The course intends to cover

- The fundamental concepts of Mathematics by exploration.
- The Mathematical ideas in Electronic circuits by acquainting knowledge.
- Z transforms which is applied in discrete time signals.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand and apply solving equations in electronic circuits.	K2, K4
CLO2	Demonstrate the process of numerical integration.	K3
CLO3	Apply Z- transforms in solving problems for discrete time signals.	K3
CLO4	Explain about Beta and Gamma functions.	K4
CLO5	Illustrate the ideas learnt in the complex numbers.	K4
K2 - Understand; **K3** - Apply; **K4** - Analyze		

CLO – PLO Mapping

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

Allied - II: Mathematics – II

Unit	Content	No. of Hours
I	**Differential Equations:** Second order linear differential equation with constant coefficients- Laplace Equations - Application to electronic circuits RL, RC, RLC.	12
II	**Numerical Methods:** Solving simultaneous equation process—Gauss Jordan method-Numerical Integration - Trapezoidal Rule- Simpson's Rule.	12
III	**Z- Transforms:** Elementary properties - Inverse Z - transform (using partial fraction and residues) - Convolution theorem - Formation of difference equations - Solution of difference equations Using Z - transform.	12
IV	**Special Functions:** Beta and Gamma Functions- Definitions- Relationship between Beta and Gamma Functions - (only statements) - Properties of Gamma and Beta Functions.	12
V	**Complex Numbers:** Definition of Complex numbers- Argand Diagram- Rectangular form- polar form- Conversion of rectangular form to polar and vice versa- addition, Subtraction- Multiplication and Division by using polar and rectangular forms-Demoivre's Theorem.	12
	Total Hours	**60**

Text Books

1.	Venkatraman.M.K (2012), Engineering Mathematics, Vol II. Unit I : Chapter 24: Section: 24.1 – 24.22 Unit IV: Chapter 21: Section: 21.1 – 21.11
2.	Venkataraman, M. K. (1999). Numerical Methods in Science and Engineering (1st ed.). The National Publishing Company. Unit II: Chapter 4: Section: 1 – 6
3.	Dr.Balaji.G., (2021). Transforms and Partial Differential Equations, Balaji Publishers. Unit III: Chapter 5: Section: 5.1 – 5.5
4.	Narayanan, S., & Pillay, M. T. K. (2009). Trigonometry. Viswanathan Printers & Publishers Pvt Ltd. Unit V: Chapter 2: Section: 1-4.

Reference Book

1.	Dr. Venkatraman. M.K. (2010). Higher Mathematics for Engineering & Science.

Web Resources (Swayam / NPTEL)

1.	https://archive.nptel.ac.in/courses/111/105/111105122/
2.	https://archive.nptel.ac.in/courses/111/101/111101164/

Part – IV : Foundation Course

(All the Undergraduate Programmes)

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

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

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

Web Resources

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

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

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

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

References

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

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

Course Objectives

The Course intends to cover

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

Course Learning Outcomes

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

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

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

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

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

Course Objectives

This course intends to cover

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

Course Learning Outcomes

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

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

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

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

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

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

Course Objectives

This course intends to cover

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

Course Learning Outcomes

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

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

Ability Enhancement Compulsory Course – II : Entrepreneurship Development

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

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

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

Question Paper Pattern

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

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

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

Examination Pattern

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

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

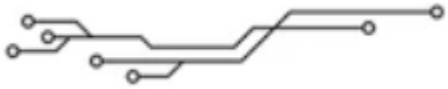
Max Marks	Marks for		Components for CIA				
50	CIA	ESE	CIA		Model		Total
	50	-	Actual	Weightage	Actual	Weightage	
			50	**25**	50	**25**	**50**

Question Paper Pattern

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

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

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



Semester 3

Semester – 3									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM31L	I	Language - I	Tamil – III	4	3	25	75	100	3
25HIN31L			Hindi – III						
25MAL31L			Malayalam – III						
25FRE31L			French – III						
25ENG32L	II	Language - II	English – III	4	3	25	75	100	3
25BEC33C	III	Core – V	Analog and Digital Communication	6	3	25	75	100	4
25BEC34C	III	Core - VI	IC's and Instrumentation	6	3	25	75	100	4
25BEC35P	III	Core Lab - IV	Electronic Communication Lab	4	3	40	60	100	2
25BEC36A	III	Allied - III	Programming in C	4	3	25	75	100	3
25BEC37P	III	SEC Lab – I	Arduino Programming Essentials Lab	2	3	40	60	100	2
25BAT3FC/	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
25ADT3FC/			Advanced Tamil/						
25IKS3FC			Indian Knowledge Systems(IKS)*						
25MOO3AE	IV	AECC - III	Online Course – MOOC	-	-	50	-	50	2
Total				**30**				**800**	**25**

Part –I: Language – I - Tamil – III

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

Course Objectives

The Course intends to cover

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

Course Learning Outcomes

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

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

Language – I: Tamil – III

பயன்பாட்டுத் தமிழ்

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

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

Part – I: Language – I- Hindi – III

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

Course Objectives

The Course intends to

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

Course Learning Outcomes

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

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

Part – I: Language – I - Hindi – III

Unit	Content	No. of Hours
I	Poetry:Kavya Tharang – by Dr. Niranjan Pracheen Kavitha 1. Mahatma kabeer – sakhi & padh (2) 2. Goswamy tulsidas – pad(4) 3. Mahatma soordas- pad(3) 4. Kavivar rahim – dohe(6)	12
II	Modern Poetry : Kavya Tharang- by Dr. Niranjan 1. Nirjar – Mythili sharan gupth 2. Parichay – Ramdhari singh Dinkar 3. Prethibimb – Sumithra nandan Panth 4. Kavi kaha ththa – Sooryakanth Tripati Nirala 5. Kah de mam Kya ab dekoon – Mahadevi varma 6. Kanu ke prathi – Darmveer Bharathi 7. Loha ka swad – Dhumil 8. Bhanth Kidikkiyon ki Takrahat – Gorakh pande	12
III	History of Hindi Literature :(Tippaniyan) 1. Bhakthi kal ka samanya parichaya (Kabeer, Jaysi, Soor, Thulsi, Meera, Raskhan, Rahim)	12
IV	Ras Chad & Alankar: 1. Srungar & veer Ras 2. Anupras & Upama 3. Dhoha & Rola	12
V	Translation : English-Hindi only 1. Anuvadh Abhyas – III (16-30 Lessons Only)	12
	Total Hours	**60**

Text Books	
1.	Kavya Tharang – by Dr. NIRANJAN, Jawahar Pusthakalay, Sadar Bazaar,Mathura U.P.281001.
2.	Anuvadh abyas-III,Dakshin Bharath Hindi Prachar Sabha Chennai – 17.
Reference Books	
1.	Hindi sahithya ka saral ithihaas,by Rajnath sharma, vinod pustak mandir, agra-282
2.	Kavya Pradeep Rambadri Shukla, Hindi Bhavan, 36, Tagore Town, Allahabad – 211 002.

Part – I: Language – I- Malayalam – III

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

Course Objectives

The Course intends to cover

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

Course Learning Outcomes

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

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

Part – I: Language – I

Malayalam – III

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

Text Books	
1.	Sishyanum makanum - Vallaththol Narayana Menon,Poorna Publishers.
2.	Rafeeque Ahammed – Selected poetries ,Mathrubhumi Books, Kozhikkode
3.	Aayisha – Vayalar Ramavarma - Kerala Book Store Publishers.
Reference Books	
1.	Kavitha SahithyaCharitram-Dr.M.Leelavathi (Kerala SahithyaAcademy,Trichur)
2.	Kavitha Dwani-Dr.M.Leelavathi (D.C.Books, Kottayam)
3.	Aadhunika Sahithyacharithram Prasthanangalilude-Dr.K.M.George (D.C.Books, Kottayam)
4.	Padya SahithyaCharithram – T.M.Chummar (Kerala SahithyaAcademy,Trichur)

Part – I: Language – I- French – III

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

Course Objectives

The Course intends to

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

Course Learning Outcomes

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

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

Part – I: Language – I

French – III

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

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

Language-II: Part – II: English –III
(All the Undergraduate Programmes)

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

Course Objectives
The course intends to cover

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

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

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

Language II: Part II - English III

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

Reference Books

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

Web Resources (Swayam / NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credits
25BEC33C	Analog and Digital Communication	Core - V	6	4

Course Objectives

The course intends to cover

- Fundamentals of analog and digital communication systems.
- Signal generation, modulation and transmission techniques.
- Analog modulation methods (AM, FM, PM).
- Digital communication processes including sampling, encoding, and modulation.
- Noise effects, bandwidth, and system performance.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Define the effects of environmental factors such as reflection, refraction, interference, diffraction, absorption, and attenuation on wave propagation.	K1
CLO2	Explain the principles of amplitude, frequency, and phase modulation, and describe the functioning of AM and FM receivers.	K2
CLO3	Apply the principles of digital communication to design basic communication systems, including the use of encoders, decoders, modulators, demodulators, and repeaters.	K3
CLO4	Demonstrate the implementation of digital modulation techniques such as ASK, FSK, PSK, and their variants.	K3
CLO5	Apply pulse modulation techniques such as PAM, PWM, and PPM, and analyze the operation and applications of PCM, Delta Modulation, and Adaptive Delta Modulation systems.	K3, K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze		

CLO – PLO Mapping

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

Core - V: Analog and Digital Communication

Unit	Content	No. of Hours
I	**Propagation of Waves:** Effects of environments such as reflection, refraction, interference, diffraction, absorption and attenuation (Definition only) - Propagation of waves - Ground waves - space waves – Tropospheric wave - Tropospheric scatter - Sky wave propagation - The Ionospheric Layer – Special Ionospheric Phenomena: Spread Echoes, Scattering, Fading, Echoes, Cosmic and Solar noise.	18
II	**Analog Communication Systems:** Modulation - Types of modulation – AM – FM – PM - Amplitude modulation - Modulation factor - Analysis of amplitude modulated wave - Sideband frequencies in AM wave -Transistor AM modulator - Power in AM wave - Frequency modulation - Theory of frequency modulation - Demodulation - Essentials in demodulation - AM diode detector - AM radio receivers -Types of AM radio receivers - Stages of superhetrodyne radio receiver - Advantages of superhetrodyne circuit - FM receiver - Difference between FM and AM receivers.	18
III	**Digital Communication Systems:** Representation of Data Signal – Serial and Parallel Data Transmission - Model of Digital Communication System – **Elements of Digital Communication System:** Information Source, Source Encoder / Decoder, Communication Channel, Modulator, Demodulator, Channel Encoder / Decoder, Other Functional Blocks – Analysis of Communication System – Design of Communication System – Repeaters - AI-Based Error Correction Techniques in Digital Communication Systems.	18
IV	**Pulse Modulation and Quantization:** Electrical Representation of Binary Digits - Pulse Amplitude Modulation – Pulse Width Modulation – Pulse Position Modulation – Quantization of Signals – Quantization Error – Pulse Code Modulation – Companding – Advantages and Applications of PCM - Differential PCM – Delta Modulation – Adaptive Delta Modulation – Comparison of PCM and DM systems.	18
V	**Digital Data Communication:** Amplitude Shift Keying – Power Spectral Density for ASK – Amplitude Shift Keying Modulator – Coherent Amplitude Shift Keying (ASK) Detector – Non coherent ASK Detector – Frequency Shift Keying – Bandwidth and Spectrum Frequency of FSK – Demodulation of Binary FSK Wave – Detection of FSK using PLL – Phase Shift Keying – Generation of Binary PSK Waves – Detection of Binary PSK Waves – Differential Phase Shift Keying – Quadrature Phase Shift Keying.	18
	Total Hours	**90**
Text Books		
1.	Sam K. Shanmugam (2017), Digital and Analog Communication Systems, Wiley Publications.	
2.	George Kennedy, Bernard Davis (2018), Electronic Communication Systems. Tata McGraw-Hill Publishing Company Limited.	
Reference Books		
1.	Anokh Singh, Chhabra, A.K., (2013), Principles of Communication Engineering, S. Chand Publishing.	
2.	Mehta, V. K., Rohit Mehta (2015), Principles of Electronics. S. Chand Publishing.	
Web Resources (Swayam / NPTEL / Others)		
1.	https://onlinecourses.nptel.ac.in/noc26_ee03/preview	
2.	https://aierrorcorrectioncodes.com/	

Course Code	Course Name	Category	Hours / Week	Credits
25BEC34C	IC's and Instrumentation	Core - VI	6	4

Course Objectives

The course intends to cover

- Fundamentals and working of operational amplifiers.
- Principles and types of waveform generators.
- Internal structure and applications of timer ICs.
- Concepts and types of transducers.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Learn the various IC fabrication techniques.	K2
CLO2	Acquire the knowledge of basic application using op-amp	K3
CLO3	Analyze and design various operational amplifier applications including summing amplifiers, subtractors, instrumentation amplifiers, waveform generators, and signal converters.	K4
CLO4	Understand the working of Timer and PLL	K2
CLO5	Understand the principle of various types of transducers	K2
K2 - Understand; **K3** - Apply; **K4** – Analyze		

CLO – PLO Mapping

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

Core - VI: IC's and Instrumentation

Unit	Content	No. of Hours
I	**Integrated Circuits Fabrication:** Fundamentals of Monolithic IC Technology – Basic Planar Processes: Silicon Wafer Preparation – Epitaxial Growth – Oxidation – Photolithography – Diffusion of Impurities – Ion Implantation - Isolation Techniques – Metallization - Assembly Processing and Packaging – Monolithic Transistor – Integrated Resistors – Fabrication of FET, MOSFET and CMOS	18
II	**Operational Amplifier and Characteristics:** Basic information of Op-Amp - Ideal Characteristics of Op-Amp - Inverting Amplifier and Non-Inverting Amplifier - Voltage Follower – Differential Amplifier - Common Mode Rejection Ratio – **DC Characteristics:** Input Bias Current - Input Offset Current – Input Offset Voltage – Thermal Drift – **AC Characteristics:** Frequency Response – Slew Rate.	18
III	**Operational Amplifier Applications:** Summing Amplifier – Inverting summing amplifier and Non Inverting Summing Amplifier – Adder - Subtractor – Instrumentation Amplifier - Voltage to Current Converter – Current to Voltage Converter – Precision half Wave Rectifiers – Precision Full Wave Rectifiers - Differentiator - Integrator - **Comparator and Waveform Generators:** Op-amp as Comparator – Zero Crossing Detector – Time Marker Generator – Regenerative Comparator – Astable Multivibrator – Monostable Multivibrator – Triangular Wave Generator	18
IV	**Timer:** Functional Block Diagram of 555 timer – Monostable Operation– Applications: Missing Pulse Detector – Linear Ramp Generator –Frequency Divider - Pulse Width Modulation – Astable Operation – Applications: FSK Generator - Schmitt Trigger – **Phase Locked Loop:** Functional Block Diagram – Phase Detector / Comparator –Voltage Controlled Oscillator – Low Pass Filter – Applications: Frequency Multiplier / Division – AM Detection	18
V	**Transducers:** Introduction – Electrical Transducer – Basic Requirements of Transducer – Classification of Transducers – Selection of Transducers – Resistive Transducers – Potentiometers – Thermistors – Thermocouple – LVDT – RVDT – Piezoelectric Transducers – Hall Effect Transducers – Photoelectric Transducers – Digital Displacement Transducers - Smart Sensors and AI	18
	Total Hours	**90**

Text Books	
1.	Roy Choudhury.D, Shail B. Jain, (2017) Linear Integrated Circuits, New Age International Publishers, Sixth Edition.
2.	A.K.Sawhney, (2016) A course in Electrical and Electronic Measurements and Instrumentationts, Dhanpat Rai & Co. Publishers, 18th Edition.
Reference Books	
1.	Sudhakar.A, (2012) Linear and Digital Integrated Circuits Design, Laxmi Publications; First Edition, ISBN 9789380386515.
2.	Ramakant A Gayakwad, (2004) Op-Amps and Linear Integrated Circuits, PHI, 4th edition.
Web Resources (Swayam / NPTEL / Others)	
1.	https://nptel.ac.in/courses/108/108/108108111/
2.	https://evelta.com/blog/smart-sensors-and-ai-a-synergistic-relationship/?srsltid=AfmBOopcrNhrS05PVI8UYFPQZMBFSPdpD3gjB-GRr3MTQRdYfYoFnqkL

Course Code	Course Name	Category	Hours / Week	Credits
25BEC35P	Electronic Communication Lab	Core Lab - IV	4	2

Electronic Communication Lab (Any 12 Practical's)	
1.	Introduction to Electronic Communication Lab
2.	AM Generation and Detection
3.	FM Generation and Detection
4.	Signal Sampling and Reconstruction
5.	PAM Generation and Detection
6.	PWM & PPM Generation and Detection
7.	Generation and Detection of PCM
8.	Amplitude Shift Keying
9.	Frequency Shift Keying
10.	Phase Shift Keying
11.	Differential Phase Shift Keying
12.	Quadrature Phase Shift Keying
13.	Generation of Delta Modulation
14.	Generation of Adaptive Delta Modulation
15.	Study of TDM
16.	Full Duplex Communication Model
Total Hours	**60**
Text Books	
1.	George Kennedy, Bernard Davis, Prasanna. S. R. M (2018) Electronic Communication Systems. McGraw-Hill Publishing.
2.	John Proakis, G, Masoud Salehi (2018) Digital Communications. McGraw-Hill Publishing.
3.	Sam Shanmugam, K. (2017) Digital and Analog Communication Systems. Wiley Publications.
Reference Books	
1.	Andreas Molosch, F (2013) Wireless Communications, Wiley-India Edition Ltd.
2.	Kennedy. Davis (2018) Electronic Communication Systems -Tata McGraw-Hill Publishing Company Limited.
Web Resources (Swayam / NPTEL / Others)	
1.	https://onlinecourses.nptel.ac.in/noc26_ee03/preview

Course Code	Course Name	Category	Hours / Week	Credits
25BEC36A	**Programming in C**	**Allied – III**	**4**	**3**

Course Objectives

The course intends to cover

- Fundamentals of computers, programming concepts, and problem-solving techniques.
- Basic structure of C programs, data types, operators, and expressions.
- Decision-making, branching, and looping statements for program control.
- Concepts of arrays, strings, and user-defined functions.
- Pointers, file handling, and their applications in C programming.

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.	K2
CLO2	Understand the basic concepts of C programming.	K2
CLO3	Describe the reason why different decision making and loop constructs areavailable for iteration in C.	K3
CLO4	Demonstrate the concept of User defined functions, Recursions, Scope and Lifetime of Variables, Structures and Unions.	K4
CLO5	Develop C programs using pointers Arrays and file management.	K3
K2 - Understand; **K3** - Apply; **K4** – Analyze		

CLO – PLO Mapping

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

Allied - III: Programming in C

Unit	Content	No. of Hours
I	**Fundamentals of Computers:** Introduction – History of Computers-Generations of Computers- Classification of Computers-Basic Anatomy of a Computer System-Input Devices-Processor- Output Devices-Memory Management – Types of Software- Overview of Operating System- Programming Languages-Translator Programs-Problem Solving Techniques - Overview of C - Introduction to AI.	12
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.	12
III	**Decision Making and Branching:** Introduction – if, if…. else, nesting of if …else statements- else if 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.	12
IV	**User-Defined Functions:** Introduction – Need and Elements of User-Defined Functions- Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions – Recursion.	12
V	**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. Basics of file management.	12
	Total Hours	**60**

Text Books	
1.	Balagurusamy, E (2023) Computing Fundamentals & C Programming. S. Tata McGraw-Hill Publishing Company Limited.
2.	Rajaraman, V (2009) Computer Programming in C.Prentice Hall of India Private Limited.
Reference Books	
1.	Ashok N Kamthane (2023) Programming in C-Pearson India Education Services Private Limited.
2.	Mullish Cooper (2004) The Sprit of C- Jaico Publishing House.
3.	Uma Maheswari, P (2007) Fundamentals of Programming in C- Umayam Publications.
Web Resources (Swayam / NPTEL / Others)	
1.	https://nptel.ac.in/courses/106105171
2.	https://nptel.ac.in/courses/106104128
3.	https://www.ibm.com/think/topics/artificial-intelligence

Course Code	Course Name	Category	Hours / Week	Credits
25BEC37P	Arduino Programming Essentials Lab	SEC Lab - I	2	2

Arduino Programming Essentials Lab	
1.	Write an Arduino program to calculate the sum, average, and standard deviation of a given set of numbers and display the results on the Serial Monitor.
2.	Write an Arduino program to generate and display the first 'n' prime numbers on the Serial Monitor.
3.	Write an Arduino program to generate and display the Fibonacci series up to 'n' terms on the Serial Monitor.
4.	Write an Arduino program to print a magic square of order 'n' (where n > 3 and n is odd) on the Serial Monitor.
5.	Write an Arduino program to read temperature data from a DHT11 sensor and plot real- time temperature variations using the Serial Plotter.
6.	Write an Arduino program to measure distance using an Ultrasonic sensor (HC-SR04) and display distance readings on the Serial Monitor.
7.	Write an Arduino program to read light intensity using an LDR sensor and display the light level values on the Serial Monitor.
8.	Write an Arduino program to read soil moisture sensor data and display the moisture percentage on the Serial Monitor.
9.	Write an Arduino program to read heart rate data from a Pulse Sensor and display BPM on Serial Monitor
10.	Write an Arduino program to detect motion using PIR Sensor and display motion alert on Serial Monitor
	Total Hours **30**
Text Books	
1.	Massimo Banzi, Michael Shiloh., (2014) Getting Started with Arduino, Maker Media Publications.
2.	Jeremy Blum., (2019) Exploring Arduino: Tools and Techniques for Engineering Wizardry, Wiley Publications.
Reference Books	
1.	Michael Margolis, (2011) Arduino Cookbook, O'Reilly Media.
2.	Jonathan Oxer, Hugh Blemings., (2010) Practical Arduino: Cool Projects for Open Source Hardware, Apress Publications.
Web Resources (Swayam / NPTEL / Others)	
1.	http://www.digimat.in/nptel/courses/video/106105159/L16.html
2.	http://www.digimat.in/nptel/courses/video/106105159/L17.html

Part – IV – Foundation Course

(All the Undergraduate Programmes)

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

Unit	Content
1	**Indian Knowledge Systems (IKS) Basic Concepts** - Introduction - Journey of Indian Culture and Civilization - Hindu Philosophical System - Contribution of Indian Knowledge System in Science and Arts - Indian Knowledge System and Way of Life - The Implicit Concepts in Indian Knowledge System - Social Viewpoint in Indian Knowledge system - Idea of Vasudhaiva Kutumbakam.
2	**Indian Culture, Art & Architecture** - Introduction - Concept of Culture - Culture and Heritage - General Characteristics of Culture - Indian Culture - Indian Culture during the Modern and Contemporary Period -The Factors of Unity in Diversity - Aspects of Indian culture - Indian Architecture - Architecture of Tamil Nadu.
3	**Vedic Mathematics** - Introduction - History of Vedic Mathematics - Addition - Subtraction - Base Method - Sub Base Method - Multiplication by numbers consisting of all 9s - Division - Special Methods of Division - Straight Division.
4	**Science and Technology in Indian Knowledge System** - Introduction - The Indian S & T Heritage - Metals and Metalworking Technology - Lost wax casting of Idols and Artefacts - Literary sources for Science and Technology - Technology in Ancient India - Significant Science and Technology Discovery in Ancient India - Council of Scientific and Industrial Research - Animal Science in Ancient India - Biodiversity and folk traditions.
5	**History of Trade and Commerce in Ancient India** - Introduction - Indigenous Banking System - Rise of Intermediaries - Transport - Major Trade Centres - Major Exports and Imports - Position of Indian Subcontinent in World Economy.
6	**Indigenous Agriculture in IKS** - Introduction - History of Indian Agriculture - Indigenous Knowledge - Organic Farming and Natural Fertilization - Mixed Cropping and Crop Rotation - Ecological and Socioeconomic Impacts of Indigenous Farming - Challenges and Future Directions.
7	**Traditional Water Management Systems of India** - Introduction - Traditional Water Management Systems - Northern Region - North Western Region - North Eastern Region - Central Indian Region - Southern Indian Region.
8	**Traditional Foods and Festival of India** - History - Introduction - Foods Consumed in Different Regions of India - Eating Styles of India - Traditional Equipment's used for Cooking - Changes in Consumption of Traditional Foods - Traditional Foods/Modern Functions - The Future of Traditional Foods - Traditional Festivals of India.
9	**Sports in India-From Ancient Period to Modern Period** - Introduction - Indus Valley Civilization - Early Hindu Period/ Epic Period - Traditional Indoor and Outdoor Games - British Period - Post Independence - Modern Period.
10	**Nobel Laureates of Indian Origin & Inspiring Scientists of India and their Contributions** - History of the Nobel Prize - Nobel Prize Insignia - Indian Nobel Prize winners and their Biography - Inspiring Scientists and their Contributions.
Reference Resources	
1.	https://www.education.gov.in/shikshakparv/docs/background_note_Stimulating_Indian_Knowledge_Systems_Arts_Culture.pdf
2.	Singh, R. K., King, C. A., & Barrett, D. A. (2010). Traditional ecological knowledge and agricultural sustainability in India. Indian Journal of Traditional Knowledge, 9(2), 231- 243

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

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

Question Paper Pattern

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

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

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

Examination Pattern

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

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

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

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

Question Paper Pattern

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

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

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



Semester 4

Semester – 4									
Course Code	**Part**	**Course Category**	**Course Name**	**Hours/ Week**	**Examination**				**Credits**
					Duration in Hours	**Max Marks**			
						CIA	**ESE**	**Total**	
25TAM41L	I	Language - I	Tamil – IV	4	3	25	75	100	3
25HIN41L			Hindi – IV						
25MAL41L			Malayalam – IV						
25FRE41L			French – IV						
25ENG42L	II	Language - II	English – IV	4	3	25	75	100	3
25BEC43C	III	Core – VII	Microprocessor and Embedded Systems	6	3	25	75	100	4
25BEC44P	III	Core Lab – V	Microprocessor and Embedded Systems Lab	4	3	40	60	100	2
25BEC45A	III	Allied – IV	Python Programming	4	3	25	75	100	3
25BEC46P	III	Allied Lab – I	Python Programming Lab	4	3	40	60	100	2
25BEC47P	III	SEC – II	IC’s and Instrumentation Lab	2	3	40	60	100	2
25QUA4AE	IV	AECC - IV	Quantitative Aptitude	2	2	-	50	50	2
25EXC4LA	IV	Extra-Curricular & Co- Curricular	Liberal Arts	-	2	50	-	50	2
Total				**30**				**800**	**23**

Course Code	Course Name	Category	Hours / Week	Credits
25TAM41L	Tamil - IV	Language - I	4	3

Course Objectives

The Course intends to cover

- தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் நடத்தும் போட்டித் தேர்வுகளை எதிர்கொண்டு வேலைவாய்ப்பினைப் பெறும் வகையில் மாணவர்களைத் தயார்படுத்துதல்.
- நீதி இலக்கியங்கள் மற்றும் ஔவையார் பாடல்களின் வழியாக வாழ்வியலுக்குத் தேவையான அறநெறிகளையும், ஒழுக்க விழுமியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- தமிழுக்குத் தொண்டாற்றிய சான்றோர்கள், கவிஞர்கள் மற்றும் விடுதலைப் போராட்ட வீரர்களின் இலக்கிய, சமூகப் பங்களிப்புகளை எடுத்துரைத்தல்.
- அடிப்படைத் தமிழ் இலக்கண விதிகளையும் சொல் அமைப்புகளையும் அறிமுகம் செய்து, பிழையற்ற மொழிப் பயன்பாட்டை உருவாக்குதல்.
- திணை மற்றும் பால் அடிப்படையிலான சொற்பயன்பாட்டையும், மரபுசார்ந்த வினைகளையும் கற்பித்து, சரியான தொடரமைப்பை உருவாக்க வழிகாட்டுதல்.
- வாசிப்புப் புரிதலை மேம்படுத்துதல், மரபுசார் தொடர்களின் பொருளை விளக்குதல் மற்றும் எளிய ஆங்கிலச் சொற்களைத் தமிழாக்கம் செய்யப் பயிற்றுவித்தல்.

Course Learning Outcomes

On the successful completion of the course

CLO	CLO Statements	Knowledge Level
CLO1	மாணவர்கள் பதினெண்கீழ்க்கணக்கு நூல்களின் வாழ்வியல் உண்மைகளைப் புரிந்து, சமுதாயத்தில் ஒழுக்கத்தோடும் நற்பண்புகளோடும் வாழும் நெறியைக் கற்றுக் கொண்டு பின்பற்றுவர்.	K1, K2
CLO2	மாணவர்கள் தமிழ் அறிஞர்களின் ஆளுமை மிக்க வாழ்வியல் நெறிகளை உணர்ந்து, மொழிப்பற்று, தேசப்பற்று மற்றும் படைப்பாற்றல் மிக்கவர்களாக செயல்படுவர்.	K2
CLO3	மாணவர்கள் எழுத்து மற்றும் சொல் வேறுபாடுகளைப் புரிந்து, பிழையின்றி எழுதவும் பேசவும் கற்றுக்கொள்வர்	K3
CLO4	மாணவர்கள் வாக்கியங்களில் திணை வழு, பால் வழு ஆகியவற்றைத் தவிர்த்து, மரபுச் சொற்களைச் சரியான சூழலில் கையாளும் ஆளுமை மிக்கவர்களாகத் திகழ்வர்.	K3
CLO5	மாணவர்கள் பத்திகளைப் படித்துப் புரிந்து விடையளிப்பர். பழமொழிகளின் பொருளை உணர்ந்து, அன்றாடப் பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்களைக் கையாள கற்றுக்கொள்வர்.	K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part - I: Language - I தமிழ் – IV

Unit	Content	No. of Hours
I	**இலக்கிய வரலாறு** 1. நாலடியார் 2. பழமொழி நானூறு 3. திரிகடுகம் 4. இன்னா நாற்பது 5. சிறுபஞ்சமூலம் 6. ஔவையார் பாடல்கள்	12
II	**தமிழ் அறிஞர்களும், தமிழ்த்தொண்டும்** 1. உ.வே.சாமிநாத ஐயர் 2. வீரமாமுனிவர் 3. டி.கே.சிதம்பரனாதர் 4. கண்ணதாசன் 5. வேலுநாச்சியார் 6. நாமக்கல் கவிஞர்	12
III	**இலக்கணம்** 1. குறில், நெடில் வேறுபாடு 2. சுட்டெழுத்துக்கள் 3. வினா எழுத்துக்கள் 4. இனவெழுத்துக்கள் 5. ஒருமைப் பன்மை அறிதல் 6. ஓரெழுத்து ஒருமொழி	12
IV	**திணை மரபு மற்றும் பால் மரபு** 1. உயர்திணை 2. அஃறிணை 3. ஆண்பால் 4. பெண்பால் 5. பலர்பால் 6. வினைமரபு	12
V	**வாசித்தல், புரிந்து கொள்ளும் திறன் மற்றும் எளிய மொழி பெயர்ப்பு** **வாசித்தல்**: கொடுக்கப்பட்ட பத்தியை வாசித்து கேட்கப்பட்ட வினாக்களுக்கு சரியான விடையைத் தேர்ந்தெடுத்தல். **புரிந்துகொள்ளும் திறன்:** உவமைத் தொடரின் பொருளறிதல், மரபுத்தொடரின் பொருளறிதல், பழமொழிகள் பொருளறிதல்.	

Unit	Content	No. of Hours
V	**எளிய மொழி பெயர்ப்பு:** ஆங்கிலம் மற்றும் பிறமொழிச் சொற்களுக்கு இணையான தமிழ்ச் சொற்கள் அறிதல், பயன்பாட்டில் உள்ள ஆங்கிலச் சொற்களை மொழிபெயர்த்தல்.	12
	Total Hours	**60**

Reference Books

1	வரதராசன் மு. (2021, 34-வது பதிப்பு), தமிழ் இலக்கிய வரலாறு, சாகித்திய அகாதமி பதிப்பு.
2	டாக்டர் தமிழண்ணல், (2010, 26-ம் பதிப்பு), புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம்.
3	பேரா. முனைவர் பாக்கியமேரி, (2022, 6-ம் பதிப்பு), வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, நியூசெஞ்சுரி புக் ஹவுஸ்(பி). லிட்.
4	பாலசுப்பிரமணியம் சி. (2016, 27-ம் பதிப்பு), தமிழ் இலக்கிய வரலாறு, சாரதா பதிப்பகம்.
5	டாக்டர் பூவண்ணன், (2019, முதல் பதிப்பு), தமிழ் இலக்கிய வரலாறு, வர்த்தமான் பதிப்பகம்
6	பேராசிரியர்.விமலானந்தம் மது.ச. (2017, முதல் பதிப்பு), தமிழ் இலக்கிய வரலாறு, பாரி நிலையம்
7	விஜயராகவன், முனைவர் கண்ணன் கு. (2018, முதல் பதிப்பு), தமிழ் இலக்கியம் இலக்கணம் வரலாறு, பாவை பப்ளிக்கேஷன்.
8	முனைவர் இராசா கி. (2019, 4-ம் பதிப்பு), தமிழ் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ் (பி). லிட்.
9	முனைவர் அருணாச்சலம் மு. (2017 6-ம் பதிப்பு), தமிழ் இலக்கிய வரலாறு, அருண் பதிப்பகம்.
10	குமரன் கோ (2010, முதல் பதிப்பு), தமிழ் இலக்கணம் எளிய அறிமுகம், சந்தியா பதிப்பகம்.

Course Code	Course Name	Category	Hours / Week	Credits
25HIN41L	Hindi - IV	Language - I	4	3

Course Objectives

The course intends to cover

- Contemporary drama contents of Hindi literature.
- Novels and its techniques.
- Litigation messages in Hindi and news on speech techniques
- Article writing and Translation of text

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the text styles and grammatical elements	K1, K2
CLO2	Develop an interest in the appreciation of short stories	K3
CLO3	Use Lokokti and Muhavare appropriately in Hindi communication.	K3
CLO4	Develop essays on general topics in Hindi.	K3
CLO5	Translate passages between Hindi and English.	K3
K1 - Remember; **K2 -** Understand; **K3 -** Develop, Use, Translate		

Part - I: Language - I Hindi - IV

Unit	Content	No. of Hours
I	Drama: Dhuvasaminy By Jayashankar Parsad	12
II	Novel - Nirmala – Premchand	12
III	Lokkothi & Muhavare - Naveen Hindi Vyakaran (Selected Lokkokthi -10 & Muhavare-10)	12
IV	General Essay :Aadarsh Nibandh	12
V	Translation : Hindi-English Only Anuvadh Abhyas – III (16-30 Lessons Only)	12
	Total Hours	**60**
Text Books		
1	Jayashankar Prasad (2015), Dhuvasaminy – Drama, Dakshin Bharath Hindi Prachar Sabha, Chennai.	
2	Premchand (2015), Nirmala – Novel, Rajkamal Prakashan,1B Nethaji Subash Marg, New Delhi.	
Reference Books		
1	Rajnath Sharma , Hindi Sahithya Ka Saral Ithihaas by, Vinod Pustak Mandir, Agra.	
2	Kavya Pradeep Rambadri Shukla, Hindi Bhavan, 36, Tagore Town, Allahabad.	

Course Code	Course Name	Category	Hours / Week	Credits
25MAL41L	Malayalam - IV	Language - I	4	3

Course Objectives

The course intends to cover

- Knowledge of contemporary drama contents of Malayalam literature
- Screen play and its techniques.
- Drama and express criticism about it and the ability to express social thoughts will improve
- Litigation messages in Malayalam and news on speech techniques
- Article writing and creative skills.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the themes and characters of the screenplay.	K1, K2
CLO2	Relate the narrative elements to the development of the screenplay.	K2
CLO3	Create interest in art literature courses	K3
CLO4	Apply dramatic techniques to interpret the conflicts in the play.	K3
CLO5	Present the thematic significance of the play through its dramatic elements.	K3
K1 - Remember; **K2 -** Understand; **K3 -** Relate, Create, Apply, Present		

Part - I: Language - I Malayalam - IV

Unit	Content	No. of Hours
I	Screen Play – Perumthachan	12
II	Screenplay – Perumthachan	12
III	Drama – Saketham	12
IV	Drama – Saketham	12
V	Drama – Saaketham	12
	Total Hours	**60**
Text Books		
1	Perumthachan – M.T.Vasudevan Nair, DC Books	
2	Saketham – C.N.Sreekandan Nair, DC Books.	
Reference Books		
1	Malayala Nataka Sahithya Charithram, G Sankara Pillai (Kerala Sahithya Akademi, Trissur)	
2	Malayala NatakaSahithya Charithram, Vayala Vasudevan Pillai (Kerala SahithyaAkademi Thrissur).	
3	Natakam- Oru Patanam (C.J. Smaraka Prasanga Samithi, Koothattukulam)	
4	Natakaroopacharcha, Kattumadam Narayanan (NBS, Kottayam)	
5	Chalachithra sameeksha – Vijayakrishanan.	
6	Cinemayude Paadangal Visakalanavum Veekshanavum , Jose K.Manual.	

Course Code	Course Name	Category	Hours / Week	Credits
25FRE41L	French - IV	Language - I	4	3

Course Objective

To communicate during easy or habitual tasks requiring a basic and direct information exchange on familiar subjects to use simple words to describe his or her surroundings and communicate immediate needs

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Comprehend the grammatical structures in various genres	K1, K2
CLO2	Understand the text styles and poetical elements	K2
CLO3	Develop an interest in the appreciation of literature	K3
CLO4	Discuss and respond to content of a reading passage	K3
CLO5	Apply vocabulary and grammatical structures	K3
K1 - Remember; **K2 –** Comprehend, Understand; **K3 -** Develop, Discuss, Apply		

Part - I: Language - I : French - IV

Unit	Content	No. of Hours
I	Etape 5 (Lecons 1 - 3)	12
II	Etape 6 (Lecons 1 - 3)	12
III	Etape 7 - Leçons 1 – 2	12
IV	Etape 7 – Leçon 3 Etape 8 – Leçon 1	12
V	Etape 8 – Leçons 2 - 3	12
Etapes 5 to 8, Pages 63 to 114		
	Total Hours	**60**
Text Book		
1.	Himber, C., Brillant, C., & Erlich, S. (n.d.). Adomania 2: Méthode de français. Hachette FLE, Goyal Publishers and Distributors Pvt Ltd, New Delhi.	
Reference Book		
1.	Loiseau, Y., & Mérieux, R. (n.d.). Latitudes 1. French and European Publications, Goyal publishers and distributors Pvt Ltd, New Delhi	
Web Resources (NPTEL/Swayam)		
1.	https://swayam.gov.in/nd2_cec19_lg04/preview	

Course Code	Course Name	Category	Hours / Week	Credits
25ENG42L	English - IV	Language - II	4	3

Course Objectives

The course intends to cover

- The Shakespearean soliloquies through understanding the psychological phenomena and morality of the characters.
- The social issues, values and justice through themes, characters, conflicts in one-act plays.
- The essential grammar rules, sentence structures, punctuation, and its usage in English.
- Vocabulary skills, sentence ordering abilities, and core professional writing skills for career readiness.
- Reading comprehension and effective writing skills through understanding, organizing, summarizing, and expressing ideas clearly.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the psychology of the characters by reflecting on emotions and well-being based on the soliloquies.	K1, K2
CLO2	Imbibe human values like social justice, gender equality and empathy in real - life.	K2
CLO3	Construct grammatically correct sentences using appropriate grammatical structures, capitalization and punctuation.	K3
CLO4	Compose effective career communication using appropriate vocabulary, language conventions and professional correspondence skills.	K3
CLO5	Prepare coherent written responses by organising, summarising and presenting information from diverse texts.	K3
K1 - Remember; **K2** - Understand, Imbibe ; **K3** - Construct, Compose, Prepare		

Language II : Part II: English IV

Unit	Content	No. of Hours
I	**Shakespearean Soliloquies - Human Conflicts and well-being (SDG 3 & 4)** 1.1. All The World's A Stage by Jacques in As You Like It 1.2. To Be or Not To Be by Hamlet in Hamlet 1.3. The Raven Himself is Hoarse by Lady Macbeth in Macbeth	12
II	**One Act Play – Social Justice (SDG 5 & 16**) 2.1. Trifles - Susan Glaspell 2.2. Mine Eyes Have Seen - Alice Dunbar-Nelson 2.3. They That Sit in Darkness – Mary Burrill	12
III	**Grammar** 3.1. Infinitives, Concord, Gerunds, Participles, Regular and Irregular Verbs, Question Tags 3.2. Phrases and Clauses, Synthesis of Sentences 3.3. Simple, Compound and Complex Sentences 3.4. Capitalization and Punctuations.	12
IV	**English Language and Career Communication Skills** 4.1. **Language and Vocabulary Skills:** British and American English, Figures of speech, Jumbled sentences, Rearranging the right order of sentences, Making queries, Inferences, Idioms & Phrases, Phrasal verbs. 4.2. **Professional Correspondence for Careers:** Job Application Letters, Covering Letters, CV/Resume Preparation.	12
V	**Reading and Writing Comprehension (SDG 4)** 5.1. **Reading Comprehension:** Introduction to Reading Strategies - Comprehending various types of texts and question - Strong question, Weak question, Match the following, Multiple choice, Identifying information, Sentence Completion, Ascertainment of facts 5.2**. Writing Comprehension:** Understanding the Topic – Organising Ideas – Sentence and Paragraph Construction – Types of Paragraphs - Description, Sequence, Comparison and Contrast, Cause and Effect, Persuasion, Argumentation - Writing opinion pieces on travel, food, film and book reviews – Summarizing Information.	12
	Total Hours	**60**

Unit Mapping with SDGs

Units	Primary SDG
Unit – I: Shakespearian Soliloquies - Human Conflicts and well-being	SDG 3 , 4
Unit – II: One Act Play – Social Justice	SDG 5 , 16
Unit - V: Reading and Writing Comprehension	SDG 4

Reference Books	
1.	Burrill, M., (1918), They That Sit in Darkness, 1st ed., The Birth Control Review.
2.	Dunbar Nelson, A. (1918), Mine Eyes Have Seen, 1st ed., Mint Editions.
3.	Glaspell, S., (1916), Trifles, 1st ed., Gyan Publishing House.
4.	Kumar, S., & Pushp Lata. (2011), English Language and Communication Skills for Engineers. 1st ed., Oxford University Press.
5.	Kumar, S., & Pushp Lata. (2015), Communication Skills: A Workbook, 2nd ed., Oxford University Press.
6.	Shakespeare, W. (1998), The Complete Works of William Shakespeare. (1st ed.) Wordsworth Edition.
7.	Wren, P. C., & Martin, H. (2016). High School English Grammar and Composition.(36th ed.) S. Chand Publishing.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.swayam2.ac.in/e-learning/preview/cec24_lg01

Course Code	Course Name	Category	Hours / Week	Credits
25BEC43C	Microprocessor and Embedded Systems	Core – VII	6	4

Course Objectives

The course intends to cover

- The fundamentals of microprocessors and microcontrollers.
- Programming concepts and techniques using the 8085 microprocessors.
- Peripheral interfacing and their utilization with the 8085 microprocessors.
- The architecture and programming of the 8051 microcontrollers for intelligent and sustainable embedded applications.
- Embedded system project development using the 8051 microcontrollers.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Understand the 8085 architecture, instruction set, addressing modes and arithmetic programs.	K1, K2
CLO2	Understand the peripheral devices and interfacing concepts of the 8085 microprocessor for user applications.	K2
CLO3	Execute assembly language programs using the 8051 microcontroller.	K3
CLO4	Implement 8051 C programs for I/O, timers, serial communication and interrupts.	K3
CLO5	Build real world embedded applications using 8051 peripheral interfacing.	K3
K1 - Remember; **K2 –** Understand; **K3 –** Execute, Implement, Build		

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5	Primary SDG
CLO1	3	2	1	2	2	-
CLO2	2	1	1	2	1	-
CLO3	3	2	1	1	1	-
CLO4	2	1	2	3	1	-
CLO5	1	3	2	1	3	SDGs 01,02,13
3 - Substantial (high)		**2** - Moderate (medium)		**1** - Slight (low)		

Core - VII: Microprocessor and Embedded Systems

Unit	Content	No. of Hours
I	**Introduction to 8085 Microprocessor:** Introduction – Block diagram, Pin Diagram - Architecture - Bus Structure. **Instruction Set and Addressing Modes:** Instruction Set – Addressing Modes – Instruction Format and Word Size – Simple Programs (8/16 bit Addition, Subtraction and 8 bit Multiplication and Division)	18
II	**Interfacing Concepts:** Peripheral I/O Instructions – Device Selection and Data Transfer – Interfacing I/O's using decoders, Interfacing Output Displays - LED and 7-Segment. **Parallel and Serial Interface:** Introduction to Programmable Peripheral Interface 8255 – Pin Diagram – Architecture. **Modes of Operation**: I/O and BSR.	18
III	**Overview and Instruction Set of 8051 Microcontroller:** Microcontrollers and Embedded Processors – Microcontrollers for Embedded systems – Overview of 8051 Families – 8051 Instruction Set and Registers. **Assembly Programming & Addressing Modes:** Introduction to 8051 Assembly Programming – Program Counter and ROM – Data Types and Directives – Flag Bits and PSW Register – Register Banks and Stack — I/O Port Programming – Addressing Modes – Arithmetic Programs.	18
IV	**8051 Programming in C:** Programming with C: Data Types – Time Delay Programming – I/O Programming – Logic Operations in C. **8051 Peripherals (Timer, Serial Communication and Interrupt):** Basic Registers of Timer – Counter Programming – Programming Timer 0 and 1 in C – Basics of Serial Communication – 8051 Connections to RS 232 – Serial Port Programming in C – 8051 Interrupts – Programming External Hardware Interrupts - Interrupt Programming in C.	18
V	**8051 Interfacing:** Interfacing ADC / DAC Interfacing with 8051 - Interfacing Sensor with 8051 - Interfacing LCD to the 8051 – Interfacing Stepper Motor – 8051 Interfacing to the Keyboard. **Real World Applications:** Water Level Controller - Traffic Light Controller – Smart Irrigation Systems - AI-Powered Smart Farming - Embedded AI.	18
	Total Hours	**90**

Unit Mapping with SDGs

Units	Primary SDG
Unit V - AI-Powered Smart Farming	SDGs 01,02,13

Text Books

1. R.S.Gaonkar (2023). Microprocessor Architecture, Program and its Application With 8085, New Age International (P) Ltd, 5th Edition.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay (2020). The 8051 Microcontroller and Embedded Systems Using Assembly and C, Pearson Education Publication, 2nd Edition.

Reference Books

1. Aditya P Mathur (2020). Introduction to Microprocessors, Tata Mcgraw - Hill Publication, 3rd Edition.
2. R.S.Kaler (2019). A Textbook of Microprocessors and Microcontrollers, I.K. International Publishing House Pvt. Ltd.

Web Resources (Swayam / NPTEL / Others)

1. https://onlinecourses.nptel.ac.in/noc24_ee46/preview
2. https://onlinecourses.swayam2.ac.in/ntr25_ed92/preview?
3. https://thrivabilitymatters.org/smart-agriculture-ai-farming/
4. https://kernelmasters.com/embedded-ai/

Course Code	Course Name	Category	Hours / Week	Credits
25BEC44P	Microprocessor and Embedded Systems Lab	Core Lab – V	4	2

Microprocessor and Embedded Systems Lab (Any 12 Practical's)

1. Introduction to Microprocessor and Embedded Systems Lab
2. Addition and Subtraction of 8 bit Data using 8085 Microprocessor.
3. Multiplication and Division of 8 bit Data using 8085 Microprocessor.
4. Block of data transfer using 8085 Microprocessor.
5. Smallest and Largest of N-8 bit numbers using 8085 Microprocessor.
6. Sum of N-8 bit numbers using 8085 Microprocessor.
7. Encryption and Decryption of N-8 bit data using 8085 Microprocessor.
8. 1's and 2's complement of an Array using 8085 Microprocessor.
9. LED Interfacing with 8051 Microcontroller.
10. 7-Segment Display Interfacing with 8051 Microcontroller.
11. ADC Interfacing with 8051 Microcontroller.
12. DAC Interfacing with 8051 Microcontroller.
13. Keyboard Interfacing with 8051 Microcontroller.
14. DC Motor interfacing with 8051 Microcontroller.
15. Relay Interfacing with 8051 Microcontroller.

Total Hours	**60**

Text Books

1.	R.S.Gaonkar (2023), Microprocessor Architecture, Program and Its Application With 8085, New Age International (P) Ltd, 5th Edition.
2.	Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay (2020), The 8051 Microcontroller and Embedded Systems Using Assembly and C, Pearson Education Publication, 2nd Edition.

Reference Books

1.	Aditya P Mathur (2020), Introduction to Microprocessors, Tata Mcgraw - Hill Publication, 3rd Edition.
2.	R.S.Kaler (2019), A Textbook of Microprocessors and Microcontrollers, I.K. International Publishing House Pvt. Ltd.

Web Resources (Swayam / NPTEL / Others)

1.	https://onlinecourses.nptel.ac.in/noc24_ee46/preview
2.	https://onlinecourses.swayam2.ac.in/ntr25_ed92/preview?

Course Code	Course Name	Category	Hours / Week	Credits
25BEC45A	Python Programming	Allied - IV	4	3

Course Objectives

The course intends to cover

- The fundamental concepts of Python Programming.
- The basics of Functions in Python.
- The knowledge of Lists, Tuples, Files and Directories.
- Learn about dictionaries in python.
- Object-oriented programming with Graphical programming.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember the concept of operators, data types, looping statements in Python programming.	K1
CLO2	Understand the concepts of Input / Output operations in file.	K2
CLO3	Apply the concept of functions and exception handling.	K3
CLO4	Analyze the structures of list, tuples and maintaining dictionaries.	K4
CLO5	Demonstrate the python programming development environment	K4
K1 - Remember; **K2** - Understand; **K3** – Apply; **K4** – Analyze, Demonstrate		

CLO – PLO Mapping

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

Allied – IV: Python Programming

Unit	Content	No. of Hours
I	**Basics:** Python - Variables - Executing Python from the Command Line - Editing Python Files - Python Reserved Words - Basic Syntax-Comments - Standard Data Types – Relational Operators - Logical Operators - Bit Wise Operators - Simple Input and Output.	12
II	**Control Statements:** Control Flow and Syntax - Indenting - if Statement - statements and expressions- string operations- Boolean Expressions - while Loop - break and continue - for Loop. **LISTS:** List-list slices - list methods - list loop – mutability – aliasing - cloning lists – list parameters. **TUPLES:** Tuple assignment, tuple as return value -Sets – Dictionaries	12
III	**Functions:** Definition - Passing parameters to a Function - Built-in Functions- Variable Number of Arguments - Scope – Type Conversion-Type Coercion- Passing Functions to a Function - Mapping Functions in a Dictionary – Lambda - Modules - Standard Modules– sys – math – time - dir - help Function.	12
IV	**Error Handling:** Run Time Errors - Exception Model - Exception Hierarchy – Handling Multiple Exceptions - Data Streams - Access Modes Writing - Data to a File Reading - Data from a File - Additional File Methods - Using Pipes as Data Streams - Handling IO Exceptions - Working with Directories**.**	12
V	**Object Oriented Features:** Principles of Object Orientation - Creating Classes - Instance Methods - File Organization - Special Methods - Class Variables – Inheritance – Polymorphism - Type Identification - Simple Character Matches - Special Characters - Character Classes – Quantifiers - Dot Character - Greedy Matches – Grouping - Matching at Beginning or End - Match Objects – Substituting - Splitting a String - Compiling Regular Expressions - Python for AI	12
	Total Hours	**60**

Text Books	
1.	Mark Summerfield, (2018) Programming in Python 3: A Complete Introduction to the Python Language India , Pearson Education: Second edition.
2.	Martin C. Brown, (2018) PYTHON: The Complete Reference, McGraw-Hill.
3.	E. Balagurusamy, (2017) Problem Solving and Python Programming, McGraw-Hill, First Edition.
Reference Books	
1.	Allen B. Downey, (2024) Think Python: How to Think Like a Computer Scientist, Updated for Python 3, Shroff, O 'Reilly Publishers, 3rd Edition.
2.	Guido van Rossum and Fred L. Drake Jr, (2022) An Introduction to Python Tutorial and What's New - Version 3.11.
3.	Wesley J Chun, (2012) Core Python Applications Programming, Prentice Hall.
Web Resources (Swayam / NPTEL / Others)	
1.	https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
2.	https://onlinecourses.nptel.ac.in/noc21_cs32/preview
3.	https://python.datalumina.com/

Course Code	Course Name	Category	Hours / Week	Credits
25BEC46P	Python Programming Lab	Allied Lab - I	4	2

S. No.	List of Experiments
1	Basics in Python Programming To compute GCD of two numbers.
2	To find the square root of a number (Newton's method).
3	To display the multiplication table.
4	To find the sum of number digits in list.
5	To perform linear search and binary search.
6	Using lists to store student marks, calculate the average, find the highest and lowest scorer, and display results.
7	Using dictionary to count the frequency of words in a sentence.
8	To make a simple calculator.
9	To multiply matrices.
10	Using command line arguments (word count).
	Total Hours **60**

Text Books

1.	Mark Summerfield, (2018) Programming in Python 3: A Complete Introduction to the Python Language India , Pearson Education: Second edition.
2.	Martin C. Brown, (2018) Python : The Complete Reference, McGraw-Hill.
3.	E. Balagurusamy, (2017) Problem Solving and Python Programming, McGraw-Hill, First Edition.

Reference Books

1.	Allen B. Downey, (2024) Think Python: How to Think Like a Computer Scientist, Updated for Python 3, Shroff, O 'Reilly Publishers, 3rd Edition,
2.	Guido van Rossum and Fred L. Drake Jr, (2022) , An Introduction to Python Tutorial and What's New - Version 3.11.
3.	Wesley J Chun, (2012) Core Python Applications Programming, Prentice Hall.

Web Resources (Swayam / NPTEL / Others)

1.	https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
2.	https://onlinecourses.nptel.ac.in/noc21_cs32/preview
3.	https://python.datalumina.com/

Course Code	Course Name	Category	Hours / Week	Credits
25BEC47P	IC's and Instrumentation Lab	SEC Lab - II	2	2

IC's and Instrumentation Lab (Any 10 Practical's)

1. Introduction to IC's and Instrumentation Lab
2. Adder and Subtractor using Op-amp
3. Inverting and Non-inverting amplifier using Op-amp
4. Current to Voltage converter using Op-amp
5. Voltage to Current converter using Op-amp
6. Zero crossing detector using Op-amp
7. Integrator using Op-amp
8. Differentiator using Op-amp
9. Monostable multivibrator using IC555
10. Astable multivibrator using IC555
11. VCO using IC 555
12. Schmitt Trigger using IC 555.

Total Hours	**30**

Text Books

1.	Roy Choudhury.D, Shail B. Jain, (2017), Linear Integrated Circuits, New Age International Publishers, 6th Edition.
2.	Botkar K.R, (2015), Integrated Circuits, Khanna Publishers, 10th Edition.

Reference Books

1.	Sudhakar.A, (2012), Linear and Digital Integrated Circuits Design, Laxmi Publications; 1st Edition, ISBN 9789380386515.
2.	Ramakant A Gayakwad, (2004), Op-Amps and Linear Integrated Circuits, PHI, 4th Edition.

Web Resources (Swayam / NPTEL / Others)

1.	https://onlinecourses.nptel.ac.in/e-learning/preview/noc24_ee73

Ability Enhancement Compulsory Course – II : Quantitative Aptitude

Course Code	Course Name	Category	Hours / Week	Credits
25QUA4AE	Quantitative Aptitude	AECC - IV	2	2

Unit	Details	No. of Hours
I	Average - Basic concepts - Equation - Mistaken value - Replacement - Including/Excluding - Ratio and Proportion - Basic concepts - Types of ratios - Proportion - Application problems.	6
II	Blood Relations - Family relationship problems - Relationship identification - Directions - Direction sense - Distance and direction - Turning and orientation problems.	6
III	Problems on Ages - Present, past and future ages - Age ratios - Application problems - Alligation and Mixture - Basic concepts - Rule of alligation - Mixture replacement problems.	6
IV	Coding and Decoding - Letter coding - Number coding - Symbol coding - Pattern-based coding- Alphanumeric Series - Letter, number and symbol sequences - Series identification - Missing term problems.	6
V	Percentage - Increase/decrease - Net change - Profit and Loss - Profit/loss percentage - Cost price and selling price – Discount- Simple Interest - Principal, rate, time and amount-Compound Interest - Principal, rate, time and amount - Difference between simple and compound interest.	6
	Total Hours	**30**
Text Book		
1.	Arora, A.(2022) Quanta Quantitative Aptitude. Kiran Institute of Career Excellence Pvt. Ltd.	
Reference Book		
1.	Guha, A. (2017). Quantitative aptitude for all competitive examinations (6th ed.). McGraw Hill Education.	
Web Resources		
1.	https://prepinsta.com/learn-aptitude/	
2.	https://www.indiabix.com/aptitude/questions-and-answers/	

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