CON 252   Construction Methods, Materials, & Equipment

Arizona State University | Del E. Webb School of Construction
Course Syllabus

COURSE INFORMATION
Semester: Spring 2022
Time/Location: Tuesday and Thursday 12:00 PM – 1:15PM (Arizona Time Zone) | –Tempe - CAVC425
Website: CANVAS (https://myasucourses.asu.edu)

INSTRUCTOR INFORMATION
Instructor: Dr. Elham (Ellie) H. Fini
Office: Zoom (https://asu.zoom.us/j/99992850181)
Phone: (480)-965-4273
Email: efini@asu.edu
Office Hours: Flexible by appointment

Instructor Assistant: Mr. Akshay J Rajagopal
Phone: (480)-735-1856
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Dr. Ellie Fini is the Director of the International Innovation Network for Construction Materials, Methods and Management (ICM3), Senior Sustainability Scientist and Associate Professor of the Del E. Webb School of Construction. She is a Fellow of American Society of Civil Engineers, J. W. Fulbright Scholar of Aalborg University of Denmark, and AAAS-Lemelson Invention Ambassador. Her research focuses on bio-inspired and bio-based construction, rehabilitation, and preservation while placing emphasis on recycling and re-use of construction materials. Dr. Fini received her Ph.D. from University of Illinois at Urbana-Champaign in 2008 on characterizing interfacial properties of adhesives and sealants. She has been a professor at NC A&T State University (2008-2018), and a research affiliate at MIT’s Center for Materials Science and Engineering (2011-2017). She has been an invited speaker at Kavli Frontiers of Science at the National Academy of Science; she also served as a program director for the National Science Foundation. She is currently serving as the associate editor of ASCE Journal of Materials and the Resources, Conservation & Recycling Journal as well as the inventor and co-founder of a start-up company, Bio-Adhesive Alliance Inc. She has been collaborating with multiple professional societies, federal agencies, and congressional offices, mainly as an academician.

Mr. Akshay Rajagopal is currently pursuing Master of Science in Construction Management and Technology in the Del E. Webb School of Construction at Arizona State University. He received his Master of Technology (integrated) degree from Sastra University in India. He is a technology person, and his area of focus is data analysis, data science and machine learning. One of his projects is Augmented Reality in Construction where the research was about uses of Augmented Reality - BIM integration in the construction sector. Akshay has worked as a research assistant in a construction materials lab where he studied merits of materials such as bamboo, recycled metal, recycled polyester, etc. to improve sustainability in construction. He has also worked in a pavement materials lab where he studied effects of fibers made from glass and plastic to improve cracking resistance of pavements.

OVERALL PROGRAM GOALS
Construction management professionals combine knowledge of innovative technologies, construction principles and business management to lead a wide variety of construction projects from residential and commercial buildings to infrastructure projects. The DEWSC program goals are to teach students how to become responsible leaders in the construction industry through organization, leadership, and current/innovative management techniques. The American Council for Construction Education (ACCE) states that it is essential that every Constructor be capable of effectively managing personnel, materials, equipment, costs, and time. The Constructor must be able to effectively communicate and understand their role as a member of a multi-disciplinary team, the assessment of project risk, and the alternate methods that can be used to structure the owner-designer-structor team.
COURSE DESCRIPTION
The course includes discussion of construction elements including both novel and conventional materials and commonly used equipment and methods. The course emphasizes both vertical and horizontal construction. We focus on materials and methods including aspects of materials characterization, method and equipment for application and maintenance. Pros and cons of various construction materials and methods will be discussed to help students gain knowledge on the following topics related to construction:

- Various types of construction materials
- Technologies for characterization and diagnosis
- Methods and machinery used in construction, repair and maintenance

LEARNING OBJECTIVES
Students will be able to:

1. Understand various concepts in materials, methods and equipment used in construction
2. Develop innovative solutions using a Design-Thinking process to address recognized industry needs
3. Analyze pros and cons of existing solutions using interview, case studies and reports as well as survey, and experimental plans to be able to stipulate expected outcomes of their solution
4. Communicate their solution in construction using written, and oral presentations, graphical forms and/or prototyping

TEXTBOOKS AND REFERENCE MATERIAL


Additional reference and recommended textbooks


Applied and Natural Science Commission (EAC) Student Outcomes:
This course covers the following ABET ANSAC Student Outcomes:
(3). An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions. (CLO 2, 3)
(4). An ability to communicate effectively with a range of audiences ((CLO 4).
(6). An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty. (CLO 1, 4)

American Council for Construction Education (ACCE) Student Learning Outcomes:
This course covers the following ACCE SLO:
(6). Analyze methods, materials, and equipment used to construct projects. (CLO 1, 3)

GRADING POLICY
The following criteria, weights, and grading scale will be used to calculate the Final Grade (the Instructor may modify/adjust as necessary):

<table>
<thead>
<tr>
<th>Weight</th>
<th>Assignment</th>
</tr>
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<tbody>
<tr>
<td>15%</td>
<td>Assignments</td>
</tr>
<tr>
<td>5%</td>
<td>Discussion Forums</td>
</tr>
<tr>
<td>10 %</td>
<td>Participation (class attendance and pop-up quiz)</td>
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<tr>
<td>20 %</td>
<td>Exam I</td>
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<tr>
<td>25 %</td>
<td>Exam 2</td>
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<tr>
<td>25 %</td>
<td>Term Project Report including the followings:</td>
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<td></td>
<td>• Quad chart (1 single PowerPoint slide)</td>
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</tbody>
</table>
• Term paper (5 pages)
• Video presentation (2 minutes)

Additional 10 points will be considered for “Bonus Project” (please discuss this option with the instructor)

The numerical grades corresponding to the alphabetic grades are as follows:
A= 4.0; A-=3.7; B+=3.3; B=3.0; B-=2.7; C+=2.3; C=2.0; C-=1.7; D+=1.3; D= 1.0; F=0.0.

Grade Scale
A = 100 – 95; A- = 94 – 90; B+ = 89 – 85; B = 84 – 80; B- = 79 – 75; C+ = 74 – 70; C = 69 – 65; C- = 64 – 60; D+ = 59 – 55; D = 54 – 50; F = below 50.

COURSE POLICIES, PROCEDURES, AND REQUIREMENTS
Note: University policies may change over time; these requirements may change to match and complement new requirements from the university, college, and school.

Face Coverings – Until further notice, face coverings are required on the ASU Campus.

Distancing – Sit only in designated seats. Should seats not be designated, be sure you are sitting at least 6 ft from anyone else. Also be sure to stay 6 ft from other people as you enter and exit the room. To successfully participate in class activities and group works, you are encouraged to bring your laptop to the class.

Communication
Communication of the course other than in class activities will be primarily through e-mail and the course website via Canvas. You are expected to read your e-mail (ASU e-mail address) and check course website on Canvas on a regular basis. Announcements, assignments, and other course related information will be transmitted via e-mail and Canvas.

Attendance in class, forums, discussion boards and quizzes – Attendance is required and active participation is weighted in the scoring. Only under the most extreme circumstances, supported by written documentation, will a make-up opportunity be given. The final decision rests with the instructor. There will be no make-up for quizzes and late assignments.

Absence Policy – If you anticipate not being able to attend any of class sessions due to travel restrictions or personal health concerns, you are expected to contact your professor at the beginning of the semester or as soon as your situation changes.

a. Excused absences related to religious observances/practices that are in accord with ACD 304–04, “Accommodation for Religious Practices”

b. Excused absences related to university sanctioned events/activities that are in accord with ACD 304–02, “Missed Classes Due to University-Sanctioned Activities”

c. Excused absences related to missed class due to military line-of-duty activities that are in accord with ACD 304–11, "Missed Class Due to Military Line-of-Duty Activities," and SSM 201–18, “Accommodating Active Duty Military”

Absences for illness, quarantine or self-isolation related to illness should be documented by a health professional and communicated to the instructor as soon as possible by email. Excused absences do not relieve students from responsibility for any part of the course work required during the period of absence. Faculty will provide accommodations that may include participation in classes remotely, access to recordings of class activities, and make-up work.

Homework Assignments
No late assignment will be accepted. Homework and assignments are due at 11:59 p.m. (MST) on Tuesday.

Online Discussion Forums
There will be discussion forums in Canvas. You need to answer the discussion questions posted in Canvas and make comments on your fellow classmates’ responses. Below is the guideline to secure perfect participation grade:

1. Respond to all posted questions for the specified week with a minimum of one paragraph by Tuesday midnight (11:59 p.m., MST).
2. Respond to a minimum of one student’s posting; a response should state agreement/disagreement with the statement and provide supporting information and the rationale.
3. Basically, a responding statement should be more than “I agree.”
4. The forum closes on Monday midnight. There will be no make up for missed participation.

**Exams**

Two exams will be given during the semester. Exams will encompass a mix of true/false, multiple choices, short answers and/or problems. The exams will not be comprehensive and will cover only materials presented since the previous exam. Students are expected to be present for all scheduled exams. Make up exams will be given only by prior arrangement with the instructor and are reserved for situations that are beyond the control of the student.

**Project/Term Paper**

The course term project(s) is part of the course assignments. The objective of the project is to apply the theory and principles associated with construction materials and methods to design innovative solutions for recognized industry problems. This is a group assignment; however, students are welcome to work as a one-man team. Teams (maximum 4 student per team) determine the problem in consultation with the instructor and come up with a solution. Each team prepare and present project updates regularly matriculating to a final term project report. The teams will stay as the originally-formed teams; exception are only granted for situations that are beyond the control of the student.

Students choose their projects from a pre-defined list of research questions. Teams who wish to work on topics not already in the list should consult with the instructor. All project topics must be within the scope of the course and relevant to the course content.

**Criteria for Grading Project/Term Paper**

1. Strength of justification of the NEED and significance of the topic (20%). In the best papers, the author does much more than just explain or describe, the author shows evidence of problems, analyzes it from different angles and assesses it critically.
2. Quality of APPROACH chosen to address the problem (20%); this includes scientific rationale, methodology and measurement techniques to prove the merits of the solution.
3. Strength of arguments, evidence and statistics pertaining to the BENEFIT of the solution (20%).
4. Quality of description of existing COMPETITION and alternatives already available including evidence-based comparison of pros and cons (20%).
5. Overall organization and logical development of report and its presentation (20%). A well-organized report has a purpose or theme; Paragraphs are linked to each other in a logical sequence using transitional sentences. Arguments, examples, facts, opinions, and details explain the main point and lend credibility to each point being developed. It contains words that are carefully selected and sentences that are purposefully constructed. Each point the author makes is expressed exactly precisely and clearly. It consistently uses correct grammar, punctuation, and spelling. Verbs agree with the subjects. Sentences are complete. There are no single sentence paragraphs. It properly references and cites other’s work.

**Due date:** The final project report and video clip is due by on **Tuesday, April 26** by midnight. Only one submission per team is allowed and each project needs to include a cover letter addressed to the instructor. The letter needs to clearly explain contribution of each member and be signed by all contributing members.

**Deliverables:** Each team should submit followings using the templates on the course website

- Quad chart (1 single PowerPoint slide)
- Term paper (5 pages)
• Video presentation (2 min) (Each team’s videos needs to be posted on YouTube, and a link* to the video be included in the cover letter)

*Ensure the link is typed in correctly; If you are copying/pasting the link from the browser into the letter, make sure the entire link is included. if the link does not work, your video will be considered as missing for grading)

Assignments—The format of the homework is a requirement. Students should expect 10 homework assignments. You are expected to act as a consultant during the semester. Merely providing a numerical answer is only part of your work requirement; the work also includes presentation and explanation of the answer. You must communicate your answers professionally. All writing requirements must be completed using a word processor, spell and grammar checked and well written with a logical flow.

General Responsibilities –The responsibility for learning rests with each student. The professor will assist by making the environment conducive to learning but your preparation is essential. The student is responsible for completing all reading assignments and assigned forums and homework problems and seeking assistance if needed. Students are expected to secure relevant texts, readings, required notes and handouts. Each student is responsible to protect his/her work; any duplication in any of course deliverables (submitted homework, assignments, quiz, exams, etc) will be considered as unethical behavior on all parties involved causing all involved parties lose the score for that assignment.

Grade Contestation Window – For 24 hours from the time at which a grade is posted to blackboard, students may not see the instructor regarding the specific grading of the assignment. Students will have one week starting after the 24 hours is over to question the grade that was given. Once this week has past, the grade is considered final.

Professional Work – To receive credit for your work, it is imperative that the work be organized, readable, and professional (part of your grade will be based on presentation of your work). Plagiarism of any type will not be tolerated. At the first occurrence, your work will be returned to you to re-do. Following occurrences will result in the instructor reporting this lack of academic integrity to university administrators. If you are unclear about how to cite the work of others, please ask!

Course Requirements – When assigned a reading, please complete it by the assigned deadline. The importance of keeping current in reading assignments cannot be overemphasized. You are responsible for all assigned reading materials, regardless of the topics discussed in the forums. Discussion is authorized and encouraged on all assignment, but each student must formulate their own answers because grades are based on the original work of each student. Use of published references is authorized but must be properly cited.

Official E-mail – An official ASU e-mail is established for each student, faculty member, and staff member. All university communications sent via e-mail will be sent to this ASU e-mail address. You are required to check your e-mail daily.

DETAILED CLASS SCHEDULE
Course assignments and activities will be in accordance with the schedule posted on Canvas that we develop as a class. The instructor reserves the right to modify the schedule and syllabus as needed. Please note Homework are due every Tuesday by 11:59 p.m. unless otherwise instructed in class (No late homework will be accepted).

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Homework due every Tuesday by 11:59 p.m. (MST)</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>01/10/2022 - 01/14/2022</td>
<td>Introduction Chapter 1 Making Buildings</td>
</tr>
<tr>
<td>Week 2</td>
<td>01/17/2022 - 01/21/2022</td>
<td>Extra Credit</td>
</tr>
<tr>
<td>Week 3</td>
<td>01/24/2022 - 01/28/2022</td>
<td>Chapter 8 Brick Masonry Answer review questions 1,2,3,15</td>
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<tr>
<td>Week</td>
<td>Dates</td>
<td>Activity</td>
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<tr>
<td>4</td>
<td>01/31/2022 - 02/04/2022</td>
<td>Project Ideation (Feb. 1; team meet to ideate) Chapter 11 Steel Frame Construction</td>
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<tr>
<td>5</td>
<td>02/07/2022 - 02/11/2022</td>
<td>Chapter 9 Stone and Concrete Masonry</td>
</tr>
<tr>
<td>6</td>
<td>02/14/2022 - 02/18/2022</td>
<td>Project Discussion &amp; Guest Speaker</td>
</tr>
<tr>
<td>7</td>
<td>02/21/2022 - 02/25/2022</td>
<td>Exam Review Exam I (the exam will be given on all contents covered up until Exam 1)</td>
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<tr>
<td>8</td>
<td>02/28/2022 - 03/04/2022</td>
<td>Chapter 13 Concrete Construction</td>
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<tr>
<td>Spring Break</td>
<td>March 6-13</td>
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<tr>
<td>9</td>
<td>03/14/2022 - 03/18/2022</td>
<td>Project discussion &amp; Guest Speaker Concrete Construction Continues</td>
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<tr>
<td>10</td>
<td>03/21/2022 - 03/25/2022</td>
<td>Chapter 14 Site cast Concrete</td>
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<tr>
<td>11</td>
<td>03/28/2022 - 04/01/2022</td>
<td>Chapter 15 Precast concrete</td>
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<tr>
<td>12</td>
<td>04/04/2022 - 04/08/2022</td>
<td>Chapter 17 Roofing</td>
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<tr>
<td>13</td>
<td>04/11/2022 - 04/15/2022</td>
<td>Exam Review &amp; Exam 2 (the exam will be given on contents covered after Exam 1)</td>
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<tr>
<td>14</td>
<td>04/18/2022 - 04/22/2022</td>
<td>Project discussion and video presentation</td>
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<tr>
<td>15</td>
<td>04/25/2022 - 04/29/2022</td>
<td>Video presentations</td>
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**UNIVERSITY POLICIES**

**Academic Integrity** - Students in this class must adhere to ASU’s academic integrity policy, which can be found at [https://provost.asu.edu/academic-integrity/policy](https://provost.asu.edu/academic-integrity/policy). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to both the ASU Academic Integrity Honor Code ([https://provost.asu.edu/academic-integrity/honor-code](https://provost.asu.edu/academic-integrity/honor-code)) and the Fulton Schools of Engineering Honor Code ([https://engineering.asu.edu/ira-a-fulton-schools-of-engineering-honor-code/](https://engineering.asu.edu/ira-a-fulton-schools-of-engineering-honor-code/)). All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

**Student Code of Conduct** - The Student Code of Conduct sets forth the standards of conduct expected of students who choose to join the university community. Students who violate these standards will be subject to disciplinary sanctions ([http://students.asu.edu/srr/code](http://students.asu.edu/srr/code)).
**Classroom Behavior** - The use of recording devices is not permitted during class. Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

**Absence & Make-Up** - Accommodations will be made for religious observances provided that students notify the instructor at the beginning of the semester concerning those dates. Students who expect to miss class due to officially university-sanctioned activities should inform the instructor early in the semester. Alternative arrangements will generally be made for any examinations and other graded in-class work affected by such absences. The preceding policies are based on ACD 304–04, “Accommodation for Religious Practices” and ACD 304–02, “Missed Classes Due to University-Sanctioned Activities.”

**Disability Accommodations** - Suitable accommodations will be made for students having disabilities. Students needing accommodations must register with the ASU Disabilities Resource Center and provide documentation of that registration to the instructor. Students should communicate the need for an accommodation in sufficient time for it to be properly arranged. See **[ACD 304-08](#)** Classroom and Testing Accommodations for Students with Disabilities.

**Harassment and Sexual Discrimination** - Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information. Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at **[https://sexualviolenceprevention.asu.edu/faqs](https://sexualviolenceprevention.asu.edu/faqs)**.

As an employee of the University I am considered a mandated reporter and therefore obligated to report any information regarding alleged acts of sexual discrimination that I am informed of or have a reasonable basis to believe occurred. ASU Counseling Services, **[https://eoss.asu.edu/counseling](https://eoss.asu.edu/counseling)**, is available if you wish to discuss any concerns confidentially and privately.

**Academic Calendar** - The academic calendar **([https://students.asu.edu/academic-calendar](https://students.asu.edu/academic-calendar))** contains important dates that students should be aware of, including: the first and last day of class, drop/add deadlines, withdrawal deadlines, and observed holidays.

**Copyright Protection** - All course content and materials, including lectures (Zoom recorded lectures included), are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell, or distribute course content or notes taken during the conduct of the course (see **[ACD 304–06](#)**, “Commercial Note Taking Services” and **[ABOR Policy 5-308 F.14](#)** for more information).

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.
**Threatening Behavior** - Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services. Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

**Syllabus Changes** - Any information in this syllabus may be subject to change with reasonable advance notice. In case of any delay by the instructor or technology glitch to resume the class, the wait time obligation will be 15 minutes. Please check your ASU email and course website before class for any updates and/or unexpected changes.