



**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

# **Choice Based Credit System & Outcome Based Education Syllabus**

**Batch 2026 - 29**

**Programme: B.Sc. Electronics and Communication  
Systems**

**Programme Code: BEC**

# **Semester 1**



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### Regulations 2026 - 27 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 2026 - 27 Onwards)**

#### Eligibility

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

#### Program Learning Outcomes (PLOs)

The successful completion of 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
III	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		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
26TAM11L	I	Language - I	Tamil – I	4	3	25	75	100	3
26HIN11L	I		Hindi – I						
26MAL11L	I		Malayalam – I						
26FRE11L	I		French – I						
26ENG12L	II	Language - II	English – I	4	3	25	75	100	3
26BEC13C	III	Core - I	Basic Electronics	4	3	25	75	100	4
26BEC14C	III	Core - II	Semiconductor Devices	4	3	25	75	100	4
26BEC15P	III	Core Lab - I	Basic Electronics Lab	3	3	40	60	100	2
26BEC16P	III	Core Lab - II	Semiconductor Devices Lab	3	3	40	60	100	2
26BEC17A	III	Allied - I	Mathematics – I	4	3	25	75	100	3
26ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
26SOF1AE	IV	AECC - I	Soft Skills	2	2	-	50	50	2
<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	
	I	Language – II	Tamil – II	4	3	25	75	100	3
	I		Hindi – II						
	I		Malayalam – II						
	I		French – II						
	II	English – II	English – II	4	3	25	75	100	3
	III	Core – III	Digital Principles and Applications	5	3	25	75	100	4
	III	Core – IV	Electronic Circuits	5	3	25	75	100	4
	III	Core Lab– III	Digital Electronics Lab	4	3	40	60	100	3
	III	Allied – II	Mathematics – II	4	3	25	75	100	3
	IV	FC – II	Human Rights / Disaster Management	2	2	50	-	50	2
	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	Hrs. / week	Examination				Credits
					Duration in hrs.	Max Marks			
						CIA	ESE	Total	
	I	Language – I	Tamil – III	4	3	25	75	100	3
	I		Hindi – III						
	I		Malayalam – III						
	I		French – III						
	II	Language – II	English – III	4	3	25	75	100	3
	III	Core – V	Analog and Digital Communication	6	3	25	75	100	4
	III	Core – VI	IC's and Instrumentation	6	3	25	75	100	4
	III	Core Lab– IV	Electronic Communication Lab	4	3	40	60	100	2
	III	Allied – III	Programming in C	4	3	25	75	100	3
	III	SEC – I	Arduino Programming Essentials Lab	2	3	40	60	100	2
	IV	FC – III	Basic Tamil /	-	2	50	-	50	2
			Advanced Tamil/						
			Indian Knowledge Systems (IKS)						
	IV	AECC – III	Online Course – MOOC	-	-	50	-	50	2
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

Semester – 4									
Course Code	Part	Course Category	Course Name	Hrs./ week	Examination			Credits	
					Duration in hrs.	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
	V	Extra-curricular and 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	Hrs./ week	Examination			Credits	
					Duration in hrs.	Max Marks			
						CIA	ESE		Total
	III	Core – IX	Industrial and Power Electronics	5	3	25	75	100	4
	III	Core – X	Internet of Things and Applications	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 and Applications Lab	5	3	40	60	100	3
	III	Elective - I:	Satellite and Network Communication <b>(Communication Systems)</b>	5	3	25	75	100	3
			Automotive Electronics <b>(Embedded Systems)</b>						
			Virtual Instrumentation <b>(Electronic Systems)</b>						
	III	Internship	SEC – III: Internship	-	2	50	-	50	2
<b>Total</b>				<b>30</b>				<b>650</b>	<b>23</b>

Semester – 6									
Course Code	Part	Course Category	Course Name	Hrs./ week	Examination			Credits	
					Duration in hrs.	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 (Communication Systems)	5	3	25	75	100	3
Medical Electronics (Embedded Systems)									
VLSI Design (Electronic Systems)									
	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

Semester – 1									
Course Code	Part	Course Category	Course Name	Hrs./ week	Examination			Credits	
					Duration in hrs.	Max Marks			
						CIA	ESE		Total
26TAM11L	I	Language - I	Tamil – I	4	3	25	75	100	3
26HIN11L	I		Hindi – I						
26MAL11L	I		Malayalam – I						
26FRE11L	I		French – I						
26ENG12L	II	Language - II	English – I	4	3	25	75	100	3
26BEC13C	III	Core - I	Basic Electronics	4	3	25	75	100	4
26BEC14C	III	Core - II	Semiconductor Devices	4	3	25	75	100	4
26BEC15P	III	Core Lab - I	Basic Electronics Lab	3	3	40	60	100	2
26BEC16P	III	Core Lab - II	Semiconductor Devices Lab	3	3	40	60	100	2
26BEC17A	III	Allied - I	Mathematics – I	4	3	25	75	100	3
26ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
26SOF1AE	IV	AECC - I	Soft Skills	2	2	-	50	50	2
<b>Total</b>				<b>30</b>				<b>800</b>	<b>25</b>

**Part – I : Language I – Tamil – I**

(All the Undergraduate Programmes)

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

**Course Objectives**

The Course intends to cover

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

**Course Learning Outcomes**

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

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

## Part – I: Language – I : தமிழ் – I

Unit	Content	No. of Hours
I	<p><b>நாட்டுப்பற்று</b></p> <p>1. பாரதியார் - உலகத்தை நோக்கி வினவுதல்</p> <p>2. பாரதிதாசன் - தமிழ்ப்பேறு</p> <p>3. கவிமணி - ஒற்றுமையே உயிர்நிலை</p> <p>4. தேவதேவன் - சாலையும் மரங்களும் செருப்பும், புதிய வீடு</p> <p>5. அப்துல் ரகுமான் - போட்டி, பாதை</p> <p>6. கவிஞர் வாலி - புத்தகச் சந்தை</p>	14
II	<p><b>சமூகம்</b></p> <p>1. ஈரோடு தமிழன்பன் - எட்டாவது சீர்...</p> <p>2. கவிஞர் தாமரை - தொலைந்து போனேன்</p> <p>3. நா. காமராசன் - திருநங்கைகள் காகிதப் பூக்கள்</p> <p>4. வைரமுத்து - மரங்களைப் பாடுவேன்</p> <p>5. அமுத பாரதி - புள்ளிப் பூக்கள் (ஹைக்கூ)</p> <p>6. நாட்டுப்புறப் பாடல்கள் (தாலாட்டுப் பாடல் , தெம்மாங்கு பாடல் , உழவுத்தொழில்)</p>	14
III	<p><b>வாழ்வியல்</b></p> <p><b>சிறுகதை</b></p> <p>1. காஞ்சனை - புதுமைப்பித்தன்</p> <p>2. சோற்றுக் கணக்கு - ஜெயமோகன்</p> <p>3. மரத்தைக் கர்ப்பம் சுமந்தவள் - ஆண்டாள் பிரியதர்சினி</p> <p><b>குறுநாவல்</b></p> <ul style="list-style-type: none"> <li>ஆயிஷா – இரா.நடராசன்</li> </ul>	12
IV	<p><b>இலக்கிய வரலாறு</b></p> <p>1. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும்</p> <p>2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்</p> <p>3. ஹைக்கூ கவிதையின் தோற்றமும் வளர்ச்சியும்</p> <p>4. சிறுகதையின் தோற்றமும் வளர்ச்சியும்</p>	10
V	<p><b>இலக்கணம் மற்றும் படைப்பாற்றல்</b></p> <p>1. எழுத்துகள் (முதல் எழுத்துகள், சார்பெழுத்துகள்)</p> <p>2. எழுத்துக்களின் பிறப்பு</p> <p>3. மாத்திரைகள்</p> <p>படைப்பாற்றல் திறன்(சிறுகதை மற்றும் புதுக்கவிதைப் படைத்தல்)</p>	10
Total Hours		<b>60</b>

**Reference Books**

1	பேரா. குருசாமி, ம.ரா.போ. (2014), பாரதி பாடல்கள், ஆய்வுப் பாதிப்பு, தமிழ்ப் பல்கலைக் கழகம், தஞ்சாவூர்.
2	அப்துல் ரகுமான்,(2000), ஆலாபனை, கவிக்கோ பதிப்பகம்.
3	தாமரை, (1995), ஒரு கதவும் கொஞ்சம் கள்ளிப்பாலும் கவிதை தொகுப்பு, காந்தளகம் பதிப்பகம், சென்னை.
4	வரதராசனார் மு, (2021), தமிழ் இலக்கிய வரலாறு, சாகித்ய அகாடமி பதிப்பு.
5	முனைவர் பஞ்சாங்கம் கா, (2017), தமிழ் இலக்கிய வரலாறு, காவ்யா பதிப்பகம்.
6	முனைவர் வேங்கடராமன் கா. கோ (2008), தமிழ் இலக்கிய வரலாறு, கலையக வெளியீடு.
7	ஜெயமோகன், (2024), அறம் (சிறுகதை), விஷ்ணுபுரம் பதிப்பகம்.
8	இரா.நடராசன், (2022) ஆயிஷா, பாரதி புத்தகாலயம்.
9	குமரன் கோ (2010), தமிழ் இலக்கணம் எளிய அறிமுகம் , சந்தியா பதிப்பகம்.
10	சக்திவேல் சு,(2012), நாட்டுப்புறவியல், மணிவாசகர் பதிப்பகம்.

**Part – I : Language I – Hindi – I**

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

**Course Objectives**

The Course intends to Cover

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

**Course Learning Outcomes**

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

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

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

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

**Reference Book**

1	Naveenhindivyakaran, 2002,Dakshin Bharat Hindi Prachar, Sabha,Chennai–600017
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**Part – I: Language – I - Malayalam – I**

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

**Course Objectives**

The Course intends to Cover

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

**Course Learning Outcomes**

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

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

**Part – I: Language – I - Malayalam – I**

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

**Text Books**

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

**Reference Books**

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

## Part – I : Language I – French - I

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

### Course Objectives

The Course intends to cover

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

### Course Outcomes

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

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

**Part – I: Language – I French – I**

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

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

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

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

**Course Objectives**

The course intends to cover

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

**Course Learning Outcomes**

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

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

**Language II : 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 Bird Sanctuary - Sarojini Naidu 3. Stopping by Woods on a Snowy Evening – Robert Frost	12
II	<b>Short Stories: Morality</b> 1. The Necklace – Guy de Maupassant 2. The Taxi Driver – K.S. Duggal 3. The Monkey’s Paw - W. W. Jacobs	12
III	<b>Grammar</b> 1. <b>Nouns:</b> Types, Singular vs. Plural forms, Case and Gender, Common errors with nouns 2. <b>Pronouns:</b> Types, Personal, Possessive, Reflexive, Intensive (Emphatic), Demonstrative, Relative, Interrogative, Indefinite, and Reciprocal pronouns, Common errors with pronouns 3. <b>Verbs:</b> Action verbs and linking verbs, Transitive and intransitive verbs, Auxiliary verbs and Modal verbs, Verb tenses, Common errors with verbs	12
IV	<b>Language Competency: Vocabulary</b> 1. <b>Vocabulary:</b> Synonyms, Antonyms, Guessing meaning from context, 2. <b>Word Formation:</b> Homonyms, Homophones, Homographs, Portmanteau words, Collocations, Compounding Words, Root Words, Prefixes and Suffixes, Clipping, Acronym, Abbreviations, Reduplication	12
V	<b>English for Communication</b> 1. Listening for General and Specific Information. 2. Self - Introduction, Introducing others, Greetings. 3. Intensive Reading - a prose passage, a poem and a short story 4. Descriptive writing – writing descriptive essays in two to three paragraphs.	12
<b>Total Hours</b>		<b>60</b>
<b>Reference Books</b>		
1.	Carter, R., McCarthy, M., Mark, G., & O’Keeffe, A. (2016). English Grammar Today. Cambridge University Press.	
2.	Swan, M. (2021). Practical English Usage (4 <sup>th</sup> ed.). Oxford University Press.	
3.	McCarthy, M., & O’Dell, F. (2017). English Vocabulary in Use: Advanced (3 <sup>rd</sup> ed.). Cambridge University Press.	
4.	Ramazani, J., Ellmann, R., & O’Clair, R. (Eds.). (2003). The Norton Anthology of Modern and Contemporary Poetry (Vols. 1–2). W. W. Norton & Company.	
5.	Wren, P. C., & Martin, H. (2015). High School English Grammar and Composition (50 <sup>th</sup> ed.). S. Chand & Company.	
6.	Jones, L. (2015). Cambridge English for Life Skills. Cambridge 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
26BEC13C	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 Kirchoff'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 – Artificial Intelligence in Electronics	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- Star and Delta Conversion - 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>
<b>Text Books</b>		
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.	
<b>Reference Books</b>		
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.	
<b>Web Resources (Swayam / NPTELs / Others)</b>		
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>	
3.	<a href="https://www.tpointtech.com/artificial-intelligence-in-electronics-engineering">https://www.tpointtech.com/artificial-intelligence-in-electronics-engineering</a>	

Course Code	Course Name	Category	Hours / Week	Credits
26BEC14C	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
<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>	

**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- <b>FET:</b> N – Channel JFET Construction, Operation and Characteristics - FET as a Voltage Variable Resistor – <b>MOSFET:</b> Depletion Type MOSFET - Enhancement Type MOSFET	12
IV	<b>Power Electronics:</b> Silicon Controlled Rectifier (SCR) – construction – SCR operation – VI characteristics of SCR – <b>DIAC:</b> construction – VI characteristics of DIAC. <b>TRIAC:</b> construction – VI characteristics of TRIAC – Applications of SCR, DIAC, TRIAC. <b>Unijunction Transistor (UJT):</b> 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 - Industry 5.0 : AI – Based Smart Solar Energy Systems	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 / Others )</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>	
3.	<a href="https://sunifysolar.in/blog-detail/what-are-ai-solar-panels-the-future-of-smart-solar-energy">https://sunifysolar.in/blog-detail/what-are-ai-solar-panels-the-future-of-smart-solar-energy</a>	

Course Code	Course Name	Category	Hours / Week	Credits
26BEC15P	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 / Others)**

- |    |   |
|----|---|
| 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
26BEC16P	Semiconductor Devices Lab	Core Lab - II	3	2

<b>Semiconductor Devices Lab (Any 10 Practical's)</b>	
<ol style="list-style-type: none"> <li>1. Introduction to Semiconductor Devices Lab</li> <li>2. V-I Characteristics of Junction Diode</li> <li>3. Clipping and Clamping Circuits</li> <li>4. V-I Characteristics of Zener Diode</li> <li>5. Zener diode as a Voltage regulator</li> <li>6. Transistor Characteristics of CE Configuration</li> <li>7. Transistor Characteristics of CB Configuration</li> <li>8. Stability Factor of Fixed Bias and Self bias</li> <li>9. V-I Characteristics of JFET</li> <li>10. V-I Characteristics of UJT</li> <li>11. UJT as Relaxation Oscillator</li> <li>12. Characteristics of SCR and TRIAC</li> <li>13. Characteristics of LDR and Solar Cell</li> <li>14. Study of LED and 7 Segment display</li> </ol>	
<b>Total Hours</b>	<b>45</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 / Others)</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
26BEC17A	Mathematics - I	Allied - I	4	3

### Course Objectives

The course intends to cover

- The fundamental tools to analyze and solve problems related to circuit and differential equations.
- The concept of fourier transforms and laplace transforms in detail

### Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Recall the concepts of the 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	Apply and Analyze Fourier Transformation techniques to solve mathematical problem	K3 & K4
<b>K1 - Remember;K2 - Understand;K3 - Apply;K4 - Analyze</b>		

### CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	1	1	1	1
CLO2	3	2	1	1	1
CLO3	2	2	2	3	1
CLO4	3	2	1	2	1
CLO5	1	1	2	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> Matrices – Types of Matrices - Operations of Matrix - Rank of Matrix - Characteristics Roots and Vectors- Inverse of Matrix -Matrices in Machine Learning	12
II	<b>Vector Calculus:</b> Introduction-Dot product - Cross product -Vector differentiation- Gradient, Divergence and Curl.	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> Fourier Series – Change of Interval- Odd and Even Functions - Half Range Series.	12
V	<b>Fourier Transforms:</b> Fourier Transform Pair- Inverse Formula for Fourier Transform- Properties of Fourier Transform - Convolution Theorem- Fourier Sine and Cosine Transform.	12
<b>(Problems - 80% &amp; Theory - 20%)Total Hours</b>		<b>60</b>
<b>Text Books</b>		
1.	Navnithan. P.A.(2017), Lakshmi M.S.V, Business Mathematics and Statistics,Jai Publishers. Unit I: Chapter 5: P.No: 5.1 – 5.37, 5.50-5.75 Unit I: Chapter 4: P. No:180-182	
2.	Venkatraman M. K. (2012). Engineering Mathematics Vol II, The National Publishing Company. Unit II: Chapter 2: Section: 1.1 – 1.6 Chapter 2: Section 2.1-2.3,2,7 Chapter 2 Section: 3.1-3.3, 3.5-3.7, 3.9, 3.12,3.15	
3.	Venkatraman. M. K. (2000), Engineering Mathematics III A,The National Publishing Company. Unit III: Chapter 1: Section: 1 – 20	
4.	Balaji. G, (2021).Transforms and Partial Differential Equations, Balaji Publishers. Unit IV: Chapter 2: Section: 2.1 – 2.3 Unit V: Chapter 4: Section: 4.2 –4.3	
<b>Reference Books</b>		
1.	Balaji G (2019), Vector Calculus, Balaji Publishers.	
2.	Venkatraman M.K. (2010), Higher Mathematics for Engineering & Science. The National Publishing Company.	
<b>Web Resources (Swayam / NPTEL / Others)</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>	
3.	<a href="https://medium.com/@bibhutibora123/matrices-in-machine-learning-5a1dbec74dc9">https://medium.com/@bibhutibora123/matrices-in-machine-learning-5a1dbec74dc9</a>	

**Part – IV : Foundation Course**

(All the Undergraduate Programmes)

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

Unit	Content
I	The Multidisciplinary nature of environmental studies Definition; Scope and importance, Need for public awareness.
II	<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: -             <ul 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> </ul> </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: habital 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: -               <ul 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> </ul> </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> 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> <p>1. Introduction to Biosafety</p> <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> <p>2. Biological Hazards and Risk Assessment</p> <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> <p>3. Biological Waste Management</p> <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> <p>4. Standard Operating Procedures (SOPs) and Safety Practices</p> <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>	
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>	

**Part – IV : Ability Enhancement Compulsory Course(AECC)****(All the Undergraduate Programmes)**

Course Code	Course Name	Category	Hours / Week	Credits
26SOF1AE	Soft Skills	AECC - I	2	2

**Course Objectives**

The course intends to cover

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

**Course Learning Outcomes**

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

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

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

Unit	Module	Details	No. of Hours	
I	<b>Presentation Skills</b>			6
	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).		
	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.		
II	<b>Confidence</b>			6
	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).		
	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
III	<b>Creativity</b>		
	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.	
IV	<b>Problem-Solving</b>		
	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.	
V	<b>Critical Thinking</b>		
	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			Weightage
		Practical Exam	Record	Total Marks	
Test	2	50	-	50	10
Model	3	60	-	60	15
Experiments Completed	-	-	-	10	10
Observation Not	-	-	-	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		Total
50	50	-	Actual	Weightage	Actual	Weightage	
			50	25	50	25	50

**Question Paper Pattern**

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

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

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

