



**Selected Topics (CRSE 59700) in the Division of
Construction Engineering & Management (CEM)
Fall 2024**

**Course Title: Asset Management of Underground Infrastructure (AMUI) (3 credit hours)
TR – 10:30-11:45 am – Room: Wang Hall 2579
Course Syllabus**

Information About the Instructor

Instructor: Prof. Tom Iseley
Office Location: HAMP 1231
Phone number: 765-496-5211
Cell Phone number: 404-386-5667
Email Address: diseley@purdue.edu
Office hours, times: Tuesday & Thursday - 3:00 pm – 5:00 pm

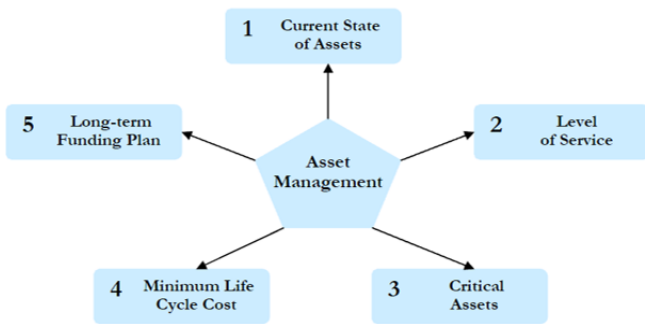
Course Description

Most of the U.S. water and wastewater conveyance infrastructure was installed during the first half of the 20th century, and is coming to an end of its useful life. “Out of sight, out of mind” describes the awareness and significance that has been placed on these underground lifeline systems which support societies’ quality of life, public health, economic development and living standard. Historically, management of these systems has been described as “crises management.” They only get attention when there is a failure. It has been determined that a reactive management approach is not sustainable. The Environmental Protection Agency (EPA) has been instrumental in assisting utilities transition from reactive management practices to proactive practices. This approach involves the principles and practices of Asset Management (AM). AM is a comprehensive approach which involves every aspect of the organization to develop and implement best business practices to address: (a) the current state of the assets, (b) levels of service, (c) critical assets, (d) life-cycle costing, and (e) funding. This course prepares students to utilize sound engineering judgment and principles for managing the construction, repair, rehabilitation and maintenance of buried infrastructure systems including pipes, tunnels, chambers, etc.

Learning Outcomes

- Have an understanding of how utilities (owners of underground infrastructure) are organized and operate,
- Understand rates of deterioration, failure mechanisms, evaluation/inspection technologies, rehabilitation and repair methods of the buried infrastructure systems including pipes, tunnels, and chambers,
- Develop strategic, tactical and operational plans to achieve the mission and objectives for developing and implementing asset management programs for buried infrastructure, and
- Improve oral and written communication skills, including effective presentation.

Five Core Components of an Asset Management Framework



Resource: EPA Asset Management-Best Practices

1- What is current state of my assets?

- What assets do we have – Inventory
- Where are they located - Mapping
- What are their condition - PCA
- Determine remaining life
- Determine renewal/replacement cost & date



Student's Responsibility:

The student has a responsibility to take appropriate advantage of the educational opportunities available at the university, to actively participate in the learning process in a serious and conscientious manner, and to respect the rights of other members of the university community with regard to academic affairs.

Learning Resources, Technology, & Texts

The below manuals along with the handouts will be provided to the students:

- CTAM 100 Manual. Guide to water & wastewater asset management.
- CTAM 200 Manual. Developing buried asset management programs.
- CTAM 300 Manual. Managing an asset management programs.
- CTAM 400 Manual. Financing asset management programs.
- Indiana Guidelines

Keys to Success:

In order to facilitate a deeper understanding of the concepts in this course, students will be expected to obtain textbooks, attend and participate in class. Assignments are essential to understanding the material. Students are expected to complete the assignments for each class in a timely manner.

Homework:

All Homework Assignments should be submitted through BrightSpace. An assignment file should be appended by yourusername, such as "assignment1-kim53.doc". This will make it easier for me to manage assignment files. Homework assignments are due at the beginning of the class. Each assignment *will* need to be considered as a professional assignment; therefore, neatness and thoroughness are essential components.

MANUSCRIPT FORMATTING (Details below extracted from ASCE's paper requirements)

Length. Total paper length includes all text, graphics, references, and appendixes.

Point size and font. Use 12-point type for text and captions, For type within figures or tables, the 12 point size is preferred. Text font should be Times Roman. *Italics*, **bold**, and ***bold italics*** may be used may be used to yield the cleanest results.

Headers and footers. Do not put any information in the header. The only acceptable content in the footer is a single page number.

Layout. All text must be single-spaced. Page design should be consistent throughout the paper. Margins should be 1 inch (34 mm) on all sides, and all elements (text, figures, tables, captions) must fit within those margins.

Figures and tables. All graphics (photos, line art, graphs, charts, tables, etc.) must be included electronically (embedded) within the document and fit within the margin settings.

Illustrations should be single numbered consecutively as they are presented (Figure 1, Figure 2, etc., and Table 1, Table 2, etc.). Each figure should be mentioned in the text or “called out.” Do **not** use field codes or any other internal links—they may cause error messages in the text.

Figures may be placed in the text or in a “gallery” at the end of the paper. More than one figure may appear on a page. Do not wrap text around the figure, even to save space. Portrait orientation is preferred; landscape-orientated figures and tables may be altered to fit.

Captions and legends. A descriptive caption, including figure number, should be placed directly *below* the illustration (see Figure 1).

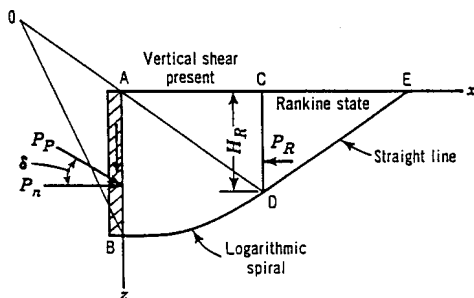


Figure 1. Sample line art illustration. If taken from a prior publication, credit should read (Source: Smith and Jones 2018). If supplied by an outside source, credit should read (Image courtesy of copyright holder. Used with permission.).

A descriptive legend, including table number, should be placed immediately *above* the table (see Table 1).

Table 1. Sample table. If taken from a prior publication, credit should read (Source: Smith and Jones 2018). If supplied by an outside source, credit should read (Image courtesy of copyright holder. Used with permission.).

	Weight	Length
Day 2	20 g	30 m
Day 3	35 g	67 m
Day 4	44 g	76 m

Style. The paper must be written in the best possible technical and grammatical English. Titles should be concise and should describe the content of the paper. If you have a long title, please consider a **Title: Subtitle** format.

Mathematics. All mathematics must be embedded in the text. Equations need to be numbered *only* if they are referred to more than once. If numbering is necessary, equations should be single numbered consecutively as they are presented (Eq. 1, Eq. 2, etc.).

System of units. Use SI units and Imperial system. For example: 150 mm (6-inches).

References. All factual material that is not original with the author(s) must be accompanied by a reference to its source. Use the author-date system of referencing. The author-date system has two parts, the text citation and the reference list.

- The text citation appears where the material to be cited is presented and it refers readers to a source in the reference list by the author's last name and year of publication. Often, the author and date appear in parentheses; a comma is not placed between them.
- The reference list appears at the end. It should be single-spaced and list each reference alphabetically by the last name of the first author. When two or more references by the same author are listed, year of publication is taken into account, and the earliest work is listed first.

Do not use of superscripts to refer to references because the numbers often become unreadable when the pages are reproduced. Some sample references are listed below.

REFERENCES

ASCE (American Society of Civil Engineers). (2014) *Minimum Design Loads for Buildings and Other Structures*, Standard ASCE/SEI 7-10. Third printing. ASCE, Reston, VA.

Burka, L. P. (1993). "A hypertext history of multi-user dimensions." *MUD history*, <<http://www.ccs.neu.edu>> (Dec. 5, 2013).

Committee on Curtain Wall Systems. (2014). *Curtain Wall Systems: A Primer*, ASCE Manuals and Reports on Engineering Practice No. 126. Memari, Ali M., ed. ASCE, Reston, VA.

Dhillon, Gurpreet S., Surinder Kaur, Ajila C. M., Brar, Satinder K., and Surampalli, Rao Y. (2013). "Greenhouse Gas Contribution on Climate Change." Chapter 3 in *Climate Change Modeling, Mitigation, and Adaptation*, Rao Y. Surampalli, Tian C. Zhang, C. S. P. Ojha, B. Gurjar, R. D. Tyagi, and S. M. Kao, eds. ASCE, Reston, VA, 26-61.

Garrett, D. L. (2003). "Coupled analysis of floating production systems." *Proc., Int. Symp. on Deep Mooring Systems*, ASCE, Reston, VA, 152-167.

Singh, Vijay P. (2014). *Entropy Theory in Hydraulic Engineering: An Introduction*. ASCE Press. ASCE, Reston, VA.

Stahl, D. C., Wolfe, R. W., and Begel, M. (2004). "Improved analysis of timber rivet connections." *J. Struct. Eng.*, 130(8), 1272-1279.

Zhou, H. and Attard, T. (2014). "Simplified Anisotropic Plasticity Model for Analyzing the Postyield Behavior of Cold-Formed Sheet-Metal Shear Panel Structures." *J. Struct. Eng.*, 10.1061/(ASCE)ST.1943-541X.0001152, 04014185.

Missed Assignment Policy:

There will be no make-up assignments except for documented medical reasons or extraordinary situations. These requests will be accepted at my discretion and may include a point penalty of 5% per day late. Asking for an extension does not guarantee it will be granted.

Grading:	Mid-Term Exam	20%
	Homework/Classwork	25%
	Projects	30%
	Presentations	20%
	Classroom participation	5%

This course will be graded on the following standard:

Course Aggregate	Grade
97-100	A+
93-96	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
<60	F

Attendance Policy

This course follows the [University Academic Regulations regarding class attendance](#), which state that students are expected to be present for every meeting of the classes in which they are enrolled. Attendance will be taken at the beginning of each class and lateness will be noted. When conflicts or absences can be anticipated, such as for many University-sponsored activities and religious observations, you should inform me of the situation as far in advance as possible. For unanticipated or emergency absences when advance notification is not possible, contact me as soon as possible by email or phone. For absences that do not fall under excused absence regulations (see below), this course follows the following procedures:

1. Do not come to class if you are feeling ill, but DO email me at diseley@purdue.edu, with the subject line: AMUI absence. I do not need details about your symptoms. Just let me know you are feeling ill and cannot come to class. If it is an emergency situation, please follow the University regulations on emergent medical care (see below).
2. Unless it falls under the University excused absence regulations (see below), any work due should be submitted on time via our course Brightspace.
3. If that day's class involves assessed work such as a test or presentation, you and I will plan if and how you can make up the work, following the assignment guidelines. This plan must be done before the next class period, so again, email me immediately when you know that you will miss class.
4. The most important consideration in any absence is how it will affect your achievement of the assignment objectives and the course learning outcomes.

For cases that fall under **excused absence regulations**, you or your representative should contact or go to the [Office of the Dean of Students \(ODOS\) website](#) to complete appropriate forms for instructor notification. Under academic

regulations, excused absences may be granted by ODOS for cases of grief/bereavement, military service, jury duty, parenting leave, or emergent medical care. The processes are detailed, so plan ahead.

DURING CLASS TIME ALL NOISEMAKING DEVICES SUCH AS CELL PHONES MUST BE TURNED OFF OR MUTED. TEXT- MESSAGING OR BROWSING THE INTERNET DURING CLASS WILL NEGATIVELY AFFECT A STUDENT'S PARTICIPATION GRADE.

Course Schedule

NOTE: See separate document in Brightspace "Course Schedule".

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either [emailing](#) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

The [Purdue Honor Pledge](#) "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue".

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. [Link to Purdue's nondiscrimination policy statement.](#)

Netiquette

Your instructor and fellow students wish to foster a safe online learning environment. All opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. You are encouraged to comment, question, or critique an idea, but you are not to attack an individual. Our differences, some of which are outlined in the University's nondiscrimination statement below, will add richness to this learning experience. Please consider that sarcasm and humor can be misconstrued in online interactions and generate unintended disruptions. Working as a community of learners, we can build a polite and respectful course ambience. Please read the Netiquette rules for this course:

- Monitor how much space/time you are taking up in any discussion. Give other students the opportunity to join in the discussion.
- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Avoid using vernacular and/or slang language. This could lead to misinterpretation.

- Keep an “open-mind” and be willing to express even your minority opinion.
- Think and edit before you push the ‘Send’ button.
- Seek and take in feedback from others; learning from other people is an important life skill.

Diversity & Inclusion Statement

1. In our discussions, structured and unstructured, we will explore a variety of challenging issues, which can help us enhance our understanding of different experiences and perspectives. This can be challenging, but in overcoming these challenges we find the greatest rewards. While we will design guidelines as a group, everyone should remember the following points:
 - We are all in the process of learning about others and their experiences. Please speak with me, anonymously if needed, if something has made you uncomfortable.
 - Intention and impact are not always aligned, and we should respect the impact something may have on someone even if it was not the speaker’s intention.
 - We all come to the class with a variety of experiences and a range of expertise, we should respect these in others while critically examining them in ourselves.
2. This course, as with every course offered at Purdue, plays a part in creating and sustaining a welcoming campus where all students can excel. There are many initiatives in CE department and supported by the university focused on this goal, and this course is designed to take advantage of those resources. Learning experiences and assignments address diversity and inclusion, not because they are “topics,” but because they are necessary to prepare students to be successful in a diverse, global environment.
3. We strive for equity, providing equal access and opportunity, and working to maximize student potential. This requires both instructor and students to identify and remove barriers that may prevent someone from full access or full participation. You can help by:
 - Contacting me, anonymously if needed, if you see a potential barrier for someone or yourself in participating fully in the class. This might be a physical barrier such as access to technology or a personal situation.
 - Suggesting ways in which members of our class can support each other. Virtual study groups and discussion boards are examples, but I encourage you to be creative in your ideas.
 - Getting to know each other as contributing members of our learning community. Everyone has something to contribute, and while I designed the course to take advantage of the wealth of knowledge, expertise, and experience we bring together, I cannot do it well without your participation. There are many opportunities built into this course for this type of work. It is important we do it together.

Basic Needs Security

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday.

Course Evaluation

During the last two weeks of the semester, you will be provided with an opportunity to give feedback on this course and your instructor. Purdue uses an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to 10 days to complete this evaluation. Your

participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

Accessibility

Purdue University is committed to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your @purdue.edu email on a frequent basis.

Guidelines regarding ensuring access to emergency information:

- Keep your cell phone on to receive a Purdue ALERT text message.
- Log into a Purdue computer connected to the network to receive any Desktop Popup Alerts.
- If you have a "no cell phone" in class policy allow one or two students who have signed up for Purdue ALERT to keep their phones on to receive any alerts

Mental Health Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack.

Sign in and find information and tools at your fingertips, available to you at any time.

- **If you need support and information about options and resources**, please see the [Office of the Dean of Students](#) for drop-in hours (M-F, 8 am- 5 pm).
- **If you're struggling and need mental health services**: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

Violent Behavior Policy

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity. See the [University's full violent behavior policy](#) for more detail.

Disclaimer

The above policies and attached schedule and assignments for this course are subject to change by the professor in the event of extenuating circumstances.