Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
ACCESS, EJC Montilla, 9800 City of Tacurong
Province of Sultan Kudarat

ET111 – ELECTRICITY AND ELECTRONICS PRINCIPLES

UNIVERSITY VISION

A leading University in advancing scholarly innovation, multi-cultural convergence, and responsive public service in a borderless Region.

UNIVERSITY MISSION

The University shall primarily provide advanced instruction and professional training in science and technology, agriculture, fisheries, education and other related fields of study. It shall also undertake research and extension services, and provide progressive leadership in its areas of specialization.

UNIVERSITY STRATEGIC GOALS

a. Deliver quality service to stakeholders to address current and future needs in instruction, research, extension, and production
b. Observe strict implementation of the laws as well as the policies and regulations of the University
c. Acquire with urgency state-of-the-art resources for its service areas
d. Bolster the relationship of the University with its local and international customers and partners
e. Leverage the qualifications and competences in personnel action and staffing
f. Evaluate the efficiency and responsiveness of the University systems and processes

INSTITUTIONAL OUTCOMES (IO)

a. Enhance competency development, commitment, professionalism, unity and true spirit of service for public accountability, transparency and delivery of quality services
b. Provide relevant programs and professional trainings that will respond to the development needs of the region
c. Strengthen local and international collaborations and partnerships for borderless programs
d. Develop a research culture among faculty and students
e. Develop and promote environmentally-sound and market-driven knowledge and technologies at par with international standards
f. Promote research-based information and technologies for sustainable development
g. Enhance resource generation and mobilization to sustain financial viability of the university

PROGRAM OUTCOMES (PO) COMMON TO ALL PROGRAMS AND ITS RELATIONSHIPS TO INSTITUTIONAL OUTCOMES

	INSTITUTIONAL OUTCOMES (IO)						
A graduate of Sultan Kudarat State University can:	a	b	c	d	e	f	g
a. Ability to analyze broadly defined industrial technology processes by using analytical tools that enhances creativity, innovativeness, and intellectual curiosity to improve methods, processes, and systems that meet the industry standards				✔	✔	✔	
b. Ability to design and implement broadly defined industrial systems, components, products or processes to meet specific industry needs with proficiency and flexibility in the area of specialization in accordance with global standards		✔			✔		
c. Ability to apply appropriate techniques, resources, and state-of-the-art industrial technology tools to meet current industry needs and use these modern tools and processes to improve and increase		✔			✔		

entrepreneurial activities upholding the safety and health standards of business and industry							
d. Ability to communicate with diverse groups of clienteles the appropriate cultural language with clarity and persuasion, in both oral and written forms, including understanding and giving of clear instructions, high comprehension level, effectiveness in delivering presentations and writing documents, and articulating technological innovation outputs	✔						
e. Ability to develop leadership and management skills in a team-based environment by making informed decisions, keeping the team motivated, acting and delegating responsibility, and inspiring positive changes in the organization by exercising responsibility with integrity and accountability in the practice of one's profession	✔	✔					
f. Practice the moral responsibilities of an industrial technologist to manage and balance wider public interest and uphold the norms and safety standards of the industrial technology profession	✔						
g. Ability to demonstrate enthusiasm and passion for continuous personal and professional development in broadly defined industrial technology and effecting positive changes in the entrepreneurial and industrial endeavor	✔						

1 **COURSE CODE** ET 111
2 **COURSE TITLE** Electricity and Electronics Principles
3 **PREREQUISITE** None
4 **CREDITS** 3 units

5 **COURSE DESCRIPTION**
This course deals with the basics electrical and electronics components and their characteristics, basic electronic circuit, control application including the study of physical, chemical and electrical properties of conductors, semi-conductors and insulators.

6 **COURSE LEARNING OUTCOMES (CLO) AND ITS RELATIONSHIPS TO PROGRAM OUTCOMES**

Course Learning Outcomes (CLO)	Program Outcomes						
At the end of the course, a student can:	a	b	c	d	e	f	g
a. Apply the principles of assessment in conceptualizing techniques for assessing authentic learning	✔	✔	✔	✔	✔	✔	✔
b. Design performance-based assessment tools	✔	✔	✔	✔	✔	✔	✔
c. Design assessment tools for effective learning	✔	✔	✔	✔	✔	✔	✔
d. Develop E-Portfolio to assess ones learning	✔	✔	✔	✔	✔	✔	✔
e. Demonstrate skills preparing and reporting grades	✔	✔	✔	✔	✔	✔	✔
f. Derive information from alternative forms of assessments in making instructional decisions	✔	✔	✔	✔	✔	✔	✔

7 **COURSE CONTENTS**

WEEK	CONTENT	INTENDED LEARNING OUTCOMES((ILOs)	TEACHING AND LEARNING ACTIVITIES (TLA)	OUTCOMES-BASED ASSESSMENT (OBA)	COURSE LEARNING OUTCOMES (CLOs)
1	**Course Orientation** *SKSU VMGO, Classroom Policies, Course Overview, Course Requirements, Grading System*	At the end of the week, the pre-service teacher (PST) can: a. discuss the University's VMGO, classroom policies, course overview, requirements and grading system	Discuss the VMGO of the University, the classroom policies, scope of the course, course requirements and grading system		
2	**Basic Electricity** a. Electricity fundamentals: definition, importance, and application b. Electric Charge and Current: Types of charges, current flow, and measurement c. Resistance and Conductance: Ohm's Law, resistivity, and conductance d. Circuits and Circuit Elements: Series and parallel circuits, resistors, capacitors, and inductors e. Electric Power and Energy: power calculation, energy consumption, and safety	At the end of the week, the pre-service teacher (PST) can: a. Understand the fundamental concepts of electricity b. Analyze electric circuits and calculate circuit parameters c. Apply Ohm's Law and circuit analysis techniques d. Design and troubleshoot simple electric circuits e. Recognize the importance of electricity safety	a. Lectures and discussions b. Circuit simulations and modeling c. Hands-on experiments and projects d. Group activities and problem-solving exercises e. Online resources and multimedia materials	a. Quizzes and exams to assess understanding of concepts b. Circuit analysis and design problems c. Lab reports and project evaluations d. Group presentations and peer assessments e. Safety protocols and practices evaluation	a, b, c, and d
3	**Conductors and Insulators** a. Conductors: Definition, examples, and applications b. Insulators: Definition, examples, and applications c. Properties of conductors and Insulators: conductivity, resistivity, and dielectric strength d. Factors affecting conductivity: temperature,	At the end of the week, the pre-service teacher (PST) can: a. Understand the difference between conductors and insulators b. Identify and explain the properties of conductors and insulators c. Analyze the factors affecting conductivity d. Apply knowledge of conductors and insulators in electrical systems e. Recognize the importance of conductors and insulators in electrical safety	a. Lectures and discussions b. Hands-on experiments c. Group activities: identifying conductors and insulators d. Case studies: Application of conductors and insulators e. Simulations: visualizing electric current flow	a. Quizzes and exams: conductors and insulators concepts b. Lab reports: experiments with conductors and insulators c. Group presentations: applications and case studies d. Problem-solving exercises: conductivity and resistivity e. Project evaluation: design and safety consideration	a, b, c, and f

	materials, and geometry e. Applications of Conductors and Insulators: Electric wiring, electronics, and safety devices				
3	**Semiconductors** a. Introduction to Semiconductors: definition, properties, and importance b. Types of Semiconductors: intrinsic and extrinsic semiconductors, p-type and n-type materials c. Semiconductor materials: silicon, germanium, and other semiconductor materials d. Applications of semiconductors: diodes, transistors, integrated circuits, and electronics e. Semiconductor devices: diode, transistor, thyristor, and other devices	At the end of the week, the pre-service teacher (PST) should be able to: a. Understand the fundamental concepts of semiconductors b. explain the properties and types of semiconductors c. analyze the applications of semiconductors in electronics d. identify and describe various semiconductors devices e. recognize the importance of semiconductors in modern technology	a. lectures and discussions b. diagrams and illustrations of semiconductors devices c. hands-on experiments with semiconductors devices d. group activities: designing and building simple semiconductor circuits e. case studies: applications of semiconductors in real-world devices	a. quizzes and exams: semiconductor concepts and devices b. lab reports: experiments with semiconductor devices c. Group presentations: applications and case studies d. Project evaluation: design and implementation of semiconductor circuits e. Problem-solving exercises: analyzing semiconductor circuits	a, b, e, and f
4	**Transformers** a. Introduction to Transformers: Definition, principle of operation, and types b. Transformer Construction: Core, windings, and insulation c. Transformer Operation:	At the end of the week, the pre-service teacher (PST) can: a. Understand the fundamental principles of transformers b. Explain the construction and operation of transformers c. Analyze transformer efficiency and losses d. Apply transformer knowledge in power	a. Lectures and discussions b. Diagrams and illustrations of transformer construction and operation c. Hands-on experiments with transformers d. Group activities: Designing and calculating transformer specifications e. Case studies: Applications of transformers in power systems and	a. Quizzes and exams: Transformer concepts and operation b. Lab reports: Experiments with transformers c. Group presentations: Applications and case studies d. Problem-solving exercises:	a, b, c, e, and f

	Step-up and step-down transformers, voltage and current transformation d. Transformer Efficiency and Losses: Energy losses, efficiency, and cooling methods e. Applications of Transformers: Power distribution, transmission, and utilization	systems and applications e. Recognize the importance of transformers in electrical engineering	industries	Transformer calculations and design e. Project evaluation: Design and implementation of transformer-based systems	
5	**Basic Electronics** a. Electronic Components: Resistors, capacitors, inductors, diodes, transistors b. Circuit Analysis: Series and parallel circuits, Kirchhoff's laws, Thevenin's theorem c. Electronic Signals: AC and DC signals, signal processing, and filtering d. Amplifiers and Oscillators: Types of amplifiers, feedback, and oscillator circuits e. Digital Electronics: Binary number system, logic gates, and basic digital circuits	At the end of the week, the pre-service teacher (PST) can: a. Understand the fundamental concepts of electronic components and circuits b. Analyze electronic circuits using various techniques and theorems c. Explain the principles of electronic signals and signal processing d. Design and implement simple electronic circuits e. Recognize the importance of electronics in modern technology	a. Lectures and discussions b. Hands-on experiments with electronic components and circuits c. Circuit simulations using software tools d. Group activities: Designing and building electronic projects e. Case studies: Applications of electronics in real-world devices	a. Quizzes and exams: Electronic components and circuit analysis b. Lab reports: Experiments with electronic circuits c. Group presentations: Applications and case studies d. Project evaluation: Design and implementation of electronic circuits e. Problem-solving exercises: Circuit analysis and design	a, b, c, e, and f
6	**Capacitors** a. Introduction to Capacitors: Definition, principle of operation, and types b. Capacitor Construction: Materials, structure, and	At the end of the week, the pre-service teacher (PST) can: a. Understand the fundamental principles of capacitors b. Explain the construction and properties of capacitors	a. Lectures and discussion b. Hands-on experiments with capacitors c. Circuit simulations using software tools d. Group activities: Designing and building capacitor-based circuits e. Case studies: Applications of capacitors	a. Quizzes and exams: Capacitor concepts and properties b. Lab reports: Experiments with capacitors c. Group presentations: Applications and case studies	a, b, d, e, and f

	capacitance c. Capacitor Properties: Capacitance, voltage rating, and dielectric strength d. Capacitor Applications: Filtering, coupling, and energy storage e. Capacitor Types: Ceramic, electrolytic, film, and variable capacitors	c. Analyze capacitor applications in electronic circuits d. Identify and describe various types of capacitors e. Recognize the importance of capacitors in electronic systems	in real-world devices	d. Problem-solving exercises: Capacitor calculations and design e. Project evaluation: Design and implementation of capacitor-based circuits	
7	**Inductors** a. Introduction to Inductors: Definition, principle of operation, and types b. Inductor Construction: Coil, core, and winding configurations c. Inductor Properties: Inductance, current rating, and magnetic field d. Inductor Applications: Filtering, energy storage, and electromagnetic interference (EMI) suppression e. Inductor Types: Air-core, iron-core, ferrite-core, and variable inductors	At the end of the week, the pre-service teacher (PST) can: a. Understand the fundamental principles of inductors b. Explain the construction and properties of inductors c. Analyze inductor applications in electronic circuits d. Identify and describe various types of inductors e. Recognize the importance of inductors in electronic systems	a. Lectures and discussions b. Hands-on experiments with inductors c. Circuit simulations using software tools d. Group activities: Designing and building inductor-based circuits e. Case studies: Applications of inductors in real-world devices	a. Quizzes and exams: Inductor concepts and properties b. Lab reports: Experiments with inductors c. Group presentations: Applications and case studies d. Problem-solving exercises: Inductor calculations and design e. Project evaluation: Design and implementation of inductor-based circuits	a, b, d, e, and f
8	**FINAL EXAMINATION**				

Total No. of Hours : 54

8 COURSE REQUIREMENTS AND COURSE POLICIES

COURSE REQUIREMENTS

Each student is required to:

1. submit accomplished assignments, problem sets and a mini-research project;
2. prepare a comprehensive lecture notebook;
3. make a PowerPoint presentation, and a written summary of the assigned report;

COURSE POLICIES

Attendance: A student will be marked late if he/she enters the class 5 minutes after start of class period. Any student who comes to class 15 minutes after the scheduled time or always late for three consecutive meetings shall be marked absent.

Missed work or exam: Any student who missed to submit a work assignment or to take a test should consult the concerned instructor for immediate compliance

Cheating and Plagiarism: Any student who committed any form of academic dishonesty (e.g., copy-paste plagiarism) shall be given disciplinary action provided in the SKSU Student's Handbook

Use of Technology: Cell phones should be turned off while the session is in progress. Using laptops, notebook PCs, smart phones, and tablets shall be allowed only when needed. A scientific calculator (e.g. Casio fx-991ES) shall be utilized in solving.

9 GRADING SYSTEM AND RUBRICS FOR GRADING

GRADING SYSTEM

Midterm Grade	
Written Examination	30%
Course requirement	40%
Attendance	5%
Quizzes	15%
Participation	10%
TOTAL	100%

Final Term Grade	
Written Examination	30%
Course requirement	40%
Attendance	5%
Quizzes	15%
Participation	10%
TOTAL	100%

FINAL GRADE	
Midterm Grade	50%
Final Term Grade	50%
TOTAL	**100%**

10 REFERENCES

Textbooks

"Electric Circuits" by James W. Nilsson and Susan A. Riedel: A comprehensive textbook on electric circuits.
"Fundamentals of Electric Circuits" by Charles K. Alexander and Matthew N.O. Sadiku: A textbook covering fundamental concepts of electric circuits.
Online resources: Websites like Khan Academy, All About Circuits, and Electronics Tutorials provide additional learning materials and practice problems.
Delmar's Standard Textbook of Electricity 6th Ed. by Stephen L. Herman American Electricians' Handbook 15th Ed. By T. Croft, W. Summers, & F. Hartwell A Textbook of Electrical Technology by B.L. Theraja & A.K. Theraja Electrical and Electronic Principles and Technology by John Bird Question and Answer for Electrician Examination by Edwin P. Anderson Electrical Wiring and Estimate by Max Fajardo Electrical Installation Design Second Edition by Bill Atkitson Revised by Roger Lovegrove

Online References

students.aiu.edu/submissions/profiles/resources/onlineBook/p8B5P5_Electrical_and_Electronic_Principles5.pdf
Revising Electronics & Electrical Principles 1 - Year 1 Module
Ohms Law - Revising Electronics & Electrical Principles 1
Combining Resistors Series & Parallel - Revising Electronics & Electrical Principles 1
Kirchoffs Laws KVL & KCL - Revising Electronics & Electrical Principles 1
Combining Voltage & Current Sources Series/Parallel - Revising Electronics & Electrical Principles 1

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