



Republic of the Philippines
SULTAN KUDARAT STATE UNIVERSITY
EJC Montilla, 9800 City of Tacurong



COLLEGE OF INDUSTRIAL TECHNOLOGY
DT 312A – ELECTRICAL, ELECTRONICS, PLUMBING AND SANITATION LAY OUT

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

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

INSTITUTIONAL OUTCOMES (IO)

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

A graduate of Sultan Kudarat State University can:	INSTITUTIONAL OUTCOMES (IO)						
	a	b	c	d	e	f	g
a. Articulate effectively and independently in multi-disciplinary and multi-cultural teams the latest development in the fields practiced such as Automotive, Architectural Drafting, Civil, Electrical, Electronics, Food and its allied discipline,	✓	✓		✓	✓	✓	✓
b. Lead in the promotion and preservation of Filipino historical and cultural heritage, social empowerment and environmental sustainability in a professional and ethical approach.	✓	✓	✓	✓	✓	✓	✓
c. Generate research-based information and technologies at par from international standards, and	✓	✓	✓	✓	✓	✓	✓
d. Promote and transfer knowledge and technologies for effective and efficient school-industry partnership	✓	✓	✓	✓	✓	✓	✓

1	COURSE CODE	DT 312A
2	COURSE TITLE	ELECTRICAL, ELECTRONICS, PLUMBING AND SANITATION LAY OUT
3	PREREQUISITE	DT 222A
4	CREDITS	3 units

5 COURSE DESCRIPTION

This course provides students with comprehensive knowledge and practical skills in the layout and design of electrical, electronics, plumbing, and sanitation systems for residential, commercial, and industrial buildings. It emphasizes the integration of technical standards, safety regulations, and sustainability considerations in creating effective utility system designs. Students will learn to interpret architectural and engineering plans, prepare detailed layout drawings, and utilize tools and software commonly used in the construction and building services industry. The course also covers basic concepts in electrical and electronic circuits, water supply and distribution, drainage systems, and installation practices. By the end of the course, learners will be equipped to collaborate in multidisciplinary teams and contribute to the planning and execution of building utility systems in compliance with relevant codes and standards.

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

Course Learning Outcomes (CLO)	Program Outcomes			
	a	b	c	d
At the end of the course, a student can:				
a. Interpret electrical symbols and schematic diagrams used in residential, commercial, and industrial plans.	✓	✓		✓
b. Design electrical layout that includes power distribution, lighting systems, and safety devices based on standard codes.	✓		✓	✓
c. Demonstrate proper placement of electrical fixtures and conduits to ensure functionality, safety, and efficiency.	✓	✓		✓
d. Identify electronic components and explain their functions in low-voltage systems like communication, security, and automation.	✓		✓	✓
e. Develop electronics layout that integrates systems such as CCTV, fire alarms, and intercoms in a building plan.	✓		✓	✓
f. Apply industry standards and guidelines in planning the layout of electronic systems to ensure compatibility and performance.	✓	✓	✓	✓
g. Understand and read basic plumbing and sanitation symbols and plans.	✓	✓		✓
h. Create plumbing and sanitation layouts for water supply and drainage systems.	✓	✓	✓	✓
i. Apply safety and environmental standards in designing plumbing and sanitation systems.	✓	✓	✓	✓

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 Orientation, the Learners 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	ELECTRICAL A. Common Electrical Symbols and Their Uses (switches, outlets, panels, etc.)	At the end of the Lesson, the Learners can: 1. Identify and define standard electrical symbols used in residential and commercial blueprints. 2. Match electrical symbols to their corresponding components and devices in a given layout. 3. Create a legend of electrical symbols for use in a basic floor plan drawing	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation	abc
2	B. Reading and Analyzing Electrical Schematic and Wiring Diagrams	At the end of the Lesson, the Learners can: 1. Interpret wiring diagrams to trace the flow of electricity through a circuit. 2. Differentiate between schematic diagrams and layout plans based on function and application. 3. Analyze a sample electrical schematic to identify connections, load paths, and protective devices.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	abc
3	C. Principles of Power Distribution and Load Balancing	At the end of the Lesson, the Learners can: 1. Explain the basic concepts of power distribution including single-phase and three-phase systems. 2. Calculate load requirements for residential or commercial electrical systems. 3. Design a simple load distribution plan ensuring balanced electrical load across circuits.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	abc
4	D. Electrical Layout Design Based on National and Local Electrical Codes	At the end of the Lesson, the Learners can: 1. Identify key provisions from the Philippine Electrical Code (or local equivalent) applicable to layout design. 2. Apply code-compliant spacing and placement rules for switches, outlets, and lighting fixtures. 3. Review and revise an electrical layout based on code compliance and safety standards.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	abc

5	E. Guidelines for Fixture and Outlet Placement in Different Building Types	At the end of the Lesson, the Learners can: 1. Compare standard fixture and outlet placement guidelines for residential, commercial, and industrial settings. 2. Determine appropriate height, distance, and location of outlets and switches based on function and user needs. 3. Prepare a room layout with correctly placed outlets, switches, and lighting fixtures.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	abcd
5	F. Conduit Routing Techniques and Installation Best Practices	At the end of the Lesson, the Learners can: 1. Identify different types of electrical conduits and their appropriate applications. 2. Plan conduit routes that minimize wire length while avoiding structural obstructions. 3. Demonstrate safe and efficient techniques for installing conduits in walls, floors, and ceilings.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	abc
6	ELECTRONICS A. Introduction to Low-Voltage Systems and Components (CCTV, alarms, etc.)	At the end of the Lesson, the Learners can: 1. Identify different types of low-voltage systems used in residential and commercial buildings. 2. Describe the basic components of systems such as CCTV, fire alarms, and access control. 3. Explain the advantages and applications of low-voltage systems in building safety and automation.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation	def
6	B. Functions and Applications of Key Electronic Devices (sensors, relays, control panels)	At the end of the Lesson, the Learners can: 1. Explain the function of sensors, relays, and control panels within a low-voltage system. 2. Match electronic devices with their appropriate use in security, communication, or automation systems. 3. Demonstrate how selected devices interact within a working circuit or system.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	def

7	C. Layout Planning for Security and Communication Systems	<p>At the end of the Lesson, the Learners can:</p> <ol style="list-style-type: none"> 1. Plan the ideal locations for security devices like cameras, motion detectors, and control panels. 2. Sketch a basic layout of a security or intercom system for a residential or office space. 3. Identify layout issues that could affect the performance or coverage of electronic devices. 	<ol style="list-style-type: none"> a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity 	<ul style="list-style-type: none"> • Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment 	def
8	D. Integrating Electronic Subsystems in Architectural Floor Plans	<p>At the end of the Lesson, the Learners can:</p> <ol style="list-style-type: none"> 1. Overlay electronic system components (e.g., alarms, CCTV, Intercom) onto existing architectural plans. 2. Coordinate device placement with structural elements and electrical systems. 3. Adjust floor plan layouts to ensure optimal functionality and minimal interference between systems. 	<ol style="list-style-type: none"> a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity 	<ul style="list-style-type: none"> • Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment 	def
9 MIDTERM EXAM					
10	E. Industry Codes and Best Practices for Low-Voltage System Design	<p>At the end of the Lesson, the Learners can:</p> <ol style="list-style-type: none"> 1. Identify local and international standards relevant to low-voltage system design (e.g., NEC, TIA/EIA). 2. Apply code-compliant practices in planning low-voltage system installations. 3. Evaluate a low-voltage layout plan for adherence to safety, performance, and regulatory standards. 	<ol style="list-style-type: none"> a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity 	<ul style="list-style-type: none"> • Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment 	def
11	F. Ensuring Compatibility and Network Integration Among Electronic Devices	<p>At the end of the Lesson, the Learners can:</p> <ol style="list-style-type: none"> 1. Explain the importance of device compatibility in integrated security and automation systems. 2. Identify common communication protocols (e.g., IP, RS-485) used in low-voltage networks. 	<ol style="list-style-type: none"> a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity 	<ul style="list-style-type: none"> • Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment 	def

		3. Design a simple system layout that ensures integration between multiple devices and control units.			
12	PLUMBING AND SANITARY A. Introduction to Plumbing and Sanitary Symbols and Blueprint Reading	At the end of the Lesson, the Learners can: 1. Recognize and interpret common plumbing and sanitary symbols used in building plans. 2. Read and understand basic plumbing blueprints for residential and commercial structures. 3. Match blueprint symbols with their corresponding real-world plumbing components.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation	ghi
12	B. Identifying System Components in Plumbing and Sanitation Drawings	At the end of the Lesson, the Learners can: 1. Identify major plumbing and sanitation components such as pipes, traps, valves, and vents. 2. Explain the function of each system component within a plumbing layout. 3. Locate key system elements (e.g., water mains, cleanouts) on a plumbing plan.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	ghi
13	C. Designing Water Supply Systems: Pipe Sizing and Fixture Placement	At the end of the Lesson, the Learners can: 1. Select appropriate pipe sizes based on fixture units and water demand. 2. Design a basic water supply system for a residential or small commercial building. 3. Position plumbing fixtures according to ergonomic standards and building codes.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	ghi
14	D. Planning Drainage and Waste Systems: Layout of Vents and Drains	At the end of the Lesson, the Learners can: 1. Plan the layout of soil and waste pipes in compliance with plumbing code requirements. 2. Design an effective venting system to prevent pressure build-up and siphoning. 3. Integrate cleanouts and slope considerations into a complete drainage plan.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	ghi

15	E. Plumbing Safety Practices and Common Hazards	At the end of the Lesson, the Learners can: 1. Identify common hazards in plumbing installation and maintenance work. 2. Describe safety measures and personal protective equipment (PPE) required on plumbing job sites. 3. Apply safe working practices when handling plumbing tools and materials.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	ghi
16	F. Sustainable and Eco-Friendly Plumbing System Design	At the end of the Lesson, the Learners can: 1. Explain the principles of water conservation and sustainable plumbing design. 2. Recommend eco-friendly plumbing fixtures and materials for a green building project. 3. Design a plumbing system that incorporates rainwater harvesting or greywater reuse.	a. Round Table Discussion b. Prior knowledge probing c. Follow-up questioning d. Interactive Lecture e. Multiple Visual Presentation f. Drawing Activity	• Written Work Assessment • Concept Note from the Round Table • Discussion • Oral Recitation • Drawing Output assessment	ghi

FINAL EXAMINATION

Total No. of Hours : 120

8 COURSE REQUIREMENTS AND COURSE POLICIES

COURSE REQUIREMENTS Each student is required to:

1. Attend classes on schedule time and day;
2. Accomplish all assessment;
3. Accomplish all drawing activities;
4. pass the major exams (midterm and final)

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 lat 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 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.

9 GRADING SYSTEM AND RUBRICS FOR GRADING

GRADING SYSTEM

Midterm Grade	
Midterm Examination	30%
Drawing Activities	40%
Attendance/ Class Participation	10%
Quizzes	20%
TOTAL	100%

Final Term Grade

Final term Examination	30%
Drawing Activities	40%
Attendance/ Class Participation	10%
Quizzes	20%
TOTAL	100%

FINAL GRADE

Midterm Grade	50%
Final Term Grade	50%
Total	100%

RUBRIC FOR THE OUTPUT IN EVERY DRAWING ACTIVITY

Criteria	1.0 (Excellent)	1.25 (Very Good)	1.50 (Good)	1.75 (Satisfactory)	2.0 (Needs Improvement)	2.50 (Poor)
Creativity & Originality	Exceptionally creative and original; stands out as highly unique.	Very creative with some unique aspects.	Good creativity with minor originality.	Some creativity, but lacks originality.	Limited creativity, ideas seem generic.	Very little creativity, lacks originality.
Composition & Layout	Masterful use of space, balance, and proportion.	Very well-balanced with good use of space.	Adequate composition with some balance.	Basic layout, some imbalance or awkward spacing.	Poor composition with noticeable imbalance.	Disorganized, lacks structure and clarity.
Detail & Precision	Extremely detailed, sharp, and precise in all aspects.	Detailed and clear with minimal errors.	Adequate detail, some areas lack clarity.	Moderate detail, some vague or rough areas.	Very few details, lacks focus or refinement.	Barely any detail or clarity, rough.
Technique & Skill	Masterful technique, flawless execution.	Very skilled, few minor imperfections.	Good technique with some visible imperfections.	Adequate technique with noticeable errors.	Weak technique, many visible mistakes.	Poor technique, major mistakes throughout.
Overall Impression	Outstanding overall impact; leaves a lasting impression.	Strong impact with a clear message.	Good overall, but lacks strong impact.	Adequate impact, lacks depth or coherence.	Weak overall impression, unclear or muddled.	Very poor overall, lacks clear message.

- **3.0 - Late Accomplished and Submission**
- **5.0 – Non-submission**

10 REFERENCES

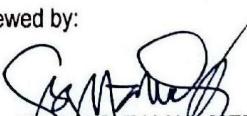
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Prepared by:



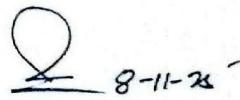
MICHAEL C. ARRIVAS, MAT
Faculty

Reviewed by:



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8-11-25

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