

COCONINO COMMUNITY COLLEGE

COURSE OUTLINE

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Effective Term: Fall 2020

Date: November, 2019

A. **Identification:**

1. Subject Area: *Construction Technology Management (CTM)*
2. Course: CTM 237
3. Course Title: Battery-Based Photovoltaic Systems
4. Credit Hrs: 3

Catalog Description: Pre-requisites CTM 150. This course will teach the fundamentals of the common types and components of photovoltaic systems that are battery-based such as P.V. direct, grid direct, stand-alone, multimode, energy storage systems (ESS) such as battery technology, and hybrid type systems are explored. Load analysis is addressed along with other critical design criteria such as battery bank design, equipment options, and electrical integration of system components. Three Lecture.

B. **Course Goals:**

This course will:

Prepare and train the learner on the technical theory and hands-on application of battery-based photovoltaic systems which serve many different areas such as off-grid single and multi-family dwellings, rural agricultural, telecommunications, and other remote applications. Understanding the battery based components and installing a complete system is an essential skill for completing an off the grid system that functions properly.

C. **Course Outcomes:**

Students will be able to:

1. identify and distinguish between battery-based and grid-tied photovoltaic systems.
2. understand battery-based components in detail, including batteries, charge controllers, and battery--based inverters.
3. differentiate battery chemistries and associated pros and cons.
4. investigate the cost comparisons between grid tied and battery based systems.
5. practice electrical and solar safety and maintenance considerations unique to battery technology.
6. prepare for the NABCEP Certification for P.V. Associate exam as well as Recertification.

D: **Course Outcomes Assessment**

1. Quizzes
2. Load analysis and calculation worksheet assignment
3. Midterm
4. Final Exam - Project to design a Battery-based system

E. **Course Content:**

Will include:

1. P.V. electrical and installation safety
2. Battery-based P.V. components and systems
3. Battery technology
4. Charge controllers
5. P.V. inverters
6. National Electrical Code (N.E.C.) related to P.V. systems