



LEGEND

1	Audio / Visual Equipment Coding Priority ranking "essential" is shown shaded yellow.
1	Furniture Equipment Coding Priority ranking "essential" is shown shaded purple.
1	Equipment Coding Priority ranking "essential" is shown unshaded.
2	Priority ranking "desirable" is shown shaded mint. Shading may be applied to any subcategory.
3	Priority ranking "enhancement" is shown shaded aqua. Shading may be applied to any subcategory.
1	Required equipment already existing is shown shaded blue. Shading may be applied to any subcategory.

NOTES

Each page represents a single space identified in the outline program.
Square footage and the number of occupants in each space is noted.
The furniture & equipment list at the bottom of each page is listed "per space".
Where more than one space type occurs in the outline program, the equipment list total is multiplied by the number of spaces programmed.
If the priority of an equipment item is lower, the cost cells are shaded per the legend above. Desirable or Enhancement level is also noted in the description line.
The footer of each page shows the sub-category of the space (i.e. labs) and the page number of that tab. This is referenced on the 3.4 Schedule of Movable Equipment to the left of each line item.
Desirable and Enhancement priority items are <u>not</u> shown as part of the project equipment cost on the 3.4 Schedule of Movable Equipment.



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Classroom	Sq. Ft. Each:	4,000
		Occupants:	200

Space Use:	Primary usage will be traditional lecture hall; capability included for team-based active learning	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage. Power at ceiling for projector and at left side of screen location for motorized projection screen.
Audio / Visual:	One large projection screen at the front of the room, full PA and sound system; white boards at front.	Lighting:	Special shading on windows to accommodate laptop usage. Dimmable room lighting with controls at front and back of room.
Special Requirements:	(2) 10'x12' whiteboards required in this space.	Fixed Furniture:	Fixed tables: Multi-tiered auditorium seating with full-size tables to accommodate laptops; each tier with enough space to accommodate two rows to enable students to turn and collaborate with row in tier (see Slide 22 upper left quadrant, Slide 24 upper left, Slide 26, Slide 27, Slide 29 bottom); whiteboards on front of first row of each tier to accommodate collaboration or whiteboards on racks similar to PRSC 204

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Standard A/V package for auditorium (single projection, voice reinforcement)	1	0	\$30,000	\$30,000
Chairs (not attached seating) with casters	198	0	\$250	\$49,500
Instructor station	2	0	\$3,000	\$6,000
Instructor stool or chair	2	0	\$410	\$820
				\$0
				\$0
Subtotal				\$86,320
Quantity of Space Type				1
Total F.F.E				\$86,320



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Classroom	Sq. Ft. Each:	2,750
		Occupants:	125

Space Use:	Primary usage will be traditional tiered lecture hall; capability included for team-based active learning	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage. Power at ceiling for projector and at left side of screen location for motorized projection screen.
Audio / Visual:	Whiteboard paint on side walls, projector system for main wall, full PA and sound system; white boards at front. Standard A/V package for auditorium (single projection, voice reinforcement) (\$30,000)	Lighting:	Special shading on windows to accommodate laptop usage. Dimmable room lighting with controls at front and back of room.
Special Requirements:	(2) 10'x12' whiteboards required in this space.	Fixed Furniture:	Fixed tables: Multi-tiered auditorium seating with full-size tables to accommodate laptops; each tier with enough space to accommodate two rows to enable students to turn and collaborate with row in tier (see Slide 22 upper left quadrant, Slide 24 upper left, Slide 26, Slide 27, Slide 29 bottom); whiteboards on sides to accommodate collaboration

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Standard A/V package for auditorium (single projection, voice reinforcement)	1		\$30,000	\$30,000
Chairs (not attached seating) with casters	124	0	\$250	\$31,000
Instructor station	1	0	\$3,000	\$3,000
Instructor stool/chair	1		\$410	\$410
Whiteboards on racks (sides of tables)	62		\$100	\$6,200
				\$0
				\$0
				\$0
Subtotal				\$70,610
Quantity of Space Type				1
Total F.F.E				\$70,610



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	3
Space Name:	Classroom	Sq. Ft. Each:	2,000
		Occupants:	80

Space Use:	Primary usage will be traditional tiered lecture hall; capability included for team-based active learning	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage. Power at ceiling for projector and at left side of screen location for motorized projection screen.
Audio / Visual:	Whiteboard paint on side walls, projector system for main wall, full PA and sound system; white boards at front for instructor. Standard A/V package for classroom (single projection, no voice reinforcement) (\$15,000)	Lighting:	Special shading on windows to accommodate laptop usage. Dimmable room lighting with controls at front and back of room.
Special Requirements:	(2) 10'x12" whiteboards required in this space.	Fixed Furniture:	Fixed tables: Multi-tiered auditorium seating with tables to accommodate laptops; each tier with enough space to accommodate two rows to enable students to turn and collaborate with row in tier (see Slide 22 upper left quadrant, Slide 24 upper left, Slide 26, Slide 27, Slide 29 bottom); whiteboards on sides to accommodate collaboration

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Standard A/V package for classroom (single projection, no voice reinforcement)	1		\$15,000.00	\$15,000
Seating	80	0	\$250	\$20,000
Instructor station	3	0	\$3,000	\$9,000
Instructor stool or chair	3	0	\$410	\$1,230
				\$0
				\$0
Subtotal				\$45,230
Quantity of Space Type				3
Total F.F.E				\$135,690



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	2
Space Name:	Classroom	Sq. Ft. Each:	1,250
		Occupants:	50
Space Use:	Primary use will be flat lecture hall; furniture arranged to allow student collaboration (see Slide 22, lower left, slide 16 - 20)	Cabinetry:	N/A
Adjacencies:	Both of these rooms should be adjacent to each other with a movable wall to allow the space to accommodate a 100 seat space	Water:	N/A
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage. Power at ceiling for projector and at left side of screen location for motorized projection screen.
Audio / Visual:	Wall monitors (or mounted under table) to accommodate collaboration by students. Short-throw projector plus projection screen/whiteboard per room for instructor; whiteboard paint on walls. Combine/divide A/V package (both rooms share one system) (\$50,000) Need (10) Monitors for collaboration (\$2,000 ea.)	Lighting:	Special shading on windows to accommodate laptop usage. Dimmable room lighting with controls at front and back of room.
Special Requirements:	Movable wall to allow for combining adjacent rooms into a larger 100 seat room. This space requires (2) 10'x12' markerboards.	Fixed Furniture:	Tables and chairs; furniture arranged to allow student collaboration (see Slide 22, lower left, slide 16 - 20); free-standing storage cabinets

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Combine/divide A/V package (both rooms share one system)	1		\$50,000	\$50,000
Tables (reconfigurable, 5 students per table)	10	0	\$650	\$6,500
Chairs (on casters)	50	0	\$250	\$12,500
Instructor station	1	0	\$3,000	\$3,000
Instructor stool or chair	1	0	\$410	\$410
Storage cabinets (mobile, approx. 60"Hx36"Wx20"D)	1	0	\$1,100	\$1,100
Subtotal				\$73,510
Quantity of Space Type				2
Total F.F.E				\$147,020



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Instructional Laboratory	Sq. Ft. Each:	1,680
	Mechatronics Laboratory	Occupants:	28

Space Use:	Instruction and demonstration of mechatronics systems to support multiple courses and projects for ME and ECE	Cabinetry:	N/A
Adjacencies:	Near Meas. & Instrumentation Lab and adjacent to shared lab support space	Water:	N/A
Communications:	Wifi / ethernet	Power:	Standard power, plus power to work benches
Audio / Visual:	2 large screen displays, speakers, camera	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Advanced Vehicle electronics and haptics cell, robotics cell, motor testing cell

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
60" Sony TV	3		\$1,100	\$3,300
Computer	1		\$3,600	\$3,600
Monitor displays	2	0	\$500.00	\$1,000
Storage Cabinet	2		\$849	\$1,698
Lab Stools	8		\$250	\$2,000
Mobile work benches (3'x5')	4		\$600	\$2,400
Oculus Rift-S Bundle	2		\$800	\$1,600
Flight Sim Cockpit Bundle	1		\$1,100	\$1,100
Motor Drivers	4		\$130	\$520
Motor Encoders	4		\$175	\$700
Linear Actuators	4		\$150	\$600
Stepper Motors	4		\$100	\$400
Servo Motors	4		\$50	\$200
DC Motors	4		\$50	\$200
DCBL Motors	4		\$140	\$560
Accelerometers	4		\$15	\$60
GPS	4		\$75	\$300
Force Sensors	4		\$135	\$540
Subtotal				\$20,778



ADDITIONAL REQUIREMENTS

Space Name:	Instructional Laboratory, Mechatronics Lab
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Additional Notes & Comments:	
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FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity	Existing	Cost Each	Total
(Total continued from 1st page)				\$20,778
Cameras	2		\$449	\$898
Sick Optic Electronic Ranger E50 Kit	1		\$12,920	\$12,920
RP Lidar	2		\$500	\$1,000
Huskey H61MWC10PB Roll-Out Bench	7		\$1,382	\$9,674
Pro-Line Lit Electronic Workstation	2		\$2,244	\$4,488
Tektronix Oscilloscope DP02024B	2		\$3,020	\$6,040
Topward 6000 Power Supply	2		\$435	\$870
Weller WX1 120V Soldering Station	2		\$366	\$732
Electron component Kits	1		\$250	\$250
Siglent SDM3045X Benchtop Multimeter	2		\$389	\$778
Optitrack Prime 13 Camera (240 FPS)	6		\$2,329	\$13,972
Electric vehicle DESIRABLE	1		\$29,990	\$29,990
Flight Sim Cockpit Bundle DESIRABLE	1		\$1,100	\$1,100
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$103,490
Quantity of Space Type				1
Total F.F.E				\$103,490



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Instructional Laboratory	Sq. Ft. Each:	1,680
	Measurements and Instrumentation	Occupants:	28

Space Use:	Measurements and Instrumentation labs for ME and ECE students	Cabinetry:	Twelve (12) lab stations for two-person teams. Standing height benchtop with drawer units and open shelving below, instrumentation shelf above
Adjacencies:	Near Mechatronics Lab and adjacent to shared storage space	Water:	One corner sink for general purpose cleanup
Communications:	a) wifi network with campus; b) independent lab network wifi access for Internet of Things (IoT) devices	Power:	a) 120V at each lab station (12), with minimum 8 plugs per station; b) 4-port (or more) USB charger per station (12);c) power drops from ceiling
Audio / Visual:	Four (4) wall mounted large LCD screens (70" or larger) with HDMI input, and with remote wireless input from in-room laptops	Lighting:	LED lighting with IR embedded sensors and low e bluetooth beacons, see attached specs
Special Requirements:	Four (4) mobile, configurable, oblong tables w/ locking wheels, adjustable height demonstration tables (min 5'x3')	Fixed Furniture:	a) Twelve (12) lab stations for two-person teams with standing height benchtop with drawer units and open shelving below; b) locked freestanding storage cabinets with adjustable shelves, see sample specs

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity	Existing	Cost Each	Total
Dell Laptops	14	0	\$1,500	\$21,000
LCD Displays (75" with remote wireless input from laptops and with HDMI input) 1,200/display, 1,400/wireless device, 600/speakers	4	0	\$3,200	\$12,800
Work benches (approx. 6'L x 2'W)	8	0	\$1,000	\$8,000
Storage cabinets (locking, free-standing) 6'Hx3'Wx1.5'	3	0	\$800	\$2,400
Lab stools	28	0	\$300	\$8,400
Strain Gage Amplifier Instrumentation	8	0	\$3,800	\$30,400
Strain Gage Beam Kits	8	0	\$1,000	\$8,000
Force and Acceleration Dynamic Instrumentation	8	0	\$2,700	\$21,600
Data Acquisition Interface	8	0	\$5,400	\$43,200
Linear Displacement Transducers LVDT Sets	8	0	\$1,200	\$9,600
Torque Instrumentation	8	0	\$1,400	\$11,200
IoT Instrumentation and microcontrollers	8	0	\$2,000	\$16,000
Motor and Dynamometer Instrumentation	8	0	\$2,900	\$23,200
Motion Track and Instrumentation	8	0	\$1,800	\$14,400
Spectraquest VFT2010-PK3 Vibration Trainer	8	0	\$18,000	\$144,000
PCB 352A24 100mv/g accelerometer	14	0	\$350	\$4,900
PCB 208C02 50mV/lb force sensor	8	0	\$350	\$2,800
Subtotal				\$381,900.00



ADDITIONAL REQUIREMENTS

Space Name:	Measurements and Instrumentation Lab
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Additional Notes &	
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FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity	Existing	Cost Each	Total
(Total continued from 1st page)				\$381,900
PCB 130D20 Microphone	8	0	\$250	\$2,000
NI CompactDAQ System: cDAQ-9174 Chassis (\$800), N	8	0	\$3,745	\$29,960
Tektronix TBS2102 Oscilloscope	8	0	\$1,500	\$12,000
Keysight 33511B Function Generator	8	0	\$2,100	\$16,800
30mj/pulse dual head PIV laser, YLF30-1000-NG DESIRABLE	1	0	\$130,000	\$130,000
Laser light sheet optics, 610026 DESIRABLE	1	0	\$4,435	\$4,435
Synchronizer for global imaging systems 610036 DESIRABLE	1	0	\$11,445	\$11,445
Module46-2DPIV (sw) DESIRABLE	1	0	\$10,020	\$10,020
Module4G-SRPIV (SW) DESIRABLE	1	0	\$5,355	\$5,355
InsightV3V-4G (SW) DESIRABLE	1	0	\$35,720	\$35,720
Phantom VE0640 with 18GB Camera, 630102-18GB DESIRABLE	4	0	\$48,885	\$195,540
532 nm Bandpass filter 610070 DESIRABLE	4	0	\$925	\$3,700
525 nm long pass filter 610072 DESIRABLE	2	0	\$1,135	\$2,270
Stereo PIV assembly, HS Camer 640058 DESIRABLE	1	0	\$11,575	\$11,575
HS Camera mount scheinpflug Pair 7002099 DESIRABLE	1	0	\$7,800	\$7,800
Digital image correlation software GOM PIV01873 DESIRABLE	1	0	\$25,000	\$25,000
3 Axis Traverse T3D DESIRABLE	1	0	\$29,750	\$29,750
U Rail Hardware kit BRH-3 DESIRABLE	1	0	\$1,580	\$1,580
Bosch Rail 90x90 BRL 100 DESIRABLE	3	0	\$390	\$1,170
Laser light arm 610015 DESIRABLE	1	0	\$13,785	\$13,785
Breadboard 3x6x2.3 newport PIV01323 DESIRABLE	1	0	\$3,000	\$3,000
Polytec PSV-500 Scanning Laser Vibrometer ENHANCEMENT	1	0	\$250,000	\$250,000
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$1,184,805
Quantity of Space Type				1
Total F.F.E				\$1,184,805



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Instructional Laboratory	Sq. Ft. Each:	1,680
	Vehicle Systems Capstone Design Lab	Occupants:	28

Space Use:	Laboratory to support the Vehicle Systems program and in particular the capstone course project	Cabinetry:	
Adjacencies:	Ground level, 3+ overhead doors; near Automotive Lab and shared support area	Water:	Yes
Communications:	wifi/ethernet	Power:	110/220, 1Ph, 3ph 408, expected to support level 1, 2 EV charging
Audio / Visual:	1 large panel display, white boards	Lighting:	
Special Requirements:	Engine exhaust ventilation system required Provide any special requirements for welding in the space.	Fixed Furniture:	Car lift, 10 fixed work cells around the exterior portion of the space, 5 vehicle bays. (2) 4'x8' glass boards required.

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity	Existing	Cost Each	Total
Monitor display (75") with audio support 1,600/display, 600/speakers	1	0	\$1,800	\$1,800
Lab stools	28	0	\$300	\$8,400
Fixed work cells - benches	8	0	\$2,000	\$16,000
Toolboxes and tools	8	0	\$5,000	\$40,000
Lift tables	4	0	\$3,000	\$12,000
Air supply	2	0	\$1,000	\$2,000
Welding location	2	0	\$3,000	\$6,000
Lathe	2	0	\$5,000	\$10,000
CNC mill	1	0	\$12,000	\$12,000
Drill press	4	0	\$1,500	\$6,000
Bandsaw	2	0	\$1,500	\$3,000
Car lift (mobile)	2	0	\$3,500	\$7,000
Basic machining center DESIRABLE	1	0	\$40,000	\$40,000
Water jet cutter WJ-4X4CNC (Replace 2 Plasma Cutters) DESIRABLE	1	0	\$115,000	\$115,000
				\$0
				\$0
Subtotal				\$279,200
Quantity of Space Type				1
Total F.F.E				\$279,200



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Automotive Laboratory	Sq. Ft. Each:	1,680
		Occupants:	28

Space Use:	Support vehicle engineering-related courses VE 3400, VE 3500, ME 4630, and other electives	Cabinetry:	
Adjacencies:	Near Vehicle Engineering Lab and shared storage space	Water:	Yes
Communications:	Wifi / ethernet	Power:	110
Audio / Visual:	2 large screen displays, speakers, camera	Lighting:	Standard
Special Requirements:	Exhasut gas removal system from the engines to the outside of the building; ground floor	Fixed Furniture:	A sound room that can house motor and engine test bench

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity	Existing	Cost Each	Total
Dell Laptop	10	0	\$1,500	\$15,000
200 Hp AC Dynamometer Kit	1	0	\$100,000	\$100,000
Various automotive-related sensors	8	0	\$3,000	\$24,000
Drum/Disc Brake Trainer (2 Wheel) / Courseware	1	0	\$4,495	\$4,495
Suspension and Steering System / Courseware	1	0	\$14,000	\$14,000
GM 6 Cylinder Cutaway Engine Trainer	1	0	\$28,000	\$28,000
Transfer Case Cutaway	1	0	\$7,500	\$7,500
Various automotive-related actuators	8	0	\$3,000	\$24,000
Calibratable and Production Engine Control Module	4	0	\$1,700	\$6,800
Calibratable general control module	2	0	\$1,700	\$3,400
Calibratable hydraulic control module	2	0	\$1,400	\$2,800
Harness and Connectors	8	0	\$1,200	\$9,600
Input/Output Devices, Protocol Convertor	2	0	\$1,500	\$3,000
MotoHawk Rapid Control Development Suite	1	0	\$11,200	\$11,200
Supervisory control for hybrid electric vehicles	2	0	\$500	\$1,000
Magelec Permanent Magnet Motor	1	0	\$5,000	\$5,000
DC-DC converter	1	0	\$500	\$500
Traction Inverter	1	0	\$5,000	\$5,000
DC-AC converter	1	0	\$8,000	\$8,000
Power distribution unit	1	0	\$5,000	\$5,000
Battery and management system	1	0	\$5,000	\$5,000
Tektronix TBS2102 Oscilloscope	8	0	\$1,500	\$12,000
Keysight 33511B Function Generator	8	0	\$2,100	\$16,800
Tools	4	0	\$1,000	\$4,000
Data Logger	10	0	\$600	\$6,000
Subtotal				\$322,095
Quantity of Space Type				1
Total F.F.E				\$322,095



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Instructional Laboratory, with hoods	Sq. Ft. Each:	1,680
	Chemical and Environmental Lab	Occupants:	28

Space Use:	Wet lab with hoods for environmental/ water/ chemicals for CEE/CHE students	Cabinetry:	Lab stations adjacent to hoods - standing height with drawers/shelves below with chemically resistant counters.
Adjacencies:	Likely needs to be on top floor due to hood venting; Next to storage space for consumables and chemical waste	Water:	Minimum of 8 sinks with eyewash stations, 1 sink located next to each hood; safety shower. RO/DI water supply required (\$10,000).
Communications:	Wifi accessible	Power:	Each station must have at least 2 receptacles
Audio / Visual:	Screen/projector	Lighting:	Standard
Special Requirements:	Gas/compressed air required. (8) 8' fume hoods required (\$25,000).	Fixed Furniture:	None

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity	Existing	Cost Each	Total
Animations and Computer Systems DESIRABLE	1		\$50,000	\$50,000
pH meters	16		\$600	\$9,600
Turbidity meter	8		\$1,000	\$8,000
BOD meters	8		\$1,000	\$8,000
TOS meters	8		\$1,000	\$8,000
Temperature controlled chamber/fridge	1		\$15,000	\$15,000
Assorted scales	8		\$1,200	\$9,600
Magnetic stirrers	8		\$300	\$2,400
Colony counter	1		\$1,000	\$1,000
Spectrometer	1		\$3,000	\$3,000
				\$0
				\$0
Subtotal				\$114,600



ADDITIONAL REQUIREMENTS

Space Name:	Chemical and Environmental Lab
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Additional Notes &	
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FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity	Existing	Cost Each	Total
(Total continued from 1st page)				\$114,600
Continuous Stirred Tank Reactor	1		\$10,000	\$10,000
Batch Reactors	2		\$5,000	\$10,000
Water Treatment Units Module	1		\$65,000	\$65,000
Reverse Osmosis Unit	1		\$56,000	\$56,000
Chromatography Units (Columns) with Detectors	2		\$10,000	\$20,000
Programmable Jar Testers	1		\$4,325	\$4,325
Sedimentation Unit with Flow Visualization DESIRABLE	1		\$40,000	\$40,000
Advanced Oxidation Unit DESIRABLE	1		\$45,000	\$45,000
Activated Sludge Process Unit DESIRABLE	1		\$112,531	\$112,531
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
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				\$0
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				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$477,456
Quantity of Space Type				1
Total F.F.E				\$477,456



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Hydraulics Laboratory	Sq. Ft. Each:	1,680
		Occupants:	28

Space Use:	Instruction and Lab activity for Fluid and hydraulics classes for ME and CEE Students	Cabinetry:	
Adjacencies:	None	Water:	Water and drains
Communications:	Wifi/network access	Power:	Standard, 110/220V AC
Audio / Visual:	Two large screen displays with audio support, two whiteboards	Lighting:	Standard
Special Requirements:		Fixed Furniture:	(2) 4'x8' glass boards required.

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity	Existing	Cost Each	Total
Monitor display (75") with audio support 1,200/display, 600/speakers	2	0	\$1,800.00	\$3,600
Stools	28	0	\$300.00	\$8,400
Instructor station	1	0	\$3,000.00	\$3,000
20-25 ft hydraulic flume	1	0	\$30,000.00	\$30,000.00
Hydraulic bench	2	0	\$15,000.00	\$30,000.00
Hydraulic bench experiments 5 are ESSENTIAL	5	0	\$10,000.00	\$50,000.00
Hydraulic bench experiments 4 are DESIRABLE	4	0	\$10,000.00	\$40,000.00
Acoustic doppler velocity meter DESIRABLE	2	0	\$20,000.00	\$40,000.00
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$205,000
Quantity of Space Type				1
Total F.F.E				\$205,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Lab Support, Hydraulics Lab	Sq. Ft. Each:	150
	and Chemical & Environmental Lab	Occupants:	

Space Use:	Chemical, glassware and equipment storage to support Water/environmental/ chemical lab for CEE/CHE students	Cabinetry:	
Adjacencies:	Next to wet lab for CHE/CEE and Fluid Mechanics and Hydraulics Lab	Water:	Safety shower, eyewash station, sink, and prep area required.
Communications:	None	Power:	Standard
Audio / Visual:	None	Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Acid/base cabinets (cabinet for chemicals 6'x3'x1')	8	0	\$500	\$4,000
Shelving units for glassware (6'x3'x1')	4	0	\$800	\$3,200
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$7,200
Quantity of Space Type				1
Total F.F.E				\$7,200



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Lab Support, Mechatronics Lab and	Sq. Ft. Each:	150
	Measurement & Instrumentation Lab	Occupants:	

Space Use:	Storage space for supplies, and work space for equipment maintenance,	Cabinetry:	
Adjacencies:	Next to Mechatronics and Measurements & Instrumentation Labs	Water:	Safety shower, eyewash station, and sink.
Communications:	None	Power:	Standard
Audio / Visual:	None	Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinets (6'x3'x1.5')	8	0	\$800	\$6,400
Work table (4'x6')	2	0	\$600	\$1,200
Stools	4	0	\$300	\$1,200
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$8,800
Quantity of Space Type				1
Total F.F.E				\$8,800



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Lab Support, Vehicle Engineering Capstone and Automotive Labs	Sq. Ft. Each:	150
		Occupants:	

Space Use:	Storage space for supplies, and work space for equipment maintenance,	Cabinetry:	
Adjacencies:	Next to Vehicle Engineering Capstone Lab and Automotive Lab	Water:	Safety shower, eyewash station, and sink.
Communications:	None	Power:	Standard
Audio / Visual:	None	Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinets (6'x3'x2')	8	0	\$800	\$6,400
Work table (4'x6')	2	0	\$600	\$1,200
Stools	4	0	\$300	\$1,200
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$8,800
Quantity of Space Type				1
Total F.F.E				\$8,800



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Laboratory, Core Research	Sq. Ft. Each:	1,000
	Material Characterization Lab	Occupants:	12

Space Use:	Specialized equipment for atomic and molecular level characterization of material. Spectroscopic instruments for precision measurements at the molecular/atomic level using emission and absorption of "light" by solids, liquid or gas are bench-top instruments using small samples.	Cabinetry:	
Adjacencies:	Other research labs, but interference with the spectroscopic instruments must be considered.	Water:	Filtered building water, safety shower and eyewash stations
Communications:	Telephones / Computers with wireless and wired access	Power:	Dedicated 220V to some Instruments, 110V-120V for other lab equipment, dedicated UPS backup source for instrumentation
Audio / Visual:	Retracting HD overhead projector, HD touch screen monitors, smart soundbars; Monitor outside the lab to display lab activities with connection such as Chromcast.	Lighting:	Automated sensory high quality LED
Special Requirements:	1st Floor Location for Electron Microscopy with all site installation conditions. (See next page.) Dry inert gas and access to liquid nitrogen. (1) chemical fume hood with chemical storage required (\$25,000).	Fixed Furniture:	Fisher Scientific (MOTT) designed laboratory workstations. Bench tops - FTIR/TGA 8'x30"; Fluorometer 3'x30"; (UV-Vis-NIR) 6'x30"; sample prep area 6'x30"; Emissions spectroscopy 2'x30"; room for 5 computers

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Desk, single pedestal (BBF)	1		\$700	\$700
Chair	1	0	\$400	\$400
Bookshelf (60"H x 36"W x 14"D)	1	0	\$800	\$800
Stools	8	0	\$300	\$2,400
Fisher Scientific (MOTT) laboratory grade stable benches with under bench tops	4	0	\$7,000	\$28,000
Chemical/flammable storage cabinet (6'Hx3'Wx1'D)	2	0	\$500	\$1,000
Sputter coater, high resolution for FEG applications	1	1	\$28,500	\$0
Carbon coater, turbo high vacuum for TEM/SEM/FEG applications	1	1	\$33,000	\$0
Semi-automated microhardness tester, includes	1	1	\$38,000	\$0
Precision cutoff saw	1	1	\$20,000	\$0
Laser diffraction particle analyzer	1	1	\$75,000	\$0
F.F.E. Subtotal				\$33,300



ADDITIONAL REQUIREMENTS

Space Name:	Material Characterization Lab
Additional Notes & Comments:	Designated room for radiation instruments (XRD) partitioned within the lab. Chemical fume hood, safety eye and shower stations, filtered building air, mechanical room for water chiller, manager's office within lab. No vibration requirements.

FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
(Total continued from 1st page)				\$33,300
Atomic force microscope DESIRABLE	1	0	\$250,000	\$250,000
Ion mill for cryogenics sample preparation DESIRABLE	1	0	\$160,000	\$160,000
X-Ray fluorescence (XRF) analyzer DESIRABLE	1	0	\$250,000	\$250,000
Fourier-transform infrared spectroscopy (FTIR) DESIRABLE	1	0	\$125,000	\$125,000
Thermogravimetric analysis (TGA)/Differential Scanning Calorimetry (DCS) tandem to FTIR DESIRABLE	1	0	\$65,000	\$65,000
Fluorometer DESIRABLE	1	0	\$35,000	\$35,000
Ultraviolet-visible-near-IR spectroscopy (UV-Vis-NIR) DESIRABLE	1	0	\$40,000	\$40,000
Emission spectroscopy - 200-700 nm, 0.1 Angstrom DESIRABLE	1	0	\$30,000	\$30,000
Electron Microscope (FEG) equipped with STEM, EDS, WDS, EBSD, CL/FQ/SEC cryogenics, nano-indentor attachments ENHANCEMENT	1	0	\$928,000	\$928,000
Electron microscope variable pressure (SEM) equipped with EDS, EBSD attachments ENHANCEMENT	1	0	\$550,000	\$550,000
X-Ray diffractometer (XRD) equipped with SAXS, SCX, DSC, low-med temperature stage, high temperature stage, capillary stage, cryogenics system ENHANCEMENT	2	1	\$475,000	\$475,000
Thermogravimetric (TGA) differential scanning calorimetry (DSC) ENHANCEMENT	2	1	\$75,000	\$75,000
3D optical profiler ENHANCEMENT	2	1	\$250,000	\$250,000
Inverted optical microscopes, digital camera, computer, software, motorized stage ENHANCEMENT	3	2	\$39,000	\$39,000
Optical zoom microscope, digital camera, computer, software	3	1	\$20,000	\$40,000
Semi-automated sample grinder/polisher system ENHANCEMENT	3	2	\$15,000	\$15,000
Semi-automated sample compression mounting press ENHANCEMENT	3	2	\$12,000	\$12,000
Subtotal				\$3,372,300
Quantity of Space Type				1
Total F.F.E				\$3,372,300



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Laboratory, Core Research	Sq. Ft. Each:	1,000
	Robotics and Wireless Lab	Occupants:	12 working, 25 tour max.

Space Use:	Shared laboratory for robotics and wireless power systems. A versatile space should be designed to accommodate variety of research in these areas.	Cabinetry:	
Adjacencies:	Adjacent to Automation and Controls Lab. Prefer ground or sub-floor to allow entry of a full size passenger vehicle.	Water:	None
Communications:	Wifi / ethernet	Power:	110/220, single phase; 3-phase 480 V, a 240V, and assorted 110V. Accessible power flush mounted on the floor.
Audio / Visual:	3 large screen displays	Lighting:	Movable lighting, track lighting may be needed in addition to standard lighting
Special Requirements:	Movable furniture to re-configure the laboratory. Movable work benches. (1) 6' fume hood required. Bay door for vehicle entry. Chemical resistant floor.	Fixed Furniture:	Mounted robotics cell: Fanuc M1, 3 collaborative Robot cells: UR3, UR5, UR10m 15x15 grid-based floor, Optitrack (camera-based tracking) mounted around 20x20 space

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Monitor displays	3	0	\$1,000	\$3,000
Mobile work benches (3'x5')	4	0	\$600	\$2,400
Optitrack 12 unit Flex-3/Prime 13	1	0	\$53,212	\$53,212
Clear Path Robotic Husky	1	0	\$18,625	\$18,625
iRobot create	15	10	\$200	\$1,000
Universal Robotics Cobot UR3	1	0	\$35,000	\$35,000
Universal Robotics UR5	1	0	\$50,000	\$50,000
Fanuc M1	1	0	\$35,000	\$35,000
Miscellaneous (Function generator, oscilloscopes, DMMs, etc.)	1		\$25,000.00	\$25,000
Packaging/Mounting table for each robot	4	0	\$2,500	\$10,000
Boston Dynamics Spot Mini	DESIRABLE 1	0	\$130,000	\$130,000
Universal Robotics UR10	DESIRABLE 1	0	\$75,000	\$75,000
Custom PXI Chassis	DESIRABLE 1		\$77,000.00	\$77,000
NI PXIe-5665 Vector Signal Analyser	DESIRABLE 1	0	\$60,534	\$60,534
NI PXIe-5840 Vector Signal Transceiver	DESIRABLE 1	0	\$61,806	\$61,806
Subtotal				\$637,577
Quantity of Space Type				1
Total F.F.E				\$637,577



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab	Sq. Ft. Each:	600
	Smart Building Laboratory	Occupants:	25 maximum for tour

Space Use:	Smart Building central hub (the "brain" of the New Engineering Building!) and data service center (data can be shared across campus network); general sensor characterization	Cabinetry:	None
Adjacencies:	150 sq ft Smart Building Lab Support Room	Water:	N/A
Communications:	High-speed hard-wired ethernet to share smart building data across campus to various departments/ colleges; Remote monitoring (cameras, etc)	Power:	Standard 120V Cabling must be low-noise, insulated for Smart Building (\$100,000).
Audio / Visual:	(6) 75" wall-mounted TV monitors for data visualization	Lighting:	Enlightened LED lights w/ IR sensors & Bluetooth should be specified <u>throughout the building</u> for data logging. Coordinate requirements for Smart Building system with other spaces where this may not be <u>specifically addressed</u> .
Special Requirements:	Smart Building sensors MUST be integrated into construction plan.	Fixed Furniture:	None

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
75" wall-mounted TV monitors for data visualization	6	0	\$1,500	\$9,000
High Performance Desktop Computers (Smart Building)	4	0	\$5,000	\$20,000
Lockable mobile cabinetry for storage (46"x24"x78" metal cabinets)	5	0	\$900	\$4,500
Butcher block pedestal workbenches, 72"x30" with drawer/cabinet pedestals, power, and riser shelves	3	0	\$1,500	\$4,500
Desks with overhead shelves, upholstered backdrops, drawers, and power	6	0	\$2,000	\$12,000
Desk chairs, ergonomic	6	0	\$500	\$3,000
Stools	4	0	\$300	\$1,200
F.F.E. Subtotal				\$54,200



ADDITIONAL REQUIREMENTS

Space Name:	Smart Building Lab
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Additional Notes & Comments:	<p>Must be able to access data logged from building systems in this space.</p> <p>Smart Building fiber-optic backbone must be accessible in this lab space - this lab is the "brain" of the building; having access to all data.</p> <p>Various "cut-aways" should be designed throughout the building to expose the integrated sensors to students/visitors.</p> <p>Windowed wall on interior cooridor.</p> <p>Hard-wired connection to Interactive Smart Building Display in Atrium.</p>
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FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
(Total continued from 1st page)				\$54,200
Flexible/Expandable Data Acquisition Systems for Smart Building Data - 300 total channel count (National Instruments PXI) (5 desired at start-up) 4 ESSENTIAL	4	0	\$100,000	\$400,000
Accelerometers (Smart Building)	200	0	\$500	\$100,000
Temperature Sensors (Smart Building)	100	0	\$100	\$10,000
Cameras (Smart Building)	40	0	\$2,000	\$80,000
Strain Gages (Smart Building)	100	0	\$20	\$2,000
Microphones (Smart Building)	50	0	\$500	\$25,000
RFID Tracking System (Smart Building)	1	0	\$50,000	\$50,000
Cabling (low noise, insulated) (Smart Building)	1	0	\$100,000	\$100,000
Data Storage Server System (SSD-based, 100TB) (Smart Building)	1	0	\$75,000	\$75,000
Flexible/Expandable Data Acquisition Systems for Smart Building Data - 300 total channel count (National Instruments PXI) 1	1	0	\$100,000	\$100,000
Mobile Glovebox DESIRABL	1	0	\$20,000	\$20,000
Newport Vibration Isolation Table (4'x8') DESIRABLE	2	0	\$15,000	\$30,000
Keysight 33511B Function Generator DESIRABLE	2	0	\$2,100	\$4,200
Tektronix TBS2102 Oscilloscope DESIRABLE	4	0	\$1,500	\$6,000
Digital multimeter (Keysight 34461A) DESIRABLE	4	0	\$1,100	\$4,400
Power supply DESIRABL	4	0	\$600	\$2,400
Polytec PSV-500 Scanning Laser Vibrometer DESIRABLE	1	0	\$250,000	\$250,000
National Instruments CompactDAQ System DESIRABLE	4	0	\$3,500	\$14,000
Subtotal				\$1,327,200
Quantity of Space Type				1
Total F.F.E				\$1,327,200



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Laboratory, Core Research	Sq. Ft. Each:	900
	Automation and Controls	Occupants:	8

Space Use:	Automation and controls research	Cabinetry:	
Adjacencies:	Robotics and Wireless lab	Water:	None
Communications:	WiFi, hard-wire connection for the instruments and phone	Power:	110/220 AC
Audio / Visual:	Monitor outside the lab to display lab activities	Lighting:	Standard
Special Requirements:	Movable furniture to re-configure the laboratory - accessible power flush mounted on the floor. Movable work benches.	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinets (mobile, 60"H x 36"W x 18"D)	2	0	\$1,100	\$2,200
Mobile workstation, 6'Wx2.5'D	4	0	\$1,000	\$4,000
Stools	8	0	\$300	\$2,400
Robotic Electronic Stations	4	0	\$3,000	\$12,000
dSPACE 1104CP Controller Boards	4	0	\$5,000	\$20,000
Autonomous car education kits	4	0	\$4,000	\$16,000
Inverted Pendulum Control Kits	4	0	\$1,000	\$4,000
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$60,600
Quantity of Space Type				1
Total F.F.E				\$60,600



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab, Core	Sq. Ft. Each:	600
	High Performance Computing & Cybersecurity Lab	Occupants:	5

Space Use:	Computing and networking equipment to support a high performance computing cluster	Cabinetry:	Limited cabinetry would be required along one wall for repair kits and documentation sets. Upper and lower cabinetry with standard height countertop required.
Adjacencies:	Smart Building Lab; Research Support Room for HPC Lab	Water:	Water required for the cooling system
Communications:	Redundant fiber optic connectivity to the campus network backbone	Power:	The lab would require power conditioning, battery backup support (short term), and campus generator access (long term). Minimum specs would be 3 phase / 208 volt 200 amps.
Audio / Visual:	Two displays should be available, with one large display to show dashboard statistics for those viewing the lab from outside.	Lighting:	Targeted lighting would be required to see components within the rack itself to support maintenance activities.
Special Requirements:	The lab would need sufficient cooling to dissipate 150,000 BTU/hr.	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Dashboard display equipment (55-inch screens)	2	0	\$1,600	\$3,200
Cybersecurity lab equipment DESIRABLE	1	0	\$200,000	\$200,000
Cluster hardware and software (Dell contract) ENHANCEMENT	1	0	\$750,000	\$750,000
Mobile workstation with storage cabinets underneath	1	0	\$6,000	\$6,000
Crash cart	1	0	\$1,000	\$1,000
Task stools w/casters	5	0	\$300	\$1,500
				\$0
				\$0
				\$0
Subtotal				\$958,500
Quantity of Space Type				1
Total F.F.E				\$958,500



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	2
Space Name:	Research Laboratory, Core Research	Sq. Ft. Each:	300
	Flexible Research Lab	Occupants:	8

Space Use:	Flexible space assigned on basis of sponsored research; space will be reassigned after research project ends.	Cabinetry:	
Adjacencies:	Robotics and wireless lab	Water:	Provide access to water for future/flexible fume hood installations for one of the flexible labs.
Communications:	WiFi, hard-wire connection for the instruments and phone	Power:	110/220 AC. Accessible power flush mounted on the floor.
Audio / Visual:		Lighting:	Standard
Special Requirements:	Movable furniture to re-configure the laboratory. Movable work benches. Specify one lab with fume hood. Specify one lab as high bay.	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinets (mobile, 60"H x 36"W x 18"D)	2	0	\$1,100	\$2,200
Fisher-Scientific mobile workstation, 6'Wx2.5'D)	4	0	\$4,800	\$19,200
Stools	8	0	\$300	\$2,400
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$23,800
Quantity of Space Type				2
Total F.F.E				\$47,600



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Laboratory, Core Research	Sq. Ft. Each:	300
	Clean Room	Occupants:	6

Space Use:	Materials Micro-Patterning, Sensor Development, Pharmaceuticals, Class 10,000. ISO 7.	Cabinetry:	None
Adjacencies:	Compatibility with clean room type research	Water:	Ultrapure; EMD Millipore water source to be coordinated with clean room specifications.
Communications:	Wireless	Power:	110/220 V
Audio / Visual:	Camera and display to show the activities outside the clean room	Lighting:	Special lighting for clean room
Special Requirements:	Walk-in fume hood 6'x3'x8' required - Hood specifications to be coordinated with the required modular clean room. Air handling for the clean room. The surrounding room must also have low vibration air system. Coordinate special air handling system (HEPA) requirements included with the modular unit specified for purchase below. Coordinate requirements for air handling for the two hoods and for heat from the HEPA filters in the modular clean room unit.	Fixed Furniture:	A modular cleanroom to be placed in the space (12'x16'x8'H). Coordinate requirements for gowning room specified in equipment list below.

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Wetbench - 316 steel, 84" x 30" (36" high)	3	0	\$8,000	\$24,000
12' x 16' hardwall clean room	1	0	\$30,000	\$30,000
8' x 8' Gowning room	1	0	\$6,800	\$6,800
Vaccum Pump	2	0	\$4,500	\$9,000
Vaccum curing oven	1	0	\$7,700	\$7,700
Shipping (for above items in this lab)	1	0	\$14,000	\$14,000
Particle counter, software. (ME-BT-620) DESIRABLE	1	0	\$6,900	\$6,900
Spin Coater DESIRABLE	1	0	\$4,000	\$4,000
Digital microscope DESIRABLE	1	0	\$7,500	\$7,500
Desicator cabinet DESIRABLE	1	0	\$4,300	\$4,300
Apparel (gowns, hoods, etc.) package DESIRABLE	1	0	\$4,000	\$4,000
Subtotal				\$67,500
Quantity of Space Type				1
Total F.F.E				\$67,500



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab Support - Mechanical Room	Sq. Ft. Each:	150
		Occupants:	3 maximum

Space Use:	House auxiliary equipment for Material Characterization Lab	Cabinetry:	
Adjacencies:	Material Characterization Lab and High Performance Computing & Cybersecurity Lab	Water:	Chilled water cooling
Communications:	Hard-wired ethernet	Power:	480V, 400A supply, 120V outlets on wall
Audio / Visual:		Lighting:	Standard task lighting
Special Requirements:	Room to house air cooling system for electrodynamic systems	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$0
Quantity of Space Type				1
Total F.F.E				\$0



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab Support for Smart Building Lab	Sq. Ft. Each:	150
		Occupants:	3 maximum

Space Use:	House servers for storage of Smart Building data	Cabinetry:	
Adjacencies:	Smart Building Lab; Research Lab Support for HPC Lab	Water:	
Communications:	Hard-wired ethernet	Power:	
Audio / Visual:		Lighting:	
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$0
Quantity of Space Type				1
Total F.F.E				\$0



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab Support - Storage	Sq. Ft. Each:	150
		Occupants:	6+E458 maximum

Space Use:	Storage for Robotics and Wireless Lab, Automation and Controls Lab, and Material Characterization Lab.	Cabinetry:	
Adjacencies:	Near the labs named above	Water:	
Communications:	Hard-wired and wireless access	Power:	Standard
Audio / Visual:		Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$0
Quantity of Space Type				1
Total F.F.E				\$0



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab Support for Clean Room	Sq. Ft. Each:	150
		Occupants:	5 maximum

Space Use:	Support area for clean room activities	Cabinetry:	
Adjacencies:	Clean Room	Water:	Sink
Communications:	Hard-wired and wireless internet access	Power:	Standard
Audio / Visual:		Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinet (mobile, approx. 60"H x 36"W x 24"D)	2	0	\$1,250.00	\$2,500
Workbench (mobile, Fisher Scientific, approx. 48"W x 24"D)	1	0	\$3,200.00	\$3,200
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$5,700
Quantity of Space Type				1
Total F.F.E				\$5,700



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Research Lab Support Room	Sq. Ft. Each:	300
		Occupants:	3

Space Use:	Testing, performing maintenance or repairs, recalibrating equipment and instrumentation from labs	Cabinetry:	
Adjacencies:	Research labs	Water:	Filtered building water, safety shower, and eyewash stations
Communications:	Wired and wireless access	Power:	110/220 on floor
Audio / Visual:		Lighting:	Automated sensory high quality LED
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Mobile workbenches (3'W x 6'L)	4	0	\$700	\$2,800
Stools	4	0	\$300	\$1,200
Lockable Cabinets (6'H x 3'W x 1.5'D)	4	0	\$1,250	\$5,000
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$9,000
Quantity of Space Type				1
F.F.E. Total				\$9,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Collaboration Room	Sq. Ft. Each:	700
		Occupants:	28

Space Use:	Collaborative meeting space for student project teams and research teams	Cabinetry:	N/A
Adjacencies:	Do not locate adjacent to high noise areas	Water:	N/A
Communications:	Wired and wireless network access	Power:	Extra duplex outlets on wall plus 6-8 duplex outlets in floor to allow reconfiguration of mobile tables and chairs
Audio / Visual:	Four wall-mounted flat panel monitors (60") with inputs for student laptops/tablets	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Four wall-mounted magnetic glass white boards (4'x6') (\$300 each)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Flat-panel monitors (60") with inputs for laptops/tablets	4	0	\$2,000	\$8,000
Mobile table for four persons (square or rectangular)	7	0	\$350	\$2,450
Mobile chair	28	0	\$250	\$7,000
Mobile magnetic glass white board (two-sided, 4'x6')	3	0	\$1,500	\$4,500
				\$0
				\$0
				\$0
Subtotal				\$21,950
Quantity of Space Type				1
Total F.F.E				\$21,950



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Collaboration Room	Sq. Ft. Each:	450
		Occupants:	18

Space Use:	Collaborative meeting space for student project teams and research teams	Cabinetry:	N/A
Adjacencies:	Do not locate adjacent to high noise areas	Water:	N/A
Communications:	Wired and wireless network access	Power:	Extra duplex outlets on wall plus 4-6 duplex outlets in floor to allow reconfiguration of mobile tables and chairs
Audio / Visual:	Two wall-mounted flat panel monitors (60") with inputs for student laptops/tablets	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Two wall-mounted magnetic glass white boards (4'x6') (\$300 each)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Flat-panel monitors (60") with inputs for laptops/tablets	2	0	\$2,000	\$4,000
Mobile table for four persons (square or rectangular)	5	0	\$350	\$1,750
Mobile chair	18	0	\$250	\$4,500
Mobile magnetic glass white board (two-sided, 4'x6')	2	0	\$1,500	\$3,000
				\$0
				\$0
				\$0
Subtotal				\$13,250
Quantity of Space Type				1
Total F.F.E				\$13,250



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Collaboration Room	Sq. Ft. Each:	360
		Occupants:	12

Space Use:	Collaborative meeting space for student project teams and research teams	Cabinetry:	N/A
Adjacencies:	Do not locate adjacent to high noise areas	Water:	N/A
Communications:	Wired and wireless network access	Power:	Extra duplex outlets on wall plus 4 duplex outlets in floor to allow reconfiguration of mobile tables and chairs
Audio / Visual:	Two wall-mounted flat panel monitors (60") with inputs for student laptops/tablets	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Two wall-mounted magnetic glass white boards (4'x6') (\$300 each)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Flat-panel monitors (60") with inputs for laptops/tablets	2	0	\$2,000	\$4,000
Mobile table for four persons (square or rectangular)	3	0	\$350	\$1,050
Mobile chair	12	0	\$250	\$3,000
Mobile magnetic glass white board (two-sided, 4'x6')	2	0	\$1,500	\$3,000
				\$0
Subtotal				\$11,050
Quantity of Space Type				1
Total F.F.E				\$11,050



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	8
Space Name:	Small Group Rooms	Sq. Ft. Each:	180
		Occupants:	6

Space Use:	Collaborative meeting space for student project teams and research teams	Cabinetry:	N/A
Adjacencies:	Do not locate adjacent to high noise areas	Water:	N/A
Communications:	Wired and wireless network access	Power:	Extra duplex outlets on wall
Audio / Visual:	One wall-mounted flat panel monitor (60") with inputs for student laptops/tablets in each space	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Two wall-mounted magnetic glass white boards (4'x6') in each space (\$300 each)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Flat-panel monitors (60") with inputs for laptops/tablets	1	0	\$2,000	\$2,000
Mobile table for six persons (square or rectangular)	1	0	\$1,000	\$1,000
Mobile chair	6	0	\$250	\$1,500
				\$0
				\$0
				\$0
Subtotal				\$2,500
Quantity of Space Type				8
Total F.F.E				\$20,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Studio, Design/Computation	Sq. Ft. Each:	1,600
		Occupants:	40

Space Use:	Computing design laboratories that focus on small team collaboration	Cabinetry:	
Adjacencies:	Not adjacent to noisy areas	Water:	
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage. Power by ceiling at projector mounting location.
Audio / Visual:	Station monitors to accommodate collaboration by students - 1 per table/group. Short-throw projector and project screen/whiteboard for instructor. Amplifier and room speakers. Streaming solution for showing instructor's screen on student monitors. Standard A/V package for classroom. Streaming device (hardware or software)	Lighting:	Special shading on windows to accommodate laptop usage
Special Requirements:		Fixed Furniture:	Tables and chairs; furniture arranged to allow student collaboration (see Slide 22, lower left, slide 16 - 20), free-standing storage cabinet, teacher station. 4-5 students per group

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Monitors for each table group 300/monitor, 150/connectivity	10	0	\$450	\$4,500
Streaming device, hardware or software	1	0	\$3,000	\$3,000
Standard A/V package for classroom	1	0	\$15,000	\$15,000
Reconfigurable tables to seat 4 students	10	0	\$350	\$3,500
Monitor arms for each group table to mount a display	10	0	\$300	\$3,000
Chairs with casters	40	0	\$250	\$10,000
Instructor station	1	0	\$3,000	\$3,000
Storage cabinet	1	0	\$800	\$800
Whiteboards (mobile)	2	0	\$1,800	\$3,600
Subtotal				\$46,400
Quantity of Space Type				1
Total F.F.E				\$46,400



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Studio, Design/Computation	Sq. Ft. Each:	1,120
		Occupants:	28

Space Use:	Computing design laboratories that focus on small team collaboration	Cabinetry:	
Adjacencies:		Water:	
Communications:	Power, data, cable, and telephone for instructor; wireless base station for room coverage; power to each student station	Power:	Power to each student station to accommodate laptop usage
Audio / Visual:	Station monitors to accommodate collaboration by students. Short-throw projector and project screen/whiteboard for instructor. Amplifier and room speakers. Streaming solution for showing instructor's screen on student monitors. Standard A/V package for classroom. Streaming device (hardware or software).	Lighting:	Special shading on windows to accommodate laptop usage
Special Requirements:	Whiteboards at front for instructor and whiteboard paint on walls for students. Tables and chairs; furniture arranged to allow student collaboration (see Slide 22, lower left, slide 16 - 20)	Fixed Furniture:	Space requires (2) 4' x 10'to 12' whiteboards.

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Monitors for each table group 300/monitor, 150/connectivity	10	0	\$450.00	\$4,500.00
Streaming device, hardware or software	1	0	\$3,000.00	\$3,000.00
Standard A/V package for classroom	1	0	\$15,000.00	\$15,000.00
Reconfigurable tables to seat 5 students each	6	0	\$650	\$3,900
Monitor arms for each group table to mount a display	6	0	\$300	\$1,800
Chairs with casters	27	0	\$250	\$6,750
Instructor station	1	0	\$3,000	\$3,000
Storage cabinet (mobile, approx. 60"Hx36"Wx18"D)	1	0	\$1,100	\$1,100
Instructor stool or chair	1	0	\$410	\$410
Subtotal				\$39,460
Quantity of Space Type				1
Total F.F.E				\$39,460



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Studio Support	Sq. Ft. Each:	150
		Occupants:	N/A

Space Use:	Storage for class materials (e.g., Arduinos) and supplies (markers)	Cabinetry:	Storage cabinets (overhead) and counter below to accommodate mobile carts.
Adjacencies:	Design Studios	Water:	
Communications:	Network access	Power:	Adequate for recharging of laptops or other rechargeable classroom equipment
Audio / Visual:		Lighting:	Standard task lighting
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Rubbermaid heavy-duty carts (50"L x 27"D x 39"H) with power strip	3	0	\$820	\$2,460
Work table (6'W x 3'D)	1	0	\$600	\$600
Lab stool	2	0	\$300	\$600
				\$0
				\$0
Subtotal				\$3,660
Quantity of Space Type				1
Total F.F.E				\$3,660



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Student Project Area	Sq. Ft. Each:	8,500
	Fabrication & Project Areas	Occupants:	60

Space Use:	Maker space: machine shop and fabrication facility to support student projects	Cabinetry:	Four stations with hand-washing sinks; one station with utility sink
Adjacencies:	Centrally located to other project areas, located on bottom floor for bay door access and heavy equipment loads	Water:	Four hand-washing stations, one utility sink station, two eye wash stations, two safety showers
Communications:	Wired and wireless network access	Power:	115 VAC and 230 VAC single phase, 460VAC 3-phase, extensive power requirements for machine tools; power drops from ceiling
Audio / Visual:	N/A	Lighting:	Standard task lighting
Special Requirements:	Exterior bay door access, floor support for heavy equipment, ventilation fans for welding stations	Fixed Furniture:	Partitions to separate machine shop, electronics area, welding area, 3-D printing area, etc.

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Lab Stools	30		\$300	\$9,000
Work benches	8		\$1,500	\$12,000
Lathe	2		\$6,000	\$12,000
Mill	2		\$12,000	\$24,000
Machining Center	1		\$40,000	\$40,000
Drill press	2		\$1,500	\$3,000
Bandsaw	2		\$1,500	\$3,000
Cut-off saw	1		\$1,500	\$1,500
Grinder	1		\$700	\$700
Sander	1		\$700	\$700
Welding center	2		\$3,000	\$6,000
Plasma cutter	1		\$5,000	\$5,000
Tool boxes and basic hand tools	8		\$3,000	\$24,000
F.F.E. Subtotal				\$140,900



ADDITIONAL REQUIREMENTS

Space Name:	Student Project Area, Fabrication Shop
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Additional Notes & Comments:	
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FURNITURE & EQUIPMENT REQUIREMENTS, CONTINUED

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
(Total continued from 1st page)				\$140,900.00
Power tool sets	8		\$500.00	\$4,000.00
CNC router	1		\$15,000.00	\$15,000.00
Compressed air supply	2		\$2,000.00	\$4,000.00
Tooling accessories for lathe, mill, machining center	1		\$12,000.00	\$12,000.00
Equipment tables	8		\$200.00	\$1,600.00
Shop vacuum	4		\$250.00	\$1,000.00
Electronic fabrication bench with soldering station,	4		\$4,500.00	\$18,000.00
3-D printer, precision	3		\$7,000.00	\$21,000.00
3-D printer, standard	3		\$3,000.00	\$9,000.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
Subtotal				\$226,500
Quantity of Space Type				1
Total F.F.E				\$226,500



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	5
Space Name:	Student Project Area, Specific Projects	Sq. Ft. Each:	300
		Occupants:	10

Space Use:	Temporary reserved space for large student projects	Cabinetry:	N/A
Adjacencies:	Near fabrication shop	Water:	N/A
Communications:	Wired and wireless network access	Power:	115 VAC and 230 VAC single phase
Audio / Visual:	N/A	Lighting:	Standard office/task lighting
Special Requirements:	Double doors for access	Fixed Furniture:	N/A

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Work bench	1		\$1,000.00	\$1,000.00
Storage cabinet	1		\$600.00	\$600.00
Toolbox and basic handtools	1		\$3,000.00	\$3,000.00
Power tool set	1		\$500.00	\$500.00
Shop vacuum	1		\$250.00	\$250.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
Subtotal				\$5,350
Quantity of Space Type				5
Total F.F.E				\$26,750



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	5
Space Name:	Student Project Area, Support Storage	Sq. Ft. Each:	200
		Occupants:	0

Space Use:	Storage space for student project fabrication area	Cabinetry:	N/A
Adjacencies:	These rooms should open into the main fabrication shop and be adjacent to project spaces.	Water:	N/A
Communications:	N/A	Power:	Standard
Audio / Visual:	N/A	Lighting:	Standard task lighting
Special Requirements:	N/A	Fixed Furniture:	N/A

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinet (36"x24"x72")	3		\$700.00	\$2,100.00
Heavy-duty shelving (96"x36"x96")	2		\$500.00	\$1,000.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
Subtotal				\$3,100
Quantity of Space Type				5
Total F.F.E				\$15,500



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	1
Space Name:	Office, Director	Sq. Ft. Each:	120
		Occupants:	1

Space Use:	Office space for Student Success Center director	Cabinetry:	
Adjacencies:	Located on main floor of building near reception area or adjacent to atrium; located adjacent to administrative assistant and near assistant director	Water:	None
Communications:	Telephone, computer (wireless and wired network access)	Power:	Standard
Audio / Visual:	Computer with dual monitors and printer	Lighting:	Traditional lighting/automated sensory lighting
Special Requirements:	Space requires a 4x6 glass markerboard (\$300)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Computer with dual monitors and printer ENHANCEMENT	1		\$2,000	\$2,000
L-shaped desk with 3 glass-door cabinet hutch w/light & tack board @ return (FF, BBF, p. drawer)	1		\$2,700	\$2,700
Credenza, 4-drawer lateral 24x72	1		\$1,300	\$1,300
Bookcase, standard 71 h, 5 shelves	1		\$850	\$850
Bookcase, 2 lateral files below	1		\$925	\$925
Task chair	1		\$400	\$400
Visitor's chair, wood/upholstered back & seat	2		\$350	\$700
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$8,875



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	1
Space Name:	Office, Assistant Director	Sq. Ft. Each:	120
		Occupants:	1

Space Use:	Office space	Cabinetry:	
Adjacencies:	Located on main floor of building; located near Director's office and administrative assistant's office	Water:	
Communications:	Telephone, computer (wireless and wired network access)	Power:	Standard
Audio / Visual:	Computer with dual monitors and printer	Lighting:	Automated sensory lighting
Special Requirements:	Space requires a 4x6 glass markerboard (\$300)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Computer with dual monitors and printer ENHANCEMENT	1		\$2,000	\$2,000
L-shaped desk with 3 glass-door cabinet hutch w/light & tack board @ return (FF, BBF, p. drawer)	1		\$2,700	\$2,700
Credenza, 4-drawer lateral 24x72	1		\$1,300	\$1,300
Bookcase, standard 71 h, 5 shelves	1		\$850	\$850
Bookcase, 2 lateral files below	1		\$925	\$925
Task chair	1		\$400	\$400
Visitor's chair, wood/upholstered back & seat	2		\$350	\$700
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$8,875



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center (SSC)	Quantity:	1
Space Name:	Office, Administrative Associate	Sq. Ft. Each:	100
		Occupants:	1

Space Use:	Office space	Cabinetry:	
Adjacencies:	Located on main floor of building; located adjacent to SSC Director and near SSC Assistant Director. Located in close proximity to advisors and SSC staff, and adjacent to main reception area for building or the atrium.	Water:	
Communications:	Telephone, computer (wireless and wired network access)	Power:	Standard
Audio / Visual:	Computer with dual monitors and printer	Lighting:	Automated sensory lighting
Special Requirements:	Space requires a 4x6 glass markerboard (\$300)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Computer with dual monitors and printer ENHANCEMENT	1		\$2,000	\$2,000
L-shaped desk with 3 glass-door cabinet hutch w/light and tack board @ return (FF, BBF, p. drawer)	1		\$2,700	\$2,700
Bookcase, standard 71 h, 5 shelves	1		\$850	\$850
Bookcase, 2 lateral files below	1		\$925	\$925
Task Chair	1		\$400	\$400
Visitor's Chair, wood/upholstered back & seat	2		\$350	\$700
Credenza, 4-drawer lateral 24x72 DESIRABLE	1		\$1,300	\$1,300
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$8,875



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	6
Space Name:	Office, Advisor	Sq. Ft. Each:	120
		Occupants:	1

Space Use:	Office space	Cabinetry:	
Adjacencies:	Located on main floor in close proximity to student success center and adjacent to other advisors	Water:	
Communications:	Telephone, computer (wireless and wired network access)	Power:	Standard
Audio / Visual:	Computer with double screen monitors and printer	Lighting:	Office
Special Requirements:	Space requires a 4x6 glass markerboard (\$300)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Computer with dual monitors and printer ENHANCEMENT	1		\$2,000	\$2,000
L-shaped desk with 3 glass-door cabinet hutch w/light & tack board @ return (FF, BBF, p. drawer)	1		\$2,700.00	\$2,700.00
Bookcase, 2 lateral files below	1		\$925.00	\$925.00
Task Chair	1		\$400.00	\$400.00
Visitor's Chair, wood/upholstered back & seat	2		\$350.00	\$700.00
Credenza, 4-drawer lateral 24x72 ENHANCEMENT	1		\$1,300.00	\$1,300.00
Bookcase, standard 71 h, 5 shelves ENHANCEMENT	1		\$850.00	\$850.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
Subtotal				\$8,875
Quantity of Space Type				6
Total F.F.E				\$53,250



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	2
Space Name:	Office Support	Sq. Ft. Each:	30
		Occupants:	

Space Use:	Storage	Cabinetry:	Cabinetry on the walls or standing cabinets with doors that can be locked.
Adjacencies:	Close to SSC administrative assistant	Water:	
Communications:		Power:	Standard
Audio / Visual:		Lighting:	Standard
Special Requirements:		Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Locking file cabinets - lateral (5'H x 3'W x 1.5'D)	4	0	\$750	\$3,000
Storage cabinets, approximately 6'H x 3'W x 1.5'D	2	0	\$800	\$1,600
Work table, 6'L x 2.5'W	1	0	\$600	\$600
Task chairs	4	0	\$400	\$1,600
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$6,800
Quantity of Space Type				2
Total F.F.E				\$13,600



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	1
Space Name:	Conference Room	Sq. Ft. Each:	450
		Occupants:	18

Space Use:	Conference room space	Cabinetry:	
Adjacencies:	Located on the main floor of the building in close proximity to the student success center.	Water:	
Communications:	Desktop computer (wireless and wired network access)	Power:	
Audio / Visual:	Computer connected to 60" television mounted on the wall in the conference room. Desktop computer.	Lighting:	Automated sensory lighting
Special Requirements:		Fixed Furniture:	Cabinet for Monitor

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Desktop computer	1		\$1,500	\$1,500
60" television monitor	1		\$1,200	\$1,200
Conference table	1		\$3,000	\$3,000
Chairs for the conference table	18		\$750	\$13,500
Small wooden storage	4		\$925	\$3,700
Monitor cabinet, wall-mounted to hide monitor when not in use	1		\$1,500	\$1,500
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$24,400



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	1
Space Name:	Lab/Studio, Tutoring Room	Sq. Ft. Each:	720
		Occupants:	24

Space Use:	Study room	Cabinetry:	
Adjacencies:	Located on main floor of building	Water:	
Communications:	Wireless and wired network access	Power:	Standard
Audio / Visual:	Televisions for digital display of media	Lighting:	Automated sensory lighting
Special Requirements:	Space needs (4) wall-mounted glass boards (\$1,000 each)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Television (50")	2		\$1,250	\$2,500
Modular tables to seat 2 people	12		\$560	\$6,720
Chairs	24		\$250	\$6,000
Cabinets	4		\$500	\$2,000
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$17,220



DESIGN REQUIREMENTS

Department:	Engineering, Student Success Center	Quantity:	1
Space Name:	Lab/Studio Support	Sq. Ft. Each:	350
		Occupants:	25

Space Use:	Lounge for students	Cabinetry:	Kitchenette style counters on one wall
Adjacencies:	Located on main floor of building	Water:	Water fountain/bottle-fill station, sink
Communications:	Wireless and wired network access	Power:	Standard
Audio / Visual:	55" TV monitor (\$1,000)	Lighting:	Automated sensory lighting
Special Requirements:	Serve as a small lounge for students to have lunch or socialize in between classes.	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
TV monitor (55")	1	0	\$1,000	\$1,000
Tables to seat 4	6	0	\$600	\$3,600
Dining chairs to go with tables above	24	0	\$180	\$4,320
Couch	2	0	\$800	\$1,600
Comfortable chairs	10	0	\$750	\$7,500
Microwaves ENHANCEMENT	2	0	\$750	\$1,500
Large refrigerator ENHANCEMENT	1	0	\$1,500	\$1,500
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$20,020



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	10
Space Name:	Office, Graduate Student, shared bullpen style	Sq. Ft. Each:	320
		Occupants:	8

Space Use:	Office space	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Wired and wireless network access	Power:	At least one duplex outlet per desk
Audio / Visual:	N/A	Lighting:	Standard office/task lighting Occupancy sensors
Special Requirements:	Need (2) 4'x6' wall mounted magnetic white boards in each space (\$300)	Fixed Furniture:	

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Single pedestal desk (BBF)	8	0	\$700.00	\$5,600
Task chair	8	0	\$350.00	\$2,800
Bookcase, 5-6 shelves	4	0	\$800.00	\$3,200
Visitor chair (plastic seat/back)	2	0	\$200.00	\$400
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$12,000
Quantity of Space Type				10
Total F.F.E				\$120,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	15
Space Name:	Office, Faculty	Sq. Ft. Each:	120
		Occupants:	1

Space Use:	Office space	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Telephone, wired and wireless network access	Power:	Standard
Audio / Visual:	Computer with double monitors and printer in each space	Lighting:	Standard office/task lighting Occupancy sensor
Special Requirements:	Each space requires a 4'x6' wall mounted glass board (\$300)	Fixed Furniture:	Wall-mounted magnetic glass white board (4'x6')

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Double monitors for laptop connection	1		\$300	\$300
Printer	1		\$150	\$150
L-shaped desk with 3 glass-door cabinet hutch w/light & tack board @ return (FF, BBF, p. drawer)	1		\$2,700	\$2,700
Bookcase, 2 lateral files below	1		\$925	\$925
Task Chair	1		\$400	\$400
Visitor's Chair, wood/upholstered back & seat	2		\$350	\$700
Credenza, 4-drawer lateral 24x72 ENHANCEMENT	1		\$1,300	\$1,300
Bookcase, standard 71 h, 5 shelves ENHANCEMENT	1		\$850	\$850
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$7,325
Quantity of Space Type				15
Total F.F.E				\$109,875



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	4
Space Name:	Office, Adjunct Faculty, shared	Sq. Ft. Each:	120
	2 desks in a single office.	Occupants:	2

Space Use:	Office space with separate desk for each person	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Telephone (2 lines), wired and wireless network access	Power:	Standard
Audio / Visual:	Monitor for each person, shared printer (\$150 for printer)	Lighting:	Standard office/task lighting Occupancy sensor
Special Requirements:	Space requires (2) 4'x6' glass marker boards (\$300 each)	Fixed Furniture:	Wall-mounted magnetic glass white board (4'x6')

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Monitor for each person	2		\$150	\$300
Printer, shared	1		\$150	\$150
Straight desk with 3 door cabinet hutch & tack board (FF, BBF, P. Drawer)	2		\$1,600	\$3,200
Bookcase, standard 71 h, 5 shelves	2		\$850	\$1,700
Task chair	2		\$400	\$800
Visitor's chair, wood/upholstered back & seat	2		\$350	\$700
				\$0
Subtotal				\$6,850
Quantity of Space Type				4
Total F.F.E				\$27,400



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	2
Space Name:	Office Support	Sq. Ft. Each:	50
	work/copy rooms	Occupants:	

Space Use:	Office support (copier, office supply cabinet, work table)	Cabinetry:	N/A
Adjacencies:	Centrally located wth respect to faculty/staff offices	Water:	N/A
Communications:	Wired and wireless network access	Power:	Standard
Audio / Visual:	N/A	Lighting:	Standard office/task lighting Occupancy sensor
Special Requirements:	N/A	Fixed Furniture:	N/A

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Storage cabinet (36"x18"x72")	1		\$900.00	\$900
Work table (approx. 24"x60")	1		\$600.00	\$600
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
				\$0
Subtotal				\$1,500
Quantity of Space Type				2
Total F.F.E				\$3,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Office, Technician	Sq. Ft. Each:	120
	2 desks	Occupants:	2

Space Use:	Office space with separate desk for each person	Cabinetry:	N/A
Adjacencies:	Close to laboratory/shop facilities (Mechanical Testing Lab, Automotive Lab)	Water:	N/A
Communications:	Telephone (2 lines), wired and wireless network access	Power:	Standard
Audio / Visual:	Computer with double monitors for each person, shared printer (\$1,300 for computer package, \$150 for printer)	Lighting:	Standard office/task lighting
Special Requirements:	N/A	Fixed Furniture:	Two wall-mounted magnetic glass white boards (4'x6') (\$300 each)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Computer and monitor for each person	2		\$1,300	\$2,600
Printer, shared	1		\$150	\$150
Straight desk with 3 door cabinet hutch & tack board (FF, BBF, P. Drawer)	2		\$1,600	\$3,200
Bookcase, standard 71 h, 5 shelves	2		\$850	\$1,700
Task Chair	2		\$400	\$800
Visitor's Chair, wood/upholstered back & seat	2		\$350	\$700
				\$0
				\$0
				\$0
				\$0
F.F.E. Total				\$9,150



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Atrium	Sq. Ft. Each:	2,000
		Occupants:	

Space Use:	Casual meeting space, study space, lunch space; reconfigure for receptions, displays, fairs, special events	Cabinetry:	N/A
Adjacencies:	Include space in atrium for an A/V control room with storage for A/V equipment; storage space for banquet/display tables and chairs; space for catering/food prep	Water:	N/A
Communications:	Wired and wireless campus network access; smart building system network access;	Power:	Extra outlets around perimeter and at seating areas, power at monitor locations, power at mobile speaker podium location
Audio / Visual:	Cluster of 4 large touch-interactive monitors for smart building system display; auditorium A/V package with projector and screen, mobile podium (security needs to be considered for A/V pkg)	Lighting:	Adjustable lighting to accommodate office/task work, displays, receptions.
Special Requirements:	Acoustic and A/V design to provide quality A/V experience for group events	Fixed Furniture:	Four wall mounted monitors for smart building system display; planters; display cabinets/areas for projects

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Large, interactive, touch screen monitors for smart building system display	4		\$4,500.00	\$18,000.00
Auditorium AV package w/projector and screen	1		\$30,000.00	\$30,000.00
Mobile speaker podium	1		\$465.00	\$465.00
Bench seating for 1-2 persons	10		\$600.00	\$6,000.00
Casual seating cluster with low table and seating for 4	5		\$2,000.00	\$10,000.00
Large planters to screen between seating clusters	5		\$300.00	\$1,500.00
Large display cabinets for student projects - Poster display	3		\$350.00	\$1,050.00
Large display cabinets for student projects - Glass case for small-scale prototypes	2		\$2,000.00	\$4,000.00
Banquet/display tables DESIRABLE	20		\$100.00	\$2,000.00
Banquet chairs (folding or stacking) DESIRABLE	160		\$160.00	\$25,600.00
F.F.E. Total				\$71,015.00



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	5
Space Name:	Student Club Office & Support	Sq. Ft. Each:	180
		Occupants:	6

Space Use:	Office space for college-wide student organizations (SWE, NSBE, SHPE, EJC, Tau Beta Pi)	Cabinetry:	N/A
Adjacencies:	N/A	Water:	N/A
Communications:	Wired and wireless network access	Power:	Standard
Audio / Visual:	N/A	Lighting:	Standard office/task lighting Occupancy sensor
Special Requirements:	N/A	Fixed Furniture:	Wall-mounted magnetic glass white board (4'x6') (\$300)

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Straight desk (FF, BBF, P. drawer)	1		\$900.00	\$900.00
Work table (approx. 2'x5')	1		\$600.00	\$600.00
Task chair	3		\$350.00	\$1,050.00
Storage cabinet (36"x18"x72")	1		\$900.00	\$900.00
Standard filing cabinet (4 drawers)	1		\$550.00	\$550.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
Subtotal				\$4,000
Quantity of Space Type				5
Total F.F.E				\$20,000



DESIGN REQUIREMENTS

Department:	Engineering	Quantity:	1
Space Name:	Study Room	Sq. Ft. Each:	400
		Occupants:	20

Space Use:	Individual study/reading in a quiet environment	Cabinetry:	N/A
Adjacencies:	Must be located to allow a quiet environment, next to the Atrium	Water:	N/A
Communications:	Wired and wireless network access	Power:	Standard, plus power to table top outlets
Audio / Visual:	N/A	Lighting:	Standard office/task lighting Occupancy sensors
Special Requirements:	Consider acoustics and soundproofing to provide quiet environment	Fixed Furniture:	N/A

FURNITURE & EQUIPMENT REQUIREMENTS

Item Description	Quantity Req'd	Existing Quantity	Cost Each	Total
Individual study carrels with power outlets on top	20		\$1,900.00	\$38,000.00
Chairs	20		\$250.00	\$5,000.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
F.F.E. Total				\$43,000.00