



Davao del Sur State College
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LABORATORY MANUAL FOR AB POWER ENGINEERING

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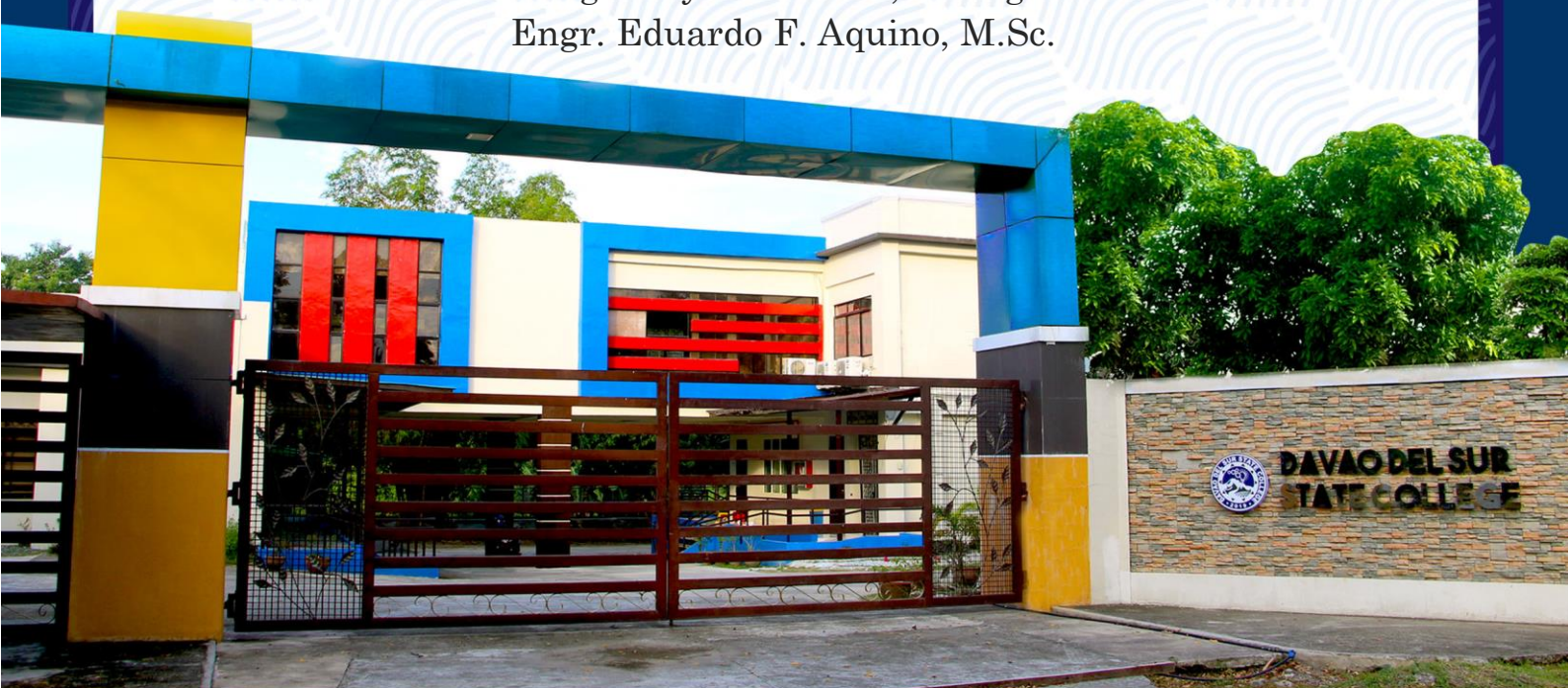


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PREFACE

This manual is your guide to hands-on learning, designed to supplement the theoretical concepts you've learned in lectures. The experiments and exercises within will allow you to apply principles of machinery power, engine and tractor operation, Diesel and Gasoline Engine system, Electric Motor, and renewable energy sources in a practical, real-world setting. You'll get to work with actual equipment and machinery, gaining valuable skills that are essential for a career in agricultural and biosystems engineering.

Our work in this lab is directly connected to a global effort to create a more sustainable and equitable future. Through your experiments, you will be contributing to the following Sustainable Development Goals (SDGs):

- *SDG 2: Zero Hunger: By optimizing agricultural machinery, we can increase efficiency and productivity, helping to produce more food to feed a growing global population.*
- *SD 7: Affordable and Clean Energy: We will explore how machinery power systems, including agricultural engines and induction motors, can become more energy-efficient and potentially transition to cleaner, renewable sources, reducing our carbon footprint. Your work in estimating available renewable energy sources will be crucial here.*
- *SDG 9: Industry, Innovation, and Infrastructure: This lab is a direct application of engineering innovation, where you will learn to build and maintain the modern infrastructure that underpins a robust and sustainable agricultural sector. Your hands-on experience with agricultural engines, tractors, and induction motors will be key to this goal.*
- *SDG 12: Responsible Consumption and Production: Understanding how to properly maintain and use machinery helps to extend its lifespan and reduce waste, promoting a more circular and sustainable approach to resource use.*

As you embark on this journey, remember that safety is paramount. Always follow the established safety protocols, wear the appropriate personal protective equipment (PPE), and never operate machinery without proper instruction and supervision.

We're excited for you to dive into these experiments and discover the power that drives modern agriculture. Let's get started!

Engr. Amante and Aquino



LABORATORY SAFETY RULES

Welcome to the lab! Your safety is our top priority. Adherence to these rules is mandatory for everyone working in the laboratory. Failure to comply will result in immediate removal from the lab.

General Rules

1. **No unauthorized experiments.** Only perform the experiments and procedures assigned by your instructor.
2. **No food, drink, or chewing gum** in the laboratory at any time. Do not use laboratory glassware as food or drink containers.
3. **Familiarize yourself** with the location of all safety equipment, including the fire extinguisher, first-aid kit, and emergency eyewash and shower stations.
4. **Report all injuries, spills, or broken equipment** to your instructor immediately, no matter how minor.
5. **Keep your workspace clean** and organized. Do not block aisles or emergency exits with equipment or personal belongings.

Personal Protective Equipment (PPE)

1. **Wear appropriate PPE at all times.** This includes safety glasses or goggles, closed-toe shoes, and a lab coat or apron.
2. **Tie back long hair** to prevent it from getting caught in machinery.
3. **Avoid loose clothing or jewelry** that could get snagged by equipment.

Machinery and Equipment

1. **Never operate machinery without permission** and proper training from your instructor.
2. **Turn off all machinery** when not in use. Ensure all moving parts have come to a complete stop before attempting any adjustments or maintenance.
3. **Secure all loose parts** on machinery before operation. Check for any signs of damage or wear before starting a machine.
4. **Do not bypass safety guards or interlocks** on any equipment. They are there to protect you.

Chemical and Waste Handling

1. **Handle all fuels, oils, and other chemicals with caution.** Read the labels and safety data sheets (SDS) for any chemical you use.
2. **Dispose of all waste properly.** Your instructor will provide specific instructions for the disposal of used oils, filters, and other materials. Do not pour chemicals or oils down the drain.

Your commitment to safety is a commitment to the success of this course and the well-being of everyone in this laboratory. By following these rules, you are creating a professional and secure environment for learning and discovery.

Be aware, be safe, and let's get to learn!

