

Credit Hours: 3

Contact Hours: This is a 3-credit course, offered in accelerated format. This means that 16 weeks of material is covered in 8 weeks. The exact number of hours per week that you can expect to spend on each course will vary based upon the weekly coursework, as well as your study style and preferences. You should plan to spend 14-20 hours per week in each course reading material, interacting on the discussion boards, writing papers, completing projects, and doing research.

Faculty Information: Faculty contact information and office hours can be found on the faculty profile page.

COURSE DESCRIPTION AND OUTCOMES

COURSE DESCRIPTION:

This course provides an overview of the main materials used in construction and teaches how materials are employed in construction projects with a focus on the study of types, properties, uses, and methods of assembly of different key materials. Students will explore the different uses of construction materials, such as Portland cement, asphalt, wood, steel, and masonry. Areas of study include investigation, testing, classification, and engineering properties of materials, as well as the modification techniques, according to ASTM standards and government laws and regulations. Material selection from a sustainable construction perspective will also be discussed as part of this course.

COURSE OVERVIEW:

This course explores the main construction materials and discusses their uses in the process of construction. It will start with highlighting the process of selecting materials in construction and explore some of the main consideration in making material selection decisions. The course will then cover areas such as soil, wood, concrete, masonry materials, steel, asphalt and bituminous materials, and concludes with exploring sustainable construction materials.

COURSE LEARNING OUTCOMES:

1. Demonstrate the knowledge of the engineering properties of different construction materials and their uses in the construction industry, and perform laboratory tests to evaluate different construction material properties.
2. Characterize soils based on soil particle-size distribution, Unified Soil Classification System, and the AASHTO classification system.
3. Understand construction methods and equipment to properly use the construction materials
4. Define the key engineering properties of concrete, wood, asphalt concrete, steel, and all other key construction materials.

5. Demonstrate the knowledge of the proper procedures for placing, finishing, and installing construction materials.
6. Assess construction material-selection criteria from a sustainable construction perspective.

PARTICIPATION & ATTENDANCE

Prompt and consistent attendance in your online courses is essential for your success at CSU-Global Campus. Failure to verify your attendance within the first 7 days of this course may result in your withdrawal. If for some reason you would like to drop a course, please contact your advisor.

Online classes have deadlines, assignments, and participation requirements just like on-campus classes. Budget your time carefully and keep an open line of communication with your instructor. If you are having technical problems, problems with your assignments, or other problems that are impeding your progress, let your instructor know as soon as possible.

COURSE MATERIALS

Required:

Alan, E., & Iano, J. (2014). *Fundamentals of building construction materials and methods* (6th ed.). Hoboken, NJ: Wiley. ISBN-13: 978-1118138915

Project Management Institute (2016). *Construction extension to the PMBOK® guide*. Newtown Square, PA: Project Management Institute. ISBN-13: 978-1628250909

NOTE: All non-textbook required readings and materials necessary to complete assignments, discussions, and/or supplemental or required exercises are provided within the course itself. Please read through each course module carefully.

COURSE SCHEDULE

Due Dates

The Academic Week at CSU-Global begins on Monday and ends the following Sunday.

- **Discussion Boards:** The original post must be completed by Thursday at 11:59 p.m. MT and peer responses posted by Sunday 11:59 p.m. MT. Late posts may not be awarded points.
- **Opening Exercises:** Take the Opening Exercise before reading each week's content to see which areas you will need to focus on. You may take these exercises as many times as you need. The Opening Exercises will not affect your final grade.
- **Mastery Exercises:** Students may access and retake Mastery Exercises up to 3 times through the last day of the assignment week. Late contributions may not be awarded points.
- **Critical Thinking:** Assignments are due Sunday at 11:59 p.m. MT.

WEEKLY READING AND ASSIGNMENT DETAILS

MODULE 1

Readings

- Chapter 1 in *Fundamentals of Building Construction Materials and Methods*
- Explore and find out about the 2018 International Building Code:
 - International Code Council (ICC). (2018). 2018 International Building Code. *International Code Council, Inc.*
- Review the 2016 International Building Code:
 - International Code Council (ICC). (2016). 2006 International Building Code. *International Code Council, Inc.*

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

MODULE 2

Readings

- Chapter 2 in *Fundamentals of Building Construction Materials and Methods*
- OSHA (n.d.). Method: ID-194: Classification of Soils for Excavations, version 2. Retrieved from <https://www.osha.gov/dts/sltc/methods/validated/id194/id194.pdf>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking (120 points)

Choose one of the following two assignments to complete this week. Do *not* complete both assignments. Identify your assignment choice in the title of your submission. Note that while there are two options for the Critical Thinking Assignment, there is only one rubric. Review the rubric to confirm you are meeting the assignment requirements.

Option #1: Sand, Silt, and Clay

Furnish a 3-4-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to:

1. Define sand, silt, and clay.
2. Characterize the physical characteristics of sand, silt, and clay.
3. Describe how the behavior of sand, silt, and clay differ in relation to building foundation.
4. Identify which of the three materials listed above are unfavorable for building foundation and explain how you would remedy site conditions in the event that materials that are unfavorable for foundation are the primary constituents of the soil present on-site.

Your submission should be 3-4-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. You must include a minimum of three peer-reviewed scholarly resources, one from among the required or recommended readings and a minimum of two references from other reliable, peer-reviewed sources. The CSU-Global Library is a

great place to find resources. Be sure to properly organize your submission and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

Option #2: Piles and Caissons

Furnish a 3-4-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to:

1. Compare and contrast piles and caissons.
2. Identify the soil conditions that favor piles over caissons.
3. Specify the type of pile that is especially well-suited to repair or improvement of existing foundations and provide your rationale for this response. Explain.

Your submission should be 3-4-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. You must include a minimum of three peer-reviewed scholarly resources, one from among the required or recommended readings and a minimum of two references from other reliable, peer-reviewed sources. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

MODULE 3

Readings

- Chapters 3 and 4 in *Fundamentals of Building Construction Materials and Methods*
- Pajchrowski, G., Noskowiak, A., Lewandowska, A., & Strykowski, W. (2014). Wood as a building material in the light of environmental assessment of full life cycle of four buildings. *Construction and Building Materials*, 52, 428-436.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking (120 points)

Choose one of the following two assignments to complete this week. Do *not* complete both assignments. Identify your assignment choice in the title of your submission. Note that while there are two options for the Critical Thinking Assignment, there is only one rubric. Review the rubric to confirm you are meeting the assignment requirements.

Option #1: Growth Characteristics and Manufacturing Characteristics of Wood

Furnish a 4-5-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to provide three examples of growth characteristics and three examples of manufacturing characteristics of wood.

Your submission should be 4-5-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. You must include a minimum of

three peer-reviewed scholarly resources, one from among the required or recommended readings and a minimum of two references from other reliable, peer-reviewed sources. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

Option #2: Five Strategies to Improve Fire Safety in Buildings Under Construction

Based on your review of the American Wood Council's Fire Safety Codes & Standards website and the resources it provides for practitioners, furnish a 4-5-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to identify and discuss a minimum of five effective strategies to improve fire safety in buildings under construction.

Your submission should be 4-5-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. You must include a minimum of three peer-reviewed scholarly resources, one from among the required or recommended readings and a minimum of two references from other reliable, peer-reviewed sources. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

MODULE 4

Readings

- Chapters 13, 14, and 15 in *Fundamentals of Building Construction Materials and Methods*
- Assi, L., Carter, K., Deaver, E., Anay, R., & Ziehl, P. (2018). Sustainable concrete: Building a greener future. *Journal of Cleaner Production*, 198, 1641-1651.
- The Portland Cement Association [PCA] (n.d.) Introduction to concrete. Retrieved from <http://members.cement.org/EBiz55/Bookstore/EB001.16-Ch.1-Intro-to-Concrete-LR.pdf>
- Review the following page to find out about the different types of concrete products:
 - Portland Cement Association (2016), Products. Retrieved from <http://www.cement.org/cement-concrete-basics/products>
- Briefly review and familiarize yourself with the tests outlined in the following reference:
 - NDDOT (2015). Field sampling and testing manual testing procedures for all tests. Retrieved from <https://www.dot.nd.gov/manuals/materials/testingmanual/testprocedures.pdf>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Project Milestone (25 points)

As the instructions for the Portfolio Project provide, you need to assume that you have been appointed as an architect or design professional for a construction project. You further assume that you need to specify the materials that are going to be used in this project.

This week, make a decision about whether you would like to work on Option #1 or Option #2 (see the Portfolio Project under the Module 8 tab for more information about the two options) and specify an

assumed construction project that will be the subject of your Portfolio Project. This project can be a project you worked on in the past, a project with which you are familiar, or a project you find online (e.g., a project your city or state is putting out for bid).

This week:

1. Provide a preliminary draft of your project, which contains the main headings (Section #) and sub-headings (choice of material). For both Section 1 (Whole Building Design Guide) and Section 2 (Principles of Construction Materials), identify the construction materials that you will be working on for your Portfolio Project.
2. Include a reference page to list the references you have comprised thus far, formatted according to the CSU-Global Guide to Writing and APA Requirements.

Review the grading rubric to see how you will be graded for this assignment.

MODULE 5

Readings

- Chapter 8, 9, and 10 in *Fundamentals of Building Construction Materials and Methods*
- Sustainable Build (2015). Stone construction. Retrieved from <http://www.sustainablebuild.co.uk/constructionstone.html>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Critical Thinking (130 points)

Choose one of the following two assignments to complete this week. Do *not* complete both assignments. Identify your assignment choice in the title of your submission. Note that while there are two options for the Critical Thinking Assignment, there is only one rubric. Review the rubric to confirm you are meeting the assignment requirements.

Option #1: Mortar for Brickwork

Review this list of Technical Notes on Brick Construction.

Then prepare a 4-5-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) about mortar for brickwork based on your review of a minimum of three of the technical notes and one additional peer-reviewed scholarly article.

Your submission should be 4-5-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

Option #2: Brick and Stone Masonry Sustainability

Furnish a 4-5-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to discuss the sustainability of brick and stone masonry work. To justify your statements, characterize each of the materials and constituents used in brick and stone masonry work and evaluate them from the sustainability perspective.

Include at least four peer-reviewed scholarly resources, one from among the required or recommended readings and a minimum of two references from other reliable, peer-reviewed sources.

Your submission should be 4-5-pages in length (excluding cover page and references) and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

MODULE 6

Readings

- Chapters 11 and 12 in *Fundamentals of Building Construction Materials and Methods*
- American Institute of Steel Construction (AISC) (2018). Structural Steel: An Industry Overview.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Project Milestone (25 points)

This week you need to complete Section 1 (Whole Building Design Guide) of your Portfolio Project. To do so, use the draft you prepared in Week 4 (see Week 4: Portfolio Millstone) and complete (and submit) its Section 1 (Whole Building Design Guide) based on the instructions provided for the Portfolio Project under the Module 8 tab.

Review the grading rubric to see how you will be graded for this assignment.

MODULE 7

Readings

- Chapter 16 in *Fundamentals of Building Construction Materials and Methods*
- Das, A. (2015). Structural design of asphalt pavements: Principles and practices in various design guidelines. *Transportation in Developing Economies*, 1(1), 25-32.
- HUD (n.d.). Maintenance guidebook III - Pavement maintenance, Chapter Three - Bituminous pavements. Retrieved from <http://portal.hud.gov/hudportal/documents/huddoc?id=HUDGB3C3GUID.pdf>

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

MODULE 8

Readings

- *Global Perspectives* (Pages 6-13) and *Key Sustainable Buildings Technology Solutions* (Pages 25-28) in World Green Building Council's (2017). *Global Status Report*. UN Environment.
- Benghida, D. (2017). Concrete as a sustainable construction material. *Key Engineering Materials*, 744, 196-200.
- Estokova, A., & Porphincak, M. (2015). Environmental analysis of two building material alternatives in structures with the aim of sustainable construction. *Clean Technologies and Environmental Policy*, 17(1), 75-83.

Opening Exercise (0 points)

Discussion (25 points)

Mastery Exercise (10 points)

Portfolio Project (300 points)

Choose one of the following two Portfolio Projects (options shown below) to complete. Do not do both assignments. Identify your assignment choice in the title of your submission. Review the Portfolio Project grading rubric to understand how you'll be graded on your project.

Instructions for Both Portfolio Project Options:

Your Portfolio Project will contain two sections (Section 1 and Section 2). For each section, you need to provide a 6-page narrative (for a full project total of a 12-page narrative) as outlined below:

Assume you have been appointed as an architect or design professional for a construction project. Further assume that you need to specify the materials that have to be used for implementing the construction project. Your choices and considerations will reflect on project plans, specifications, and other contract documents.

Section 1 (Whole Building Design Guide).

Explore the following two sections of the WBDG – Whole Building Design Guide:

- a. Guides & Specifications
 - b. Design Recommendations
- I. Based on your review of the above set of resources, choose three building elements that relate to any of the topics of soil, wood, concrete, masonry materials, steel, asphalt, bituminous materials, or sustainable construction materials.
 - II. Then prepare a minimum of a six-page narrative (excluding supplemental pages, such as the cover page, table of contents, references, and appendices – if any) to describe the three elements you identified in Item I above. Discuss the following main considerations in:
 - a. choosing these elements in buildings
 - b. preparing these elements in buildings
 - c. placing and installing these elements in buildings

Section 2 (Principles of Construction Materials).

Use the course textbook and other reliable, peer-reviewed references to provide a six-page narrative to outline:

- a. your choices of materials (from the list of materials provided below) and your rationale by considering the following criteria, at a minimum: practical suitability, climate, economic, sustainability, and safety considerations), and
- b. the main practical and technical considerations in preparation, placement, and installation of the material you selected in Section 2 Item a, above, by considering means and methods, and equipment and machinery needed to install the material.

Portfolio Project Options

Here are your two Portfolio Project choices:

Portfolio Project Option #1:

1. Wood
2. Brick masonry
3. Bituminous materials

Portfolio Project Option #2:

1. Concrete
2. Steel
3. Stone masonry

Your submission should be a minimum of 12 pages in length and formatted according to the CSU-Global Guide to Writing and APA Requirements. Be sure to discuss and reference concepts taken from the course reading material and relevant research. You must include a minimum of eight peer-reviewed scholarly resources beyond the text or other course materials. The CSU-Global Library is a great place to find resources. Be sure to properly organize your writing and include an introduction, headings/subheadings for the body of your work, analysis and recommendations, conclusion, and list of references. Consult the assignment template for a more complete list of requirements. Review the grading rubric to see how you will be graded for this assignment.

COURSE POLICIES

Course Grading

20% Discussion Participation
0% Opening Exercises
8% Mastery Exercises
37% Critical Thinking Assignments
35% Portfolio Project & Milestones

Grading Scale	
A	95.0 – 100
A-	90.0 – 94.9
B+	86.7 – 89.9
B	83.3 – 86.6
B-	80.0 – 83.2
C+	75.0 – 79.9
C	70.0 – 74.9
D	60.0 – 69.9
F	59.9 or below

IN-CLASSROOM POLICIES

For information on late work and incomplete grade policies, please refer to our [In-Classroom Student Policies and Guidelines](#) or the Academic Catalog for comprehensive documentation of CSU-Global institutional policies.

Academic Integrity

Students must assume responsibility for maintaining honesty in all work submitted for credit and in any other work designated by the instructor of the course. Academic dishonesty includes cheating, fabrication, facilitating academic dishonesty, plagiarism, reusing /repurposing your own work (see *CSU-Global Guide to Writing and APA Requirements* for percentage of repurposed work that can be used in an assignment), unauthorized possession of academic materials, and unauthorized collaboration. The CSU-Global Library provides information on how students can avoid plagiarism by understanding what it is and how to use the Library and Internet resources.

Citing Sources with APA Style

All students are expected to follow the CSU-Global Guide to Writing & APA when citing in APA (based on the most recent APA style manual) for all assignments. A link to this guide should also be provided within most assignment descriptions in your course.

Disability Services Statement

CSU-Global is committed to providing reasonable accommodations for all persons with disabilities. Any student with a documented disability requesting academic accommodations should contact the Disability Resource Coordinator at 720-279-0650 and/or email ada@CSUGlobal.edu for additional information to coordinate reasonable accommodations for students with documented disabilities.

Netiquette

Respect the diversity of opinions among the instructor and classmates and engage with them in a courteous, respectful, and professional manner. All posts and classroom communication must be conducted in accordance with the student code of conduct. Think before you push the Send button. Did you say just what you meant? How will the person on the other end read the words?

Maintain an environment free of harassment, stalking, threats, abuse, insults, or humiliation toward the instructor and classmates. This includes, but is not limited to, demeaning written or oral comments of an ethnic, religious, age, disability, sexist (or sexual orientation), or racist nature; and the unwanted sexual advances or intimidations by email, or on discussion boards and other postings within or connected to the online classroom. If you have concerns about something that has been said, please let your instructor know.