SUSTAINABLE RESOURCE MANAGEMENT

Course Outline

West Valley College

2015

Introduction

Welcome to the Introductory Course on Sustainable Resource Management. This course covers the 25 principles, or student learning outcomes (SLO's), identified by the National Standards Certification Board of the NRC. More information can be found at: http://nrcrecycles.org/national-standards-certification-board/.

The Introduction to Sustainable Resource Management (SRM) course has been designed to provide information on the policies, programs and infrastructure that support Zero Waste. Dependence on natural resources continues to grow at an unsustainable pace. Through SRM, both communities and businesses can support the reduction of wasted resources and materials and work to create a green economy.

The goal of SRM is to reduce, reuse, recycle and compost as a means to achieving Zero Waste. But, Zero Waste is not just about preserving precious resources. The implications of landfilling and incineration go far beyond just burying valuable resources. These practices also contaminate the air, water and land, and they contribute significantly to the production of methane, a potent greenhouse gas.

In 1970, the phrase "Reduce, Reuse, Recycle" was coined during the first Earth Day. Despite the fact that this phrase is highly recognized, not all aspects of the phrase are well understood or well practiced. Yes, Americans recycle! Yes, many Americans participate in reuse! But the fact is, that the "reduce" part of the phrase has been neglected to the point that most don't even realize it is the first and most important part of the equation. This Country consumes and produces more now than ever. Much of these products contain chemicals, toxins and heavy metals that pollute the environment and our bodies. The good news is that through effective SRM strategies, businesses and communities can begin to look upstream at new practices and product redesign, that: reduce toxins; reduce the extraction and dependence of resources; reduce disposal; and reduce the harmful impacts to animals, people and the planet.

This course will look at upstream practices that reduce waste during the manufacturing and distribution of products, as well as downstream practices to collect, reuse, recycle and compost materials once they have been discarded. Additionally, the course will look at the impacts to the economy and job creation connected to SRM. According to a report by the Centers of Excellence (CoE), as well as numerous other national studies, Recycling and Resource Management (or Materials Management) is a field of high job growth. The report by CoE estimates 14,000 new jobs could be created over the next two years in California alone. A national study estimates 1.5 million new jobs by recycling 75% of all waste. These jobs depend on reducing disposal and returning more materials back into the economy through reuse and recycling.

David, so you want something in here to tie to:"Doing What Matter for Jobs and the Economy".

Lesson #1: Introduction to Sustainable Resource Management (SRM) – PART 1

Lesson Description

Understand how and why Sustainable Resource Management (SRM) is the foundation for solving the issue of resource depletion facing our planet.

- Understand how and why resources are being converted to solid waste at an unprecedented rate
- Identify National and California based data and trends in disposal and recycling

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify what materials are being disposed and locate resources on existing disposal data.
- (Comprehension Level) explain what is meant by the term Sustainable Resource Management according to the National Standard Certification Board of the National Recycling Coalition
- (Comprehension Level) describe why wasting occurs and the various systems needed to manage waste and resources more sustainably
- (Application Level) predict what materials currently have high levels of disposal

Lesson #2: Introduction to Sustainable Resource Management (SRM) – PART 2

Lesson Description

Learn the various technical terms associated with Sustainable Resource Management (SRM) and identify the hierarchy of existing systems needed to achieve Zero Waste

- Master key terminology used by SRM professionals
- Categorize materials in order to optimize opportunities for reduction, reuse, recycling and composting

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) describe the fundamental principles and practices related to waste reduction and reuse; recycling and composting
- (Knowledge Level) list at least 5 primary (or market) categories of resources or materials
- (Comprehension Level) explain what is meant by Sustainable Resource Management
- (Comprehension Level) explain the meaning of the various technical terms and language used in an SRM system.

- (Comprehension Level) summarize examples of 1-2 resources or materials within each primary (or market) category.
- (Application Level) state personal examples of items they currently use that are wasteful and could be eliminated
- (Analysis Level) differentiate the different types of material streams among various sections, such as residential and commercial.

Lesson #3: History of Solid Waste Management

Lesson Description

Understand the practices and laws that have led to the establishment of the modern-day waste management systems in California.

- Explain the history of residential and commercial recycling systems and programs.
- Understand the applicable resource management laws

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) recall at least 5 Federal, State or Local laws that have contributed to resource management in California
- (Knowledge Level) identify key state regulatory agencies in California
- (Comprehension Level) describe the key components and requirements of Assembly Bill 939 on local government
- (Application Level) examine existing legislation and draw conclusions as to why certain adopted policies have been able to gain the legislative support needed to become law

Lesson #4: Collection Systems

Lesson Description

Gain insight into the various systems needed to collect resources from residential, commercial and industrial establishments.

- Recognize different bin and cart types
- Learn how to optimize collection through various equipment and material sort strategies
- Understand the importance of properly sorting materials prior to disposal

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify the various bins and carts used to collect waste and recyclables

- (Comprehension Level) contrast the differences in collection systems for residential and commercial resource streams
- (Application Level) classify resources into collection categories that optimize both diversion and costs

Lesson #5: SRM System Infrastructure

Lesson Description

Understand the infrastructure, design, and systems needed to process waste and recyclables, maximize diversion and reduce material disposal.

- Learn about the various facilities used to process recyclables, reusables, organics and residuals.
- Understand the basics of sorting materials and which factors play a role in the design of processing systems.

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify at least four different facility types needed in an SRM system
- (Comprehension Level) classify different materials by the type of facility that can handle, process and sort resources for secondary markets
- (Application Level) modify a collection or sort system to adapt to season variation in materials collected to ensure the highest diversion from landfills or incineration

Lesson #6: Understand the Basics of Commodities and Their Markets

Lesson Description

Understand the basics of how facilities sort, process and market commodities to secondary markets.

- Identify the Market Categories of discarded commodities and their values
- Learn how secondary markets process and reutilize the commodities and where this is commonly done
- Gain insight into the embedded energy savings of reutilized resources

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) describe how contamination impacts the sorting and processing of materials
- (Comprehension Level) contrast the process for sorting, processing and marketing two common recyclable materials
- (Application Level) discuss various factors in processing systems that can affect the amount of residual being produced and ultimately lead to the decision to dispose of resources

Lesson #7: Conducting a Waste Audit

Lesson Description

Learn the steps to conduct a waste analysis

- Learn the steps to plan and safely carry out a waste audit
- Use acquired information to perform a waste analysis at home or at a business

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) describe the primary steps to perform a waste audit/analysis
- (Knowledge Level) state the best time to audit and identify proper steps to prepare for the audit
- (Application Level) apply knowledge learned by conducting a waste audit at home, school or a businesses

Lesson #8: Tracking, Measurement, and Analysis

Lesson Description

Understand why developing baseline data, measurement and tracking are critical to effective strategies to reduce waste and save businesses money. Learn the steps to right-size waste and recycling services. Be provided basic information on how to analyze the captured data and create action plans for businesses based on the information.

- Understand how to develop a baseline and then measure and track diversion programs
- Learn to the formula for calculating diversion
- Learn the steps to plan and safely perform a waste and recycling “right-sizing”
- Use acquired data from the waste analysis to help create “next-steps” and drive diversion

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify some of the key factors to measure when tracking and recording the cost of disposal and recycling practices
- (Knowledge Level) describe the primary steps to perform a waste /recycling “right-sizing”
- (Comprehension Level) explain what is meant by baseline data
- (Comprehension Level) summarize how the results of the audit can be used to design program "next steps" and help eliminate wasting
- (Application Level) Calculate diversion rates for various business models
- (Analysis Level) examine the data from a waste audit and create a strategy for home/school/businesses to reduce or eliminate wasteful practices

Lesson #9: Introduction to Zero Waste

Lesson Description

Zero Waste Businesses are leading the way to Zero Waste and have diverted over 90% of their waste from landfill and incineration. Zero Waste Communities have adopted Zero Waste goals and plans to implement those goals. Through lecture, group discussion and interactive activities students will be introduced to:

- Definition of Zero Waste, drivers and benefits for businesses and communities to pursue Zero Waste, and examples of Zero Waste Businesses and Communities
- Zero Waste Business Principles and Zero Waste Business Recognition and Certification Programs
- Zero Waste Community Principles and samples of policies and programs Upstream (e.g. Extended Producer Responsibility, Local Product Bans and Fees) and Downstream (including Reuse, Recycling, Composting infrastructure and Resource Recovery Parks) that can help a community achieve Zero Waste

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify the 3 key components of the Definition of Zero Waste
- (Comprehension Level) describe how businesses benefit from achieving Zero Waste
- (Application Level) cite several examples of businesses that have already achieved Zero Waste, or darn close.

Lesson #10: Developing Zero waste Community Plans

Lesson Description

Through lecture, group discussion and activity, students will learn how communities working to pursue Zero Waste often develop Zero Waste Plans to identify an approach that is embraced by residents, businesses, service providers and other stakeholders in the community. This lesson will discuss key elements of the Zero Waste planning process, including:

- Review Data, Policies and Programs
- Participation Strategy
- Commodities & Service Opportunities Analysis
- Policies, Programs and Facilities Options
- Economics & Impacts (Jobs, GHG)
- Implementation Plan (including timeline & “low-hanging fruit” for quick success)

This class will review sample Zero Waste Community plans and will discuss the basic approach communities have taken to developing Zero Waste Plans.

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify the 6 key elements of the Zero Waste community planning process
- (Comprehension Level) describe how residents, businesses, staff, elected officials or nonprofit organizations initiate the development of a Zero Waste Plan for their community
- (Application Level) examine what services are missing from their communities that are needed to achieve Zero Waste.

Lesson #11: Zero Waste Market Development

Lesson Description

Through lecture, group discussion and activities students will learn:

- How Resource Recovery Parks can help in the siting of new processing facilities
- The importance of developing local markets and end uses for recovered materials
- How public and private partnerships with colleges and universities could help in research and development for new products and innovations
- The different tools for efficient exchange of materials between businesses and individuals

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify what a Resource Recovery Park is and where they are developing as a logical extension of current systems and processes for handling waste.
- (Comprehension Level) describe different types of market development programs that have been adopted by state and local governments to stimulate the development of new markets.
- (Application Level) explain how posting an item to Craig's list, e-Bay, or other materials marketplaces helps to achieve Zero Waste.

Lesson #12: Introduction to Zero Waste Businesses

Lesson Description

This lesson provides an introduction to developing Zero Waste plans for businesses. Students will focus on leadership, total participation and increasing efficiency and the bottom-line. Understand why businesses pursue Zero Waste (history and background)

- Be introduced to key components of a zero waste plan (total participation, leadership, training and vendor relations)
- Learn about Contracts and service provider relationships

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Comprehension) Describe the key goals and objectives of a zero waste plan
- (Knowledge) Identify the basic format for a Zero Waste plan and Zero Waste Goals
- (Knowledge) Share how different contract and agreement businesses and service providers can mutually benefit from Zero Waste initiatives
- (Comprehension) Describe the difference between a waste audit and a Zero Waste audit in identifying opportunities for efficiency and increase savings/revenues
- (Knowledge) Understand how leadership, employee training and vendor relations are an important piece of the Zero Waste plan

Lesson #13: Introduction to Product Stewardship and Extended Producer Responsibility

Lesson Description

Learn the various definitions and recognize the importance of Product Stewardships and Producer Responsibility policies and programs for achieving Zero Waste

- Learn the various forms of product stewardship (PS) and producer responsibility (EPR) policies that have been adopted around the world
- Recognize that Product Stewardship and EPR are a necessary component of Zero Waste primarily related to difficult to handle material types

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) list at least five materials that generally require a producer responsibility policy to ensure safe and proper disposal/recycling
- (Knowledge Level) identify countries that have implemented EPR
- (Comprehension Level) describe the benefits to manufacturers when they take responsibility for products

Lesson #14: Zero Waste Economics

Lesson Description

Understand various economic issues required to successfully implement Sustainable Resource Management and how Zero Waste can work to grow local economies, including:

- How to harness the avoided costs of garbage collection and disposal as the engine of change for Zero Waste
- Different public and private sector financing approaches to fund Zero Waste programs

- Clauses for Requests for Proposals (RFP), contract structures and incentives such as revised garbage rate structures that can be used to stimulate waste generators, haulers, processors and disposal facilities to reduce wasting and increase reuse, recycling and composting
- Economic analyses of program costs and benefits, and developing budgets for short- and long-term planning
- How reducing waste has a positive impact on local economies, including job creation

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) identify 3 incentives that communities can adopt to stimulate generators, haulers, processors and/or disposal facilities to reduce wasting and increase reuse, recycling and composting
- (Comprehension Level) describe how to harness the avoided costs of garbage collection and disposal as the engine of change for Zero Waste
- (Application Level) examine how a garbage rate structure can incentivize waste reduction.

Lesson #15: Introduction to Organics

Lesson Description

This lesson provides an introduction to the organic fraction of the waste stream which comprises a third of all disposed materials. Through lecture, slides and group discussion students will:

- Understand the organic fraction of the waste stream
- Be introduced to the composting process

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge) Describe which fractions of the waste stream are organic
- (Comprehension) State the various options for diverting organics from the waste stream via composting or other technologies
- (Comprehension) Describe the basic process of composting.
- (Application) Utilize available resources to research organics topics.

Lesson #16: Organics Programs and Facilities

Lesson Description

This lesson provides an overview of organics collection programs and composting facilities. Through lecture, slides, group discussion, and hands on activities, students will:

- Understand the basic requirements of organics collection programs
- Understand the need for public education and outreach

- Review how the composting process works on a large scale and in practice
- Be exposed to a number of examples of organics collection programs and compost facilities.

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Application) Provide input on an organics collection program
- (Comprehension) Describe the basics of organics collection and the importance of working with the end user facility
- (Knowledge) State how large scale composting is practiced
- (Comprehension) Describe the opportunities and constraints of on-site composting

Lesson #17: Commercial Organics Programs

Lesson Description

This lesson will describe a variety of commercial organics collection and processing programs. Through lecture, group discussion, and slides students will:

- Review a number of organics collection and composting programs
- Understand how to develop an organics collection program

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge) State the primary markets for compost.
- (Comprehension) State key steps of implementing an organics collection program based on a case study of the City of San Diego and one of its major organics suppliers.
- (Application) Describe the key elements, opportunities and challenges of an organics collection program.

Lesson #18: Construction Debris Best Management Practices

Lesson Description

Learn about the various material types and systems which are classified as Construction and Demolition or more commonly referred to as “C&D”.

- Learn the various materials types and secondary markets for reuse and recycling
- Gain an understanding of how to implement collection systems that encourage diversion and optimal processing of these highly valued resources

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) list at least five material types generally classified as C&D and describe the most common construction project that generates each type of material
- (Comprehension Level) describe the key benefits associated with C&D recovery and recycling
- (Application Level) examine a local C&D ordinance and share key areas that both positively and negatively impact diversion of C&D materials

Lesson #19: U.S. Zero Waste Business Council and Facility Rating Systems

Lesson Description

The USZWBC has developed a Zero Waste Business Facility Certification. This lesson will share important information about the different business certification programs and how the definition of Zero Waste is key to creating a true Zero Waste business model.

- History and purpose of the USZWBC rating system as compared to other similar certifications
- The Facility Scorecard rating system and categories

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge) Identify all 15 categories of the Facility Scorecard
- (Knowledge) State the importance of tracking and measurement
- (Comprehension) Contrast the USZWBC facility certification from other third-party certifications
- (Application) Use tools and metrics to identify cost reduction opportunities in implementing a zero waste initiative.

Lesson #20: Greenhouse Gas Connections to Sustainable Resource Management

Lesson Description

Through lecture, group discussion and activity students will:

- Learn about Greenhouse Gas (GHG) emissions and reductions
- Understand Sustainable Materials Management and Lifecycle Analysis,
- Describe and compare models measuring GHG impacts from SRM,
- Summarize California policies linking GHG reduction and increased recycling.

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge) Identify the fundamental principles and practices relating to SRM greenhouse gas emissions and reductions
- (Knowledge) Identify market impacts for recovered products and material and the associated GHG reduction impacts
- (Comprehension) Explain why communities are adopting community greenhouse gas protocols including SRM
- (Knowledge) Identify tools and metrics to measure and compare GHG impacts to sustainable management programs

Lesson #21: Developing Outreach Strategies to Enhance SRM Programs and Practices

Lesson Description

Learn about the various forms of outreach activities and how to use these activities to create effective campaign strategies aimed at enhancing individual sustainable actions and habits

- Learn about different types of outreach and education strategies
- Understand how to motivate behaviors through messaging
- Build a communications plan

Student Learning Outcomes

By the end of this lesson, students will be able to:

- (Knowledge Level) describe the three types of outreach strategies
- (Comprehension Level) Identify the five elements of a communications plan
- (Application Level) create a communications plan for a target audience that will educate them on the roll-out of a new organics recycling program