Development of a Web-based Course in Radiological Engineering

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Abstract

The purpose of this paper is to supply a full procedure for designing a web-based course and illustrate the design with a course developed for Radiological Engineering. The simple corporate identity (CI) design is introduced. The organizational and navigational structures of a web-based course are discussed in detail. A tree with a return-to-home page link, which is a practical navigational structure for a web-based instructional design, was applied. A simple page layout was used based on printing consideration. The HTML source code templates for every major web page are given and explained.

A graduate course in Radiological Engineering was developed using the procedure described. The course was developed in eight modules with the modules having a consistent format and navigational structure. The course was developed collaboratively by the instructor who provided content expertise and pedagogical design and a graduate teaching assistant who provided development and HTML expertise. Testing of HTML coding and revision of all material was performed prior to posting material on the server.

Keywords

Web design, web based course, HTML, Distance Learning, Internet, Nuclear Engineering

Introduction

Environmental pathway analysis is a graduate level course that is traditionally taught in the classroom. For the winter quarter of 2000, we migrated the whole course content to the web. No class attendance was required. Students participated in the course via the Internet. One of advantages of a web-based course is that students can get to the content at their convenience. It is also possible to provide more information than in a traditional classroom. The course consists of eight units. To make the course content easy to follow, each unit has a consistent structure. Specific learning objectives and a recommended learning route were provided for each unit.

Text, pictures, and some external links are major content of this web-based course, so HTML was the language we used. To try to make the course appealing, we applied a simple CI design for the course. For a web site, CI includes logo, standard colors, standard fonts etc, which can virtually represent it. In this web-based course, the course logo, standard font and standard color were chosen, with white background, black text and a few pictures as the basic style.

Since offering information is the main goal of this web-based course, we used a simple, clear navigational structure tree. With this structure, readers can clearly know where they are and where they can go. The page layout is straightforward. The rule is we try to let the text take up most of the screen area, since students may need to print out some pages. No color bars were used.

The HTML source code templates for introduction page, course outline, assignments, contact instructor, and unit1 introduction page are given and explained.

Content

1.Specification

There are three major requirements for this web-based course from the course instructor. They are:

- 1.Use text as much as possible, with figures to enhance text.
- 2.The web page should be easy to navigate.
- 3.Every link should be verified.

2. Design

2.1 Overall Design

The simple CI (corporate identity) design of the course consists of a logo, use of standard colors and standard fonts. These are discussed in the text below. Because the goal of this web is to instruct and our target audiences are graduate students we didn't need to spend much time on complicated structures or "flashy" color schemes.

2.1.1 Logo

The logo is used to visually identify a web site. Our logo is the title of this course. It fits its purpose.

Environmental Pathway Analysis

A unique font in this web-based course is used for the title, "Comic Sans MS". Also its color, light blue, ("#639AFF") is not used by any other text. Compared to "Times New Roman", the font used for the major content, the italicized "Comic Sans MS" is more active and more prominent. Its color belongs to one of the cold colors, which we chose as our standard colors.

2.1.2 Standard Colors

Standard colors are the characteristics colors of a web site. Choosing colors is an overwhelming task for designing a web site because there are too many choices. Fortunately, for a text based web site, basically the colors of links, visited links and active links are the only colors that should be considered.

There are three categories of colors: warm, cold, and black and white. We chose the cold colors (green/blue) because they make people feel calm. Students are supposed to read the course material silently. The links are set to blue ("#0000FF"). That is also its default color. The visited links are green ("#008000"). The active links are silver ("#c0c0c0").

2.1.3 Standard Fonts

Standard fonts are used by main text or main menu of a web site. "Times New Roman" is our standard font since it is a formal and a good printing font.

2.2 Web Based Course Format

In the following paragraphs, course organizational structure, page navigational structure, and page layout are discussed.

2.2.1 Course Organizational Structure

Figure 1 shows the organizational structure of the course. There are eight content units all together. Other components of the course are the course outline, the class introduction, contact information and the instructor biography. Since the conversation opportunity between students and instructor may be less in a web-based course than in a traditional course, the last two parts about the instructor are necessary. When students need help on assignments or projects, contact information will be very helpful.

Figure 1. The Organizational Structure Of The Course.

There are 8 units in this course. Each unit has a learning objective, several topics, reading assignments and homework. Unit i stands for Unit1 through Unit8 because there are eight units in this course. Subject i is each topic of a unit. It is the main content of this course.

Table1 shows the web pages and their content.

Table 1. The Course Web Pages And Their Contents

Web pages	Content
Introduction to Class	The brief introduction of the web-based course
Course Outline	Course Syllabus
Assignments	All assignments from unit1 to unit8 and projects
Contact Instructor	Instructor contact information such as email, phone number
Instructor Biography	Instructor's personal information
Unit <i>i</i> Introduction*	The introduction of each unit
Learning Objective of Unit <i>i</i>	The learning objective of each unit
Subject <i>I</i> * of unit <i>i</i>	The main topics of each unit

* Unit*i* stands for Unit1 through Unit8 because there are eight units in this course.

* Subject *i* is each topic of a unit. It is the main content of this course.

The “Introduction to Class” provides an overview of the course. In addition this unit covers how the material is arranged, how students are graded and class learning objectives. The “Course Outline” shows there are eight content units all together and provides a link to the introduction pages of every unit. The topics of each unit are also listed. The “Assignments” page provides links to the assignment for each unit. From this page you can go to all required projects and homework. These can also be accessed from the introduction page of each unit. “Contact Instructor” and “Instructor Biography” are two different pages. The former one focuses on contact information. The latter one is some personal information about the instructor.

Each unit has an introduction page. It is named “Unit*i* Introduction”. This document takes you to the learning objective and the main topics of the unit and it also explains what this unit covers and a recommended path through this unit. “Learning Objective of Unit *i*” tells students what they should know after finishing the unit. “Subject *i** of unit *i*” stands for the content of each topic in each unit.

2.2.2 Page Navigational Structure

A web site structure can be hierarchical, linear, web, parallel, matrix, overlay or special zoom. Some practical structures that lie between hierarchical and web are a tree, a tree with a return-to-home page link, and a tree with a few horizontal links.

Our web structure falls into the middle category. It is a tree with a return-to-home link. This design means a page is linked to one or more pages at the next level and to only one page at the previous level and each page has a return to home link. In this web-based course, the course outline page actually works as the home page, because people may visit or go back to it more often than to the Introduction to class page. So let's say it is the root of our web tree. It links to three main objects, which are assignments page, contact page and unit1 through unit8 introduction pages (if unit1 through unit8 are considered one object). The assignments page contains the links to all assignments from unit1 to unit8 and all projects required. The unit introduction page links to: Learning Objective, Subject links (top of the unit), Reading and Homework. Contact Instructor is the contact information of the course instructor. This hierarchical structure allows people to know where they are and where they can go. However it has limitations. A visitor has to go back to the unit introduction page first if he wants to switch from subject1 to subject2. This situation may not happen often since each subject requires certain amount of time to be read. It is rare for a visitor to go through all subjects at a single visit to the site. The structure is illustrated in Figure 2. Only paths a real visitor may take are drawn.

Page directly. Your choices are basically limited to unit1 contents. The advantage of this design is people never get lost in the course.

A “you are here” navigation bar is also available. It is convenient for people who are not entering the web-based course from the home page. From the navigation bar you can know your exact position and go back to any level you like. For example you are reading unit1 topic one. The navigation bar will be like this. You are HOME > Course Outline > Unit1 > topic one title.

The following are layout, structure, and HTML source code of selected modules.

2.2.3 Page Layout

A simply layout is applied in the course, sometimes referred to as “≡” style. There are three major regions in this design, each bar stands for one. The top region is the logo, the middle region is content and the bottom one is links.

There are two main reasons for choosing this design. First is based on printing consideration. Students may print some pages out. Color bar and figures can make a web page more attractive, but their effects on print-out may be opposite. Using this design, the main content takes up at least 80% of the whole page. The second reason is based on screen viewing. This design gives students as much as possible screen for reading the course material. A 14’ inch monitor with resolution of 800*600 is good enough for viewing the web pages.

Figure3 is the typical layout of the web pages. The “Logo” and “You are here” can be considered the first area of as the “≡”.

Figure 3. The Page Layout

3 HTML Source Code

The HTML source code for typical pages are shown .

3.1 Introduction to Class

The HTML code for the “Introduction to class” unit is shown.

```
<!-- filename: IntrotoClass.html -->
<!-- function: It is the homepage -->
<!-- Beginning of HTML document -->
<HTML>

<!-- Beginning of the HTML document head. This web page does not have search function, so the
META tag is optional. But, it is good to have it here for possible future use. The title is the title of
the document. -->
<HEAD>
  <META name="keywords" content="Environmental Pathway Analysis Introduction to Class">
  <TITLE>Environmental Pathway Analysis Introduction to Class</TITLE>
</HEAD>
<!-- End of the HTML document head-->

<!-- Beginning of the text body. This part defines the body of the web page. Background color is
white. Text color is black. Links are blue. Visited links are green. Active links are silver. This tag
is same for all web pages to keep the look consistent. -->
<BODY bgcolor="#FFFFFF" text="#000000" link="#0000FF" vlink="#008000"
alink="#c0c0c0">

<!-- The logo of the this web page. Different font, color are used. It is also centered. -->
<CENTER><FONT FACE="Comic Sans MS" SIZE="5" color="#639AFF"> Environmental
Pathway Analysis</FONT></CENTER>
<!-- End of logo -->

<!-- Break between the logo and the main text -->
<BR>
<!-- End of break -->

<!-- Beginning of the body text. The whole document is put in a centered table. Table gives us a
good flexibility to arrange data because we can put data into rows and columns of cells. The table
we use here has one cell ( only one row and one column ). Its function is to set a frame in which
the main text is put. All web pages but the course outline used the same parameters -->
<CENTER>
<TABLE width="80%" border="0" cellpadding="10" cellspacing="5">

<!-- Beginning of the row. -->
<TR>
```

```

<!-- Beginning of the column. All text is left adjusted. -->
  <TD ALIGN=LEFT>
<!-- Beginning of the title of text. The "Arial" is the font for titles -->
  <FONT FACE="Arial" SIZE="4">Introduction to Class</FONT>
<!-- End of the title of the text>

<!-- Beginning of the main text. The standard font "Times New Roman" is used and all titles are
italics and bolded -->
  <FONT FACE="Times New Roman "SIZE="4">
    <P>Topic one title goes here<BR>
      Topic one content goes here.
    </P>
    <P>Topic two title goes here<BR>
      Topic two content goes here.
    </P>
  </TD>
<!-- End of the column -->

</TR>
<!-- End of the row -->

</TABLE>
</CENTER>
<!-- End of the table -->

<!-- Break between the logo and the main text -->
<BR>
<!-- End of break -->

<!-- Beginning of the horizontal bar. it separates the address part from the main text.-->
<HR WIDTH="90%" ALIGN=LEFT>
<!-- End of the horizontal bar -->

<!-- Beginning of address. It gives the readers the email address of the web master -->
<ADDRESS>
Last Updated:13-Apr-2000<BR>
Any comments to <A HREF="mailto:zhaoz@email.uc.edu">WebMaster@email.uc.edu</A>
</ADDRESS>
<!-- End of address>

</BODY>
<!-- End of text body-->

```

```
</HTML>
<!-- End of HTML document>
```

3.2 Course Outline

The HTML code for the “Course Outline” unit is shown.

```
<!-- filename: Outline.html -->
<!-- function: list the course outline and links to the introduction page of every unit>
<!-- Beginning of document head, body and logo tag. The structure of this part is same as the
introduction page's -->
<HTML>
<HEAD>
  <META name="keywords" content="Environmental Pathway Analysis Course Outline">
  <TITLE>Environmental Pathway Analysis course outline</TITLE>
</HEAD>
<!-- End of the HTML document head-->

<BODY bgcolor="#FFFFFF" text="#000000" link="#0000FF" vlink="#008000"
alink="#c0c0c0">

<CENTER><FONT FACE="Comic Sans MS" SIZE="5" color="#639AFF"> Environmental
Pathway Analysis</FONT></CENTER>
<!-- End of logo -->
<BR>

<!-- Beginning of “you are here” bar. This bar tells the reader where he is. Using it, one can
clearly know his current position and go back to any level he wants. As it shows below, the current
file is course outline and the upper file is Homepage. -->
<A HREF="../IntrotoClass.html">HOME </A> >
<FONT SIZE="4">Course outline</FONT><BR>
<!-- End of “you are here” bar -->

<!-- Beginning of a horizontal bar. It is to separate the “you are here” bar and the main text -->
<HR WIDTH="90%" ALIGN=LEFT>
<!-- End of horizontal bar -->

<!-- Beginning of a centered table. The course outline is put in the table -->
<!-- An exact example is shown here. There is only one cell in the first row. The title, which is the
course outline, goes there. There are two columns in the middle of the table. The left one that is
designed as the table header contents the links to the introduction page of each unit. The right
column contents the topics of each unit. The last row is the major links of the web page. -->
```

```

<CENTER>
<TABLE border="0" cellpadding="10" cellspacing="1">
  <TR VALIGN=top>
    <TD COLSPAN="2">
      <FONT FACE="Arial" SIZE="4">Course Outline</FONT>
    </TD>
  </TR>

  <TR VALIGN=top>
    <TH ALIGN=left >
      Instructor<br>
      Phone<br>
      FAX<br>
      Email
    </TH>
    <TD >
      <UL>
        <A HREF="../htdocs/ERBio.html">Eugene Rutz<BR></A>
        (999)999-9999<BR>
        (999)999-9999<BR>
        <A HREF="mailto:prof.eugene.rutz@uc.edu">
          prof.eugene.rutz@uc.edu</A>
      </UL>
    </TD>
  </TR>

  <TR VALIGN=top>
    <TH ALIGN=left >
      <H2><a href="Unit1.html">Unit1</a></H2>
    </TH>
    <TD >
      <UL>
        Introduction to Risk Assessment Process
      </UL>
    </TD>
  </TR>

  <TR VALIGN=top>
    <TH ALIGN=left >
      <H2><a href="Unit2.html">Unit2</a></H2>
    </TH>
    <TD >

```

```

        <UL>
            Source Characterization/Data Evaluation and Analysis<BR>
            Source Characterization<BR>
            Data Needs<BR>
            Analysis and Evaluation
        </UL>
    </TD>
</TR>

```

```

<TR VALIGN=baseline align=center >
    <TD colspan=2 align=left>
        <UL>
            Grading<BR>
            20% Participation and Interaction <br>
            40% Homework <br>
            40% Project
        </UL>
    </TD>
</TR>
</TABLE>

```

```

<BR>
<HR WIDTH="90%" ALIGN=LEFT>
<A HREF="../IntrotoClass.html">HOME</A> |
<A HREF="../htdocs/Outline.html">Course outline</A> |
<A HREF="../htdocs/AssignmentsList.html">Assignments</A> |
<A HREF="../htdocs/Contact.html">Contact Instructor</A>
</CENTER>
</BODY>
</HTML>

```

3.3course Content

The HTML code for the “introduction to unit1” unit is shown.

```

<!-- filename: Unit1.html -->
<!-- the introduction page of unit1. It has unit one topic links >
<HTML>
<HEAD>
    <META name="keywords" content="Unit1 Introduction">
    <TITLE>Unit1 Introduction</TITLE>
</HEAD>
<BODY bgcolor="#FFFFFF" text="#000000" link="#0000FF" vlink="#008000"

```

alink="#c0c0c0">

<CENTER> ***Environmental
Pathway Analysis***</CENTER>

HOME >

Course Outline >

Unit1

<HR WIDTH="90%" ALIGN=LEFT>

<CENTER>

<TABLE width="80%" border="0" cellpadding="10" cellspacing="5">

<TR>

<TD ALIGN=LEFT COLSPAN="2">

Unit 1 Introduction

<P>In this unit, we will be studying...</P>

<p>

Go to Unit 1 Learning Objectives</P>

</TD>

</TR>

<TR>

<TD COLSPAN="2">

<P>

Introduction to Risk Assessment Process</P>

<P>

*History and Background of Risk Assessment
Process*</P>

<P>

Decision Making</P>

<P>

Defining Risk</P>

<P>

Elements of Risk Assessment

<P>

Information Sources for Risk Assessment</P>

<P>

Readings</P>

<P>

Homework</P>

</TD>

```

</TR>
</TABLE>

<BR>
<HR WIDTH="90%" ALIGN=LEFT>
<A HREF="../Introtoctclass.html">HOME</A> |
<A HREF="../htdocs/Outline.html">Course outline</A> |
<A HREF="../htdocs/AssignmentsList.html">Assignments</A> |
<A HREF="../htdocs/Contact.html">Contact Instructor</A>

</CENTER>
</BODY>
</HTML>

```

3.4 Assignments

The HTML code for the “Assignments” unit is shown.

```

<HTML>
<HEAD>
  <META name="keywords" content="Assignments List">
  <TITLE>Assignments List</TITLE>
</HEAD>

<BODY bgcolor="#FFFFFF" text="#000000" link="#0000FF" vlink="#008000"
alink="#c0c0c0">

<CENTER><FONT FACE="Comic Sans MS" SIZE="5" color="#639AFF"> Environmental
Pathway Analysis</FONT></CENTER>
<BR>

<A HREF="../Introtoctclass.html">HOME</A> >
<FONT SIZE="4">Assignments List</FONT><BR>
<HR WIDTH="90%" ALIGN=LEFT>

<CENTER>
<TABLE WIDTH="80%" border="0" cellpadding="10" cellspacing="5">
  <TR>
    <TD>
      <FONT FACE="Arial" SIZE="4">
        Assignments</FONT><BR>
      <FONT SIZE="4">
        <OL type=1>

```



```

<LI><a href="../htdocs/Homework01.html">Unit 1</a>
<LI><a href="../htdocs/Homework02.html">Unit 2</a>
<LI><a href="../htdocs/Homework03.html">Unit 3</a>
<LI><a href="../htdocs/Project01.html">Project 1</a>
<LI><a href="../htdocs/Project02.html">Project 2</a>
<LI><a href="../htdocs/Project03.html">Project 3</a>
<LI><a href="../htdocs/FinalProject.html">Final Project</a>
</OL>
</FONT>
</TD>
</TR>
</TABLE>

<BR>
<HR WIDTH="90%" ALIGN=LEFT>
<A HREF="../IntrotoClass.html">HOME</A> | <A HREF="../htdocs/Outline.html">Course
outline</A> | <A HREF="../htdocs/AssignmentsList.html">Assignments</A> | <A
HREF="../htdocs/Contact.html">Contact Instructor</A>
</CENTER>
</BODY>
</HTML>

```

3.5 Contact Instructor

The HTML code for the "Contact Instructor" unit is shown.

```

<HTML>
<HEAD>
  <META name="keywords" content="Contact Instructor">
  <TITLE>Contact Instructor</TITLE>
</HEAD>

<BODY bgcolor="#FFFFFF" text="#000000" link="#0000FF" vlink="#008000"
alink="#c0c0c0">

  <center><FONT FACE="Comic Sans MS" SIZE="5" color="#639AFF"> Environmental
  Pathway Analysis</FONT></center>
  <BR>

  <A HREF="../IntrotoClass.html">HOME </A> >
  <FONT SIZE="4">Contact Instructor</FONT><BR>
  <HR WIDTH="90%" ALIGN=LEFT>

```

```

<CENTER>
<TABLE border="0" cellpadding="10" cellspacing="1">
  <TR VALIGN=top>
    <TH ALIGN=left >
      Instructor<br>
      Phone<br>
      FAX<br>
      Email
    </TH>
  <TD>
    <UL>
      <A HREF=" ../htdocs/ERBio.html">Eugene Rutz<BR></A>
      (999)999-9999<BR>
      (999)999-9999<BR>
      <A href="mailto:prof.eugene.rutz@uc.edu">
        prof.eugene.rutz@uc.edu</a>
    </UL>
  </TD>
</TR>
</table>

<BR>
<HR WIDTH="90%" ALIGN=LEFT>
<A HREF=" ../Introclass.html">HOME</A> |
<A HREF=" ../htdocs/Outline.html">Course outline</A> |
<A HREF=" ../htdocs/AssignmentsList.html">Assignments</A> |
<A HREF=" ../htdocs/Contact.html">Contact Instructor</A>
</CENTER>
</BODY>
</HTML>

```

4. Testing

The testing here has two meanings. One is to test if the HTML codes can be interpreted by web browsers correctly. Another is to test if the links, which appear in the text, are active.

HTML is an interpreting language. A good way to test if the codes are correct is to various interpreters commonly available. Two of the most popular interpreters are Internet Explorer and Netscape. All web pages of this class were tested using Internet Explorer 5.0 and Netscape 4.0. They can be viewed by using either web browsers.

There are some external links in the text. They supply additional information for the course and reading assignments. All these links were tested before we put the web pages on the server.

5. Uploading on A Server

When coding this web based course, a few types of files needed to be handled. So storing different types of files to different directories is necessary. Figure4 illustrates the directory structure of the course web pages. The RadiologicalEngineering is the root directory where the homepage, IntrotoClass.html, sits. The htdocs directory contains all other .html files. The image directory is for pictures. The icons directory holds icons used in the web pages. The documents directory has all downloadable documents such as Microsoft Word files and .pdf files. The src and cgi-bin are reserved for putting background images and cgi programs in future.

The web page is ready for use after the whole directories are uploaded to a server.

Figure4. The Web Page File System

6. The Screen Shots Of Typical Pages

This section contains screen shots of some of the pages.

6.1 Introduction To Class

Environmental Pathway Analysis

Introduction to Class

What the class covers

This class will examine the fundamental principles of the risk assessment process, particularly as they apply to evaluating risk from radioactive materials in the environment. The title ‘**environmental pathway analysis**’ is used because the class spends considerable time on understanding the mechanisms for contaminants to move through the environment to a point that exposure to individuals or populations can occur. We won’t just look at environmental fate and transport, however. We will be concerned with the role environmental pathway analysis plays in radiological risk; we will also emphasize sound decision making regarding radioactive contamination and the risk it poses.

How the material is arranged

The [course outline](#) describes how the material is laid out. The material is broken into logical units (at least they seemed logical to me!) that can be covered in a particular series. The material starts with an overview of the risk assessment process then delves into elements of that process with a great deal of “time” spent on environmental transport. The class material concludes with a look at risk management and the need for making appropriate decisions with environmental data and evaluation of risk.

Although I expect most of you will progress through the material in a sequential fashion from Unit 1 to Unit 8, the beauty of the web is that you are not constrained to my linear thinking. You are welcome to progress through the material in any order that seems appropriate to you. Homework assignments and projects will be given that may force you to look at a particular unit by a particular date but these will not limit your explorations of the content.

Each Unit begins with an **introduction** that provides a brief summary of that unit. I recommend reading these first before viewing the remainder of that unit’s material. Each unit also contains specific learning objectives. As they say, “study smarter – not harder”. These learning objectives provide specific

LEARNING OBJECTIVES TO GUIDE YOUR TIME WITH THE MATERIAL. In addition to unit specific learning objectives, the learning objectives of the course are also provided.

How you will be graded

news and bad news. The good news is there are **NO** traditional exams. news is the amount of time you will need to spend in order to optimize will be at least as much as studying for an exam. My hope is that the do to obtain a good grade will both be more enjoyable for you and better learning experience that many traditional courses.

Grades will be assigned based on participation and interaction (with your classmates, and with the instructor), homework assignments, and projects.

20% Participation and Interaction
40% Homework
40% Projects

Class Learning Objectives

After completing the course, students will:

1. Explain the risk assessment process and the various steps in the process.
2. Describe the exposure assessment process including the elements of land use scenario development and exposure pathway selection.
3. Perform environmental transport calculations using models and equations presented in the material
4. Describe health effects associated with various types of environmental contamination.
5. List data quality characteristics and their definitions.
6. Apply the data quality objectives process.
7. Prepare defensible rationale for risk management decisions based on the risk assessment process

Last Updated: 13-Apr-2000

Any comments to WebMaster@email.uc.edu

6.2 Course Outline

Environmental Pathway Analysis

[HOME](#) > Course outline

Course Outline

Instructor [Eugene Rutz](#)
Phone (513)556-1096
FAX (513)556-3390
Email eugene.rutz@uc.edu

[Unit1](#) Introduction to Risk Assessment Process

[Unit2](#) Source Characterization/Data Evaluation and Analysis
Source Characterization
Data Needs
Analysis and Evaluation

[Unit3](#) Exposure Assessment process
Land Use Scenarios
Exposure pathways
[Environmental Transport Overview](#)

[Unit4](#) Environmental Transport Through Air

[Unit5](#) Environmental Transport Through Water

[Unit6](#) Environmental Transport Through Soil

[Unit7](#) Health Effects Overview
Carcinogenic
Non Carcinogenic
Radiation Health Effects

[Unit8](#) Risk Management Overview
Decision Making

Grading
20% Participation and Interaction
40% Homework
40% Project

[HOME](#) | [Course outline](#) | [Assignments](#) | [Contact Instructor](#)

6.3 Course Content

Environmental Pathway Analysis

[HOME](#) > [Course Outline](#) > Unit 1

Unit 1 Introduction

In this unit, we will be studying the basic characteristics of the risk assessment process **in the context of making decisions** based on quantitative estimation of risk. The materials in this unit describe risk, the elements of the risk assessment process, and the regulatory framework for the risk assessment process. We will focus on environmental risk as opposed to ecological risk, probabilistic assessment of systems, or evaluation of alternative actions regarding monetary issues.

[*Go to Unit 1 Learning Objectives*](#)

Unit Navigation

You are free to view the content of this unit in any order that you like. However, two suggested routes through the material for unit 1 are given below. The first is a traditional approach to presenting the material – background to general concepts to specific concepts to assignments. The second is for those who prefer the big picture first: context (assigned reading) to specific concepts to supplemental material.

Route 1

Introduction to Risk Assessment
History
Decision Making
Elements of Risk Assessment
Information Sources for Risk Assessment
Required Readings
Homework

Route 2

Introduction to Risk Assessment
Required Readings
Elements of Risk Assessment
Information Sources for Risk Assessment
Decision Making
History
Homework

[*Introduction to Risk Assessment Process*](#)

[*History and Background of Risk Assessment Process*](#)

[*Decision Making*](#)

[*Defining Risk*](#)

[*Elements of Risk Assessment*](#)

Site Characterization
Exposure Assessment
Hazard Assessment
Risk Characterization

[*Information Sources for Risk Assessment*](#)

[*Readings*](#)

[*Homework*](#)

[HOME](#) | [Course outline](#) | [Assignments](#) | [Contact Instructor](#)

6.4Assignments

Environmental Pathway Analysis

[HOME](#) > Assignments List

Assignments

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1. [Unit 1](#)
2. [Unit 2](#)
3. [Unit 3](#)
4. [Project 1](#)
5. [Project 2](#)
6. [Project 3](#)
7. [Final Project](#)

[HOME](#) | [Course outline](#) | [Assignments](#) | [Contact Instructor](#)

6.5Contact Instructor

Environmental Pathway Analysis

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Instructor	Eugene Rutz
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