Course Title	Applied Electricity and Basic Electronics.
Course Code	PHY 107 2.0 /PHY 155 2.0
Credit Value	2.0
Status	Core
Year / Level	Year 1
Semester	1
Theory: Practical: Independent Learning	30 : 00 : 70
Other: Pre-requisite Course/s	Students are expected to have knowledge of Current Electricity principals and Basic Electronics knoweledge.

Aim of the Course:

The aim of this course is to teach the general concepts in Electricity fundermentals, including single phase and three phase networks and their applications.

Intended Learning Outcomes:

On the successful completion of this course, the student should be able to:

1. Identify the reasons to implement Applied Electricity fundermentals.
2. Identify the Alternating current circuit theory.
3. Classify the types of RLC networks.
4. Compare and contrast wide variety of single phase and three phase electrical networks.
5. Apply the AC theory for industry base applications.
6. Design and analysis of electrical and electronic networks..
7. Evaluate performance of the electrical and electronics systems implemented.

Course Content:

Applied electricity:-

1.Familiarization with active and passive components.

2.Fundamentals of DC and AC circuits.

Circuit theory, Kirchhoff's law, Superposition theory, Thevenin's equivalent circuit, Nodal and mesh analysis.

3.Alternating Current Circuit Theory.
AC circuit with resistor, AC circuit with an Inductor, AC circuit with an Capacitor.

4.The LRC series circuit.
Impedance, Capacitive reactance, Inductive reactance, Susceptance, Admittance.

5.Power in AC circuits.
Power factor, Vector Diagrams of circuit elements for resistive circuit, Inductive circuit, capacitive circuits and combine circuits, Resonance, Band width and quality factor.

6.Transient Phenomena for L-R series.
C-R series, Discharge of capacitor in C-L circuit, L-C-R circuit, Discharge of Capacitor in L-C-R circuit.

7.Single Phase and Three Phase electrical circuits.

8.Star and Delta networks.
Phase voltage and current, Line voltage and current.

9.Power factor improvements for industry base applications.
Power Triangle, Active Power, Reactive Power and Apparent Power.

10.Transformer principal.
Single phase and three phase transformers, Fundamental equation of transformer design, Open circuit and short circuit test, Power losses in Transformers, Copper loss, Iron loss, Loss due to Eddy currents, Transformer equivalent circuit.

11. Power Transmission in single phase and three phase, Balance load and unbalance load.

Basic Electronics:-

12.Introduction to Semiconductor Devices,

Diode characteristics, Types of diodes, Transistor characteristics(BJT), Transistor biasing circuits, Transistor switching and amplifiers,

13.Integrator circuits, Operational Amplifiers and application.

Open loop and close loop systems, Ideal characteristics, Golden rules, Inverting amplifier, Non Inverting amplifier, Summing amplifier, Differentiating amplifier, Differential amplifier, Integrator amplifier, Unity gain amplifier.

14.Field Effect Transistor (FET) characteristics and applications, Logic circuits and their application,

15.DC power supply ,Rectification, Smoothing and voltage stabilization, Ripple factor and efficiency.

Scope and Schedule of Teaching - Learning Activities:

Topic No.	Topic / Sub Topic	No. of Hrs.			Teaching Method	Assessment Criteria	ILO Alignment
		T	P	IL			
1	Familiarization with active and passive components,	1	-	2	Lecture		1,2
2	Fundamentals of DC and AC circuits, Circuit theory.	3	-	6	Lecture		1,2
3	Alternating Current Circuit Theory	3	-	6	Lecture		1,2
4	The LRC series circuit	2	-	4	Lecture		2,3
5	Power in AC circuits.	3		6	Lecture		1,2,4
6	Transient Phenomena.	3	-	6	Lecture		3,4,5
7	Preparation for Assignment 1	-	-	5	Assignment 01	FA1 10% of Final Marks	1,2,3,4,5
8	Star and Delta networks.	2	-	4	Lecture		4,5
10	Transformer principal.	2	-	4	Lecture		1,2,4
11	Power Transmission in single phase and three phase	2	-	4	Lecture		2.4,5
12	Introduction to Semiconductor Devices.	2	-	4	Lecture		6,7
13	Integrator circuits, Operational Amplifiers and application.	3	-	6	Lecture		6,7
14	Field Effect Transistor (FET) characteristics and applications	2	-	4	Lecture		6,7
15	DC power supply.	2	-	4	Lecture		6,7
16	Preparation for Assignment 2	-	-	5	Assignment 02	FA2 10% of Final Marks	4,5,6,7
	Total	*30*	-	*70*			

Linking Program Outcomes with ILOs:

Program Outcomes:

1. Demonstrate competency in theoretical knowledge and practical and/or technical skills in respective subject areas.
2. Communicate efficiently and effectively in the respective subject areas using written, oral, visual and/or electronic forms.
3. Facilitate, and participate as an empathetic and emotionally intelligent team player with leadership qualities, in a group, diverse team or organization.
4. Apply subject based knowledge and skills creatively in making appropriate judgments in changing situations
5. Integrate creativity and innovation to achieve entrepreneurial competencies.
6. Implement solutions in keeping with ethical, societal and environmental norms and need for sustainable development.
7. Secure lifegoals through lifelong learning with the aim of strengthening professional skills, and ensuring the betterment of the community.

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
ILO 1	***	**	**	**	*	*	*
ILO 2	***	**	*	***	**	**	**
ILO 3	**	***		**	***	**	*
ILO 4	***	***	*	*	**	*	*
ILO 5	***	**		**	***	**	*
ILO 6	**	***	*	**	*	**	*
ILO 7	***	**	*	***	***	*	*

*** - *Strongly Linked; ** - Medium linked; * Weakly linked*

Mode of Assessment:

Formative Assessments (FA): FA 1 10% + FA 2 10% = 20% of Total Marks

Summative Assessments (SA): End Semester Examination: 2-hour written exam 80% of Total Marks

References:

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1. A Text book of Electrical Technology. B. L. Theraja, A.K.Theraja, S .Chand Publications
2. Electronic Devices and Circuit theory (7th edition),Robert Boylestad Louis Nashelsky.
3. Basic Circuit Theory.Charles A Desoer Ernest S Kuh(1969)