KG College of Arts and Science
Autonomous Institution | Affiliated to Bharathiar University
ISO 9001-2015 Certified Institution
KGiSL Campus, Saravanampatti, Coimbatore – 641 035

Regulations 2024 - 25 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 2024 - 25 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 / 2024 / 9206 dated 24/05/2024).

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	4	4 X 4	16	4 X 3	12	12	1 – 4
II	English	4	4 X 4	16	4 X 3	12	12	1 – 4
III	Core Theory (4 hrs. / week)	2	2 X 4	8	2 X 4	8	100	1
	Core Theory (5 hrs. / week)	6	6 X 5	30	6 X 4	24		2, 3, 5
	Core Theory (6 hrs. / week)	3	3 X 6	18	3 X 4	12		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 (5 hrs. / week)	4	4 X 5	20	4 X 3	12		3, 5, 6
	Core Lab (6 hrs. / week)	1	1 X 6	6	1 X 4	4		4
	Allied (4 hrs. / week)	2	2 X 4	8	2 X 3	6		1, 2
	Allied (5 hrs. / week)	1	1 X 5	5	1 X 3	3		3
	Allied (6 hrs. / week)	1	1 X 6	6	1 X 3	3		4
	Allied Lab (3 hrs. / week)	1	1 X 3	3	1 X 2	2		3
	Electives (5 hrs. / week)	2	2 X 5	10	2 X 3	6		5, 6
	Project	1	1 X 6	6	1 X 5	5		6
	Internship (IT)	1	-	-	1 X 2	2		5
	Skill Enhancement (SEC)	3	3 X 2	6	3 X 2	6		3,4, 6
IV	Foundation Course (FC)	3	3 X 2	6	3 X 2	6	14	1 – 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 - Extension Activity		-	-	1 X 2	2	2	4
Total		**46**		**180**		**140**	**140**	

Consolidated Semester wise and Component wise Hours and Credits Distribution

Semester	Part I		Part II		Part III		Part IV		Part V		Total	
	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	Hrs.	Credits	**Hrs.**	**Credits**
1	4	3	4	3	18	15	4	4	-	-	**30**	**25**
2	4	3	4	3	18	14	4	4	-	-	**30**	**24**
3	4	3	4	3	20	14	2	4	-	-	**30**	**24**
4	4	3	4	3	20	13	2	2	-	2	**30**	**23**
5	-	-	-	-	30	23	-	-	-	-	**30**	**23**
6	-	-	-	-	30	21	-	-	-	-	**30**	**21**
Total	**16**	**12**	**16**	**12**	**136**	**100**	**12**	**14**	**-**	**2**	**180**	**140**

Curriculum
B.Sc. Electronics and Communication Systems

Semester – 1									
Course Code	**Part**	**Course Category**	**Course Name**	**Hrs. / week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM11L	I	Language - I	Tamil – I	4	3	25	75	100	3
24HIN11L	I		Hindi – I						
24MAL11L	I		Malayalam – I						
24FRE11L	I		French – I						
24ENG12L	II	English - I	English – I	4	3	25	75	100	3
24BEC13C	III	Core - I	Basic Electronics	4	3	25	75	100	4
24BEC14C	III	Core - II	Semiconductor Devices	4	3	25	75	100	4
24BEC15P	III	Core Lab - I	**Lab:** Basic Electronics	3	3	40	60	100	2
24BEC16P	III	Core Lab - II	**Lab:** Semiconductor Devices	3	3	40	60	100	2
24BEC17A	III	Allied - I	Mathematics - I	4	3	25	75	100	3
24ENV1FC	IV	FC – I	Environmental Studies	2	2	50	-	50	2
24QUA1AE	IV	AECC - I	Quantitative Aptitude	2	2	-	50	50	2
Total				**30**				**800**	**25**

Semester – 2									
Course Code	**Part**	**Course Category**	**Course Name**	**Hrs. / week**	**Examination**				**Credits**
					Duration in hrs.	**Max Marks**			
						CIA	**ESE**	**Total**	
24TAM21L	I	Language – II	Tamil – II	4	3	25	75	100	3
24HIN21L	I		Hindi – II						
4MAL21L	I		Malayalam – II						
24FRE21L	I		French – II						
24ENG22L	II	English – II	English – II	4	3	25	75	100	3
24BEC23C	III	Core – III	Digital Principles and Applications	5	3	25	75	100	4
24BEC24C	III	Core – IV	Electronic Circuits	5	3	25	75	100	4
24BEC25P	III	Core Lab– III	**Lab:** Digital Electronics	4	3	40	60	100	3
24BEC26A	III	Allied – II	Mathematics - II	4	3	25	75	100	3
24HUM2FC	IV	FC – II	Human Rights	2	2	50	-	50	2
24SOF2AE	IV	AECC – II	Soft Skills	2	2	-	50	50	2
Total				**30**				**700**	**24**

Semester 1

Part – I : Language I

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hrs. / Week	Credits
24TAM11L	Tamil - I	Part - I	4	3

Course Objectives

The course intends to cover

- இலக்கிய வளர்ச்சியை அறிந்துகொள்ளுதல்
- 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 அறிந்துகொள்ளுதல்.	K2, K3
CLO3	சிறந்த படைப்பாளர்களின் சிறுகதையில் வெளிப்படும் சமூகச்சிந்தனைகளை அறிந்து விழிப்புணர்வைப் பெறுதல்.	K3
CLO4	தற்கால இலக்கியங்களான புதுக்கவிதை, சிறுகதை தோன்றி வளர்ந்த பின்புலத்தை அறிதல்.	K1, K3
CLO5	மொழியைப் பிழையின்றி பேச, எழுத, கற்கத் தேவையான தமிழ் இலக்கணத்தின் இன்றியமையாமையை உணர்தல். நடைமுறை வாழ்வியலுக்குத் தேவைப்படும் ஆங்கிலக் கடிதத்தைத் தமிழாக்கம் செய்தலுக்கான பயிற்சி பெறுதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part – I: Tamil – I

Unit	Content	No. of Hours
I	**(நாட்டுப்பற்று)** 1. உலகத்தை நோக்கி வினவுதல் - பாரதியார் 2. பாரதிதாசன் கவிதைகள் - பாரதிதாசன் • தமிழ்ப்பேறு 3. ஒற்றுமையே உயிர்நிலை - கவிமணி 4. தேவதேவன் கவிதைகள் - தேவதேவன் • சாலையும் மரங்களும் செருப்பும் • புதிய வீடு 5. ஆலாபனை - கவிக்கோ அப்துல் ரகுமான் • போட்டி • பாதை 6. புத்தகச் சந்தை - கவிஞர் வாலி	14
II	**(சமூகம்)** 1. எட்டாவது சீர்..... - ஈரோடு தமிழன்பன் 2. தொலைந்து போனேன் - கவிஞர் தாமரை 3. திருநங்கைகள் காகிதப் பூக்கள் - நா. காமராசன் 4. மரங்களைப் பாடுவேன் - வைரமுத்து 5. புள்ளிப் பூக்கள் (ஹைக்கூ) - அமுத பாரதி 6. நாட்டுப்புறப் பாடல்கள் • தாலாட்டுப் பாடல், தெம்மாங்கு பாடல், உழவுத்தொழில்	14
III	**(சிறுகதை)** 1. அகல்யை - புதுமைப்பித்தன் 2. சுமைதாங்கி - ஜெயகாந்தன் 3. அம்மா ஒரு கொலை செய்தாள் - அம்பை 4. சோற்றுக் கணக்கு - ஜெயமோகன் 5. தூரத்து உறவு - வைரமுத்து	12

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

Reference Books	
1	பாரதி பாடல்கள் ஆய்வுப் பதிப்பு, பேரா. ம ரா போ குருசாமி,(2016) தமிழ்ப் பல்கலைக் கழகம், தஞ்சாவூர்
2	ஆலாபனை, அப்துல் ரகுமான்,(2000) கவிக்கோ பதிப்பகம்
3	தாமரை கவிதைகள், தாமரை, (2012) நியூ செஞ்சுரி புக் ஹவுஸ்
4	தமிழ் இலக்கிய வரலாறு, மு வரதராசனார், (2021) சாகித்திய அகாதெமி பதிப்பு
5	புதிய வெளிச்சத்தில் தமிழ் இலக்கிய வரலாறு, முனைவர் க பஞ்சாங்கம், (2017) அன்னம் வெளியீட்டு
6	தமிழ் இலக்கிய வரலாறு, முனைவர் கா கோ வேங்கடராமன்,(2008) கலையக வெளியீடு
7	நல்ல தமிழ் எழுத வேண்டுமா?, அ கி பரந்தாமனார் எம். ஏ., (2002)அல்லி நிலையம்
8	100 சிறந்த சிறுகதைகள் (தொகுதி 1 & 2) தொகுப்பு: எஸ் ராமகிருஷ்ணன் (2006) பதிப்பகம்: தேசாந்திரி பதிப்பகம்
9	தமிழ் இலக்கணம் எளிய அறிமுகம் , கோ குமரன் (2010) சந்தியா பதிப்பகம்
10	நாட்டுப்புற இயல் ஆய்வு, சு சக்திவேல்,(2012) மணிவாசகர் பதிப்பகம்

Part – II : Language II - English -I

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24ENG12L	English - I	Part - II	4	3

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

Part - II: English - I

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

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

Course Code	Course Name	Category	Hours/ Week	Credits
24BEC13C	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, K4
CLO4	Summarize various network theorems for simplifying complex DC circuits and solving for voltages and currents.	K2
CLO5	Apply the understanding of sinusoidal waves (RMS and average values) to analyze AC circuits containing resistors, inductors, and capacitors in series, parallel, and combined configurations, and calculate real power.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** – Analyze		

CLO – PLO Mapping

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

Core - I: Basic Electronics

Unit	Content	No. of Hours
I	**Resistors & Inductors:** Types of Resistors: Fixed, Variable - Brief mention of their Construction and Characteristics - Color Coding of Resistors - Connecting Resistors in Series and Parallel. Types of Inductors: Fixed, Variable-Self and Mutual Inductance-Faraday's Law and Lenz's Law of Electromagnetic Induction-Inductance in Series and Parallel - Testing of Resistance and Inductance using Multimeter.	12
II	**Capacitors**: Principles of Capacitance-Parallel Plate Capacitor-Permittivity-Definition of Dielectric Constant - Dielectric Strength-Energy Stored in a Capacitor-Types of Capacitors: Air, Paper, Mica, Teflon, Ceramic, Plastic and Electrolytic- Construction and Application- Connecting Capacitors in Series and Parallel.	12
III	**Electrical Elements and Circuits:** Potential Difference- Electric Current-Electromotive Force-Ohms Law- Kirchoff's Voltage Law- Kirchoff's Current Law-Analysis of Resistance in Series Circuits, Parallel Circuits and Series Parallel Circuits-Concept of Voltage Source and Current Source-Voltage Source in Series and Current Source in Parallel-Simple Problems in DC Circuits.	12
IV	**Network Theorems:** Superposition Theorem - Thevenin Theorem-Thevenizing a Circuit with Two Voltage Sources - Bridge Circuit - Norton's Theorem - Thevenin Norton Conversion - Conversion of Voltage and Current Sources-Millman's Theorem-Maximum Power Transfer Theorem - Simple Problems in DC Circuits.	12
V	**AC Circuits:** Introduction to Sinusoidal Wave - RMS Value - Average Value - AC Circuits with Resistance-Circuits with XL Alone–Circuits with XC Alone-Series Reactance and Resistance - Parallel Reactance and Resistance - Series Parallel Reactance and Resistance - Real Power.	12
	Total Hours	**60**
Text Books		
1.	Sedha, R. S (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.	
2.	Mehta, V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.	
3.	Chakrabarti A (2008) Circuit Theory and Networks: Analysis and Synthesis. Hodder & Stoughton Publication.	
Reference Books		
1.	Bernard Grob (2009) Basic Electronics -Tata McGraw-Hill Publishing Company Limited.	
2.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.	
Web Resources (Swayam / NPTEL)		
1.	https://nptel.ac.in/courses/108/104/108104139/	
2.	https://nptel.ac.in/courses/108/101/108101091/	

Course Code	Course Name	Category	Hours/ Week	Credits
24BEC14C	Semiconductor Devices	Core - II	4	4

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

CLO – PLO Mapping

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

Core - II: Semiconductor Devices

Unit	Content	No. of Hours
I	**Semiconductor Theory:** Introduction - Structure of Semiconductor Materials – Energy Band Theory – Types of Semiconductor: Intrinsic and Extrinsic Semiconductor – Formation of PN Junction diode and characteristics - Application: Clipping and clamping circuit.	12
II	**Special Diodes:** Zener Diode - VI Characteristics – Zener diode as a voltage regulator - Backward Diode – Varactor Diode - Step Recovery Diode - Point Contact Diode – Schottky Diode - Tunnel Diode - Gunn Diode - PIN Diode.	12
III	**Transistor and FET Operation:** Introduction – Transistor Construction and Operation – CB, CE & CC Configurations –Transistor Comparison - Transistor Biasing: Self bias- feedback bias and voltage divider bias- FET: N – Channel JFET Construction, Operation and Characteristics - FET as a Voltage Variable Resistor – MOSFET: Depletion Type MOSFET - Enhancement Type MOSFET.	12
IV	**Power Electronics:** Silicon Controlled Rectifier (SCR) – construction – SCR operation – VI characteristics of SCR – DIAC: construction – VI characteristics of DIAC. TRIAC: construction – VI characteristics of TRIAC – Applications of SCR, DIAC, TRIAC. Unijunction Transistor (UJT): construction – operation – VI characteristics of UJT – UJT Relaxation Oscillator.	12
V	**Optoelectronic Devices:** LDR – Photo Diode - Photo Transistor – Solar Cell – Photo Multiplexer – LED – LCD - Seven Segment Display - IR Emitter – Optocouplers.	12
	Total Hours	**60**
Text Books		
1.	Mehta, V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.	
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2012) Electronic devices and circuits, TMH publishing company Ltd.	
Reference Books		
1.	Sedha, R. S. (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.	
2.	Robert L. Boylestad, Louis Nashelsky (2023) Electronic Devices and Circuit Theory, Pearson Prentice Hall.	
Web Resources (Swayam / NPTEL)		
1.	https://onlinecourses.nptel.ac.in/noc24_ee02/preview	
2.	https://onlinecourses.nptel.ac.in/noc24_ee27/preview	

Course code	Course Name	Category	Hours / Week	Credit
24BEC15P	Basic Electronics Lab	Core Lab - I	3	2

Basic Electronics Lab (Any 10 Practicals)

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

Total Hours	**45**

Text Books

1.	Sedha, R. S. (2012) A Text Book of Applied Electronics. S. Chand & Company Ltd.
2.	Mehta, V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.
3.	Chakrabarti A (2008) Circuit Theory and Networks: Analysis and Synthesis. Hodder & Stoughton Publication.

Reference Books

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

Web Resources (Swayam / NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credit
24BEC16P	Semiconductor Devices Lab	Core Lab - II	3	2

Semiconductor Devices Lab (Any 10 Practicals)

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

Total Hours	**45**

Text Books

1.	Mehta V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2012) Electronic devices and circuits, TMH publishing company Ltd.

Reference Books

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

Web Resources (Swayam / NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credits
24BEC17A	Mathematics - I	Allied - I	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.

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	Distinguish Gradient, Solenoidal, Curl.	K2
CLO3	Relate Laplace transforms in circuit problems.	K3
CLO4	Analyse Fourier Series in real time problems.	K4
CLO5	Correlate the ideas learnt in the complex numbers.	K4

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze

CLO – PLO Mapping

CLOs/PLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	3	-	-	-	-
CLO2	3	2	1	-	-
CLO3	2	2	-	3	-
CLO4	3	2	1	-	1
CLO5	1	1	-	2	1

3 - Substantial (high) **2** - Moderate (medium) **1** - Slight (low)

Allied - I: Mathematics – I

Unit	Content	No. of Hours
I	**Matrices:** Different types of matrices- Inverse of matrix- solution of simultaneous equation of matrix method- properties of unitary and orthogonal matrices - Characteristics equation and Characteristics roots.	12
II	**Vector Calculus:** Concepts of vector and scalar fields-the Del operator-Divergence of a vector-curl of a vector- Laplacian operator-Gauss's theorem, Green theorem, Stoke's theorem.	12
III	**Laplace Transforms:** Definition of Laplace transform-properties of Laplace Transform, Inverse Laplace transform - Convolution theorem.	12
IV	**Fourier Series:** General Fourier series - change of length of Interval - Fourier cosine and sine series- Half range Series - Fourier series in complex form.	12
V	**Fourier Transforms:** Definition of Fourier Transform- Properties of Fourier Transform- Inverse Fourier Transform - Convolution Theorem.	12
	Total Hours	**60**
Text Books		
1.	Dr.G. Balaji (2021). Matrices and Calculus, Balaji Publishers. Unit I: Chapter 1: Section: 1.1 – 1.146	
2.	Dr. M.K. Venkatraman.(2012). Engineering Mathematics, Vol II. Unit II: Chapter 2: Section: 1.1 – 1.12 Chapter 2 Section: 3.1-3.7, 3.9 Chapter:2 Section: 4.3, 4.9, 4.13	
3.	Dr. Venkatraman. M.K..(2000) Engineering Mathematics, III A. Unit III: Chapter 1: Section: 1 - 23	
4.	Dr.Balaji.G, (2021). Transforms and Partial Differential Equations, Balaji Publishers. Unit IV: Chapter 2: Section: 2.1 – 2.185 Unit V: Chapter 4: Section: 4.1 – 1.139	
Reference Books		
1.	Dr.G. Balaji (2019). Vector Calculus, Balaji Publishers, 2019.	
2.	Dr.M.K.Venkatraman (2010). Higher Mathematics for Engineering & Science.	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/105/111105122/	
2.	https://archive.nptel.ac.in/courses/111/101/111101164/	

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

Max Marks	Marks for		Components for CIA									
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Attendance	Active Engagement	Total
100	25	75	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	5	5	25
			50	**5**	50	**5**	**5**	75	**10**			

Question Paper Pattern

Component	Duration in Hrs.	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 – I &II	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 – I		Test - II		Model		Observation	Total
100	40	60	Actual	Weightage	Actual	Weightage	Actual	Weightage	5	40
			50	**10**	50	**10**	60	**15**		

Examination Pattern

Component	Duration in Hrs.	Marks			Weightage
		Practical	Record	Total Marks	
Test – I	2	50	-	50	10
Test – II	2	50	-	50	10
Model	3	60	-	60	15
ESE	3	50	10	60	-

Part – IV : Foundation Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24ENV1FC	Environmental Studies	FC- I	2	2

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

Unit	Content
IV	**Biodiversity and its Conservation** - Introduction-Definition: genetic, species and ecosystem diversity. - Bio geographical classification of India. - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. - Biodiversity at global, National and local levels. - India as a mega-diversity nation. - Hot-spots of biodiversity. - Threats to biodiversity: habital loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India. - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
V	**Environmental Pollution Definition** - Causes, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards - Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.
VI	**Social Issues and the Environment** - From Unsustainable to Sustainable development. - Urban problems related to energy. - Water conservation, rain water harvesting, watershed management. - Resettlement and rehabilitation of people; its problems and concerns. Case studies. - Environmental ethics: Issues and possible solutions. - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. - Wasteland reclamation. - Consumerism and waste products. - Environment Protection Act. - Air (Prevention and Control of Pollution) Act. - Water (Prevention and Control of Pollution) Act. - Wildlife Protection Act. - Forest Conservation Act. - Issues involved in enforcement of environmental legislation. - Public awareness.

Unit	Content
VII	**Human Population and the Environment** - Population growth, variation among nations. - Population explosion-Family welfare Programme. - Environment and human health. - Human Rights. - Value Education. - HIV/AIDS. - Women and Child Welfare. - Role of information Technology in Environment and human health. - Case Studies.
VIII	**Field Work (Practical).** - Visit to a local area to document environmental assets-river/forest/grassland/ hill/mountain. - Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. - Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.
	Total Hours. 30

Web Resources	
1.	https://www.ugc.gov.in/oldpdf/modelcurriculum/env.pdf

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

Max Marks	Marks for		Components for CIA							
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Total (Best + Model)
50	50	-	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	**50**
			50	**25**	50	**25**	**25**	50	**25**	

Question Paper Pattern

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

Part – IV : Ability Enhancement Compulsory Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours/Week	Credits
24QUA1AE	Quantitative Aptitude	AECC - I	2	2

Course Objectives

The course intends to cover

- Basic concepts of numbers, time and work, interests, data representation and graphs
- Concepts of permutation, probability, discounts, percentage & profit loss.

Course Learning Outcomes

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

CLO	CLO Statements	Knowledge Level
CLO1	Remember and Understand the concepts of numbers and average	K1, K2
CLO2	Understand about percentage and apply profit & loss related processing.	K2, K3
CLO3	To understand the concepts of time and work and interest calculations.	K2
CLO4	To understand about the concepts of permutation, combination and probability.	K2
CLO5	Understand , Apply and analyze the concept of problem solving involved in graphs and age.	K2,,K3,K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** -Analyze		

Ability Enhancement Compulsory Course - I: Quantitative Aptitude

Unit	Content	No. of Hours
I	Numbers - Simplification - BODMAS rule - Algebraic formulas - Decimal fractions - Square root and cube roots - Surds and indices - Divisibility rules - HCF and LCM - same remainder - different remainder - application problems – average – equation - mistaken value – replacement - including/excluding.	6
II	Percentage - increase/decrease – netchange – salary – election – marks – consumption - population / machine - profit and loss - profit and loss % - finding cp and sp - profit=loss - same product cp and sp with percentage – discount - ratio and proportion - divided into parts - based on numbers - increase/decrease/ income / expenditure – coins – partnership.	6
III	Time-and-work - individual/combined - alternative days - remaining work - efficiency based - amount split - chain rule - group of male and female or boys - pipes and cistern - finding time - efficiency based – alternative - remaining part - capacity of the tank - simple interest - finding principal - rate of interest – amount -time period - doubles or triples - compound interest - finding rate - finding time, principal - doubles or triples - difference between SI and CI.	6
IV	Permutation - finding value - vowels come together - vowel never comes together - some letters come together - no two vowels come together - vowels in odd/even places - based on repetition - circular permutation – application – combination - finding value and application – probability – coins - dice-cards - balls and miscellaneous problems - odd man out and number series.	6
V	Clock - finding angle - reflex angle - gain or loss – calendars - finding particularday - data interpretation - bar chart - line chart - pie chart – table – combined –ages ratio-twice or thrice - addition /subtraction - family based - problems on numbers - equations.	6
	Total Hours	**30**
Text Book		
1.	R.S. Aggarwal , Quantitative Aptitude, S.Chand & Company Ltd.,	
Reference Book		
1.	Ashish Arora, Quantitative Aptitude.	
Web Resources		
1.	https://www.javatpoint.com/aptitude/quantitative	
2.	https://www.indiabix.com/aptitude/questions-and-answers/	

Components for and Distribution of Marks for ESE (Theory)

Ability Enhancement Compulsory Course(AECC)

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

Semester 2

Course Code	Course Name	Category	Hours/Week	Credit
24TAM21L	Tamil – II	Language - II	4	3

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 ஒழுக்கங்களைக் கற்றுத் தருதல்.	K1, K2
CLO2	பக்தி இலக்கியங்கள் வழி பக்தி நெறிகளை உணர்த்துதல்.	K2
CLO3	தமிழில் உரைநடை இலக்கியப் படைப்பாளர்களின் சிந்தனைகளை எடுத்துரைத்தல்.	K3
CLO4	தமிழ் இலக்கிய வரலாற்றில் அற இலக்கியம் மற்றும் உரைநடையின் தாக்கம் குறித்து அறிதல்.	K1, K3
CLO5	பிழையின்றி எழுத இலக்கணங்களைக் கற்றுத் தருதல்.	K2, K3
K1 - Remember; **K2** - Understand; **K3** – Apply		

Part – I: Tamil – II

Unit	Content	No. of Hours
I	**(அறம்)** 1. திருக்குறள் • புகழ் • வினை செயல்வகை • நெஞ்சொடு கிளத்தல் 2. திரிகடுகம்(தேர்ந்தெடுக்கப்பட்ட 10 பாடல்கள்) 3. பழமொழி நானூறு(தேர்ந்தெடுக்கப்பட்ட 10 பாடல்கள்)	**14**
II	**(பக்தி)** 1. அபிராமி அந்தாதி(10 பாடல்கள்) - அபிராமி பட்டர் 2. உமர்கயாம் பாடல்கள் (தனிப்பாடல்கள்) - கவிமணி தேசிய விநாயகம் பிள்ளை 3. முத்துக்குமாரசாமி பிள்ளைத்தமிழ்(தாலப் பருவம்) – குமரகுருபரர் 4. இயேசுகாவியம் - மலைப்பொழிவு - கண்ணதாசன் 5. சித்தர் பாடல்கள் - சிவவாக்கியர் பாடல்	**14**
III	**(கலை மற்றும் பண்பாடு)** 1. அறம் எனப்படுவது - அமுதன் 2. ஏட்டில் எழுதா இலக்கியம் - ஔவை துரைச்சாமி 3. கீழடி - தொல்லியல் துறை, வெளியீடு 4. மனம் எனும் சொர்க்கவாசல் - டாக்டர் எம்.எஸ்.உதயமூர்த்தி 5. ஆளுமைத் திறன் - அறிவுக்கதிர் (அரசுப்பணி சிறப்பிதழ்)	**12**
IV	**(இலக்கிய வரலாறு)** 1. பதினெண் கீழ்க்கணக்கு நூல்கள் 2. உரைநடையின் தோற்றமும் வளர்ச்சியும்	**10**
V	**(இலக்கணம்)** 1. சொல்லின் வகைகள் 2. வேற்றுமைத் தொகைகள் 3. பயிற்சிக்குரியன:(விண்ணப்பங்கள், மடல்கள் எழுதச் செய்தல்)	**10**
	Total Hours	**60**

Reference Books	
1	முத்துக்குமாரசாமி பிள்ளைத்தமிழ்,(2021) கமலா முருகன், சாரதா பதிப்பகம்
2	இயேசு காவியம், கவிஞர் கண்ணதாசன்,(2006) கலைக்காவிரி பதிப்பகம்
3	உரைகளும் உரையாசிரியர்களும்,(2013) தி சு நடராசன் நியூ செஞ்சுரி புக் ஹவுஸ்
4	அபிராமி அந்தாதி, முனைவர் சி சேதுராமன்,(2010) நியூ செஞ்சுரி புக் ஹவுஸ்
5	புதிய வெளிச்சத்தில் தமிழ் இலக்கிய வரலாறு, முனைவர் க பஞ்சாங்கம், (2017) அன்னம் வெளியீட்டு
6	தமிழ் இலக்கிய வரலாறு, மு வரதராசனார்,(2021) சாகித்ய அகாடமி பதிப்பு
7	தமிழ் உரைநடை வரலாறு, வி செல்வநாயகம்,(2003) அடையாளம் பதிப்பகம்
8	தமிழ் இலக்கிய வரலாறு, முனைவர் கா கோ வேங்கடராமன்,(2010) கலையக வெளியீடு
9	எண்ணங்கள் - டாக்டர் எம் எஸ் உதயமூர்த்தி,(2016) வெளியீடு: கங்கை புத்தக நிலையம், சென்னை
10	அடோன் தமிழ் இலக்கணம், புலவர் பொன்மணிமாறன்,(2011) அருண் பப்ளிஷிங்

Part – II : English - II

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours/ Week	Credits
24ENG22L	English-II	Part - 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	Persist flexibility and mobility in the sequel LSRW.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply		

Part - II: English - II

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

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

Course Code	Course Name	Category	Hours / Week	Credits
24BEC23C	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.	K3, K4
CLO5	Illustrate the functionalities of various analog-to-digital converter (ADC) architectures and identify the key factors to consider when selecting an ADC for a specific application.	K3
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze		

CLO – PLO Mapping

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

Core - III: Digital Principles and Applications

Unit	Content	No. of Hours
I	**Number Systems and Codes: Introduction -** Digital Vs Analog- Number Systems: Binary, Octal, Decimal and Hexa Decimal Numbers – Conversion – Binary Coded Decimal (BCD) – Excess Three – Grey Code – ASCII Codes.	15
II	**Logic Gates and Boolean Algebra:** AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates – Boolean Algebra – Commutative, Associative and Distributive Laws – Duality Theorem – De-Morgans Theorem – Sum of Products and Products of Sums – Karnaugh map.	15
III	**Combinational Logic Circuits:** Binary Addition, Subtraction– Addition of 1's and 2's Complements - Half Adder – Full Adder – Half Subtractor – Full Subtractor – 4-bit Binary Adder / Subtractor – BCD adder – Multiplexer – Demultiplexer – Decoders – Encoders – Magnitude Comparators.	15
IV	**Sequential Logic Circuits:** Flip Flops – RS, Clocked RS, JK, JK Master Slave, D and T Flip Flops – Shift Registers–Ring Counters–Synchronous Counter–Asynchronous Counter - Up Down counter – Mod-3, Mod-5 Counters – Decade Counter.	15
V	**Digital to Analog Converters:** Resistive Divider Type - Ladder Type – Analog to Digital Converters: Counter – Ramp Type – simultaneous Conversion – Dual Slope Type – Successive Approximation Type – Accuracy and Resolution.	15
	Total Hours	**75**
Text Books		
1.	Morris Mano (2022) Computer System Architecture, Pearson Education.	
2.	Albert Paul Malvino and Donald P. Leech (2019) Digital Principles and Applications, McGraw Hill Company.	
Reference Books		
1.	Puri V K (2017) Digital Electronics: Circuits and Systems, McGraw Hill Education.	
2.	Salivahanan S (2012) Digital Circuits and Design, McGraw Hill Education.	
Web Resources (Swayam / NPTEL)		
1.	https://nptel.ac.in/courses/108105132	
2.	https://onlinecourses.swayam2.ac.in/cec24_cs09/preview	

Course Code	Course Name	Category	Hours / Week	Credits
24BEC24C	Electronic Circuits	Core - IV	5	4

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

CLO – PLO Mapping

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

Core - IV: Electronic Circuits

Unit	Content	No. of Hours
I	**Rectifiers and Regulators:** Half-wave, Full-wave and Bridge Rectifiers – Calculation of RMS Value – Average Value - Ripple Factor – Efficiency – Transformer Utility Factor – Peak Inverse Voltage - Inductor Filter, Capacitor Filter, LC Filter and Pi Filter – Voltage Doubler – Voltage Regulator – Zener Diode Shunt Regulator – Transistor Shunt and Series Regulator – Overload Protection - Construction of DC Power Supply.	15
II	**Small Signal Amplifiers:** CE, CB, CC Amplifiers – Calculation of I/P Resistance, O/P Resistance – Current Gain – Voltage Gain – Power Gain - Single Stage Transistor Amplifier – DC and AC Load Line - RC Coupled Amplifier – Gain Frequency Response – Bandwidth - Transformer Coupled Amplifier – Impedance Matching - FET Amplifier.	15
III	**Power Amplifiers:** Operation and Graphical Representation of Class A, Class B, Class C and Class AB Amplifiers – Maximum Collector Efficiency of Class A Power Amplifier – Collector Dissipation Curve – Harmonic Distortion – Class B Push Pull Amplifier – Crossover Distortion - Complementary Symmetry Push Pull Amplifier.	15
IV	**Feedback Amplifiers:** Basic concepts of Feedback – Positive feedback – Negative feedback – Effects of Negative feedback on Gain – Bandwidth – Distortion – Noise. Voltage Series Feedback – Voltage Shunt Feedback – Current Series Feedback – Current Shunt Feedback.	15
V	**Oscillators and Multivibrators:** Barkhausen Criterion – Hartley oscillator – Colpitt's Oscillator– Phase Shift Oscillator – Wien Bridge Oscillator – Piezo Electric Crystal and its Effects - Crystal Oscillator. Multivibrators: Astable Multivibrator – Monostable Multivibrator – Bistable Multivibrator – Schmitt Trigger.	15
	Total Hours	**75**

Text Books	
1.	Mehta, V. K., Rohit Mehta (2012) Principles of Electronics. S. Chand Publishing.
2.	Salivahanan. S, Suresh Kumar. N, Vallavaraj. A (2012) Electronic devices and circuits, TMH publishing company Ltd.
Reference Books	
1.	Theraja, B. L (2009) Basic Electronics-Solid State Devices, S. Chand Company Ltd.
Web Resources (Swayam / NPTEL)	
1.	https://onlinecourses.nptel.ac.in/noc24_ee12/preview
2.	https://onlinecourses.swayam2.ac.in/nou24_ec04/preview

Course Code	Course Name	Category	Hours / Week	Credit
24BEC25P	Digital Electronics Lab	Core Lab - III	3	2

Digital Electronics Lab (Any 10 Practicals)

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

Total Hours	**45**

Text Books

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

Reference Books

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

Web Resources (Swayam/NPTEL)

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

Course Code	Course Name	Category	Hours / Week	Credits
24BEC26A	Mathematics - II	Allied - II	4	3

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

CLO – PLO Mapping

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

Allied - II: Mathematics – II

Unit	Content	No. of Hours
I	**Differential Equations:** Second order linear differential equation with constant coefficients- Laplace Equations - Application to electronic circuits RL, RC, RLC.	12
II	**Numerical Methods:** Solving simultaneous equation process—Gauss Jorden method-Numerical Integration - Trapezoidal Rule- Simpson's Rule.	12
III	**Z- Transforms:** Elementary properties - Inverse Z - transform (using partial fraction and residues) - Convolution theorem - Formation of difference equations - Solution of difference equations Using Z - transform.	12
IV	**Special Functions:** Beta and Gamma Functions- Definitions- Relationship between Beta and Gamma Functions - (only statements) - Properties of Gamma and Beta Functions.	12
V	**Complex Numbers:** Definition of Complex numbers- Argand Diagram- Rectangular form- polar form- Conversion of rectangular form to polar and vice versa- addition, Subtraction- Multiplication and Division by using polar and rectangular forms-Demoivre's Theorem.	12
	Total Hours.	**60**
Text Books		
1.	Dr.M.K. Venkatraman (2012), Engineering Mathematics, Vol II. Unit I: Chapter 24: Section: 24.1 – 24.22 Unit IV: Chapter 21: Section: 21.1 – 21.11	
2.	M.K.Dr. Venkatraman, Numerical Methods In Science and Engineering Unit II: Chapter 4: Section: 1 – 6	
3.	Dr. G. Balaji., (2021). Transforms and Partial Differential Equations, Balaji Publishers. Unit III: Chapter 2: Section: 2.1 – 2.185	
4.	S. Narayanan, T.K. Manicavachagam Pillay, Trigonometry Unit V: Chapter 2: Section: 1-4.	
Reference Book		
1.	A.V. Oppenheim and Schafer,(1989), Discrete Time Signal Processing, Prentice Hall	
Web Resources (Swayam / NPTEL)		
1.	https://archive.nptel.ac.in/courses/111/105/111105122/	
2.	https://archive.nptel.ac.in/courses/111/101/111101164/	

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

Max Marks	Marks for		Components for CIA									
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Attendance	Active Engagement	Total
			Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage			
100	25	75	50	**5**	50	**5**	**5**	75	**10**	**5**	**5**	**25**

Question Paper Pattern

Component	Duration in Hrs.	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 – I &II	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 – I		Test - II		Model		Observation	Total
			Actual	Weightage	Actual	Weightage	Actual	Weightage		
100	40	60	50	**10**	50	**10**	60	**15**	**5**	**40**

Examination Pattern

Component	Duration in Hrs.	Marks			Weightage
		Practical	Record	Total Marks	
Test – I	2	50	-	50	10
Test – II	2	50	-	50	10
Model	3	60	-	60	15
ESE	3	50	10	60	-

Part – IV : Foundation Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24HUM2FC	Human Rights	FC - II	2	2

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

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

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

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

Max Marks	Marks for		Components for CIA							
	CIA	ESE	CIA – I		CIA – II		Best of CIA-I & CIA-II	Model		Total (Best + Model)
50	50	-	Actual	Weightage	Actual	Weightage	Weightage	Actual	Weightage	50
			50	**25**	50	**25**	**25**	50	**25**	

Question Paper Pattern

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

Part – IV : Ability Enhancement Compulsory Courses

(All the Undergraduate Programmes)

Course Code	Course Name	Category	Hours / Week	Credits
24SOF2AE	Soft Skills	AECC - II	2	2

Course Objectives

The course intends to cover

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

Course Learning Outcomes

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

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

Ability Enhancement Compulsory Course - II : Soft Skills

Unit	Details	No. of Hours
I	**Presentation Skills : Getting to Know You:** Grammar: Introduction to Tenses; Listening: Fill in the blanks; Speaking: Self Introduction, Everyday English, Role-Play; Reading: Different ways of communication. **My Day:** Grammar: Present simple positive & negative / Adverbs of Frequency; Vocabulary & Speaking: Daily Activities; Listening: Observe and Answer / Telling the time; Reading & Writing: Describe where you live. **Your World:** Grammar: Possessive determiners; Vocabulary & Speaking: Talk about countries, nationalities; Listening: Positive & negative contractions; Reading & Writing: Personal profile. **The World Of Work:** Grammar: Yes/No & Wh Questions; Vocabulary & Speaking: Jobs; Listening: Recognize the schwa sound; Reading & Writing: Opening and closing an email. .**Places And Things:** Grammar: There is / there are, articles; Vocabulary & Speaking: Talk about rooms & furniture; Listening: Directions; Reading & Writing: Imperatives.**24 Hours:** Grammar: Likes & Dislikes; Vocabulary & Speaking: Speak about hobbies and interests; Listening: Observe & answer; Reading: Match the photos with descriptions; Writing: Write complete sentence using prompts;	6
II	**Confidence : Clothes and Shopping:** Grammar: Modal verbs / Adverbs of Frequency / Adjectives and Adverbs; Vocabulary & Speaking: Shopping; Listening: Observe and Answer; Reading & Writing: Product Review. **Travel & Transport:** Grammar: Past simple questions; Vocabulary & Speaking: Talk about holidays; Listening: At the train station; Reading & Writing: Email - A perfect holiday. **Health & Fitness:** Grammar: Past simple irregular verbs; Vocabulary & Speaking: Talk about a healthy lifestyle; Listening: Listen & Answer; Reading & Writing: Time sequencers. **Music:** Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; Reading: Use adjectives and create sentences. **Let's go shopping:** Grammar: Countable & Uncountable; Vocabulary & Speaking: Town Survey; Listening: Listen and answer; Reading & Writing: Read and match	6
III	**Creativity :Cooking & Eating:** Grammar: Some & Any, Quantifiers; Vocabulary & Speaking: Food & Drink; Listening: Kitchen conversation; Reading & Writing: Article reading & answering. **Survival:** Grammar: Comparison of adjectives; Vocabulary & Speaking: Describing people; Listening: Listen & Answer; Reading & Writing: Read and Answer. **Working Together:** Grammar: Verb + Noun phrases; Vocabulary & Speaking: Talk about technology; Listening: Listen & Answer; Reading & Writing: Notice. **Music:** Grammar: Present perfect simple; Vocabulary & Speaking: Survey about music; Listening: Listen two people talk about music; Reading: Use adjectives and create sentences. **Culture and Arts:** Grammar: Present perfect; Vocabulary & Speaking: Speak on the phone; Listening: Listen and answer; Reading & Writing: Review	6

Unit	Content	No. of Hours
IV	**Problem-Solving :Do's and Don'ts:** Grammar: Modal verbs; Vocabulary & Speaking: Role play; Listening: Holidays in January; Reading & Writing: Article reading & answering. **Body:** Grammar: First conditional; Vocabulary & Speaking: Personality & Appearance; Listening: Listen to conversations about personality; Reading & Writing: Read and Answer about your skills. **Speed:** Grammar: Present simple passive; Vocabulary & Speaking: Talk about relationships; Listening: Listen & Answer; Reading & Writing: Error spotting. **Work:** Grammar: Adverbs of manner; Vocabulary & Speaking: Talk about work advice; Listening: Observe & Answer; Reading: Read & check your ideas	6
V	**Critical Thinking : Influence:** Grammar: would / past habits; Listening: Sentence Correction; Speaking & Vocabulary: Your inspiration; Reading: Picture description; Writing: Rewrite the sentences. **Money:** Grammar: Second conditional; Listening: radio programme; Speaking & Vocabulary: Talk about games; Reading & Writing: Fill in the blanks. **Things that changed the world:** Grammar: articles; Speaking & Listening: Talk about chewing gum; Reading & Writing: Read and write a book review	6
	Total Hours	**30**

Components for and Distribution of Marks for ESE (Theory)

Ability Enhancement Compulsory Course(AECC)

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