

COLLEGE OF ENGINEERING

**R&D**

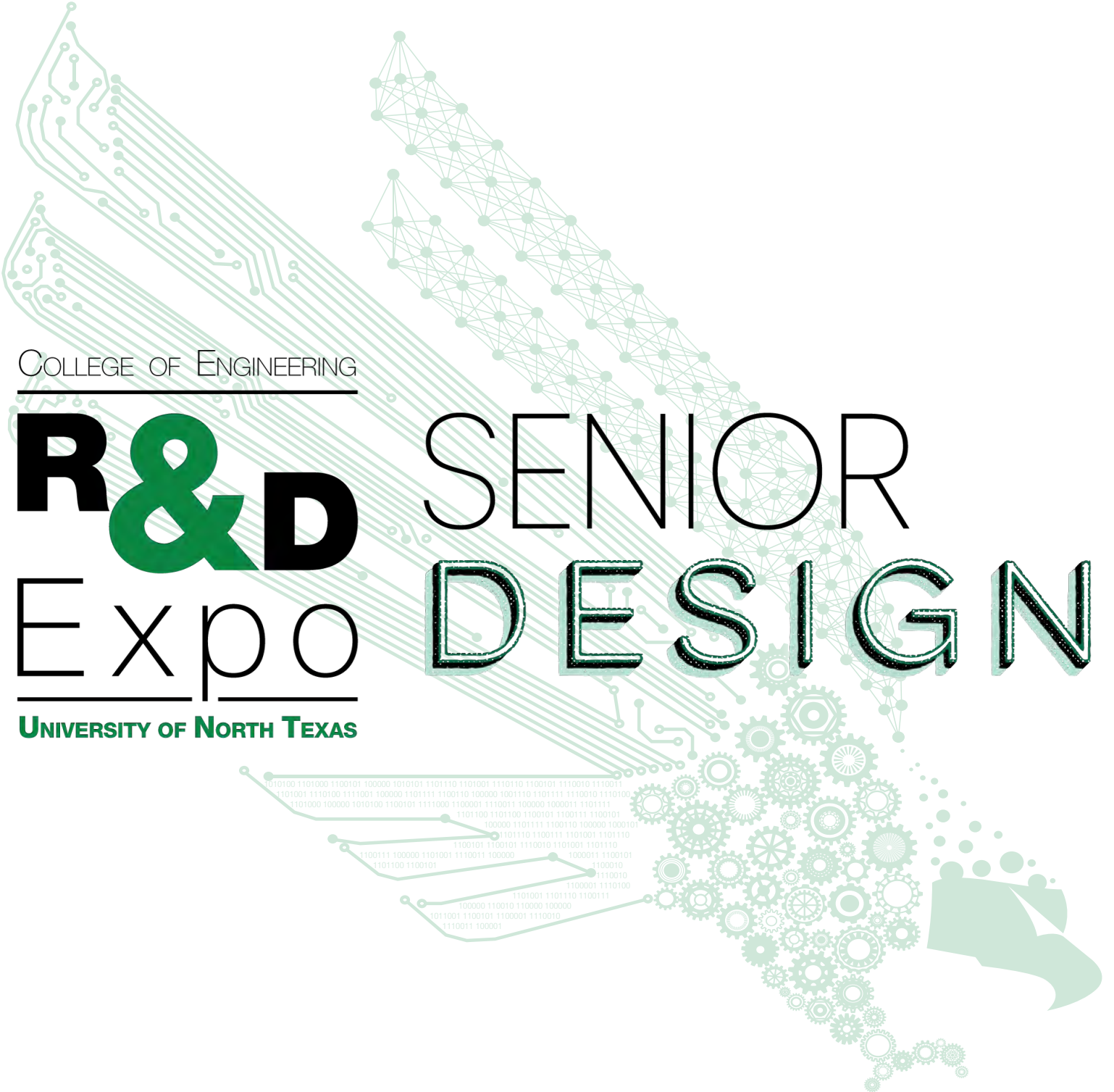
**Expo**

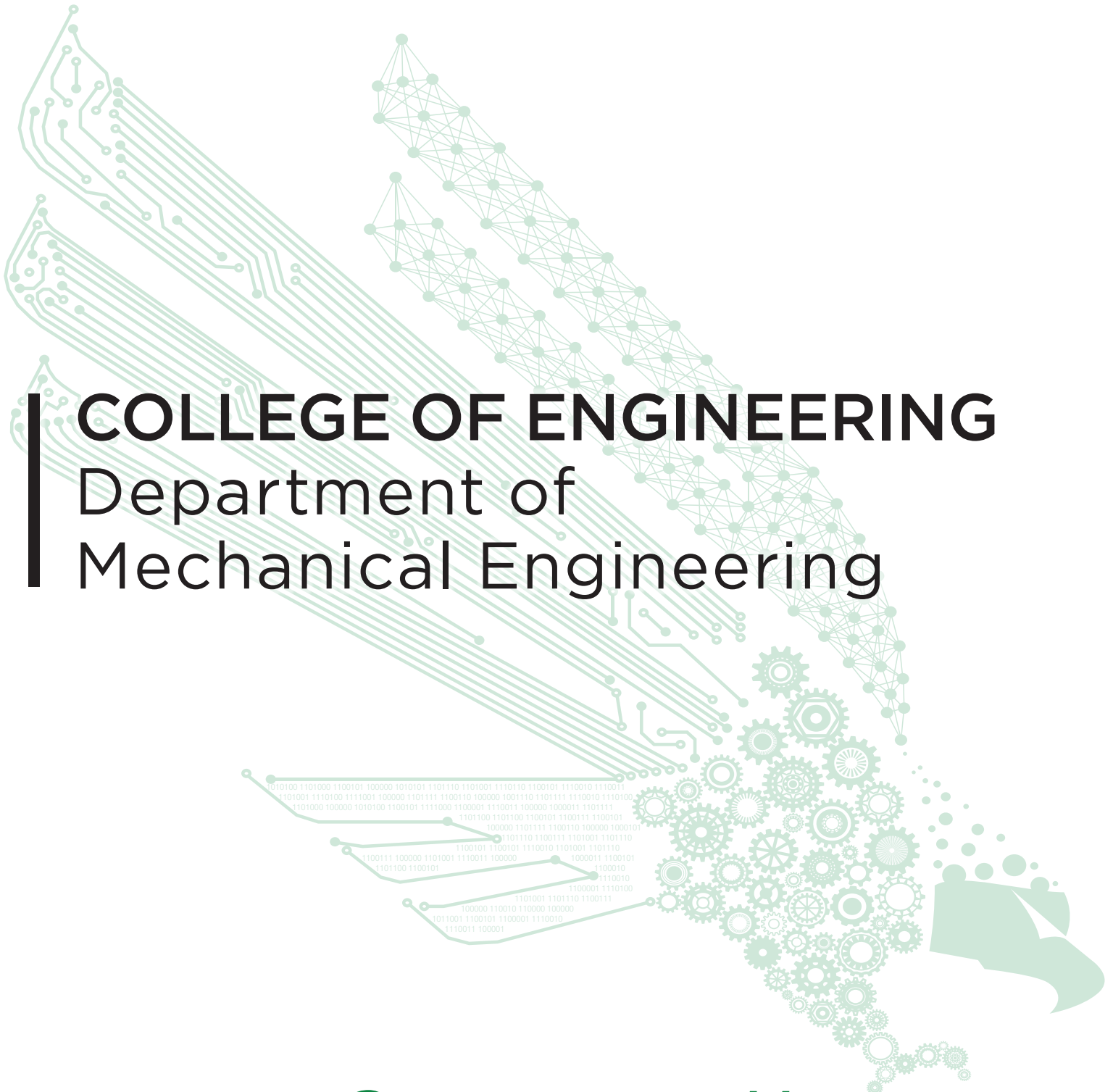
UNIVERSITY OF NORTH TEXAS

SENIOR

**DESIGN**

**Spring 2026**





**COLLEGE OF ENGINEERING**  
Department of  
Mechanical Engineering

**CONSTRUCTION MANAGEMENT**  
**Senior Design Abstracts**  
**Spring 2026**

# Texas Health Plano Bed Tower 4 & CUP Expansion

## Team Members

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Hunter Sanders  
Edgar Sanchez  
Justin Robles  
John Apodaca  
Alonzo Cortez

## External Sponsors/Mentors

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Austin Commercial  
Valentina Valero PM II

## Internal Sponsors/Mentors

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Dr. Orlando Bagcal  
Dr. Aloysius Attah

## Abstract

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The Capstone Project, sponsored by Austin Commercial, centers on the development and construction of the Texas Health Plano Bed Tower 4 and associated renovations in Plano, Texas. This healthcare expansion will add a new multi-story bed tower across the existing campus to improve patient capacity, operational efficiency, and overall quality of care. Construction is scheduled to begin in September 2025 and conclude in May 2028, following an extensive multi-year process of planning, coordination, and quality assurance.

Our work focuses on the core components of successful project delivery, including risk assessment, logistics planning, job layout, budgeting, cost control, BIM integration, value engineering, sustainability considerations, and construction scheduling. Through comprehensive risk identification and mitigation planning, the team aims to protect both the project timeline and budget. Logistics and site layout studies will enhance material flow, equipment access, and workforce coordination, while budgeting and value engineering efforts will balance cost efficiency with structural integrity and environmental responsibility. The integration of BIM will further support design coordination, reduce rework, and strengthen communication among project stakeholders. Together, these efforts provide Austin Commercial with a structured, data-driven approach to delivering the Texas Health Plano Bed Tower 4 successfully.



# Frisco ISD Visual and Performing Arts Center

## Team Members

James Swanson  
Seth Zapata  
Jesus Munoz  
Gerardo De La O  
Bryan Garcia

## External Sponsors/Mentors

Joeris General Contractors  
Kyle Ware

## Internal Sponsors/Mentors

Dr. Cheng Yu  
Dr. Aloysius Attah

## Abstract

The Frisco ISD Visual and Performing Arts Center (VPAC) is a new two-story, approximately 67,000 square-foot facility designed to support district-wide fine arts programs in Frisco, Texas. The project includes a 1,200-seat auditorium with balcony seating, a full orchestra pit, rehearsal and back-of-house spaces, two multipurpose fine arts labs, district office areas, and a 2,000 square-foot visual arts gallery. The facility is intended to provide high-quality performance and learning spaces for students, as well as host UIL competitions and community events.

This senior design project focuses on developing a comprehensive construction plan for the VPAC, including logistics, scheduling, budgeting, safety planning, and risk analysis. The project also incorporates Building Information Modeling (BIM) to improve coordination between architectural, structural, and MEP systems, especially in complex areas such as the auditorium and stage systems. Construction began in early 2024 and is expected to reach substantial completion in Spring 2026. Overall, the project demonstrates the application of construction management principles to deliver a large-scale educational facility efficiently and safely.



We would like to acknowledge Humberto Lopez for his sponsorship and support for this project. We would also like to express gratitude to our professors and the Construction Management department at the University of North Texas for their continuous guidance.

# McLane Children's Hospital

## Team Members

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Uthman Ajibade  
Ryan Zavala  
Daniel Nuno  
Jairo Gutierrez

## External Sponsors/Mentors

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Brasfield & Gorrie  
PM, Lindsay Lauderdale  
PE, Austin Gallier

## Internal Sponsors/Mentors

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Dr. Zhenhua Huang  
Dr. Al Attah

## Abstract

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Our senior design project focuses on renovations at McLane Children's Hospital in Temple, Texas. Brasfield & Gorrie is leading multiple upgrades to improve hospital operations and patient care. The project mainly consists of the relocation of respiratory therapy and the addition of six intermediate care patient rooms scheduled for 2025-2027. Additional updates include relocating on-call suites, lounge areas, and dormitories. These improvements will modernize the facility and enhance the quality of care for children in Central Texas. Our project's scope of work is estimated to be roughly 6,721 sf. Our project's original budget is \$5.4 million, and the completion of the project will be conducted in the span of 431 days.



## Denton Fire Station #6

### Team Members

Ashley Aragon  
 Filiberto Gutierrez  
 Jonathan Lilly  
 Lianae Pacheco  
 Esmeralda Villegas-Marroquin

### External Sponsors/Mentors

Sponsor: CORE Construction  
 Mentors: Madison Ampoe, APM  
 Brianna McCool, PE

### Internal Sponsors/Mentors

University of North Texas  
 Faculty Advisor: Dr. Kaur Kawalpreet  
 Class Professor: Dr. Aloysius Attah

### Abstract

The Denton Fire Station No.6 is a ground up 13,231 gsf one-story municipality for the City of Denton, with a storm shelter. This new station is to help the emergency responders live and work in a place that is up to code, and help improve their overall health with Clean PSB (clean public safety building). Our senior design team aims to communicate with the CORE project team to help identify risks, help coordinate rising problems, and help identify products that could be Value Engineering. During this process we will be able to use all the knowledge that we have learned in the CNET classes, as well as real world experiences we have gained. Using the drawings and specs provided by the CORE project team, we should be able to read, understand and recognize any discrepancies. Having the opportunity to collaborate with CORE will allow us to enhance our knowledge in the technical world of construction, strengthening our communication, and coordination.



# Borman Elementary School Replacement Project



## Team Members

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Jonathan McKerley  
Ulises Rubio  
Benjamin Kaltenbach  
Mariano Barbosa  
Sifa Kwamungu Veyi

## External Sponsors/Mentors

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Kyle Ware  
Joeris Construction

## Internal Sponsors/Mentors

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Dr. Al Attah  
Dr. Salar Shirkanloo

## Abstract

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For Group 5 of Construction Management Senior Design, we have been assigned to the Denton ISD Borman Elementary School Replacement Project. The new Borman Elementary School will completely replace the old Borman Elementary School. When completed, this two-story 125,605 square foot structure will feature state-of-the-art environmentally sustainable components including Geothermal Heat Pumps, Photovoltaic Systems Solar Panels, and Insulated Concrete Form walls. A land swap between the City of Denton and the Denton Independent School District was established, granting the new Borman Elementary to be built adjacent to the existing school. The schedule of the Borman Elementary School Replacement Project is broken into two main phases.

JUBMS Construction is proceeding apace with Phase I constructing the modern structure with a handoff date of August 2026. Upon completion, Phase II A will begin with the demolition of the existing 56-year-old Borman Elementary school taking place from September to December 2026. Lastly the project will end with Phase II B with the construction of a brand-new park for the City of Denton ending in August 2027. JUBMS Construction, in accordance with Denton ISD and Corgan Architects, has been set to the task of delivering a comprehensive Senior Design report incorporating a business plan, site logistics, quality management, budget, schedule, sustainability, value engineering, risk assessment, and safety coordination.



# 165 Aiden Drive, Tuscan Estates



## Team Members

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Colby Jenkins  
Sergio Loredo  
Ribanshu Rawal  
Isaac Dawson-Cabrera

## External Sponsors/Mentors

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Bridge Homes  
Bryan Rodriguez

## Internal Sponsors/Mentors

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Dr. Orlando Bagcal P.E.  
Dr. Al Attah P.E.

## Abstract

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Our senior design project is a custom one-story house in the Tuscan Estate's community located in Waxahachie Texas. This house measures 4,176 sq. ft. under roof and comprises features such as a media room, three-car garage, an outdoor kitchen, and a special dog wash station. The design and construction of custom homes represent custom undertakings that demand meticulous planning, coordination, client design choices, and superior craftsmanship in order to satisfy clients.

The entire project cycle lasts for five months or 127 working days, and the projected cost of construction stands at \$750,000. Our team has been tasked with managing all aspects of the project, including preconstruction preparations, coordinating schedules, interacting with subcontractors, controlling quality, and cost management. Key areas of focus include developing a well-articulated construction schedule and ensuring efficient work sequencing and effective communication among all parties involved.



# University of Texas at Arlington's Life Sciences Building

## Team Members

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Paul Heredia  
Emmanuel Alamilla  
Isaac Villalobos  
Daniel Pedroza

## External Sponsors/Mentors

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Hensel Phelps Construction

## Internal Sponsors/Mentors

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Dr. Aloysius Attah  
Dr. Saman Rashidyan

## Abstract

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Our senior design project is the University of Texas at Arlington's Life Sciences Building located in Arlington, TX. Our project includes the new construction the Southeast Corner (SEC) of the building, and an overall renovation of the MEP systems within the building. Our focus as directed by our mentors is the construction of the SEC.

The building was constructed in the mid 1970s, which is reflected in the design of its original systems. The electrical system was initially set up with a shared neutral throughout the building, which does not meet current code requirements, so it has been updated to improve safety and efficiency. The original air handling units were located in the basement and supplied air from the bottom up, but to keep the building operational during construction, five new units have been installed on the roof to distribute air from the top down, allowing the building to remain occupied while work is ongoing.

The SEC is a three-story addition that will house offices, conference rooms, and student testing rooms. The addition begins on the 3rd floor and provides new areas for faculty and students to utilize the building.

Our project team, Brim Construction, is responsible for developing a comprehensive project report that includes cost estimation, scheduling, constructability analysis, and coordination with our industry sponsor, Hensel Phelps Construction Co. Under the guidance of mentors Zach Hill and Quinn Shoop, and with support from our faculty advisor, our goal is to deliver a detailed project plan that aligns with real world construction management practices and industry standards.



# UNT D170 Lab Buildout

## Team Members

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Ethan McLeod  
Cody McPherson  
Ethan Myers  
Brayam Martinez

## External Sponsors/Mentors

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Sponsor: Vaughn Construction  
Mentor: Parker Anderson

## Internal Sponsors/Mentors

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Professor Cheng Yu  
Dr. Aloysius Attah

## Abstract

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The UNT D170 Labs project is a renovation and expansion effort that transforms an existing 7,556-squarefoot shell space into a modern, fully functional research and laboratory facility. A new mezzanine level significantly expands the usable floor area and introduces additional research capacity while maintaining clear vertical circulation through the installation of a new exterior access staircase. This staircase connects directly to the mezzanine and provides code-compliant egress independent of existing building pathways. In addition, an exterior equipment pad is incorporated to support mechanical, electrical, and process equipment needed for advanced laboratory operations. The interior program is designed around both lab space and daily operational needs. Six specialized laboratory and support rooms are strategically distributed throughout the renovated space to accommodate sample preparation, equipment operation, storage, and controlled environment activities. Two major laboratory zones serve as the core of the facility, a fully equipped wet laboratory for chemical and biological processes, and a dry research laboratory tailored for analytical, computational, and device-focused investigation. The design includes fume hoods on both Level 1 and Level 2, with plumbing rough-ins installed throughout the renovation area; all plumbing fixtures were excluded from the project scope.

The facility is designed to support an occupancy load of 48 individuals on Level 1 and 45 individuals on Level 2, ensuring safe and efficient circulation for students, researchers, and faculty. The project also requires the protection of UNT's stored inventory located within sections of the existing shell space.



# Tom Harpool Regional Water Treatment Plant Phase II expansion (GMP 3)



## Team Members

Ilayla Hernandez,  
Gabriel Hernandez,  
Joshue Reyes Ramirez,  
Gerardo Gonzalez

## External Sponsors/Mentors

Humberto Lopez

## Internal Sponsors/Mentors

Dr. Al Attah  
Dr. Orlando Bagcal

## Abstract

Our senior design project focuses on a selected portion of the near Aubrey/Providence Village, Texas. This larger project will increase treatment capacity from 30 MGD to 60 MGD and improve longterm reliability of the regional water system.

Our team is specifically focusing on the Finished Water Pump Station North, the Electrical Building North, and the surrounding concrete paving within the designated work area. The selected scope excludes most underground piping, process mechanical systems, and electrical work outside of the concrete-related items shown in the plans.

Through this project, we will apply construction management concepts such as logistics, scheduling, budgeting, BIM, sustainability, risk assessment, safety planning, and value analysis to show how this portion of the expansion can be effectively planned and managed.



We would like to acknowledge Humberto Lopez for his sponsorship and support for this project. We would also like to express gratitude to our professors and the Construction Management department at the University of North Texas for their continuous guidance.



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