



## 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	Work in the contemporary industrial / research settings and thereby innovate novel solutions to existing problems in areas like wireless communication systems and embedded systems.
PLO4	Gain knowledge with digital fluency to integrate with the related disciplines.
PLO5	Imbibe the spirit of lifelong learning to solve ethically the real-life problems in societal and environmental contexts.

**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
	Core Theory (4 hrs. / week)	2	2 X 4	8	2 X 4	8	100	1
	Core Theory (5 hrs. / week)	5	5 X 5	25	5 X 4	20		2,5
	Core Theory (6 hrs. / week)	5	5 X 6	30	5 X 4	20		3,4,6
	Core Lab (3 hrs. / week)	2	2 X 3	6	2 X 2	4		1
	Core Lab (4 hrs. / week)	1	1 X 4	4	1 X 3	3		2
	Core Lab (4 hrs. / week)	2	2 X 4	8	2 X 2	4		3,4
	Core Lab (5 hrs. / week)	3	3 X 5	15	3 X 3	9		5,6
	Allied (4 hrs. / week)	4	4 X 4	16	4 X 3	12		1,2,3,4
	Allied Lab (4 hrs. / week)	1	1 X 4	4	1 X 2	2		4
	Electives (5 hrs. / week)	2	2 X 5	10	2 X 3	6		5,6
	Project	1	1 X 6	6	1 X 4	4		6
	Internship (IT)	1	-	-	1 X 2	2		5
Skill Enhancement (SEC)	3	3 X 2	6	3 X 2	6	3,4, 6		
IV	Foundation Course (FC)	2	2 X 2	4	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
<b>Total</b>		<b>48</b>		<b>180</b>		<b>140</b>	<b>140</b>	

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

Semester	Part I		Part II		Part III		Part IV		Part V		Total	
	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits
1	4	3	4	3	18	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
<b>Total</b>	<b>16</b>	<b>12</b>	<b>16</b>	<b>12</b>	<b>138</b>	<b>100</b>	<b>10</b>	<b>14</b>	<b>-</b>	<b>2</b>	<b>180</b>	<b>140</b>

**Curriculum**  
**B.Sc. Electronics and Communication Systems**

<b>Semester – 1</b>									
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
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

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/ 25DIM2FC	IV	FC – II	Human Rights/ Disaster Management	2	2	50	-	50	2
25IDT2AE/ 25IPR2AE/ 25END2AE	IV	AECC – II	Innovation & Design Thinking/ Intellectual Property Rights / Entrepreneurship Development	2	2	-	50	50	2
<b>Total</b>				<b>30</b>				<b>700</b>	<b>24</b>

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
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

Semester – 4									
Course Code	Part	Course Category	Course Name	Hours/Week	Examination			Credits	
					Duration in Hours	Max Marks			
						CIA	ESE		Total
	I	Language - I	Tamil – IV	4	3	25	75	100	3
			Hindi – IV						
			Malayalam – IV						
			French – IV						
	II	Language - II	English – IV	4	3	25	75	100	3
	III	Core – VII	Microprocessor and Embedded Systems	6	3	25	75	100	4
	III	Core Lab – V	Microprocessor and Embedded Systems Lab	4	3	40	60	100	2
	III	Allied – IV	Python Programming	4	3	25	75	100	3
	III	Allied Lab – I	Python Programming Lab	4	3	40	60	100	2
	III	SEC – II	IC's and Instrumentation Lab	2	3	40	60	100	2
	IV	AECC - IV	Quantitative Aptitude	2	2	-	50	50	2
	IV	Extra-Curricular & Co- Curricular	Liberal Arts	-	2	50	-	50	2
<b>Total</b>				<b>30</b>				<b>800</b>	<b>23</b>

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
<b>Total</b>				<b>30</b>				<b>650</b>	<b>23</b>

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	5	3	25	75	100	3
Medical Electronics									
VLSI Design									
	III	SEC – IV	Raspberry Pi Essentials Lab	2	3	40	60	100	2
	III	Core	Project Work	6	3	40	60	100	4
<b>Total</b>				<b>30</b>				<b>600</b>	<b>20</b>

# Semester - 1

<b>Semester – 1</b>									
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
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

### 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
<b>K1 - Remember; K2 - Understand; K3 - Apply</b>		

## Part – I: Language I - Tamil – I

Unit	Content	No. of Hours
I	<p><b>நாட்டுப்பற்று</b></p> <ol style="list-style-type: none"> <li>1. உலகத்தைநோக்கிவினவுதல் - பாரதியார்</li> <li>2. பாரதிதாசன்கவிதைகள் - பாரதிதாசன் <ul style="list-style-type: none"> <li>• தமிழ்ப்பேறு</li> </ul> </li> <li>3. ஒற்றுமையேஉயிர்நிலை - நாமக்கல்கவிஞர்</li> <li>4. தேவதேவன்கவிதைகள் - தேவதேவன் <ul style="list-style-type: none"> <li>• சாலையும்மரங்களும்செருப்பும்</li> <li>• புதியவீடு</li> </ul> </li> <li>5. ஆலாபனை - கவிக்கோஅப்துல்ரகுமான் <ul style="list-style-type: none"> <li>• போட்டி</li> <li>• பாதை</li> </ul> </li> <li>6. புத்தகச்சந்தை - கவிஞர்வாலி</li> </ol>	14
II	<p><b>சமூகம்</b></p> <ol style="list-style-type: none"> <li>1. எட்டாவதுசீர்..... - ஈரோடு தமிழன்பன்</li> <li>2. தொலைந்துபோனேன் - கவிஞர்தாமரை</li> <li>3. திருநங்கைகள் காகிதப் பூக்கள் - நா. காமராசன்</li> <li>4. மரங்களைப் பாடுவேன் - வைரமுத்து</li> <li>5. புள்ளிப் பூக்கள் (ஹைக்கூ) - அமுத பாரதி</li> <li>6. நாட்டுப்புறப் பாடல்கள் (தாலாட்டுப் பாடல் , தெம்மாங்குப் பாடல், உழவுத்தொழில்)</li> </ol>	14
III	<p><b>சிறுகதை</b></p> <ol style="list-style-type: none"> <li>1. காஞ்சனை - புதுமைப்பித்தன்</li> <li>2. சுமைதாங்கி - ஜெயகாந்தன்</li> <li>3. சோற்றுக் கணக்கு - ஜெயமோகன்</li> <li>4. ஆறு யானைகள் - எஸ்.ராமகிருஷ்ணன்</li> <li>5. மரத்தைக்கர்ப்பம்சுமந்தவள் - ஆண்டாள்பிரியதர்சினி</li> </ol>	12
IV	<p><b>இலக்கியவரலாறு</b></p> <ol style="list-style-type: none"> <li>1. மரபுக்கவிதையின்தோற்றமும்வளர்ச்சியும்</li> <li>2. புதுக்கவிதையின்தோற்றமும்வளர்ச்சியும்</li> <li>3. ஹைக்கூகவிதையின்தோற்றமும்வளர்ச்சியும்</li> <li>4. சிறுகதையின்தோற்றமும்வளர்ச்சியும்</li> </ol>	10

Unit	Content	No. of Hours
V	<b>இலக்கணம்</b> 1. எழுத்துகள் (முதல்எழுத்துகள், சார்பெழுத்துகள்) 2. எழுத்துக்களின்பிறப்பு 3. மாத்திரைகள் 4. பயிற்சிக்குரியன - மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்துதமிழுக்குமொழிபெயர்த்தல்)	10
<b>Total Hours</b>		<b>60</b>
<b>Reference Books</b>		
1	பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதிபாடல்கள், ஆய்வுப்பாதிப்பு, தமிழ்ப்பல்கலைக்கழகம், தஞ்சாவூர்.	
2	அப்துல்ரகுமான்,(2000), ஆலாபனை, கவிக் கோபதிப்பகம்	
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
<b>K1-Remember; K2 -Understand; K3 –Apply</b>		

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

Unit	Content	Hours
I	<b>Prose: Nuthan Gadya Sangrah</b> 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	<b>Non Detailed Text Short Stories: Kahani Kunj</b> Pareksha - Premchand Mamtha - Jayashankar Prasad Aparaparaya - Jaynendrakumar Admikabachcha - Yespal Bolaramkajeev - Harishankar Parsayi Vapasi - MannuBhandari	14
III	<b>Grammar: Shabdha Vichar Only</b> (Noun, Pronoun, Adjective, Verb, Tense, Case, Endings) Theoretical & Applied.	12
IV	<b>Translation: English –Hindi Only.</b> Anuvadh Abhyas – III (1 - 15 Lessons Only)	10
V	<b>Comprehension:</b> 1 Passage From Anuvadh Abhyas – III (16 - 30)	10
<b>Total Hours</b>		<b>60</b>

**Text Books**

1	Jayaprakash, (2009), Nuthan Gadya Sangrah, Publisher: Sumitra Prakashan Sumitras, 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
<b>K1-Remember; K2-Understand; K3 –Apply;K4-Analyse</b>		

**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
<b>Total Hours</b>		<b>60</b>

**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
<b>K1-Remember; K2-Understand; K3 –Apply</b>		

### 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
<b>Total Hours</b>		<b>60</b>

#### Text Book

1	Céline Himber, Corina Brilliant, Sophie Erlich, (2008), Adomania1–Methodede francais, Publisher-Hachette Fle
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#### Reference Book

1.	Yves Loiseau, Régine, (2014), Latitudes1, Merieux Publisher: French and European Publications Inc.
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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
<b>K1-Remember; K2-Understand; K3–Apply</b>		

**Part-II: English-I**

Unit	Content	No. of Hours
I	<b>Poetry: Nature</b> 1. I Wandered Lonely as a Cloud – William Wordsworth 2. The Sparrow – Paul Laurence Dunbar 3. Stopping by woods on a snowy Evening – Robert Frost	12
II	<b>Prose: Friendship</b> 1. The Man in Black – Oliver Goldsmith 2. Of Friendship – Francis Bacon 3. The Blessing of Friends – Sir John Lubbock	12
III	<b>Short Stories: Morality</b> 1. The Necklace – Guy de Maupassant 2. The Lottery - Shirley Jackson 3. The Monkey’s Paw - W.W.Jacobs	12
IV	<b>Language Competency</b> 1. Vocabulary: Synonyms, Antonyms, Word Formation 2. Parts of Speech 3. Error correction	12
V	<b>English for Communication</b> 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
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam/NPTEL)</b>		
1.	<a href="https://nptel.ac.in/courses/109105205">https://nptel.ac.in/courses/109105205</a>	

Course Code	Course Name	Category	Hours/ Week	Credits
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
<b>K1 - Remember; K2 - Understand; K3 – Apply</b>		

### 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

**Core - I: Basic Electronics**

Unit	Content	No. of Hours
I	<b>Resistors &amp; Inductors:</b> 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	<b>Capacitors:</b> 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	<b>Electrical Elements and Circuits:</b> 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	<b>Network Theorems:</b> 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	<b>AC Circuits:</b> 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
<b>Total Hours</b>		<b>60</b>

**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.	<a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a>
2.	<a href="https://nptel.ac.in/courses/108/101/108101091/">https://nptel.ac.in/courses/108/101/108101091/</a>

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
<b>3</b> - Substantial (high)		<b>2</b> - Moderate (medium)		<b>1</b> - Slight (low)	

## Core - II: Semiconductor Devices

Unit	Content	No. of Hours
I	<b>Semiconductor Theory:</b> 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	<b>Special Diodes:</b> 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	<b>Transistor and FET Operation:</b> 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	<b>Power Electronics:</b> 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	<b>Optoelectronic Devices:</b> LDR – Photo Diode - Photo Transistor – Solar Cell – Photo Multiplexer – LED – LCD - Seven Segment Display - IR Emitter – Optocouplers	12
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://onlinecourses.nptel.ac.in/noc24_ee02/preview">https://onlinecourses.nptel.ac.in/noc24_ee02/preview</a>	
2.	<a href="https://onlinecourses.nptel.ac.in/noc24_ee27/preview">https://onlinecourses.nptel.ac.in/noc24_ee27/preview</a>	

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

<b>Total Hours</b>	<b>45</b>
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**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. | <a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a> |
| 2. | <a href="https://nptel.ac.in/courses/108/101/108101091/">https://nptel.ac.in/courses/108/101/108101091/</a> |

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

<b>Total Hours</b>	<b>45</b>
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**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**

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|----|---|
| 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. | <a href="https://onlinecourses.nptel.ac.in/noc24_ee02/preview">https://onlinecourses.nptel.ac.in/noc24_ee02/preview</a> |
| 2. | <a href="https://onlinecourses.nptel.ac.in/noc24_ee27/preview">https://onlinecourses.nptel.ac.in/noc24_ee27/preview</a> |

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
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze</b>		

### 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

**Allied - I: Mathematics -I**

Unit	Content	No. of Hours
I	<b>Matrices:</b> 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	<b>Vector Calculus:</b> Concepts of vector and scalar fields-the Del operator-Divergence of a vector-curl of a vector- Laplacian operator	12
III	<b>Laplace Transforms:</b> Definition of Laplace transform-properties of Laplace Transform, Inverse Laplace transform - Convolution theorem.	12
IV	<b>Fourier Series:</b> General Fourier series - change of length of Interval - Fourier cosine and sine series- Half range Series - Fourier series in complex form.	12
V	<b>Fourier Transforms:</b> Definition of Fourier Transform- Properties of Fourier Transform- Inverse Fourier Transform - Convolution Theorem.	12
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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	
<b>Reference Books</b>		
1.	Dr. G. Balaji (2019), “Vector Calculus”, Balaji Publishers.	
2.	Dr. M. K. Venkatraman (2010), “Higher Mathematics for Engineering & Science”.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://archive.nptel.ac.in/courses/111/105/111105122/">https://archive.nptel.ac.in/courses/111/105/111105122/</a>	
2.	<a href="https://archive.nptel.ac.in/courses/111/101/111101164/">https://archive.nptel.ac.in/courses/111/101/111101164/</a>	

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

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

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

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
<b>K1 - Remember; K2 - Understand; K3 - Apply;</b>		

**Ability Enhancement Compulsory Course - I : Soft Skills**

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

Unit	Module	Details	No. of Hours
<b>Creativity</b>			
III	1	<b>Cooking &amp; Eating:</b> Grammar: Some & Any, Quantifiers. Vocabulary & Speaking about Food & Drink. <i>Activities</i> Kitchen conversation (Listening). Reading an article & answering.	6
	2	<b>Survival:</b> Grammar: Comparison of adjectives. <i>Activities</i> Describing people (Speaking and Vocabulary). Listening to an audio & Answering. Reading & Writing: Read and Answer.	
	3	<b>Working Together:</b> Grammar: Verb + Noun phrases. <i>Activities</i> Technology (Vocabulary & Speaking). Listening: Listen & Answer. Reading & Writing: Notice.	
	4	<b>Music:</b> Grammar: Present perfect simple. <i>Activities</i> Survey about music (Vocabulary & Speaking). Listen to two people talking about music (Listening). Reading: Use adjectives and create sentences.	
	5	<b>Culture and Arts:</b> Grammar: Present perfect. Vocabulary & Speaking activity: Speak on the phone. <i>Activities:</i> Listen and answer. Reading & Writing activity: Review.	
		<b>Practice:</b> Writing comparison sentences & paragraphs.	
<b>Problem-Solving</b>			
IV	1	<b>Do's and Don'ts:</b> Grammar, Modal Verbs. <i>Activities</i> Roleplay (Speaking). Holidays in January (Listening). Reading an article & answering.	6
	2	<b>Body:</b> Grammar: First conditional. Vocabulary & Speaking about Personality & Appearance. <i>Activities</i> Conversations about personality (Listening), Reading & Writing: Read and Answer about your skills.	
	3	<b>Speed:</b> Grammar: Present simple passive. Vocabulary & Speaking about relationships. Listening: Listen & Answer. Reading and Error spotting.	
	4	<b>Work:</b> Grammar: Adverbs of manner. Vocabulary & Speaking about work advice. Listening: Observe & Answer; Reading: Read & check your ideas.	
		<b>Practice:</b> Writing argumentative and descriptive essays.	
<b>Critical Thinking</b>			
V	1	<b>Influence:</b> Grammar: would / past habits. Listening: Sentence Correction. <i>Activities</i> Your inspiration (Speaking). Picture description (Reading). Rewrite the sentences (Writing).	6
	2	<b>Money:</b> Grammar: Second conditional. <i>Activities:</i> Radio programme (Listening). Talk about games (Speaking). Reading & Writing: Fill in the blanks.	
	3	<b>Things that changed the world:</b> Grammar: articles. <i>Activities</i> :Talk about chewing gum (Speaking & Listening). Reading & Writing: Read and write a book review.	
		<b>Practice:</b> Writing Emails, reports and proposals.	
		<b>Total Hours</b>	<b>30</b>

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

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

### Question Paper Pattern

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

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

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

### Examination Pattern

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

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

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

**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						
<b>Total</b>				<b>30</b>				<b>700</b>	<b>24</b>

**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
<b>K1 - Remember; K2 - Understand; K3 – Apply</b>		

Unit	Content	No. of Hours
I	<p>(அறம்)</p> <ol style="list-style-type: none"> <li>திருக்குறள்(மூன்று அதிகாரங்கள்) <ul style="list-style-type: none"> <li>புகழ்</li> <li>வினை செயல்வகை</li> <li>நெஞ்சொடு கிளத்தல்</li> </ul> </li> <li>திரிகடுகம்(10, 16, 19, 26, 42 பாடல்கள் மட்டும்)</li> <li>பழமொழி நானூறு( 2,7,21,54,69,119,130,184,267,375 பாடல்கள் மட்டும்)</li> </ol>	14
II	<p>(பக்தி)</p> <ol style="list-style-type: none"> <li>தாயுமானவர் பாடல்கள்(பராபரக் கண்ணி முதல் 10 பாடல்கள்)</li> <li>உமர்கயாம் பாடல்கள் (தனிப்பாடல்கள்) - கவிமணி தேசிகவிநாயகம் பிள்ளை</li> <li>வள்ளலார் பாடல்கள்(திருவருட்பா – வள்ளலார் விண்ணப்பம்)</li> <li>இயேசுகாவியம் - மலைப்பொழிவு - கண்ணதாசன்</li> <li>சித்தர் பாடல் - சிவவாக்கியார் பாடல்</li> </ol>	14
III	<p>(கலை மற்றும் பண்பாடு )</p> <ol style="list-style-type: none"> <li>அறம் எனப்படுவது - அமுதன்</li> <li>ஏட்டில் எழுதா இலக்கியம் - ஓளவை துரைச்சாமி</li> <li>கீழடி - தொல்லியல் துறை, வெளியீடு</li> <li>மனம் எனும் சொர்க்கவாசல்- டாக்டர் எம்.எஸ்.உதயமூர்த்தி</li> <li>ஆளுமைத் திறன் - அறிவுக்கதிர். அரசுப்பணி சிறப்பிதழ்</li> </ol>	12
IV	<p>(இலக்கிய வரலாறு)</p> <ol style="list-style-type: none"> <li>பதினெண் கீழ்க்கணக்கு நூல்கள்</li> <li>உரைநடையின் தோற்றமும் வளர்ச்சியும்</li> </ol>	10

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

### 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
<b>K1 - Remember; K2 - Understand; K3 – Apply; K4 - Analyse</b>		

Unit	Content	No. of Hours
I	<b>Modern Poetry</b> : Panchvati By Mythli Sharan Gupt	14
II	<b>One Act Play</b> : 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	<b>Letter Writing</b> : (Leave Letter, Job Application, Ordering Books, Letter to Publisher, Personal Letter)	12
IV	<b>Conversation</b> :(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	<b>Translation</b> : Hindi-English only Lessons – 1-15 only Anuvadh Aabyas -III	10
<b>Total Hours</b>		<b>60</b>

**Text Book**

1. Luca Giachino, Carla Baracco, Romain Chrétien(DELFL), (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
<b>25FRE21L</b>	<b>French - II</b>	<b>Language - I</b>	<b>4</b>	<b>3</b>

**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
<b>K1 - Remember; K2 - Understand; K3 – Apply; K4-Analyse</b>		

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
<b>Total Hours</b>		<b>60</b>

**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.
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**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
<b>K1 - Remember; K2 - Understand; K3 - Apply</b>		

Unit	Content	No. of Hours
I	<b>Poetry: Motherhood</b> 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	<b>Prose: Humour</b> 1. With The Photographer – Stephen Leacock 2. Travel by Train – J.B.Priestley 3. On Forgetting – Robert Lynd	12
III	<b>Short Stories: Integrity</b> 1. The taxi driver – K.S. Duggal 2. A Retrieved Reformation- O Henry 3. Kabuliwala - Rabindranath Tagore	12
IV	<b>Language Competency : Vocabulary</b> 1. Homonyms, Homophones, Homographs Portmanteau words 2. Verbs and Tenses, Subject Verb Agreement 3. Error Correction Vocabulary : Synonyms, Antonyms, Word Formation	12
V	<b>English for Communication</b> 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
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
1.	Ezekiel Nissim, 1989 .Collected Poems 1952-1988. Oxford University Press.	
2.	Hewings, M. (2000). Advanced English Grammar. Cambridge. University Press.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://nptel.ac.in/courses/109103020">https://nptel.ac.in/courses/109103020</a>	

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
<b>K1 – Remember    K2 – Understand    K3 – Apply    K4 - Analyze</b>		

### 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

### Core - III: Digital Principles and Applications

Unit	Content	No. of Hours
I	<b>Number Systems and Codes: Introduction</b> - 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	<b>Logic Gates and Boolean Algebra:</b> 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	<b>Combinational Logic Circuits:</b> 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	<b>Sequential Logic Circuits:</b> 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	<b>Digital to Analog Converters:</b> 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
<b>Total Hours</b>		<b>75</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
1.	Puri V K (2017) Digital Electronics: Circuits and Systems, McGraw Hill Education.	
2.	Salivahanan S (2012) Digital Circuits and Design, McGraw Hill Education.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://nptel.ac.in/courses/108105132">https://nptel.ac.in/courses/108105132</a>	
2.	<a href="https://onlinecourses.swayam2.ac.in/cec24_cs09/preview">https://onlinecourses.swayam2.ac.in/cec24_cs09/preview</a>	

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	<b>Rectifiers and Regulators:</b> 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	<b>Small Signal Amplifiers:</b> 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	<b>Power Amplifiers:</b> 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	<b>Feedback Amplifiers:</b> 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	<b>Oscillators and Multivibrators:</b> 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
<b>Total Hours</b>		<b>75</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
1.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://onlinecourses.nptel.ac.in/noc24_ee12/preview">https://onlinecourses.nptel.ac.in/noc24_ee12/preview</a>	
2.	<a href="https://onlinecourses.swayam2.ac.in/nou24_ec04/preview">https://onlinecourses.swayam2.ac.in/nou24_ec04/preview</a>	

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

<b>Digital Electronics Lab (Any 10 Practical's)</b>	
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
<b>Total Hours</b>	
<b>45</b>	
<b>Text Books</b>	
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.
<b>Reference Books</b>	
1.	Puri V K (2017) Digital Electronics: Circuits and Systems, McGraw Hill Education.
2.	Salivahanan S (2012) Digital Circuits and Design, McGraw Hill Education.
<b>Web Resources (Swayam/NPTEL)</b>	
1.	<a href="https://nptel.ac.in/courses/108105132">https://nptel.ac.in/courses/108105132</a>
2.	<a href="https://onlinecourses.swayam2.ac.in/cec24_cs09/preview">https://onlinecourses.swayam2.ac.in/cec24_cs09/preview</a>

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
<b>K2 - Understand; K3 - Apply; K4 - Analyze</b>		

### 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
<b>3 - Substantial (high)</b>	<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>		

**Allied - II: Mathematics – II**

Unit	Content	No. of Hours
I	<b>Differential Equations:</b> Second order linear differential equation with constant coefficients- Laplace Equations - Application to electronic circuits RL, RC, RLC.	12
II	<b>Numerical Methods:</b> Solving simultaneous equation process—Gauss Jordan method-Numerical Integration - Trapezoidal Rule- Simpson's Rule.	12
III	<b>Z- Transforms:</b> 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	<b>Special Functions:</b> Beta and Gamma Functions- Definitions- Relationship between Beta and Gamma Functions - (only statements) - Properties of Gamma and Beta Functions.	12
V	<b>Complex Numbers:</b> 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
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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 (1 <sup>st</sup> 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.	
<b>Reference Book</b>		
1.	Dr. Venkatraman. M.K. (2010). Higher Mathematics for Engineering & Science.	
<b>Web Resources (Swayam / NPTEL)</b>		
1.	<a href="https://archive.nptel.ac.in/courses/111/105/111105122/">https://archive.nptel.ac.in/courses/111/105/111105122/</a>	
2.	<a href="https://archive.nptel.ac.in/courses/111/101/111101164/">https://archive.nptel.ac.in/courses/111/101/111101164/</a>	

**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	<p><b>Concept of Human Values, Value Education Towards Personal Development</b>                      Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education.</p> <p><b>Personal Development:</b>                      Self-analysis and Introspection; Sensitization towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbors, Co-workers.</p> <p>Character Formation towards Positive Personality:                      Truthfulness, Constructively, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.</p>
II	<p><b>Value Education Towards National and Global Development</b>  <b>National and International Values:</b>                      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.</p> <p>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.</p>
III	<p><b>Impact of Global Development on Ethics and Values</b>                      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</p>
IV	<p><b>Therapeutic Measures</b>                      Control of the Mind through</p> <ol style="list-style-type: none"> <li>a. Simplified Physical Exercise</li> <li>b. Meditation – Objectives, Types, Effect on Body, Mind and Soul</li> <li>c. Yoga – Objectives, Types, Asanas</li> <li>d. Activities:                             <ol style="list-style-type: none"> <li>(i) Moralisation of Desires</li> <li>(ii) Neutralisation of Anger</li> <li>(iii) Eradication of Worries</li> <li>(iv) Benefits of Blessings</li> </ol> </li> </ol>

Unit	Content
V	<p><b>Human Rights</b></p> <ol style="list-style-type: none"> <li>1. Concept of Human Rights – Indian and International Perspectives                             <ol style="list-style-type: none"> <li>a. Evolution of Human Rights</li> <li>b. Definitions under Indian and International Documents</li> </ol> </li> <li>2. Broad Classification of Human Rights and Relevant Constitutional Provisions.                             <ol style="list-style-type: none"> <li>a. Right to Life, Liberty and Dignity</li> <li>b. Right to Equality</li> <li>c. Right against Exploitation</li> <li>d. Cultural and Educational Rights</li> <li>e. Economic Rights</li> <li>f. Political Rights</li> <li>g. Social Rights</li> </ol> </li> <li>3. Human Rights of Women and Children                             <ol style="list-style-type: none"> <li>a. Social Practice and Constitutional Safeguards                                     <ol style="list-style-type: none"> <li>(i) Female Feticide and Infanticide</li> <li>(ii) Physical Assault and harassment</li> <li>(iii) Domestic Violence</li> <li>(iv) Conditions of Working Women</li> </ol> </li> </ol> </li> <li>4. Institutions for Implementation                             <ol style="list-style-type: none"> <li>a. Human Rights Commission</li> <li>b. Judiciary</li> </ol> </li> <li>5. Violations and Redressal                             <ol style="list-style-type: none"> <li>a. Violation by State</li> <li>b. Violation by Individuals</li> <li>c. Nuclear Weapons and terrorism</li> <li>d. Safeguards</li> </ol> </li> </ol>
	<b>Total Hours</b> <b>30</b>
<b>Web Resources</b>	
1.	<a href="https://syllabus.b-u.ac.in/syl_college/ug_ve.pdf">https://syllabus.b-u.ac.in/syl_college/ug_ve.pdf</a>

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

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

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

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 (1 <sup>st</sup> 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.	<a href="http://www.EasyEngineering.net">www.EasyEngineering.net</a>

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
<b>K2 - Understand; K3 – Apply ; K4 – Evaluate</b>		

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

Unit	Content	No. of Hours
I	<b>Principles of Design Thinking:</b> Usability, Human-centeredness, Empathy, Iteration. <b>Types of Innovation:</b> Product, Process, Business Model, Social Innovation.	6
II	<b>Empathy &amp; Defining The Problem:</b> Understanding users - observation - ethnographic research - interviews - Empathy maps and personas - Identifying user pain points - Problem framing vs. problem solving.	6
III	<b>Ideation &amp; Creativity Tools:</b> Divergent vs. Convergent Thinking - Brainstorming and mind mapping techniques – SCAMPER. Idea selection and prioritization frameworks.	6
IV	<b>Prototyping &amp; Experimentation:</b> Low-fidelity vs. High-fidelity prototyping - Storyboarding, sketching, mock-ups, and role-playing - Rapid prototyping with simple materials.	6
V	<b>Testing &amp; Feedback:</b> Testing prototypes with users - Iteration and learning from feedback. <b>Innovation Strategy &amp; Implementation :</b> Scaling ideas into innovations - Measuring innovation impact - Barriers - Design Thinking for social change and sustainability.	6
<b>Total Hours</b>		<b>30</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTEL)</b>		
1	<a href="https://onlinecourses.nptel.ac.in/noc22_mg32/preview">https://onlinecourses.nptel.ac.in/noc22_mg32/preview</a>	
2	<a href="https://onlinecourses.swayam2.ac.in/imb23_mg65/preview">https://onlinecourses.swayam2.ac.in/imb23_mg65/preview</a>	
3	<a href="https://onlinecourses.nptel.ac.in/noc20_hs08/preview">https://onlinecourses.nptel.ac.in/noc20_hs08/preview</a>	

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
<b>K1 - Remember; K2 - Understand; K3 – Apply; K4 – Analyze</b>		

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

Unit	Content	No. of Hours
I	<b>Introduction to Intellectual Property:</b> Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.	6
II	<b>Trade Marks:</b> Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.	6
III	<b>Law of Copy Rights:</b> 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	<b>Law of Patents, Trade Secrets:</b> 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	<b>Protection of Plant Varieties and Farmers' Rights:</b> Introduction -Meaning and Definition - Registrable Varieties of Plants - Procedure for Registration - Plant Varieties Protection.	6
<b>Total Hours</b>		<b>30</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam/NPTEL)</b>		
1	<a href="https://onlinecourses.nptel.ac.in/noc22_hs59/preview">https://onlinecourses.nptel.ac.in/noc22_hs59/preview</a>	

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
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyse</b>		

**Ability Enhancement Compulsory Course – II : Entrepreneurship Development**

Unit	Content	No. of Hours
I	<b>Entrepreneurship:</b> 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	<b>Entrepreneurial Motivation:</b> Meaning - Need for Achievement Theory - Risk-taking Behaviour - Innovation and Entrepreneur – Economic & non-economic factors affecting entrepreneurial growth.	5
III	<b>Business Ideas:</b> 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	<b>Business Plan:</b> Meaning and importance of Business Plan – Structure and components – Market Study.	7
V	<b>Entrepreneurial finance:</b> Sources of finance (Bank, Angel investors, Venture Capital, Crowdfunding, Mudra Loans) - Institutional support to entrepreneurs (DIC, KVIC, EDII and MSME).	6
<b>Total Hours</b>		<b>30</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
1	Dr. Jayashree Suresh (2021), Entrepreneurial Publications, Margham Publications	
2	S S Khanka (2020), Entrepreneurial Development, Sultan Chand and Sons, New Delhi.	
<b>Web Resources (Swayam/NPTEL)</b>		
1	<a href="https://onlinecourses.nptel.ac.in/noc25_mg95/preview">https://onlinecourses.nptel.ac.in/noc25_mg95/preview</a>	

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

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

### Question Paper Pattern

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

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

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

### Examination Pattern

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

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

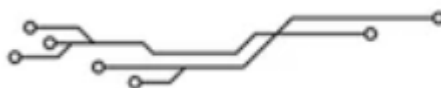
Max Marks	Marks for		Components for CIA				Total
	CIA	ESE	CIA		Model		
50	50	-	Actual	Weightage	Actual	Weightage	50
			50	25	50	25	

**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
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

**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
<b>K1 - Remember; K2 - Understand; K3 - Apply</b>		

**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
<b>Total Hours</b>		<b>60</b>

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 செஞ்சரி 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
<b>K1 - Remember; K2 - Understand; K3 – Apply;K4 - Analyze</b>		

**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 gupt 2. Parichay – Ramdhari singh Dinkar 3. Prethibimb – Sumithra nandan Panth 4. Kavi kaha ththa – Sooryakanth Tripathi Nirala 5. Kah de mam Kya ab dekhoon – 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
<b>Total Hours</b>		<b>60</b>

<b>Text Books</b>	
1.	Kavya Tharang – by Dr. NIRANJAN, Jawahar Pusthakalay, Sadar Bazaar, Mathura U.P.281001.
2.	Anuvadh abhyas-III, Dakshin Bharath Hindi Prachar Sabha Chennai – 17.
<b>Reference Books</b>	
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
<b>K1 - Remember; K2 - Understand; K3 – Apply; K4 - Analyze</b>		

**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 - Rafeeqe Ahammed (Selected poetries – Thoramazha, Madhuranarangakal, Athrayum, Umma, Pakaram)	12
IV	Poetry-RafeeqeAhammed(Selectedpoetries-Ammathottil, Vidhyalayam,	12
V	Thottakutty, Sivakami, Ithanu prarthana)	12
<b>Total Hours</b>		<b>60</b>

<b>Text Books</b>	
1.	Sishyanum makanum - Vallaththol Narayana Menon, Poorna Publishers.
2.	Rafeeqe Ahammed – Selected poetries , Mathrubhumi Books, Kozhikkode
3.	Aayisha – Vayalar Ramavarma - Kerala Book Store Publishers.
<b>Reference Books</b>	
1.	Kavitha Sahithya Charitram - Dr. M. Leelavathi (Kerala Sahithya Academy, 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 Sahithya Charithram – T. M. Chummar (Kerala Sahithya Academy, 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
<b>K1 - Remember; K2 - Understand; K3 – Apply;K4- Analyse</b>		

**Part – I: Language – I****French – III**

<b>Unit</b>	<b>Content</b>	<b>No. of Hours</b>
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)		
<b>Total Hours</b>		<b>60</b>

<b>Text Book</b>	
1.	Luca Giachino, Carla Baracco, Romain Chrétien(DELFF), 2022, Nouvelle Génération A1, Didier FLE
<b>Reference Book</b>	
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
<b>K1 Remember; K2 Understand; K3 Apply</b>		

**Language II: Part II - English III**

Unit	Content	No. of Hours
I	<b>Biographies : Patriotism</b> 1. Nehru – AF Toynbee 2. Martin Luther King – R N Roy 3. C.V. Raman – H. Kusumakar	12
II	<b>Renowned Speeches : Empowerment</b> 1. UN Youth Assembly Speech - Malala Yousafzai 2. Give Us a Role Model - A.P.J. Kalam 3. Inaugural Address Nelson Mandela	12
III	<b>Grammar</b> 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	<b>Listening and Speaking Skills:</b> 1. <b>Group Discussion:</b> 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. <b>Group Dynamics (Nonverbal and Behavioural Aspects):</b> Body Language, Personal Appearance, Posture, Gestures, Facial Expression, Eye Contact, Space Distancing 3. <b>Paralinguistic Cues:</b> Tone, Pitch, Volume, Speed (rate of speech), Pauses, Stress and Intonation.	12
V	<b>Reading and Writing Skills : Digital Communication</b> 1. <b>Reading and Understanding Digital Texts:</b> Skills for Analysing Digital Texts (connotative and denotative skills). 2. <b>Introduction to Digital Writing:</b> 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
<b>Total Hours</b>		<b>60</b>

**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. <a href="https://www.un.org/en/events/malalayousafzaispeech">https://www.un.org/en/events/malalayousafzaispeech</a>
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 (3 <sup>rd</sup> ed.). Oxford University Press India.
8.	Butterfield, J. (2023). Written Communication: Soft Skills for a Digital Workplace (3 <sup>rd</sup> ed.). Cengage India.

**Web Resources (Swayam / NPTEL)**

1.	<a href="https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_hs08">https://onlinecourses.swayam2.ac.in/e-learning/preview/cec26_hs08</a>
2.	<a href="https://onlinecourses.nptel.ac.in/noc26_hs111/preview">https://onlinecourses.nptel.ac.in/noc26_hs111/preview</a>

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
<b>K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze</b>		

### 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

**Core - V: Analog and Digital Communication**

Unit	Content	No. of Hours
I	<b>Propagation of Waves:</b> 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	<b>Analog Communication Systems:</b> 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	<b>Digital Communication Systems:</b> Representation of Data Signal – Serial and Parallel Data Transmission - Model of Digital Communication System – <b>Elements of Digital Communication System:</b> 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	<b>Pulse Modulation and Quantization:</b> 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	<b>Digital Data Communication:</b> 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
<b>Total Hours</b>		<b>90</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTEL / Others)</b>		
1.	<a href="https://onlinecourses.nptel.ac.in/noc26_ee03/preview">https://onlinecourses.nptel.ac.in/noc26_ee03/preview</a>	
2.	<a href="https://aierrorcorrectioncodes.com/">https://aierrorcorrectioncodes.com/</a>	

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
<b>K2 - Understand; K3 - Apply; K4 – Analyze</b>		

### 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

### Core - VI: IC's and Instrumentation

Unit	Content	No. of Hours
I	<b>Integrated Circuits Fabrication:</b> 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	<b>Operational Amplifier and Characteristics:</b> Basic information of Op-Amp - Ideal Characteristics of Op-Amp - Inverting Amplifier and Non-Inverting Amplifier - Voltage Follower – Differential Amplifier - Common Mode Rejection Ratio – <b>DC Characteristics:</b> Input Bias Current - Input Offset Current – Input Offset Voltage – Thermal Drift – <b>AC Characteristics:</b> Frequency Response – Slew Rate.	18
III	<b>Operational Amplifier Applications:</b> 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 - <b>Comparator and Waveform Generators:</b> Op-amp as Comparator – Zero Crossing Detector – Time Marker Generator – Regenerative Comparator – Astable Multivibrator – Monostable Multivibrator – Triangular Wave Generator	18
IV	<b>Timer:</b> 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 – <b>Phase Locked Loop:</b> Functional Block Diagram – Phase Detector / Comparator –Voltage Controlled Oscillator – Low Pass Filter – Applications: Frequency Multiplier / Division – AM Detection	18
V	<b>Transducers:</b> 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
<b>Total Hours</b>		<b>90</b>
<b>Text Books</b>		
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 Instrumentations, Dhanpat Rai & Co. Publishers, 18 <sup>th</sup> Edition.	
<b>Reference Books</b>		
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, 4 <sup>th</sup> edition.	
<b>Web Resources (Swayam / NPTEL / Others)</b>		
1.	<a href="https://nptel.ac.in/courses/108/108/108108111/">https://nptel.ac.in/courses/108/108/108108111/</a>	
2.	<a href="https://evelta.com/blog/smart-sensors-and-ai-a-synergistic-relationship/?srsltid=AfmBOopcrNhrS05PVI8UYFPQZMBFSPdpD3gjB-GRr3MTQRdYfyFnqL">https://evelta.com/blog/smart-sensors-and-ai-a-synergistic-relationship/?srsltid=AfmBOopcrNhrS05PVI8UYFPQZMBFSPdpD3gjB-GRr3MTQRdYfyFnqL</a>	

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	
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
1.	Andreas Molosch, F (2013) Wireless Communications, Wiley-India Edition Ltd.	
2.	Kennedy. Davis (2018) Electronic Communication Systems -Tata McGraw-Hill Publishing Company Limited.	
<b>Web Resources (Swayam / NPTEL / Others)</b>		
1.	<a href="https://onlinecourses.nptel.ac.in/noc26_ee03/preview">https://onlinecourses.nptel.ac.in/noc26_ee03/preview</a>	

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 are available 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
<b>K2 - Understand; K3 - Apply; K4 – Analyze</b>		

## 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
<b>3 - Substantial (high)</b>		<b>2 - Moderate (medium)</b>		<b>1 - Slight (low)</b>	

**Allied - III: Programming in C**

Unit	Content	No. of Hours
I	<b>Fundamentals of Computers:</b> 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	<b>Overview of C:</b> Introduction - Character set - C tokens - keyword & Identifiers - Constants - Variables - Data types - Declaration of variables - Assigning values to variables - Defining Symbolic Constants - Arithmetic, Relational, Logical, Assignment, Conditional, Bitwise, Special, Increment and Decrement operators - Arithmetic Expressions - Evaluation of expression - precedence of arithmetic operators - Type conversion.	12
III	<b>Decision Making and Branching:</b> Introduction – if, if... else, nesting of if ...else statements- else if ladder – The switch statement, The?: Operator – The goto Statement. <b>Decision Making and Looping:</b> Introduction- The while statement- the do statement – the for statement-jumps in loops. Arrays – Character Arrays and Strings.	12
IV	<b>User-Defined Functions:</b> Introduction – Need and Elements of User-Defined Functions- Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions – Recursion.	12
V	<b>Pointers:</b> Introduction-Understanding pointers -Accessing the address of a variable Declaration and Initialization of pointer Variable – Accessing a variable through its pointer Chain of pointers- Pointer Expressions – Pointer Increments and Scale factor. Pointers and Arrays. Basics of file management.	12
<b>Total Hours</b>		<b>60</b>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTEL / Others)</b>		
1.	<a href="https://nptel.ac.in/courses/106105171">https://nptel.ac.in/courses/106105171</a>	
2.	<a href="https://nptel.ac.in/courses/106104128">https://nptel.ac.in/courses/106104128</a>	
3.	<a href="https://www.ibm.com/think/topics/artificial-intelligence">https://www.ibm.com/think/topics/artificial-intelligence</a>	

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 Oser, Hugh Blemings., (2010) Practical Arduino: Cool Projects for Open Source Hardware, Apress Publications.

#### Web Resources (Swayam / NPTEL / Others)

1.	<a href="http://www.digimat.in/nptel/courses/video/106105159/L16.html">http://www.digimat.in/nptel/courses/video/106105159/L16.html</a>
2.	<a href="http://www.digimat.in/nptel/courses/video/106105159/L17.html">http://www.digimat.in/nptel/courses/video/106105159/L17.html</a>

## 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	<b>Indian Knowledge Systems (IKS) Basic Concepts</b> - 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	<b>Indian Culture, Art &amp; Architecture</b> - 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	<b>Vedic Mathematics</b> - 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	<b>Science and Technology in Indian Knowledge System</b> - 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	<b>History of Trade and Commerce in Ancient India</b> - Introduction - Indigenous Banking System - Rise of Intermediaries - Transport - Major Trade Centres - Major Exports and Imports - Position of Indian Subcontinent in World Economy.
6	<b>Indigenous Agriculture in IKS</b> - 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	<b>Traditional Water Management Systems of India</b> - Introduction - Traditional Water Management Systems - Northern Region - North Western Region - North Eastern Region - Central Indian Region - Southern Indian Region.
8	<b>Traditional Foods and Festival of India</b> - 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	<b>Sports in India-From Ancient Period to Modern Period</b> - Introduction - Indus Valley Civilization - Early Hindu Period/ Epic Period - Traditional Indoor and Outdoor Games - British Period - Post Independence - Modern Period.
10	<b>Nobel Laureates of Indian Origin &amp; Inspiring Scientists of India and their Contributions</b> - History of the Nobel Prize - Nobel Prize Insignia - Indian Nobel Prize winners and their Biography - Inspiring Scientists and their Contributions.

### Reference Resources

1.	<a href="https://www.education.gov.in/shikshakparv/docs/background_note_Stimulating_Indian_Knowledge_Systems_Arts_Culture.pdf">https://www.education.gov.in/shikshakparv/docs/background_note_Stimulating_Indian_Knowledge_Systems_Arts_Culture.pdf</a>
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						
	CIA	ESE	CIA		Model		Attendance	Active Engagement	Total
100	25	75	Actual	Weightage	Actual	Weightage	5	5	25
			50	5	75	10			

### Question Paper Pattern

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

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

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

### 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
<b>Total Marks - CIA</b>					<b>40</b>
ESE	3	50	10	-	60

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

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

