CANNONDESIGN

UNIVERSITY OF COLORADO COLORADO SPRINGS

ENGINEERING AND APPLIED SCIENCES ANNEX ADDITION

June 12, 2020

PROGRAM PLAN

CONTENTS


DEWALT

Overview

Executive Summary

University of Colorado Colorado Springs (UCCS) is proposing an approximately 24,000SF engineering annex to house infrastructure for a growing student body. Currently the 1,700 student College of Engineering and Applied Science (EAS) continues to grow at ~3% per year. With the current growth coupled with new programs the university conservatively estimates a student population of 2400-2600 students by 2026 but lacks the facilities to accommodate the growth. The workforce needs in Colorado Springs and Southern Colorado are currently greater than the university capacity to deliver engineers and computer scientists to the region, so there is a need for growth to serve Southern Colorado. Currently there are ~200 companies in the region seeking graduates from EAS. UCCS speaks to our industry partners on a consistent basis and their primary requests are for additional engineers and computer scientists available to hire. A common theme for these requests includes an expanded intern supply coupled with long-term employment. Industry partners have indicated that long-term retention of graduates with technical depth is their priority with local UCCS graduates representing the most reliable employees for long-term retention.

Program

This request is for an approximately 24,000SF annex to the current engineering building. It will house undergraduate laboratory instructional space, classrooms, student help centers, senior capstone space, faculty offices, and faculty research space. A three-story building adjacent to the existing engineering building with access to the front of the building along the "spine" and from the back from Mountain Lion Way as well is envisioned as a future connection to the existing Engineering Building is a consideration in this program planning..

Cost and schedule is indicated below:

	Timing	UCCS Endowment $M	UCCS Fund Raising $M	UC System Funding $M	Total $M
Approximately 24,000 ft² Annex	July 2021 May 2022	6	8.7	2	16.7

Phase 1 of 2	Start Date	Completion Date
Design	**July, 2021**	**February, 2022**
Construction	**March, 2022**	**May, 2023**
FF&E /Other	**May, 2023**	**August, 2023**
Occupancy	**August, 2023**	**August, 2023**

Vision:

The College of Engineering & Applied Science aspires to improve health, welfare, and prosperity through technical learning, research, professional practice, and invention.

Mission:

In partnership with the community and our alumni, the mission of the College of Engineering & Applied Science is to: Illuminate: Inspiring a passion in our students for life-long learning; and graduating engineers and scientists who are knowledgeable and competitive in the global marketplace throughout their careers.

Investigate:

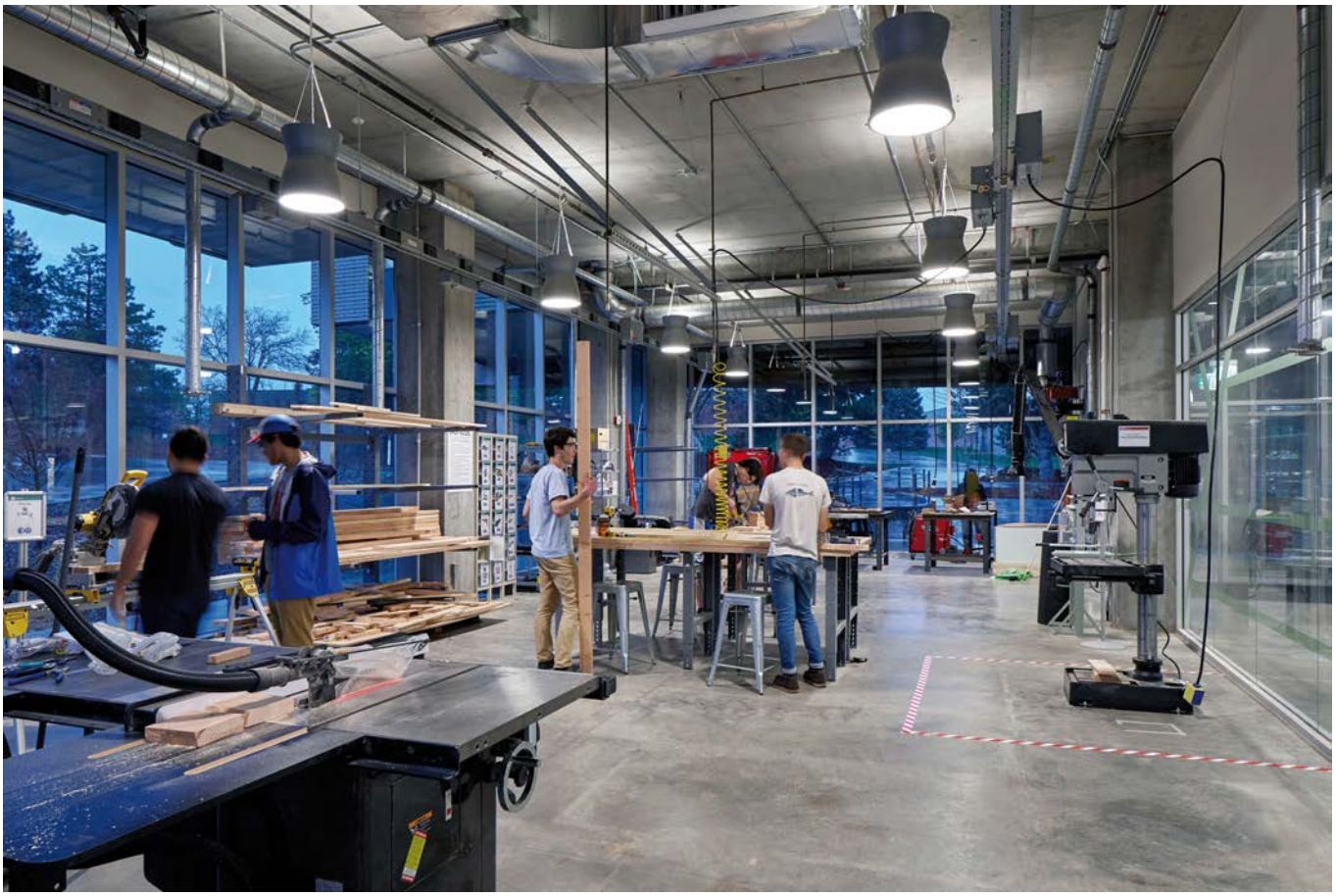
Conducting recognized and relevant research that has both local and global impact.

Innovate:

Engaging in leadership, service, economic and technology development that improves health, welfare, and prosperity through engineering

Relation to the Facility Master Plan

The UCCS Master Plan outlines work associated with the Engineering and Applied Sciences as part of Phase Three of the 2020 Plan. This program plan aligns with the goals of the master plan.




MEETING
ROOM
1025

Justification

Project / Program Need

Space Needs Analysis

Space needs within the Engineering and Applied Science building were examined through numerous lenses before making decisions regarding new spaces to add in the Annex. As is the case at the majority of public institutions across the nation, space is in demand in the Engineering and Applied Science building; some space is underutilized, while other space is over utilized, certain space could be managed better, etc. UCCS understands that all space on campus is an asset owned by the University, and not by any individual department.

Figure 2.1

Program space – existing conditions

	First Floor	Second Floor	Total
Offices	3490	7653	11143
Classrooms	6035	0	6035
Teaching Labs	22709	13,990	36699
Seating/Study	0	0	0
Corridors	9,364	8,470	17833
Bathrooms	914	914	1828
Mech/Cust	0	481	481
Total	42,512	31,508	74,019

The measurement and management of space is critical to the understanding of when new space is required, and the type of new space needed. The types of spaces (classrooms, faculty offices, laboratories, etc.) and amount of space dedicated to each classification, for the existing condition, is provided in Figure 2.1 above, while room capacity, average square feet per seat, average Enrollment cap, and average occupancy for teaching labs and classrooms throughout the building, are provided in Figures 2.2 and 2.3.

Key Strategic Goals

Illuminate: While sustaining academic quality and integrity, increase, at a responsible rate, the number of students in EAS programs who are passionate about life-long learning and who are knowledgeable and competitive in the global marketplace throughout their careers.

Investigate: Provide adequate support and incentives to increase, at a reasonable rate, recognized and relevant research that has both local and global impact.

Innovate: Develop practices, policies and incentives to support a reasonable increase in activities leading to economic and technology development that improves health, welfare, and prosperity through engineering

College of Engineering and Applied Science Goals

Figure 2.2

Utilization & average area per seat – labs

	FCLTY TYPE LD	Room	Room Capacity	Sqft per seat	Average Enrollment	Avg Enrollment Cap	Avg Occupancy 67%+
Engineering & Applied Sciences	Laboratory	113	34	31.27	12.8	17.9	71.6%
	Laboratory	116	27	28.21	13.0	20.0	65.0%
	Laboratory	136	36	26.10	22.0	26.6	81.5%
	Laboratory	138	30	28.24	28.5	29.5	96.4%
	Laboratory	229	22	55.66	18.5	29.3	64.3%
	Laboratory	230	20	46.04	16.0	22.3	78.0%
	Laboratory	242	12	22.98	6.0	12.0	50.0%
	Average	NA	25.86	35.79	15.40	22.70	76.14%

The data in the aforementioned figures speaks to a less than perfect use of lab and classroom space within existing engineering building. The building, when considering the existing layout of labs provides an average of 36 square feet per seat, with a high of 56 square feet per seat, versus a preferred typical lab sf/student for engineering should be 50 sf /student seat, while classrooms provides an average of 18 square feet per seat, with a high of 24 square feet per seat, versus a preferred classrooms should be no less than 20 sf/student with 25 -30 sf/student preferable for active learning. In addition, the majority of classrooms and labs throughout the building reached utilization rates above 80% during the fall, 2017 semester as well. Utilization above 80% is considered by many experts in the field to be over capacity. All of which support the need for reapportioning space within existing labs and classrooms, the creation of new labs and classrooms to meet current demands and to provide future capacity, and to increase utilization of space through standardization.

Figure 2.3

Building	FCLTY TYPE LD	Room	Room Capacity	Sqft per seat	Average Enrollment	Avg Enrollment Cap	Avg Occupancy 67%+
Engineering & Applied Sciences	Classroom	101	47	16.19	26.2	34.7	71.5%
	Classroom	103	90	14.98	53.9	59.9	91.4%
	Classroom	105	40	16.85	28.7	34.2	81.2%
	Classroom	107	52	16.01	36.9	41.8	87.5%
	Classroom	109	56	16.20	33.7	41.0	86.2%
	Classroom	247	18	23.93	8.0	10.0	80.0%
	Seminar Room	239	15	22.29	9.0	12.6	71.5%
	Average	NA	45	18	27	32	81.28%

Enrollment Growth

The EAS College is growing at a tremendous pace – Enrollment has more than doubled since 2008, growing from 762 students in 2008, to 1,944 students in the fall of 2018. There are no indications that this trend will abate. Enrollment in the relatively new Bachelor of Innovation (BI) degree program has shown double-digit growth and has seen increased interest in this unique program from students around the world. The Bachelor of Innovation program requires team projects throughout the four years, which will require additional space for discussion groups.

The undergraduate student Enrollment in the Mechanical and Aerospace Engineering department has been growing at the average of more than 10% per year for the past ten years. Current and future students will need additional, regular and lab classes, starting in the near future. The Vision and Security Technology (VAST) laboratory, housed in the Engineering and Applied Science building, employs more than 20 students and researchers at all levels, from undergraduate to post-doctorates. Interest and expansion of this program is placing demands on all available research space. The Engineering and Applied Science College is poised to move to the next level of externally funded research activities. In the past six years, the college has hired 12 new tenure-track faculty members who have graduated from top-tier research universities. The college is supporting new tenure-track faculty, and other faculty, with funding for graduate students and research. The college expects the external funding for research to double in the next 5 – 7 years. As the research activities grow, so will the demand for space.

Program Information:

College of Engineering and Applied Science

UCCS, and the undergraduate program in electrical engineering, were started in response to the need for trained professionals to support the newly formed Hewlett Packard Company in the mid 1960's. The Bachelor of Science in Electrical Engineering was one of the earliest degrees awarded by the campus. In keeping with the mission of addressing the needs of the local community the Bachelor of Science degree in Computer Science program was started in 1980, the master's and doctorate programs in the mid 1980's, the mechanical & aerospace and the computer engineering programs in 1999 and 2000, and the bachelor of innovation programs in 2007. Currently the college offers four Bachelor of Science, four Bachelor of Innovation, three Master of Science, six Master of Engineering, and the Doctor of Philosophy in engineering degrees. The four Bachelor of Science degree programs are accredited by the Accreditation Board for Engineering and Technology (ABET). We will seek accreditation for the Bachelor of Innovation degree programs when an accreditation criteria and process have been established by ABET.

The College of Engineering and Applied Science has three academic Departments: Computer Science (CS), Electrical and Computer Engineering (ECE), and Mechanical and Aerospace (MAE). The college also has an Extended Studies program for online Master of Engineering Degrees. There are a total of 32 tenured and tenure-track faculty members, two of the faculty members are El Pomar endowed Chairs. Additionally, there are twelve Instructors whose primary duties are to teach regular and laboratory classes. The faculty in the college has expertise in a variety of engineering and computer science areas and conduct both sponsored and unsponsored research in microelectronics, electromagnetics, network and cyber security, biomedical instruments, battery control, energy, space and aerospace areas, etc.

Computer Science and Electrical and Computer Engineering departments are housed in the EAS building. These departments have established laboratories for teaching and research that are distributed throughout the Engineering and Applied Science building with state-of-the art equipment. Mechanical and Aerospace Engineering research laboratories are located in the EPIIC Osborne Science and Engineering building. However, there is need for more and higher quality space for engineering research than is available in the two buildings.

The Micro Electronics Electromagnetic Research Labs was established in 1985 and since then two multimillion-dollar companies have been created due to the research of Dr. Carlos Araujo: Ramtron Corporation and Symetrix Corporation. Dr. Araujo was awarded the prestigious Institute of Electrical and Electronic Engineers (IEEE) Daniel Noble award for his pioneering work in the area of ferroelectric memories that led to the formation of the two companies. Both the MRL and the Anechoic Chamber have been instrumental in attracting federal funds from NASA, NSF, DOD, Air Force Research Laboratories (AFRL), etc. A number of small and large companies have leased time to use these laboratories to experiment with their ideas and products. The two laboratories, especially MRL, have been used by researchers from other departments outside EAS to conduct multi-disciplinary experiments.

Building Adjacencies and Building Program Spaces

As EAS grows to satisfy student demand and workforce needs, facilities have not kept up with demand. The college consist of three departments that include Computer Science, Electrical and Computer Engineering, and Mechanical and Aerospace Engineering. They currently reside in the Osborne Center, the Engineering Building and have over-flowed into the Forster house, formerly a family residence. EAS completed a study to look at projected growth in our current programs and near-term future programs. Our study suggested that the college would grow from 1700 to 2400-2600 students by 2026. We then asked faculty and Chairs what facilities would be needed beyond their existing facilities to accommodate the growth considering faculty needs, instructional laboratory space, capstone project space etc.. Data came back in several categories that included:

1. Resolving space issues assuming no growth. These are situations in our current facilities where we have instructional laboratory facilities doubling as senior capstone design space, instructional space, and faculty research space, or no office space for current faculty.
2. Additional space associated with no new programs but continued growth in our existing program in the 3%/year range.
3. Additional space associated with new programs coming online in next two years.

Based on the combination of those areas we compiled the data from the EAS Departments and then filtered the requests based on the composite of all three to remove overlap and correct for omissions.

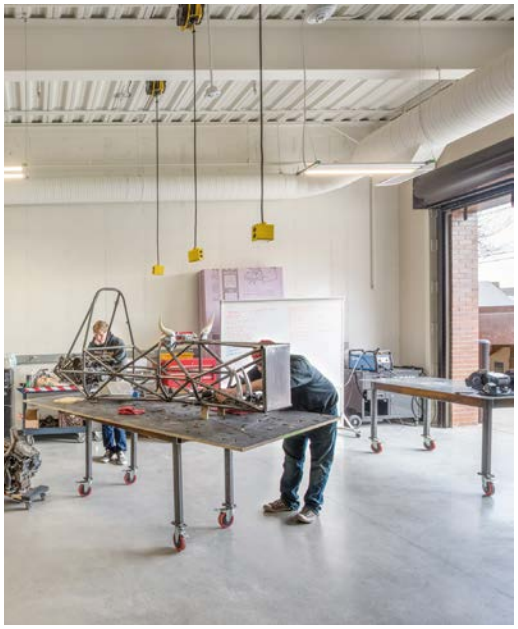
Options to Increase Capacity / Long Term Planning

An Annex to Engineering is considered to solve the issues of capacity, create space for new programs for the growing southern Colorado Aerospace and Military presence.

We considered multiple options as we looked at strategies to solve facilities space issues associated with student growth in EAS. The plan that seemed most viable to satisfy work force needs in the region was to increase the student base while continuing to grow the facilities infrastructure. One option was to request a new building to supplement our existing footprint in the Engineering building and portions within the Osborne Center. We thought it was unrealistic to expect another engineering building through the capital construction submittal process within the next ten years. Given that, we arrived at the plan outlined below.

Build a 24,000 ft2 engineering annex to support student growth and expanded programs within Engineering and Applied Science at UCCS. This coupled with a future engineering building renovation would provide enough space to satisfy ~80% of the needs over the next 10-15 years.

In considering the cost associated with the proposed annex the university also considered revenue associated with student growth. In the scenario of a current 1700 student population growing to 2400 students by the year 2026, the university assumed an additional ten faculty would be needed to satisfy instructional needs from the students with tenure track faculty. In this scenario the increase in revenue associated with tuition far out-weighs the faculty costs and should likely contribute $3-4M/year after burdened faculty cost. If one considers a cumulative effect of growing the programs from 2020-2026 and hiring through that period, the accumulated costs associated with addition tuition revenue will likely reach $7M by 2026.



Total Space Requirements

Space ID	Space Type	Space Name	Occupancy	Count	NSF	Sub-total NS	Floor	Dimensions	Comments / Questions
1.01	Office	Faculty Office	1	14	100	1,400	2	10 x 10	Individual faculty offices, or 2-3 graduate students / office, 8 offices in Cyber
1.02	Office	Workstations - Graduate Students	1	0	40	-	2	5 X 8	Graduate student carrels, research space in CS will
1.11	Collaboration	Help Center - Large Study Room	12	1	360	360	1	15 X 24	Walls should have markerboards and space around table should be 5' clear to allow easy use. Spaces will be used for
1.12	Collaboration	Help Center - Small Study Room	5	2	150	300	1	15 x 10	Walls should have markerboards and space around table should be 5' clear to allow easy use. Spaces will be used for
1.13	Collaboration	Conference Room Space	30	1	900	900	3	30 x 30	Make just a large conference room for 30 to accommodate CS Dept faculty meetings, thesis defense etc., technical
1.14	Collaboration	Group Study	4	0	100	-	2	10 x 10	Space for group study, use help centers when
1.15	Collaboration	Coffee / Food / Dining	4	1	120	120	1	10 x 12	Need a small kitchen and frig just for sink, storage,
1.16	Collaboration	Student Living Room	20	1	500	500	1	20 X 25	Near entrance from
2.01	Lab	Instructional Laboratory	16	2	1,080	2,160	1	30 x 36	Flexible instructional labs to support: - Thermal Fluids - Controls
2.02	Lab	Instructional Laboratory - Prep/Storage Room	16	1	360	360	1	18 x 20	Support space for instructional labs to provide prep and storage
2.03	Lab	Research Lab - Computer Science	4	1	360	360	2	18 x 20	Strong preference to provide individual research labs to provide space for reflection. CS
2.04	Lab	Research Lab - Electrical Engineering	4	2	360	720	2	18 x 20	Strong preference to provide individual
2.05	Lab	Research Lab - Mechanical and Aerospace Engineering	4	4	360	1,440	2	18 x 20	Strong preference to provide individual
2.06	Lab	Capstone Project	0	2	360	720	3	18 x 20	Size based on a garage bay. Space used for small teams to develop and
2.07	Lab	Instructional Project Area	0	2	360	720	3	18 x 20	Size based on a garage bay. Space used for small teams to develop and
3.11	Shop	Shop	0	1	1,080	1,080	3	20 x 54	Size based on 3 garage bays. Will augment existing shop. Imagine
3.12	Shop	Workshop - Electrical	0	1	360	360	3	18 x 20	Size based on a garage bay. Small electrical
3.13	Shop	Tool Storage	0	1	180	180	3	10 x 18	Adjacent to shop
3.14	Shop	Material Storage	0	1	180	180	3	10 x 18	Adjacent to shop
3.15	Shop	Tech Office	1	1	100	100	3	10 x 10	Adjacent to shop
3.16	Shop	Welding	0	0	180	-	3		No welding?, Welding already resides in
3.17	Shop	Dust Collection	0	0	100	-	3		No wood materials in this shop - dust collection not
4.11	Classroom	Computer Lab (30)	30	1	900	900	2	25 x 36	Desks should all face instructor for
4.12	Classroom	Classroom (40)	40	1	1,000	1,000	1	28 x 36	Desire to have 4 of these spaces if possible and would prefer to size for
4.12	Classroom	Classroom (40)	40	1	1,000	1,000	3	28 x 36	Desire to have 4 of these spaces if possible and would prefer to size for
5.01	Support	Furniture Storage Room	0	0	150	-	3	10 x 15	Storage space to support flex conference space. No
Total						**14,860**	**NSF**		
						1.60	Grossing Factor		

Project Alternatives

Alternate options considered by UCCS leadership are described below:

Alternate option #1

One acceptable alternate solution for providing the additional capacity needed to meet current and future demand, would involve construction of a separate 30,000 sf academic classroom building to serve first and second year students who would normally take classes in the Engineering and Applied Science building, as well as students from various other programs offered at UCCS. This option would provide much needed capacity for the degree programs delivered in Engineering and Applied Science, but at a much higher cost.

The choice to construct a new general academic classroom building would not solve any of the health, life safety, and code issues in the building, or any of the energy related issues nor the deferred maintenance problems that make the Engineering and Applied Science building one of most expensive buildings to operate on campus.

Alternate option #2

Another solution would involve building a small addition on the east side of the building, to provide additional teaching and research space along with new faculty offices. This option would be a less expensive option than building an entire new facility but has the same failings as the first option and does not address existing health, life safety, code, deferred maintenance, and efficiency issues.

Alternate option #3

Another alternative would include UCCS borrowing sufficient funding to address the deferred maintenance backlog, replace antiquated and inefficient building heating and cooling systems, and address all existing life, health, and safety issues. This option would reset the clock on deferred maintenance, would reduce annual operating costs, lower the buildings energy use index, and reduce the university's greenhouse gas emission. Unfortunately, this alternative would do nothing to address inadequacies in existing laboratories and classrooms or provide additional faculty offices, nor help UCCS address goals surrounding student recruitment and retention.

Alternate #2, building an addition on the east side of the building, was determined to be the most viable option for this program plan.

Consequences if Not Funded:

Choosing to not fund the project will have a lasting impact on UCCS's ability to meet current and future needs of engineering students. The cleanroom and support spaces in the existing building are inadequate for today's research. UCCS's ability to expand existing research and generate new research will be compromised, as will UCCS's ability to support the National Cybersecurity Center by providing needed research space.

Funding the Annex in this program plan is the first step in solving deficiencies: The Engineering and Applied Science building will remain an extremely energy inefficient facility that employs an ozone depleting CFC chiller as well. The condition of the research and teaching spaces will have a negative impact on the recruitment and retention of undergraduate students, graduate students, and future faculty members. Several health, life safety, and code issues will remain unresolved as well.


CREATE
EXIT
STOP
PLATE

Design and Implementation Criteria

Project Developments – Site Concept

The UCCS campus has ~500 acres of land but much of it is sloping and creates challenges in locating buildable sites. The campus is broken into three general areas however the central campus is the core of academics on the campus. (Figure 3.1)

Given the modest scope of the proposed Engineering Annex, the site selection needs to be near the current support infrastructure of the existing engineering building. There are multiple sites to consider but only two of those are realistic. The most realistic scenario creates a three-story building on the sloped lot just north-east of the existing building and just to the south of the University Center. It enables vehicular access from the rear of the building, pedestrian access from the front, as well as a connector component from the existing engineering building. (Figure 3.2). For a 24,000 ft2 three-story structure we would need a site that can accommodate a 84' x 94' footprint. The proposed site is large enough for this size building. This site is also along the primary spine of the campus and would significantly improve our ability to fund raise for the project.

A second less desirable location would be behind the existing engineering building and would likely be a two-story structure. Access between the Engineering building would be easy in this scenario but slope stability and potentially having to relocate civil infrastructure could be problematic. (Figure 3.3).

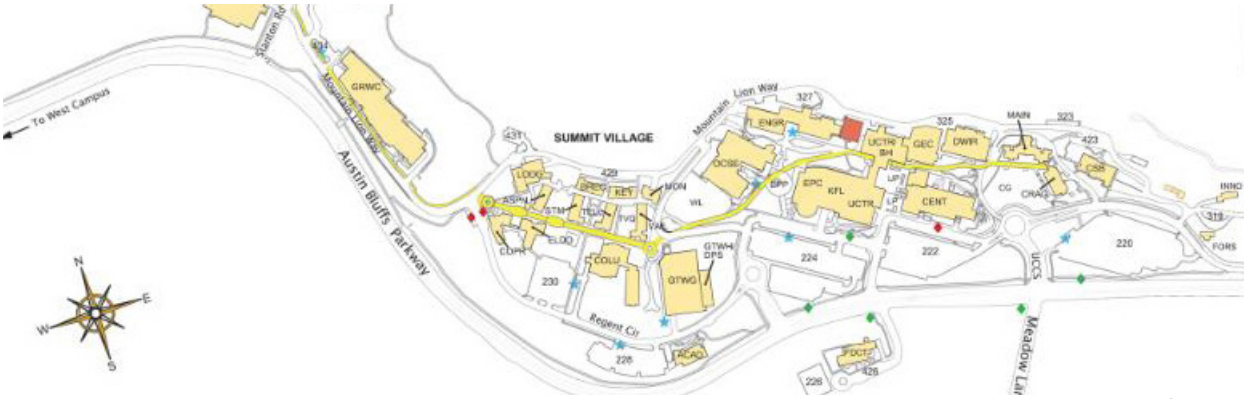


Figure 3.1

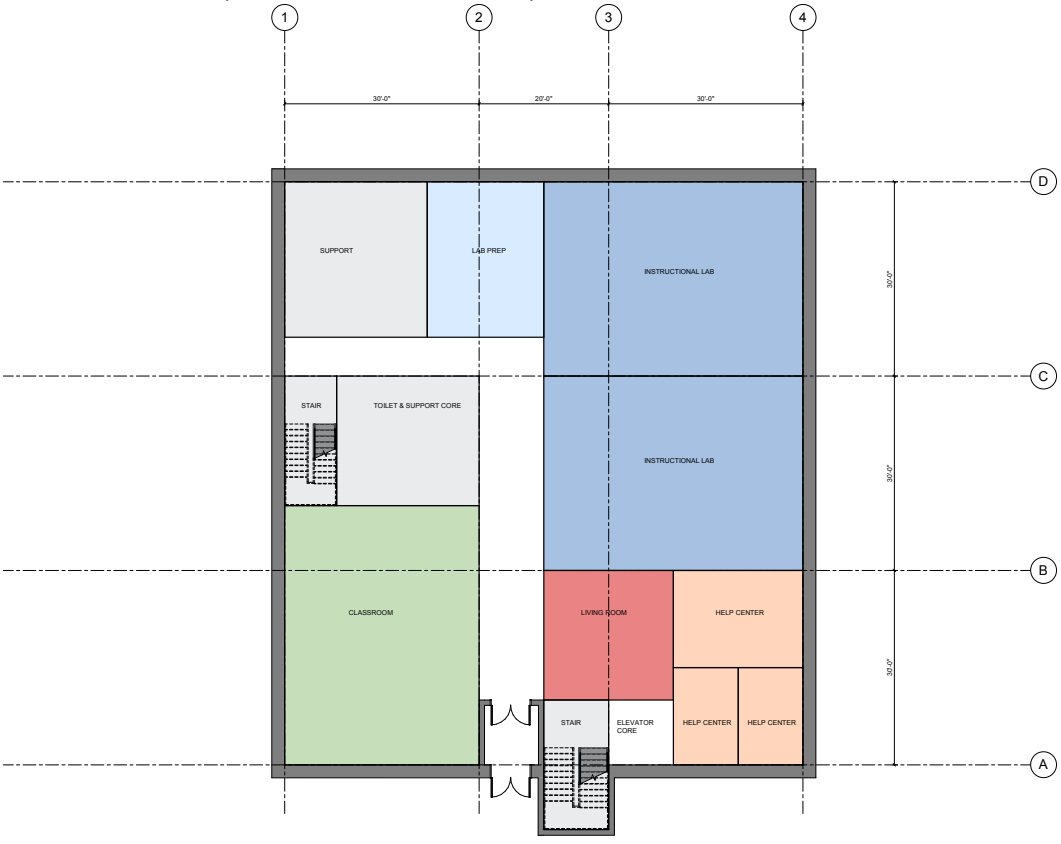
Figure 3.2

Figure 3.3

Building Adjacencies and Building Program Spaces

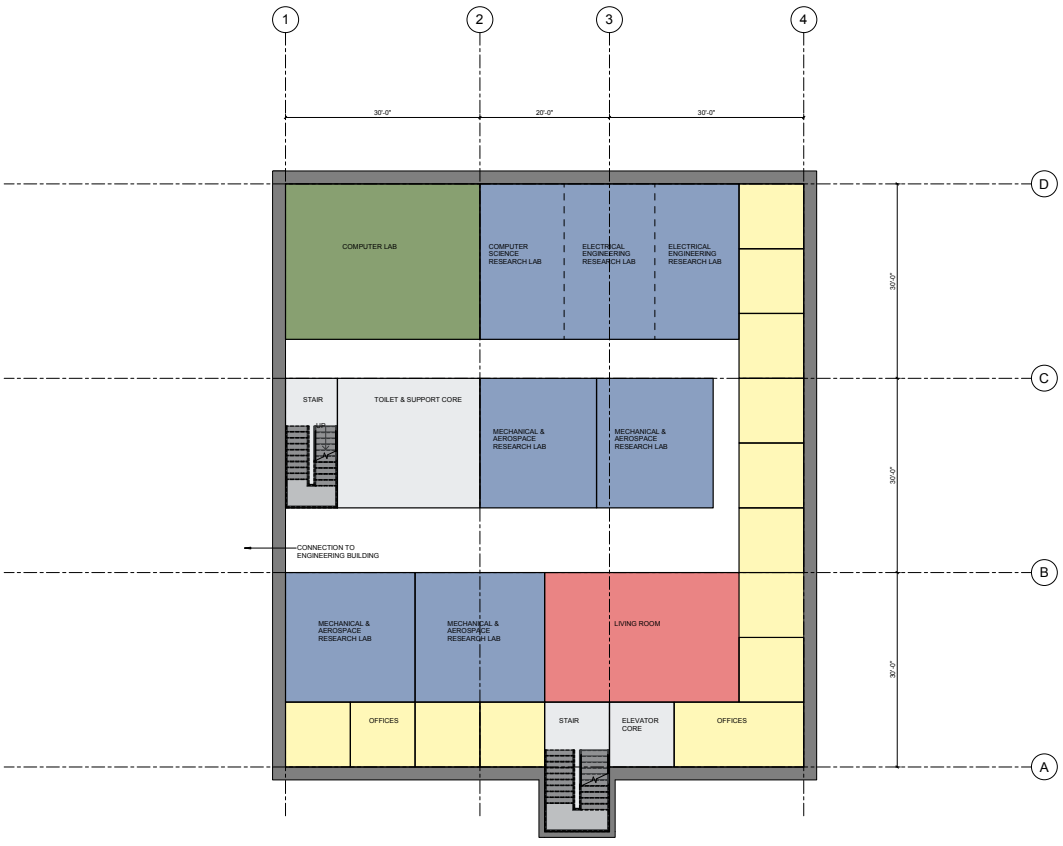
The program has six general components:

- **Laboratories:** To fill deficiencies in instructional space - classrooms and a computer lab are provided. There are two types of laboratories – instructional and research laboratories. The instructional laboratories are flexible in nature and intended to support laboratory course work in mechanical and aerospace engineering. Each laboratory should provide lab/lecture functionality to support 16 students and 1-2 instructors. The courses will range from thermal fluids, controls, to materials testing. An adjacent prep space is provided to allow for simultaneous use of both labs, with the prep room used for setup activities as much as possible to enhance laboratory utilization. AV/IT should be per UCCS standards. The research laboratories support individual faculty work in computer science, electrical engineering, and mechanical & aerospace engineering.
    - Mechanical: These laboratories (except for the computer science laboratory) will require 2-4 air changes per hour and (2) point exhausts for equipment, soldering, and small laboratory experiments. 2 (5)' constant volume fume hoods should be anticipated in the building.
    - Electrical: Extensive 120V power with (2) 208V/30 amp in each laboratory.
    - Plumbing: Laboratory water should be provided separate from domestic water. All water polishing (reverse osmosis/deionized water) will be handled by owner provided point-of-use polishers. These laboratories will include owner provided chillers for point of use chilled water for equipment. Central lab compressed air is anticipated in labs and shops. Emergency eyewashes with tempered water should be provided in the instructional labs and mechanical and aerospace engineering research labs. No lab natural gas use anticipated in the labs and shops.



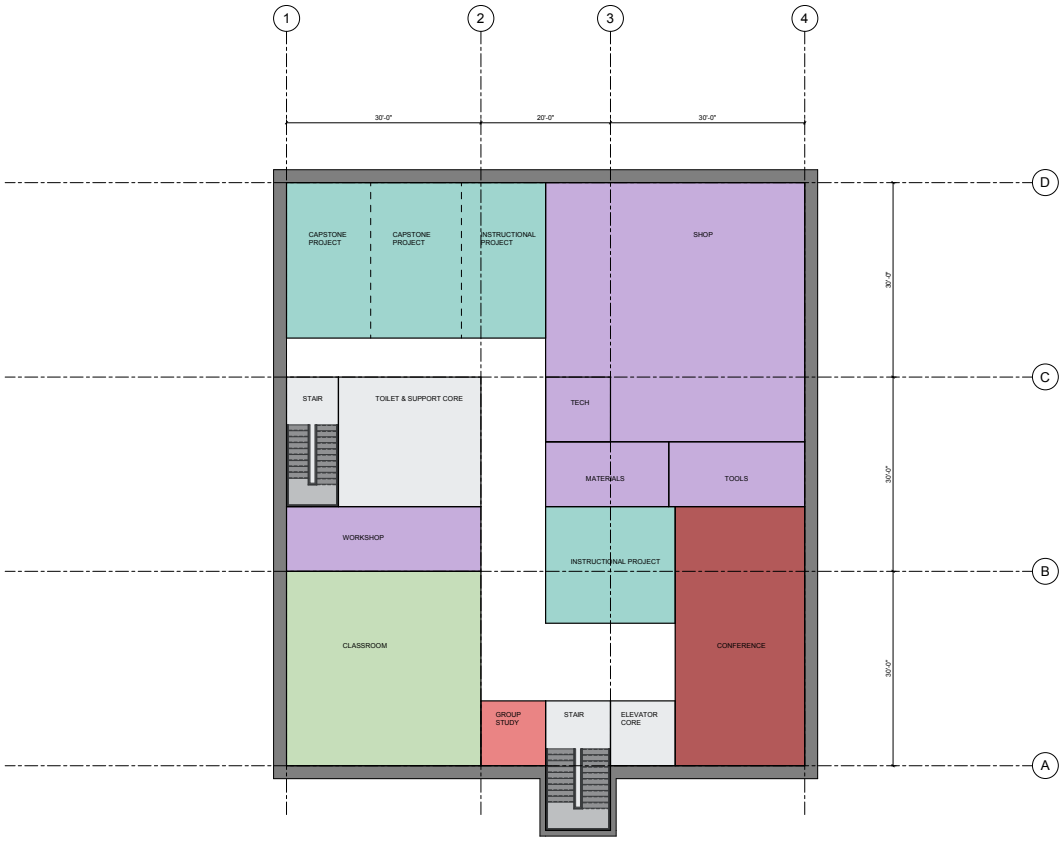
First Floor Plan

- **Shops:** These shops are supplemental to the Osborn shops and provide shop space for advanced manufacturing and student project space that cannot be accommodated in current shop facilities. There are two types of shop spaces – instructional and working shops. The instructional shops are for instructional projects and for capstone courses. At least one of these 4 spaces will require a laboratories are flexible in nature and intended to support laboratory coursework in mechanical and aerospace engineering. The courses will range from thermal fluids, controls, to materials testing. The research laboratories support individual faculty work in computer science, electrical engineering, and mechanical & aerospace engineering.
    - Mechanical: These laboratories (except for the computer science laboratory) will require 2-4 air changes per hour and (2) point exhausts for equipment, soldering, and small laboratory experiments.
    - Electrical: Extensive 120V power with (2) 208V/30 amp in each instructional laboratory and workshop. Provide a busduct system in the main shop to support evolving equipment. Major equipment power should be controlled by card swipe or controlled power buttons for safety and security. Emergency power off button should be provided at each shop with major equipment.
    - Plumbing: The shops do not require lab water or chilled water. No chilled water need is anticipated. Central lab compressed air is anticipated in labs and shops. Emergency eyewashes with tempered water should be provided in each shop. No lab natural gas use anticipated in the labs and shops.



Second Floor Plan

- **Classrooms:** To fill deficiencies in instructional space - classrooms and a computer lab are provided. There are two classrooms for 40 students and one computer lab for 30 students. The classrooms should support lecture/discussion activities with the teaching wall on the long wall. Student seating is anticipated at 20" x 60" mobile tables with moveable student chairs. AV/IT should be per UCCS standards. The computer lab should provide for synchronous use of the computers by instructors and students – students will need to be forward facing. AV/IT should be per UCCS standards.
- **Conference Space:** There is a rentable conference space included on the third floor to accommodate thirty people. This space should have flexible furnishings, but storage will need to be within the conference space. AV/IT should be per UCCS standards.
- **Offices:** 14 faculty offices, primarily private offices, are provided on the second floor to accommodate faculty required to support enrollment growth. Faculty offices are located near the research laboratories.
- **Student Support Space:** A Help Center is located on the first floor facing the main campus pedestrian spine, right at the front door. These spaces will be used for tutoring and student study spaces during off-hours. These spaces are meant to be very inviting and flexible. Consider floor-to-ceiling whiteboards and large flat panel displays. AV/IT should be per UCCS standards.



Third Floor Plan

Design requirements and Codes

The program for the project is composed of a new three story building totalling approximately 24,000GSF and is located to the north-east of the existing engineering building.

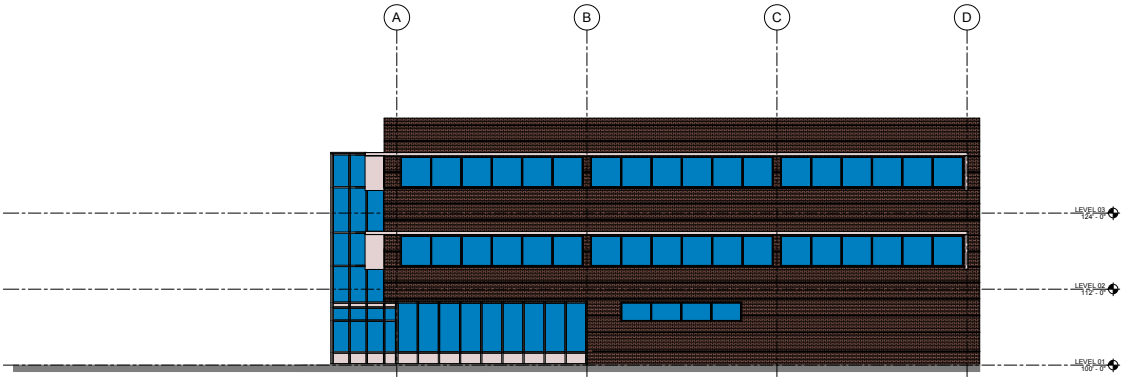
Applicable Codes: The project will be under the jurisdiction of the Colorado Office of the State Architect.

2018 International Building Code (IBC)
2018 International Energy Conservation Code
2018 International Fire Code
Local Amendments to international codes
Current editions of ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
2018 International Mechanical Code (IMC)
2017 National Electrical Code (NEC) (NFPA 70)
2018 International Plumbing Code (IPC)
Local Fire Department
    Occupancy Type: E
    Assumed Constrution Type: IIIA
    Fully Sprinklered

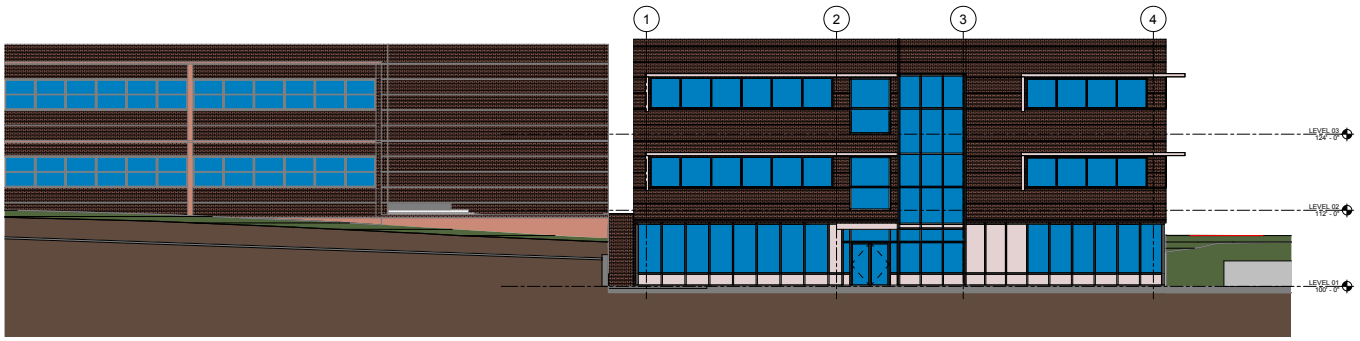
Design Guidelines

The primary objective of the UCCS Campus is to provide an building that is cohesive and sensitive to the existing campus in building material, massing and proportion. All new construction should promote an academic environment and support the camps fabric.

Primary materials on the campus include light terracotta colored brick, aluminium windows and protruding elements to shade windows.



East Elevation



South Elevation

Planned Sustainable Initiatives

This project will comply with UCCS's climate commitment and strategic plan by reducing consumption of energy through high efficiency building systems, with use of state of the art building automation systems, The annex will follow the State of Colorado's requirement for a high performance building that is energy efficient, has low short-term and long-term life-cycle costs, is a healthy place for its occupants, and has a relatively low impact on the environment. Per the State guidelines, high performance buildings use key resources, such as energy, water, materials, and land, more efficiently than buildings built to code or through a standard design process. The project will follow the Office of the State Architect e guidelines to meet the High Performance Certification Program (HPCP) requirements per C.R.S.24-30-1305.5; the U.S. Green Building Council, Leadership in Energy and Environmental Design - New Construction (USGBC LEEDTM-NC) guideline with Gold as the targeted certification level.

The design of annex is aimed at significantly reducing the buildings operating costs over the lifetime of the building's life. Energy conservation measures that will be incorporated into this building include the creation of an energy model that will be used to inform decisions made regarding the efficiency of the building envelope and the cost and payback of various options, the energy model will also allow numerous different HVAC systems to be vetted before making a decision on how best to proceed.

The renovated building will provide direct digital controls that will allow the HVAC systems to be programmed, daylight sensors that will automatically shut off lights in corridors when adequate natural light is present, carbon monoxide sensors that will turn on or shut off the flow of outside air into the building based on carbon monoxide levels, an energy recovery ventilator that will exchange heat between air streams moving into and out of the building, and the combination of high efficiency glazing with either ceramic frit or sun shades built into the architecture of the building, to lower heat gain during the summer. The cost of various other upgrades will be considered though the use of an energy model to determine those that have the most impact with a reasonable payback.

UCCS will continue to explore the use solar photovoltaics and solar hot water on all new buildings and significant remodels on campus, and will continue the practice of purchasing some amount of power consumed by the building, through the purchase of renewable energy credits from the local municipality

Conceptual Building Rendering

Cost Estimate and Project Schedule

The cost model shown in Figure X uses the actual construction dollars from similar projects which are factored by location and escalated to today's cost at benchmark values. These values are then averaged and a probable cost range is calculated using factors of 0.9 and 1.1. Escalation from the current day to the anticipated midpoint of construction is then added based on market trends again by the area of the project. This data shows a low average cost of $510/GSF, a medium cost of $537/GSF, and a high cost of $590/GSF.

UCCS is requesting approval for an approximately $16.7 million project, funded through the UCCS Endowment, through UCCS Fund Raising and through UC System Funding to design and construct a new 24,000GSF Annex building and site improvements. The cost breakdown is as follows:

UCCS EAS ANNEX				
	TOTAL PROJECT ASK		**$**	**16,700,000**
Professional Service				
Site Survey	$	25,000		
A/E Basic Design Services	$	1,280,000		
Code Review/Inspections	$	100,000		
Geotech survey	$	55,000		
Operating costs/Advertisements	$	45,000	$	1,505,000
SUBTOTAL				
Construction			$	12,800,000
FF&E (furniture, fixtures & equipment)			$	1,000,000
AV/IT/Communications			$	449,700
	TOTAL PROJECT COST		**$**	**15,754,700**
Design contingency @ 2.5%			$	393,868
Construction contingency @ 3.5%			$	551,415
	TOTAL PROJECT BUDGET		**$**	**16,699,982**

The project budget of $16,700,000 includes a construction budget of $12,800,000. A program area of 24,000 GSF equates to $533/GSF. This cost is very close to our medium average cost noted in our cost model. Given the tight site, the 22 feet of grade change from front to back, the cost of rock excavation and retaining walls this project needs to be in the medium average, and not the low average. The Project will proceed once funding is received in July 2021, with design and construction completing in May 2023. Occupancy will be in August 2023.

Total Resource Development:
Maximize financial resources and revenues to the College and the campus.

College of Engineering and Applied Science Objectives

Acknowledgements

University of Colorado, Colorado Springs

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College of Engineering and Applied Science Slogan