8Th STD FIRST SEMESTER	KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR JUNIOR TECHNICAL SCHOOL	
	PROGRAMME NAME: JUNIOR TECHNICAL SCHOOL	**JTS- ELECTRONICS ENGINEERING.**
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS
	Class: VIII - First Semester	**Scheme: C-20**

Sl.no	**Subject Name**	Teaching Scheme Contact Hours				Examination Scheme					
		TH	TU	PR	Total	Exam Paper Duration in Hrs	End Exam Max Marks	End Exam Min Marks	I A Marks	Total Marks	Min Marks for passing (including IA marks)
1	Kannada	6	-	-	6	1 ½	40	12	10	50	18
2	English	5	-	-	5	1 ½	40	12	10	50	18
3	Hindi	5	-	-	5	1 ½	40	12	10	50	18
4	Mathematics	6	-	-	6	1 ½	40	12	10	50	18
5	Science	6	-	-	6	1 ½	40	12	10	50	18
6	Social Science	6	-	-	6	1 ½	40	12	10	50	18
7	Elements of Electronics-I	4	-	-	4	1 ½	40	12	10	50	18
8	Electronics engineering Lab-I	-	-	3	3	3	20	6	5	25	9
	Total	38		3	41		**300**	**90**	**75**	**375**	**135**
TH- Theory :: TU-Tutorial :: PR-Practical :: IA-Internal Assessment											

8Th STD SECOND SEMESTER	KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR JUNIOR TECHNICAL SCHOOL	
	PROGRAMME NAME: JUNIOR TECHNICAL SCHOOL	**JTS- ELECTRONICS ENGINEERING.**
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS
	Class: VIII - Second Semester	**Scheme: C-20**

Sl.no	Subject Name	Teaching Scheme Contact Hours				Examination Scheme					
		TH	TU	PR	Total	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
							Max Marks	Min Marks			
1	Kannada	6	-	-	6	1 ½	40	12	10	50	18
2	English	5	-	-	5	1 ½	40	12	10	50	18
3	Hindi	5	-	-	5	1 ½	40	12	10	50	18
4	Mathematics	6	-	-	6	1 ½	40	12	10	50	18
5	Science	6	-	-	6	1 ½	40	12	10	50	18
6	Social Science	6	-	-	6	1 ½	40	12	10	50	18
7	Elements of Electronics-II	4	-	-	4	1 ½	40	12	10	50	18
8	Electronics engineering Lab-II	-	-	3	3	3	20	6	5	25	9
	Total	38		3	41		**300**	**90**	**75**	**375**	**135**
TH- Theory :: TU-Tutorial :: PR-Practical :: IA-Internal Assessment											

9Th STD YEARLY SCHEME	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR JUNIOR TECHNICAL SCHOOL.	
	PROGRAMME NAME: JUNIOR TECHNICAL SCHOOL	**JTS- ELECTRONICS ENGINEERING.**
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS
	Class: IX	**C-2020**

Sl.no	Subject Name	Teaching Scheme Contact Hours				Examination Scheme					
		TH	TU	PR	Total	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
							Max Marks	Min Marks			
1	Kannada	6	-	-	6	3	100	35	25	125	45
2	English	5	-	-	5	2 ½	80	24	20	100	35
3	Hindi	5	-	-	5	2 ½	80	24	20	100	35
4	Mathematics	6	-	-	6	3	80	24	20	100	35
5	Science	6	-	-	6	3	80	24	20	100	35
6	Social Science	6	-	-	6	3	80	24	20	100	35
7	Elements of Electronics -III	4	-	-	4	3	80	24	20	100	35
8	Electronics engineering Lab-III	-	-	3	3	3	40	12	10	50	18
	Total	38	-	3	41		**620**	**191**	**155**	**775**	**273**
TH- Theory :: TU-Tutorial :: PR-Practical :: IA-Internal Assessment											

10Th STD YEARLY SCHEME	KARNATAKA STATE BOARD OF TECHNICAL EXAMINATION, BENGALURU.	
	TEACHING AND EXAMINATION SCHEME FOR JUNIOR TECHNICAL SCHOOL.	
	PROGRAMME NAME: JUNIOR TECHNICAL SCHOOL	**JTS- ELECTRONICS ENGINEERING.**
	PATTERN: FULL TIME	DURATION OF PROGRAMME: 3 YEARS
	Class: X	**Scheme: C-20**

Sl. no	Subject Name	Teaching Scheme Contact Hours				Examination Scheme					
		TH	TU	PR	Total	Exam Paper Duration in Hrs	End Exam		I A Marks	Total Marks	Min Marks for passing (including IA marks)
							Max Marks	Min Marks			
1	Kannada	6	-	-	6	3	100	35	25	125	45
2	English	5	-	-	5	2 ½	80	24	20	100	35
3	Hindi	5	-	-	5	2 ½	80	24	20	100	35
4	Mathematics	6	-	-	6	3	80	24	20	100	35
5	Science	6	-	-	6	3	80	24	20	100	35
6	Social Science	6	-	-	6	3	80	24	20	100	35
7	Elements of Electronics-IV	4	-	-	4	3	80	24	20	100	35
8	Electronics engineering Lab-IV	-	-	3	3	3	40	12	10	50	18
	Total	38		3	41		**620**	**191**	**155**	**775**	**273**
TH- Theory :: TU-Tutorial :: PR-Practical :: IA-Internal Assessment											

Junior Technical School Curriculum

Electronics and Communication Engineering Revision Committee Members

1. Sri. Gangadhara M.C. Selection Grade Lecturer/E&C. Govt. Polytechnic, Hiriyur.

2. Smt. Jyoti Senior Grade Lecturer/E&C. S.J. Govt. Polytechnic, Bangalore.

3. Sri. A.V.Neethan Patel Lecturer/E &C. Govt. Polytechnic, Mulbagalu.

4. Smt. Sunitha K Lecturer/E &C. Govt. Polytechnic, Bagepalli.

Course Code	:	20ECJTS1AT		Semester	:	VIII Std, I -Semester
Course Title	:	Elements of Electronics Engineering-I		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Lecture
Course Category	:	Electronics & Communication		Total Contact Hours	:	4 Periods Per Week 64 Periods per semester **(1 Period =40 minutes)**
Prerequisites	:	Knowledge of Physics and Mathematics in Higher Primary Education		Teaching Scheme	:	(L:T:P)-4:0:0
CIE Marks	:	10		SEE Marks	:	40

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Course Objectives: To expose to the field of electrical & electronics engineering, and to acquire the fundamental knowledge in the field.

Course Content
Unit-1: Evolution of Electronics Engineering
Marks: 8 **Allotted Periods: 8**
History of Electronics, Vacuum tube era, Semiconductor evolution-Invention of transistors, ICs, Digital electronics, Opto-electronics
Unit– 2: Introduction to Electrical Engineering
Marks: 16 **Allotted Periods: 12**
Introduction -Sources of Electrical Energy, Effects of Electric current and examples to each, Advantages of Electrical energy, Applications of Electrical energy
Unit- 3: Concepts of Electric current, voltage and circuits
Marks: 25 **Allotted Periods :20**
Definition of Electric current. Mention its unit, Instrument used for measurement of electric current, its types, Definitions of emf, potential difference and its units, Name the instrument used for measurement of voltage, its types, A practical electric circuit consisting of source, load, switch, Protective device and measuring devices, Definitions of conductor, insulator and semiconductor. Give Examples to each. Define Resistance and mention its unit, Name the instrument used for measurement of resistance, Define Ohm's law and Mention its limitations, Explain series and parallel resistive networks, State KCL & KVL.
Unit– 4: Work, Power and Energy
Marks: 16 **Allotted Periods:12**
Define electric power, energy, work and mention their units, Instrument used for measurement of electric power and Energy, Conversion of mechanical units into electrical units and vice –versa.

Unit-5: Batteries	
Marks: 15	**Allotted Periods:12**
Define primary and secondary cells, Name primary and secondary cells, Applications of primary and secondary cells, Series and Parallel connection of cells.	

References:

Suggested Learning Resources:

(a) Principles of Electrical and Electronics Engg –B L Thereja.
(b) Elements of Electrical and Electronics Engg – V K Mehtha.

Open source software and website address:

https://www.britannica.com/technology/electronics
http://electrical4u.com/
www.electronics-tutorials.ws

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to Govt. offices/ Corporate offices/Business establishments/ Libraries etc around the institution.

Course outcomes:

At the end of the course student will be able to:

CO1. To understand evolution of electronics.
CO2. To understand the basic electrical and electronics engineering terminologies, definitions, units, laws and relationship between different terms.
CO3. To understand relationship between work, power and energy**.**
CO4. To understand concept of cells and batteries.

Unit No & Name	Detailed Course Content	Periods
1. Evolution of Electronics Engineering	History of Electronics	1
	Vacuum tube era	1
	Semiconductor evolution	
	a)Invention of transistors	2
	b) ICs	2
	c) Digital electronics	2
	d)Opto electronics	2
2. Introduction to Electrical Engineering	Introduction -Sources of Electrical Energy	4
	Effects of Electric current and examples	4
	Advantages of Electrical energy	2
	Applications of Electrical energy	2
3. Concepts of Electric current, voltage and Circuits	Definition of Electric current. Mention its unit, Instrument used for measurement of electric current.	2
	Definitions of emf, potential difference and its units, Name the instrument used for measurement of voltage.	2
	Explain a practical electric circuit consisting of source, load, switch, Protective device and measuring devices	2
	Definitions of conductor, insulator and semi-conductor. Give Examples to each.	4
	Define Resistance and mention its unit, Name the instrument used for measurement of resistance.	2
	Define Ohm's law. Mention its limitations,	2
	Explain series and parallel resistive networks.	4
	State KCL & KVL	2
4. Work, Power and Energy	Define electric power, energy, work and mention their units,	5
	Instrument used for measurement of electric power and Energy.	3
	Conversion of mechanical units into electrical units and vice Versa	4
5. Batteries	Define primary and secondary cells.	3
	Name primary and secondary cells	3
	Applications of primary and secondary cells	2
	Series and Parallel connection of cells.	4
	Total Periods	**64**

Suggested Activities

1. List various protective devices.
2. Construct a simple circuit to show the flow of current.
3. Identify the terminals of cell and measure the voltage.
4. Collect samples for conductor, insulator and semi conductor materials.

Model Question Bank

Sl. No	Questions	Marks
	Unit -I	
1	What is electronics?	2
2	Briefly explain invention of transistors.	5
3	Compare vacuum tubes and transistors.	5
4	List the stages in evolution of semiconductors.	5
5	Write a note on digital electronics.	4
6	Write a note on opto electronics.	4
	Unit-II	
1	List the sources of electrical energy.	5
2	Write the effects of electric current.	3
3	Mention the advantages of electrical energy.	5
4	Mention the applications of electrical energy.	5
5	Give the examples for effects of electric current.	5
	Unit-III	
1	Define emf with unit.	2
2	Define potential difference with unit	2
3	Define the following with units and measuring device a.emf b. resistance	6
4	Explain a simple electric circuit	5

5	Define conductor, semiconductor and insulator with example.	6
6	Define Ohm's law with equation.	3
7	Mention the limitations of ohm's law	5
8	Explain the series resistive network.	4
10	Explain the parallel resistive network.	4
11	State KVL.	2
12	State KCL.	2
	Unit-IV	
1	Define the following terms with units a. Electric Power b. Electric energy c. Work	6
2	Write the instruments used to measure electric power and energy.	2
3	Explain the conversion of mechanical units into electrical units with example	5
4	Explain the conversion of electrical units into mechanical units with example	5
	Unit-V	
1	Define primary and secondary cells	4
2	Name primary and secondary cells	5
3	Mention the applications of primary cells.	3
4	Mention the applications of secondary cells.	3
5	Explain the effect of series connection of cells	4
6	Explain the effect of parallel connection of cells	4

Course Code	:	20ECJTS1AP		Standard	:	VIII Std -I Semester
Course Title	:	Electronics Engineering Lab-I		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Practical
Course Category	:	EC		Total Contact Hours	:	3 Periods Per Week 48 Periods Per Semester
Prerequisites	:	Knowledge of Basic Electronics.		Teaching Scheme	:	(L:T:P) - 0:1:2
CIE Marks	:	05		SEE Marks	:	20

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Course Objectives: Learn the fundamentals of electrical and electronics engineering and components.

List of Practical Experiments

Sl no	Name of the Experiment	Periods
1	Identification of passive components such as resistor, Inductor, capacitors etc	6
2	Measurement of resistor values by colour code method	12
3	Soldering practice	12
4	Identification of different types of power supplies.	6
5	Recognize and use of different types of measuring instruments with different ranges	9

Course/Learning Outcome:

After undergoing this lab work, the student will be able to:

CO1. Recognize passive components.

CO2. Calculate resistor values by colour code method.

CO3. Solder various components.

CO4. Use different types of power supplies and measuring instrument.

Model Question Paper

For CIE and SEE

Programme: EC	Standard: VIII Std, I Sem
Course : Electronics Engineering Lab-I	Max Marks : 40
Course Code : 20ECJTS1AP	Duration:3 Periods
Name of the course coordinator:	Test :

Note: Student has to conduct any one experiment in the CIE and SEE

Model Questions

1. Determine the resistance of a given unknown resistor using colour code.
2. Solder the given component.
3. Identify the given measuring instrument.
4. Identify the given passive component.
5. Identify the given power supply.

Scheme of Evaluation for both CIE and SEE

Sl. No	Particulars	Marks
1	Identification of meters/ equipment's/components etc	05
2	Soldering Practice	10
3	Calculate unknown resistance value by colour code method	20
4	Viva Voce	05
	Total	**40**

NOTE: CIE SHOULD BE CONDUCTED FOR 10 MARKS AND THEN REDUCED TO 05 MARKS
SEE SHOULD BE CONDUCTED FOR 40 MARKS AND THEN REDUCED TO 20 MARKS

Course Code	:	20ECJTS1BT		Semester	:	VIII-II semester
Course Title	:	Elements of Electronics Engineering-II		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Lecture
Course Category	:	EC		Total Contact Hours	:	4 Periods Per Week 64 Periods per semester
Prerequisites	:	Knowledge of Physics and Mathematics and Basics of EC-1		Teaching Scheme	:	(L:T:P)-4:0:0
CIE Marks	:	10		SEE Marks	:	40

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Course Objectives: To expose to the field of electrical & electronics engineering, and to acquire the fundamental knowledge in the field.

Course Content	
Unit-1: Alternating current and circuits	
Marks: 16	**Allotted Periods: 12**
Define Alternating current along with a wave form, Define the terms in AC such as cycle, frequency, max value, Difference between single phase and three phase circuits.	
Unit-2: Transformers	
Marks: 16	**Allotted Periods:13**
Working principle, types of transformer and applications.	
Unit- 3: Generators	
Marks: 16	**Allotted Periods:13**
Working principle of DC and AC generators and its applications.	
Unit– 4: Motors	
Marks: 16	**Allotted Periods:13**
Working principle of DC and AC motors and its applications.	
Unit-5: Passive components	
Marks: 16	**Allotted Periods:13**
Resistors – definition, types, Colour code, Rating and uses, **Capacitors** - definition, types, Rating and uses, **Inductors**- definition, types, Rating and uses.	

References:

Suggested Learning Resources:

(c) Principles of Electrical and Electronics Engg –B L Thereja.

(d) Elements of Electrical and Electronics Engg – V K Mehtha.

Open source software and website address:

http://electrical4u.com/

www.electronics-tutorials.ws

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to Govt. offices/ Corporate offices/Business establishments/ Libraries etc around the institution.

Course outcomes:

At the end of the course student will be able to:

CO1.To understand the AC fundamentals.

CO2.To understand working of transformer and its types.

CO3.To understand working of generators and motors.

CO4. To understand working and measurement of passive components.

Unit No & Name	Detailed Course Content	Periods
1. Alternating current and circuits	Define Alternating current along with a wave form.	3
	Define the terms in AC such as cycle, frequency, max value.	6
	Difference between single phase and three phase circuits.	3
2. Transformer	Working principle of transformer.	4
	Types of transformer-Step up and step down.	6
	Applications of transformer.	3
3. Generators	Working principal of DC generators and its applications.	6
	Working principal of AC generators and its applications.	7
4.Motors	Working principal of DC motor and its applications.	6
	Working principal of AC motor and its applications.	7
5. Passive components	Resistors – definition, types, colour code, rating and uses	5
	Capacitors - introduction, types, rating and uses	4
	Inductors - definition, types, rating and uses	4
	Total periods	64

Suggested Activities

1. Measure voltage in sockets in lab and know the frequency
2. Identify primary and secondary windings of transformer.
3. Identify usages of 3 phase supply.
4. Collect resistors and capacitors of different values.

Model Question Bank

Sl. No	Questions	Marks
	Unit-I	
1	Define alternating current with waveform.	4
2	Define the terms with waveform a. cycle b. frequency c. maximum value	6
3	Describe single phase circuits.	3
4	Describe three phase circuits.	3
5	Mention the differences between single and three phase circuits.	5
	Unit-II	
1	Explain the working principle of transformer.	5
2	Mention the different types of transformer.	4
3	List the applications of transformer.	5
4	List the type of transformer with application.	5
	Unit-III	
1	Briefly explain the working principal of DC generators.	5
2	Mention the applications of DC generators.	5
3	Briefly explain the working principal of AC generators.	5
4	Mention the applications of AC generators.	5

	Unit-IV	
1	Briefly explain the working principal of DC motors.	5
2	Mention the applications of DC motors.	5
3	Briefly explain the working principal of AC motors.	5
4	Mention the applications of AC motors.	5
	Unit-V	
1	Define resistors.	2
2	Mention the types of resistors.	4
3	Explain colour code method of calculating resistance.	6
4	Mention rating and uses of resistor.	5
5	What is capacitor? List its types.	5
6	Mention rating and uses of capacitor.	5
7	Mention rating and uses of inductor.	5
8	What is inductor? Mention its types.	5

Course Code	:	20ECJTS1BP		Standard	:	VIII Std- II Semester
Course Title	:	Electronics Engineering Lab-II		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Practical
Course Category	:	EC		Total Contact Hours	:	3 Periods Per Week 48 Periods Per Semester
Prerequisites	:	Knowledge of basic Electronics		Teaching Scheme	:	(L:T:P)- 0: 0:3
CIE Marks	:	05		SEE Marks	:	20

*CIE – Continuous Internal Evaluation *SEE – Semester End Examination

Course Objectives: Apply electrical laws in understanding circuit functions and simple designs

List of Practical Experiments

Sl No	List of Experiments	Periods
1	Verification of Ohm's Law.	6
2	Verification of KVL.	6
3	Verification of KCL.	6
4	Construction & Verification of Series Resistive circuit	6
5	Construction & Verification of Parallel Resistive circuit.	9
6	Construct and verification of Cells in Series .	6
7	Construct and verification of Cells in parallel.	6
8	Revision	3
	Total	48

Course/Learning Outcome:

After undergoing this lab work, the student will be able to:

CO1. Calculate the current and voltages in a simple circuit.

CO2. Calculate effective resistance in series and parallel combination.

CO3. Observe the effect of cells connected in series and parallel

Model Question Paper

For CIE and SEE

Programme : EC	Standard: VIII Std, II Sem
Course : Electronics Engineering Lab-II	Max Marks : 40
Course Code : 20ECJTS1BP	Duration : 3 Periods
Name of the course coordinator:	Test :

Note: Student has to conduct any one experiment in the CIE and SEE

Model Questions

1.Demonstrate the verification of Ohm's law.

2.Compute the effective resistance experimentally for two resistors are connected in series

3.Compute the effective resistance experimentally for two resistors are connected in parallel

4. Demonstrate the verification of Kirchhoff's Current Law (KCL).

5. Demonstrate the verification of Kirchhoff's Voltage Law (KVL).

6. Experimentally know the effect of cells connected in series and parallel combinations.

Scheme of Evaluation for both CIE and SEE

Sl. No	Particulars	Marks
1	Writing of 2 experiments.	10
2	Conduction of any 1 experiment.	20
3	Result.	05
4	Viva Voce	05
	Total	**40**

NOTE: CIE SHOULD BE CONDUCTED FOR 10 MARKS AND THEN REDUCED TO 05 MARKS
SEE SHOULD BE CONDUCTED FOR 40 MARKS AND THEN REDUCED TO 20 MARKS

Course Code	:	20ECJTS2T		Standard	:	IX Std
Course Title	:	Elements of Electronics Engineering-III		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Lecture
Course Category	:	E&C		Total Contact Hours	:	4 Periods Per Week 128 Periods per Year
Prerequisites	:	Elements of Electronics & Communication Engineering-IA & 1B.		Teaching Scheme	:	(L:T:P)-4:0:0
CIE Marks	:	20		SEE Marks	:	80

* CIE – Continuous Internal Evaluation, * SEE – Semester End Examination.

Note: 1 period is equal to 40minutes.

Course Objectives: To expose to the field of electrical & electronics engineering, and to acquire the fundamental knowledge in the field.

Course Content
Unit-1 : Emission
Marks: 10 **Allotted Periods:20**
Definition of emission, meaning of emissions such as thermionic, photo and Secondary emission.
Unit– 2: Semiconductor Devices
Marks: 25 **Allotted Periods:40**
Semiconductor, Intrinsic and extrinsic semiconductors, P type and N type semiconductors, PN junction diode. Explain forward and reverse bias along with its characteristics, Explain unipolar and bipolar transistors. Explain NPN and PNP transistors. Working and applications of LED, Working and applications of Photo diode, Operation and use of CRO
Unit- 3: Rectifiers
Marks: 15 **Allotted Periods:20**
Rectifier definition, Construct and explain the operation of half wave rectifier, Construct and explain the operation of full wave rectifier, Definition of Voltage regulator ,Explain zener diode as a voltage regulator.
Unit– 4: Amplifiers
Marks: 15 **Allotted Periods:24**
Amplifier and mention its applications, Explain how transistor works as an amplifier..

Unit-5: Oscillators	
Marks: 15	**Allotted Periods:24**
Oscillator and mention its applications,, Explain the operation of an oscillator	

References:

Suggested Learning Resources:

(e) Principles of Electrical and Electronics Engg –B L Thereja.
(f) Elements of Electrical and Electronics Engg – V K Mehtha.
(g) Electronic Components, Dr. K. Padmanabhan and P. Swaminathan, Lakshmi Publications, 2006

Open source software and website address:

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www.electronics-tutorials.ws

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- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to Govt. offices/ Corporate offices/Business establishments/ Libraries etc around the institution.

Course outcomes:

At the end of the course student will be able to:

CO1.To Understand the concept of emissions .
CO2. To Understand the characteristics of semiconductor devices.
CO3.To understand the working of different types of rectifiers.
CO4. To understand the working of amplifiers and oscillators.

Unit No & Name	Detailed Course Content	Contact Periods
1. Emission	Definition of emission	5
	Meaning of emissions such as thermionic	5
	Meaning of emissions such as photo emission	5
	Meaning of emissions such as Secondary emission.	5
2. Semiconductor Devices	Explain Semiconductor , Intrinsic and extrinsic semiconductors	4
	Explain P type and N type semiconductors	4
	Explain PN junction diode.	4

	Explain forward and reverse bias along with its characteristics	8
	Explain unipolar and bipolar transistors.	4
	Explain NPN and PNP transistors.	4
	Working and applications of LED	4
	Working and applications of Photo diode	4
	Operation and use of CRO	4
3.Rectifiers	Rectifier definition	2
	Construct and explain the operation of half wave rectifier	5
	Construct and explain the operation of full wave rectifier,	5
	Definition of Voltage regulator	3
	Explain Zener diode as a voltage regulator	5
4. Amplifiers.	Explain amplifier.	6
	Mention its applications	8
	Explain how transistor works as an amplifier.	10
5. Oscillators	Explain oscillator.	8
	Explain the operation of an oscillator.	16
	TOTAL	**128**

Suggested Activities

1. Collect information about bridge rectifier.

2. Collect information about different types of amplifiers.

3. Collect information about different types of oscillators.

4. Collect different about different materials used in LEDs.

Model Question Bank

Sl .No	Questions	Marks
	Unit 1 : Emission	
1	Definition of emission.	2
2	Explain thermionic Emission.	5
3	Explain photo Emission.	5
4	Explain Secondary Emission.	5

	Unit 2: Semiconductor Devices	
1	Explain Semiconductor.	5
2	Explain Intrinsic & extrinsic Semiconductor.	5
3	Explain P type and N type semiconductors	10
4	Explain PN junction diode.	5
5	Explain forward and reverse bias along with its characteristics	10
6	Explain unipolar and bipolar transistors.	10
7	Explain NPN transistors.	5
8	Explain PNP transistors.	5
9	Explain working of LED	5
10	List applications of LED	5
11	Explain Working Photo diode.	5
12	List the applications of Photo diode	5
13	Explain the Operation of CRO.	5
14	List the uses of CRO	5
	Unit 3: Rectifiers	
1	Define Rectifier.	5
2	Construct and explain the operation of half wave rectifier.	10
3	Construct and explain the operation of full wave rectifier.	10
4	Define Voltage regulator	5
5	Explain Zener diode as a voltage regulator	10
	Unit-4: Amplifiers	
1	Explain amplifier	5
2	List the applications of Amplifier	5
3	Explain how transistor works as an amplifier.	10
	Unit -5: Oscillators	
1	Explain oscillator,.	5
2	List the applications of Oscillators	5
3	Explain the operation of an oscillator	10

Course Code	:	20ECJTS2P		Standard	:	IX Std
Course Title	:	Electronics Engineering Lab-III		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Practical
Course Category	:	EC		Total Contact period	:	3 periods Per Week 90 periods Per year
Prerequisites	:	Knowledge of basic Electronics, EC lab-1 Concepts.		Teaching Scheme	:	(L:T:P)- 0: 0: 3
CCE Marks	:	10		SEE Marks	:	40

* CIE – Continuous Internal Evaluation, * SEE – Semester End E xamination.
Note : 1 period is equal to 40minutes.

Course Objectives: Learn the fundamentals of Electronics engineering, CRO operations , Characteristics of components and Implementation of basic Circuits .

List of Practical Experiments

Sl no	Name of the Experiment	Periods
1	Identification and study of various active components such as Diode, Transistors etc.	5
2	Familiarize the modes of operation in CRO and study how to measure amplitude and time of a wave form using CRO.	30
3	Plot VI characteristic of PN junction diode.	10
4	Construct and Test half wave rectifier (use one diode).	15
5	Construct and Test full wave rectifier (use two diodes).	15
6	Construct and Test transistor as an amplifier.	15
	TOTAL	90

Course/Learning Outcome:

After undergoing this lab work, the student will be able to:

CO1. Identify the various active components.
CO2. To calculate the parameters such as Time and amplitude of a waveform using CRO.
CO3. To understand the working principle of Rectifiers (Half wave & Full wave).
CO4. To understand the working principle of transistor as an amplifier.

Question Bank
For CIE and SEE

Programme: EC	Standard: IX
Course: Electronics Engineering Lab-III	Max Marks : 40
Course Code : 20ECJTS2P	Duration : 3 periods
Name of the course coordinator:	Test :

Note: Student has to conduct any one experiment in the CIE and SEE

Questions

1. Identification of active components such as Diode, Transistors etc.
2. Calculate the parameters such as Time and amplitude of a waveform using CRO.
3. Construct & Test characteristic of PN junction diode.
4. Construct and Test half wave rectifier (use one diode) and
5. Construct and Test full wave rectifier(use two diode).
6. Construct and test Construct and Test transistor as an amplifier.

Note:
CIE test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks

Scheme of Evaluation for both CIE and SEE

Sl.No	Particulars	Marks
1	Identification of Active Components .	05
2	Writing & Construction of Circuit.	25
3	CRO output	05
4	Viva Voce	05
Total		40

Course Code	:	20ECJTS3T		Standard	:	X- Standard
Course Title	:	Elements of Electronics Engineering-IV		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Lecture
Course Category	:	E&C		Total Contact Hours	:	4 Periods Per Week 128 Periods per Year
Prerequisites	:	Knowledge of Physics and Mathematics and Basics of Electronics -1and 2		Teaching Scheme	:	(L:T:P)-4:0:0
CIE Marks	:	20		SEE Marks	:	80

*** CIE – Continuous Internal Evaluation * SEE – Semester End Examination**.

Note: 1 Period is equal to 40 minutes.

Course Objectives: To expose to the field of Electrical & Electronics engineering, and to acquire the fundamental knowledge in the field.

Course Content
Unit-1 : Number Systems
Marks: 16 **Allotted Periods: 25**
Number Systems- decimal, binary, octal and hexadecimal. Conversion of number systems. i. Problems to convert decimal to binary. ii. Problems to convert binary to decimal. iii. Problems to convert decimal to octal. iv. Problems to convert octal to decimal. v. Problems to convert decimal to hexadecimal. vi Problems to convert hexadecimal to decimal.
Unit– 2: Integrated circuits
Marks: 16 **Allotted Periods: 25**
What is an IC? Discuss fundamentals of IC's. List out features and advantages of IC's over discrete Components. Classification of IC's. a) Based on Scale of Integration.(i. SSI ii. MSI iii. LSI iv. VLSI) b) Based on Function (Analog & Digital). List the applications of IC's.

Unit- 3: Analog IC	
Marks: 16	**Allotted Periods: 25**
What is OP-AMP? Block diagram of OP-AMP. Explain the characteristics and applications of OP-AMP –inverting ,non inverting, Summer circuits.	
Unit– 4: Digital ICs	
Marks: 16	**Allotted Periods: 25**
LOGIC GATES –Symbol, Operation and Truth table verification of the AND,OR ,NOT,NOR & NAND gates	
Unit-5: Communication System.	
Marks: 16	**Allotted Periods:28**
Importance and need of communication, Block diagram of Basic Communication System. (Source,Modulator,Transmitter,Channel,Receiver,Demodulator,Destination.)	

References:

Suggested Learning Resources:

(h) Digital Electronics – Tokheim.
(i) Op-amps and linear integrated circuits, Ramakanth A. Gayakwad, ISBN- 9780132808682
(j) Electronic Communication by Dennis Roddy and John Coolen PHI Publications ISBN: 8177585584, 9788177585582

Open source software and website address:

http://www.allaboutcircuits.com

Unit No & Name	Detailed Course Content	Contact Periods
1. Number Systems	Number Systems- decimal, binary, octal and hexadecimal.	3
	Conversion of number system.	4
	Problems to convert decimal to binary	3
	Problems to convert binary to decimal.	3
	Problems to convert decimal to octal	3
	Problems to convert octal to decimal.	3
	Problems to convert decimal to hexadecimal.	3
	Problems to convert hexadecimal to decimal.	3
2. Integrated Circuits.	What is an IC? Discuss fundamentals of IC's.	5
	List out features and advantages of IC's over discrete Components	5
	Classification of IC's. Based on Scale of Integration.(i. SSI ii. MSI iii. LSI iv. VLSI)	5
	Classification of IC's. Based on Function(Analog & Digital)	5
	List the applications of IC's.	5
3.Analog IC's	What is OP-AMP.	4
	Explain the block diagram of OP-AMP.	4
	Explain the characteristics of OP-AMP.	5
	Explain the applications of OP-AMP as inverting Amplifier.	6
	Explain the applications of OP-AMP non inverting Amplifier.	6
4.Digital IC's	LOGIC GATES	2
	Symbol of the AND,OR ,NOT,NOR & NAND gates	5
	Operation of the AND,OR ,NOT,NOR & NAND gates	5
	Truth table verification of the AND,OR ,NOT,NOR & NAND gates	13
5. Communication System	Explain the Importance and need of Communication System,	6
	Explain Block diagram of Basic Communication System	10
	Explain - Source, Modulator, Transmitter, Channel, Receiver, Demodulator, and Destination.	12
	TOTAL	**128**

Teachers should use the following strategies to achieve the various outcomes of the course.

- Different methods of teaching and media to be used to attain classroom attention.
- Massive open online courses (MOOCs) may be used to teach various topics/sub topics.
- 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom Presentations.
- Micro-projects may be given to group of students for hand-on experiences
- Encouraging students to visit to Govt. offices/ Corporate offices/Business establishments/ Libraries etc around the institution.

Course outcomes:

At the end of the course student will be able to:

CO1. To understand the different number systems and conversions.
CO2. To understand the concept and classification of ICs.
CO3.To understands the different analog and digital ICs.
CO4. To understand the need and working of communication system.

Suggested Activities

1. List the Analog IC's which are not mentioned in Curriculum.
2. List the Digital IC's which are not mentioned in Curriculum.
3. Write binary numbers from 1 to 30.
4. Write Hexadecimal numbers from 1 to 30
5. Collect the transmission mediums such as Co-axial cable, OFC, Twisted Pair cable, etc.
6. List the different types of Communication Systems. (Such as Mobile Communication, Satellite communication, Wi-Fi, Bluetooth, etc)

Model Question Bank

Sl. No	Questions	Marks
	UNIT 1: Number Systems.	
1	Explain Number Systems- decimal, binary, octal and hexadecimal.	10
2	Convert decimal to binary number system.	5
3	Convert binary to decimal number system.	5
4	Convert decimal to octal number system	5
5	Convert octal to decimal number system.	5
6	Convert decimal to hexadecimal number system.	5
7	Convert hexadecimal to decimal number system.	5
	UNIT 2: Integrated Circuits.	
1	What is an IC?	2
2	List out features of IC's.	5
3	List the advantages of IC's over discrete Components.	5
4	Classify the IC's Based on Scale of Integration.	5
5	Classify the IC's Based on Function.	5
6	List the applications of IC's.	5
	UNIT 3: Analog IC's.	
1	Define OP-AMP.	2
2	Explain the block diagram of OP-AMP.	5
3	Explain the characteristics of OP-AMP.	5

4	Explain the applications of OP-AMP as inverting Amplifier.	7
5	Explain the applications of OP-AMP non inverting Amplifier.	7
	UNIT 4: Digital IC's.	
1	Write the Symbol of AND,OR ,NOT,NOR & NAND gates	5
2	Explain the Operation of the AND gate.	5
3	Explain the Operation of the OR gate.	5
4	Explain the Operation of the NOT gate.	5
5	Explain the Operation of the NOR gate.	5
6	Explain the Operation of the NAND gate.	5
7	Write the truth table of AND gate.	5
8	Write the truth table of OR gate.	5
9	Write the truth table of NOT gate.	5
10	Write the truth table of NOR gate.	5
11	Write the truth table of NAND gate.	5
	UNIT 5: Digital IC's.	
1	Explain the Importance of Communication System.	5
2	Explain Block diagram of Basic Communication System.	10
3	Explain - Source, Modulator, Transmitter, Channel, Receiver, Demodulator, and Destination.	3 marks for each component.

Course Code	:	20ECJTS3P		Semester	:	X- Standard
Course Title	:	Electronics Engineering Lab-IV		Course Group	:	Core
No. of Credits	:	--		Type of Course	:	Practical
Course Category	:	EC		Total Contact Periods	:	3 periods Per Week 90 periods Per year
Prerequisites	:	Knowledge of basic Electronics, EC lab-I & EC Lab-II Concepts.		Teaching Scheme	:	(L:T:P)- 0: 0: 3
CIE Marks	:	10		SEE Marks	:	40

* CIE – Continuous Internal Evaluation * SEE – Semester End Examination.

Note: 1 Period is equal to 40 minutes.

Course Objectives: Learn the fundamentals of Analog & Digital IC's and their applications.

List of Practical Experiments

SL. No	Name of the Experiments	Periods
1	Identify linear and digital IC's. (Pin Diagrams of Analog IC- IC 741 and Digital IC's 7400,7432,7408,7404,7402)	20
2	Verify the truth table of logic gates such as: i. NOT. ii. AND. iii. OR. iv. NOR. v. NAND.	30
3	OP-AMP operation. 3.1 Inverting amplifier. 3.2 Non – Inverting Amplifier. 3.3 Summing Amplifier.	40
	TOTAL	**90**

Course/Learning Outcome:

After undergoing this lab work, the student will be able to:

CO1. Identify & Study various Linear and Digital IC's.
CO2. Verify the Truth tables of logic Gates.
CO3. Implement the applications of Op-Amp.

Note: CIE test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks

Question Bank
For CIE and SEE

Course & Programmed: EC	**Standard: X**
Subject: Electronics Engineering Lab IV	**Max Marks : 40**
Course Code : 20ECJTS3P	**Duration : 3 periods**
Name of the course coordinator:	**Test :**

Note: Student has to conduct any one experiment in the CIE and SEE

Questions

1. Identify linear and digital IC's. (Pin Diagrams of Analog IC- IC 741 and Digital IC's 7400, 7432, 7408, 7404, 7402).
2. Verify the truth table of NOT gate.
3. Verify the truth table of AND gate.
4. Verify the truth table of OR gate.
5. Verify the truth table of NOR gate.
6. Verify the truth table of NAND gate
7. Construct & test Op-Amp as an Inverting amplifier.
8. Construct & test Op-Amp as an Non-Inverting amplifier.
9. Construct & test Op-Amp as an Summing amplifier.

Scheme of Evaluation for both CIE and SEE

Sl. No	Particulars	Marks
1	Identification of IC's.	5
2	Writing & Construction.	25
3	Result	5
4	Viva Voce	5
Total		**40**