Civil, Architectural, and Environmental Engineering (CAEE)

Student Handbook

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MESSAGE FROM THE CHAIR

This handbook is intended to support you as an entering and continuing student in the Department of Civil, Architectural, and Environmental Engineering (CAEE) at North Carolina A&T State University. It has been prepared as a handy reference guide to the programs, policies, curriculums, faculty & staff, teaching labs, research programs, and student organizations in the department. We hope that you will find the information you need for both planning and understanding your engineering education.

The CAEE Department is committed to quality teaching, research and advising. The department takes great pride in preparing students to excel in their professional careers. The department encompasses two undergraduate programs:

- **Civil Engineering (CE)**
- **Architectural Engineering (AE)**

The undergraduate degrees in Civil and Architectural Engineering have a common interest in structures and construction engineering. Dual degrees are possible in Architectural and Civil Engineering, which typically require an additional two semesters of course work. The department also administers a combined graduate program that awards a **Master of Science in Civil Engineering (MSCE)** with a focus on three major areas: Building Energy; Civil Infrastructures; and Environmental/Water Resources. We invite prospective and current students to visit the departmental web site to discover more about the department's academic and research areas.

We hope you find this handbook a useful resource as you progress through your years at A&T. We wish you much success and welcome your suggestions for improvement of the handbook.

Manoj K. Jha, PhD, PE, PH, D.WRE
Professor and Chair
Civil, Architectural, and Environmental Engineering
North Carolina Agricultural & Technical State University
Email: mkjha@ncat.edu

CAEE FACULTY AND STAFF

Administration and Staff

Chair Dr. Manoj K. Jha mkjha@ncat.edu 336-285-3678 McNair 448 	**Business Servi. Coordinator** TBA 336-285-3683 McNair 451
Admin & Student Services Mike Walker dmwalker2@ncat.edu 336-334-7575 McNair 447 	**Research Operation Manager** Simon Esau sresau@ncat.edu McNair 626 

Faculty Members

Dr. Ahmed Megri Professor acmegri@ncat.edu 336-285-3671 McNair 454 Lighting and Indoor Air Envir. 	Dr. Clayton J Clark Associate Dean cjclarkii@ncat.edu 336-285-4607 MERIC Civil Engineering 
Dr. Hyosoo Moon Assistant Professor hmoon1@ncat.edu 336-285-2219 McNair 455 Architecture 	Dr. David Wang Assistant Professor ywang124@ncat.edu 336-285- McNair 452 Construction Materials 
Dr. Manoj K. Jha Professor mkjha@ncat.edu 336-285-3678 McNair 448 Water Resources 	Dr. Miguel Picornell Professor mpicorne@ncat.edu 336-285-3682 McNair 433 Soil and Geotechnical 
Dr. Raymond Tesiero Associate Professor rctesier@ncat.edu 336-285-3680 Graham 305 HVAC and Energy 	Dr. Renzun Zhao Associate Professor rzhao@ncat.edu 336-285-3684 McNair 437-A Environmental Engineering 

CAEE FACULTY AND STAFF

Faculty Members (Continued)

Dr. Sameer Hamoush Professor sameer@ncat.edu 336-285-3677 McNair 438 Structural Engineering 	Dr. Shuva Chowdhury Assistant Professor schowdhury@ncat.edu 336-285-3679 McNair 436 Architecture 
Dr. Stephanie Luster-Teasley Dean Luster@ncat.edu 336-285-2640 MERIC Civil Engineering 	Dr. Taher Abu-Lebdeh Professor Graduate Coordinator taher@ncat.edu 336-285-3670 McNair 437-B Structural Engineering 
Dr. Venktesh Pandey Assistant Professor vpandey@ncat.edu 336-285-3687 McNair 434 Transportation Engineering 	Dr. Hiba Ahmed Teaching Ass. Professor haahmed@ncat.edu McNair 436 Statics, Dynamics, Solid Mechanics 

Part-time Instructors

(McNair 444)

Dr. Dale McKinney dalebrentmckinney@hotmail.com Construction Engineering 	Thomas Phoenix thphoenix@ncat.edu HVAC and Energy 
Prof. Ronnie Bailey phase@ncat.edu Graphics 	Prof. Sk. Sadman Sakib sskib@aggies.ncat.edu Surveying and Const. Mat. 
Dr. Tammy Thompson tsthompson1@ncat.edu Architecture 	Dr. Hari Anantharama hanantharaman@ncat.edu Numerical Methods 

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Civil Engineering

Civil engineers plan, design, construct, operate and maintain public infrastructures such as buildings, dams, bridges, harbors, power facilities, pollution control, facilities, water supply, and transportation systems. The Program Educational Objectives (PEOs) are:

- Objective 1: Our graduates will be gainfully employed as civil engineers, with designations of, at least, Engineer Interns, and will demonstrate the ability to work productively in the main areas of civil engineering.
- Objective 2: Our graduates will demonstrate expertise in a primary area of civil engineering and the ability to function effectively on intra-disciplinary and multi-disciplinary teams or be in the process of completing post-baccalaureate studies or expanding their proficiency in civil engineering.
- Objective 3: Our graduates will continue to learn and adapt to changing technologies, procedures and concepts in civil engineering.
- Objective 4: Our graduates will demonstrate that they possess the skills and knowledge necessary to function effectively in roles of leadership and service in the communities where they will live and work, and that they are contributing to the welfare, quality of life, protection, and advancement of the community.

Architectural Engineering

Architectural engineers design, construct, and maintain buildings. They design structural systems, the heating and air conditioning systems, the lighting and electrical systems, and the plumbing and fire protection systems for buildings. They facilitate maintenance and renovations of existing buildings. The Program Educational Objectives (PEOs) are:

- Objective 1: They will be assigned progressively increasing technical responsibility by their supervisor.
- Objective 2: They will be recognized for their interdisciplinary perspective to problem-solving and for their teamwork and leadership skills.
- Objective 3: They will be active in a professional society and be involved in continuing education, making progress towards professional registration.
- Objective 4: They will contribute to society, and to the diversity of their company and their profession by actively mentoring new engineering graduates.

LEARNING OUTCOMES - ABET

The Civil Engineering (CE) Program and the Architectural Engineering (AE) Programs are accredited by ABET (Accreditation Board for Engineering and Technology, Inc.). With ABET accreditation, students, employers and the society we serve can be confident that the programs meet the quality standards that produce graduates prepared to enter a global workforce.

The Outcomes of the CE and the AE programs follow the same outcomes specified by ABET. Each program for accreditation must show that the graduates of the program satisfy or accomplish these seven outcomes to an acceptable level. These outcomes are published in the website of the University, and systematically are included in the syllabi distributed to each class at the beginning of the semester.

The seven outcomes are as follows:

OUTCOME 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

OUTCOME 2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

OOUTCOME 3: An ability to communicate effectively with a range of audiences (Oral and Written Communication).

OUTCOME 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

OUTCOME 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

OUTCOME 6: an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

OUTCOME 7: an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

CURRICULUM - CE

Approved 2025

FRESHMAN YEAR

Fall Semester	GEEN 100 Fundamentals of Engineering (F,S)	2	Spring Semester	MATH 132 Calculus 2**	4
	GEEN 111 College of Eng. Colloquium (F)	1		ENGL 101 English Composition II	3
	CAEE 101 Graphics in CAEE (F,S)	2		PHYS 241 Physics I**	3
	MATH 131 Calculus 1**	4		PHYS 251 Physics I Lab	1
	CHEM 106 General Chemistry **	3		CAEE 121 CAEE Colloquium (F,S)	0
	CHEM 116 General Chemistry Lab VI	1		General Education Course	3
	ENGL 100 English Composition I	3			
		16			14

SOPHOMORE YEAR

Fall Semester	MATH 231 Calculus III**	4	Spring Semester	MATH 341 Intro to Differential Eq.	3
	CAEE 231 Engineering Statics** (F,S)	3		CIEN 281 Civil Engineering CAD (S)	1
	CAEE 230 Engineering Statics Lab (F,S)	1		CAEE 362 Eng. Fluid Mech & Hy** (F, S)	3
	PHYS 242 General Physics II	3		CAEE 363 Eng Fluid Mech. Lab (F,S)	1
	PHYS 252 General Physics II Lab	1		CAEE 232 Solid Mechanics ** (F,S)	3
	CAEE 204 Fundamentals of Surveying (F)	3		CAEE 240 Num. Meth. & Prog. (F,S)	3
				General Education Course	3
		15			17

JUNIOR YEAR

Fall Semester	CAEE 325 Structural Analysis (F,S)	3	Spring Semester	CIEN 310 Intro to Env. Engineering (S)	3
	CAEE 330 Construction Mat. & Meth. (F,S)	3		CIEN 311 Environmental Eng. Lab (S)	1
	CAEE 335 Construction Material Lab (F,S)	1		CIEN 422 Geotechnical Eng. Design (S)	3
	CIEN 350 Transportation Engineering I (F)	3		CAEE 304 Statistics & Reliability (F,S)	3
	CIEN 320 Geotechnical Eng. I (F)	3		CIEN 364 Engineering Hydrology (S)	3
	CIEN 321 Geotechnical Eng. I Lab (F)	1		CAEE 430 Structural Design in Steel (F,S)	3
	CAEE 400 FE General Topics Review (F)	1			
		15			16

SENIOR YEAR

Fall Semester	CIEN 483 CE Capstone Design I (F)	2	Spring Semester	CIEN 484 CE Capstone Design II (S)	2
	CAEE 436 Reinforced Concrete Design (F,S)	3		CIEN 405 FE Civil Topics Review (S)	1
	CAEE 481 Construction Engineering I (F,S)	3		CIEN 453 Transportation Eng. Design (S)	3
	CIEN 412 Environmental Eng. Design (F)	3		General Education Course	3
	CAEE 334 Engineering Dynamics (F,S)	2		General Education Course	3
	General Education Course	3			
		15			12

** denotes minimum passing grade "C-"

Total Credits = 120

CURRICULUM - AE

Approved 2025

FRESHMAN YEAR

Fall Semester	GEEN 100 Fundamentals of Engineering (F,S)	2	Spring Semester	MATH 132 Calculus 2**	4
	GEEN 111 College of Eng. Colloquium (F)	1		ENGL 101 English Composition II	3
	CAEE 121 CAEE Colloquium (F,S)	0		PHYS 241 Physics I**	3
	MATH 131 Calculus 1**	4		PHYS 251 Physics I Lab	1
	CHEM 106 General Chemistry **	3		CAEE 101 Graphics in CAEE (F,S)	2
	CHEM 116 General Chemistry Lab VI	1		General Education Course	3
	ENGL 100 English Composition I	3			
		14			16

SOPHOMORE YEAR

Fall Semester	MATH 231 Calculus III**	4	Spring Semester	MATH 341 Intro to Differential Eq.	3
	PHYS 242 General Physics II**	3		AREN 281 BIM & Intro to Bldg Syst. (S)	2
	PHYS 252 General Physics II Lab	1		ECEN 340 Electrical Circuits** (F,S)	3
	CAEE 231 Engineering Statics** (F,S)	3		MEEN 241 Thermodynamics (F,S)	3
	CAEE 230 Engineering Statics Lab (F,S)	1		CAEE 232 Eng. Solid Mechanics** (F,S)	3
	AREN 112 Architectural History (F)	3		CAEE 240 Numerical Meth. & Prog. (F,S)	3
		15			17

JUNIOR YEAR

Fall Semester	AREN 343 Heat Transfer and Appl. Therm. (F)	2	Spring Semester	AREN 387 Integrated Building Design (S)	3
	AREN 382 Architectural Design (F)	3		CAEE 330 Construction Mats & Meth (F,S)	3
	CAEE 362 Eng. Fluid Mech & Hyd** (F,S)	3		CAEE 335 Construction Mat. Lab (F,S)	1
	CAEE 363 Eng. Fluid Mechanics Lab (F,S)	1		CAEE 325 Structural Analysis (F,S)	3
	CAEE 304 Statistics & Reliability in CAEE (F,S)	3		AREN 364 HVAC Principles & Systems (S)	2
	AREN 348 Illumination & Electrical Power (F)	3		AREN 363 HVAC Principles & Sys Lab (S)	1
	AREN 344 Illumination & Elec. Power Lab (F)	1		CAEE 400 FE General Topics Review (S)	0
				General Education Course	3
		16			16

SENIOR YEAR

Fall Semester	AREN 480 AE Capstone Design I (F)	2	Spring Semester	AREN 486 AE Capstone Design II (S)	2
	AREN 462 HVAC Design and Hydronic System Design (F)	3		Design Elective (CAEE 436 or CAEE 481) (F,S)	3
	CAEE 450 Construction Management (F)	3		AREN 467 Electrical Syst & Smart Bldgs (S)	2
	CAEE 430 Structural Design in Steel (F,S)	3		CAEE 334 Engineering Dynamics (F,S)	2
	General Education Course	3		General Education Course	3
		14			12

** denotes minimum passing grade "C-"

Total Credits = 120

CURRICULUM – MS in Civil Eng.

Graduate Coordinator: Taher Abu-Lebdeh **Email:** taher@ncat.edu **Phone**: 336-285-3678
Department Chair: Manoj K. Jha **Email:** mkjha@ncat.edu **Phone**: 336-285-3679

The Master of Science in Civil Engineering program provides advanced study and research in the following areas: Environmental/Water Resources, Structures/Geotechnical, Transportation/Regional Development, Construction Management, and Energy Resources/ Systems, Building Energy, and others.

Additional Admission Requirements
Unconditional admission requires undergraduate degree from an ABET accredited Civil Engineering, Architectural Engineering, or Environmental Engineering program

Degree Requirements: Total credit hours = 30

Thesis option

- Core courses (9 credits): CIEN 700, 702, Advanced Math course (CIEN approved)
- CIEN electives (9 credits): Take 9 credits of additional CIEN 600-799 courses with approval of advisor
- Electives (6 credits): Take 6 credits from CIEN 600-799 or other departments with approval of advisor
- Thesis (6 credits): CIEN 797
- Pass thesis defense
- CIEN seminar: CIEN 792

Project option

- Core courses (9 credits): CIEN 700, 702, Advanced Math course (CIEN approved)
- CIEN electives (9 credits): Take 9 credits of additional CIEN 600-799 courses with approval of advisor
- Electives (9 credits): Take 9 credits from CIEN 600-799 or other departments with approval of advisor
- Project (3 credits): CIEN 796
- CIEN seminar: CIEN 792

Course option

- Core courses (9 credits): CIEN 700, 702, Advanced Math course (CIEN approved)
- CIEN electives (9 credits): Take 9 credits of additional CIEN 600-799 courses with approval of advisor
- Electives (12 credits): Take 12 cr. from CIEN 600-799 or other departments with approval of advisor
- Comprehensive exam
- CIEN seminar: CIEN 792

ADVISING AND REGISTRATION

Each CAEE student is assigned a faculty advisor. Students are required to meet their academic advisor (by appointment or during student hours) at the beginning of each semester to discuss their plan of study and to obtain a PIN, required for course registration.

The role of the **faculty advisor** is to guide students toward graduation and a rewarding career. Freshmen Advisors can help students become acclimated to college life and assist them with the various administrative procedures at A&T. Advisors will assist students during the registration process. When a student is progressing satisfactorily from semester to semester, the role of the academic advisor is primarily to discuss electives and provide career guidance. However, an academic advisor becomes critical when a student gets an “F” or “D”. When this occurs, the student’s schedule must be customized to take into account pre-requisite courses and to minimize the extra time required for the student to complete the degree. A student’s graduation date may be delayed by a year, or more, if courses are taken in an inappropriate sequence.

Advising Process

Reach out to your advisor and schedule a time for advising. You can find your academic advisor here: https://www.ncat.edu/provost/academic-affairs/center-for-academic-excellence/find-advisor.php

Complete: (1) Student Success Curriculum Form (fillable pdf) and (2) Advising form (fillable pdf) prior to your meeting with the advisor. Here you discuss already completed courses and the courses you are eligible to take for the next semester. You can get the Forms from the CAEE front desk or by contacting the advisor or department administrative personnel (chair, student service, or UG coordinator).

Once you have been advised, your advisor will issue you the PIN number which you need to register for the courses. Follow the registration instructions on the Office of Registrar’s website: https://www.ncat.edu/registrar/registration.php

You can search for classes and CRN numbers from Dynamic Course Schedule obtained from NCAT’s website:

https://ssbprod-ncat.uncecs.edu/pls/NCATPROD/bwckschd.p_disp_dyn_sched

CAEE Advising Form

Semester/Year:

Name:

Classification:

Banner:

Major:

PIN:

Course	Section	Credits	CRN	Days	Time

Comments:

Student Signature:		Date:	
Advisor Signature:		Date:	

*Disclaimer You have been advised based on your midterm grades or grades-to-date. If you fail to pass the pre-requisites for the upcoming semester, your classes will be dropped and you will be responsible for making sure that you have the correct amount of hours.

ADVISING AND REGISTRATION (cont.)

Math Pathways

If you meet all criteria for admission into NC A&T, as a STEM major, **you are required to start with MATH 131**. This requires an SAT Math Score of at least 570, an ACT MATH Score of at least 24, or Math Dept. Pre-calculus Placement Test Scores of at least 17.

Math Level	SAT Math Score	ACT Math Score	ALEKS PPL Score	Eligible Math Classes
ML1	< 480	< 18	< 41	MATH 101E
ML2	480 - 510	18 - 20	41 or above	MATH 101, Math 103
ML3	520 - 560	21 - 23	56 or above	MATH 110, MATH 111
ML4	570 - 800	24 - 36	71 or above	MATH 131

Students are strongly encouraged to enroll in summer math courses if they begin below MATH 131. If you do not qualify for MATH 131, choose from the following pathway that best fit your scores.

- Math 110 ➔ Math 131
- Math 103 ➔ Math 104 ➔ Math 131
- Math 101E ➔ Math 103 ➔ Math 104 ➔ Math 131

Chemistry Pathways

Typically, freshman engineering students start with CHEM106. The prerequisites for CHEM106 are "*SAT MATH score of 490 (old) or 520 (new), SAT II MATH Level II score of 470 or ACT MATH score of 19 or CHEM 103 with a grade of C or better*".

If you do not satisfy the pre-requisites, then you can sign up for CHEM 103 and after receiving a C or better grade you will be eligible for CHEM 106.

General Education Course

Please use this link to determine the courses that are available as general education electives. Courses outside this list won't count towards the general education course requirement.

https://www.ncat.edu/provost/general-education-resources/gec-list.php

CAEE students need to do "one" of the electives in each of the following sets:

- Global Awareness (GL)
- Humanities and Fine Arts (HFA)
- Knowledge of African American Culture and History (AA)
- Social and Behavioral Sciences (SBS)
- Scientific Reasoning (SR)

ADVISING AND REGISTRATION (cont.)

Course Override

You may need an override to get registered into a course, either because (1) the course is at full capacity, but you must take it to graduate in time, or (2) you met the pre- or co-requisite, but the system did not recognize it. The course override form (page 15) is available at the front desk. Complete the form entirely and leave it in the box at the front office for processing.

For override of courses outside the CAEE, you need to reach out to the respective department.

- **Chemistry**: Undergraduate Studies, Dr. Marion Franks, (mafranks@ncat.edu), Room 345, New Science Building, Tel: 336-285-2230.
- **Physics**: Administrative Assistant, Ms. Helen Clark (hdclark@ncat.edu), Marteena Hall 101, (336) 285-2105
- **Math**: Email the department chair Dr. Tang (gtang@ncat.edu)

Taking Courses Outside NC A&T

After consulting with your academic advisor, you may be able to identify a course at a different university using the Transfer Articulation Tool available at the following link:
https://www.ncat.edu/apps/transfer-articulation/

The permission form must be completed with all the required signatures and submitted to the Office of Transfer Articulation **BEFORE** a student enrolls in courses at another institution. The form is located at:
https://www.ncat.edu/_files/pdfs/forms/permission_to_take_courses_outside_ncat.pdf

Please note: The University will not accept credits earned at another institution while a student is: (1) on academic probation (unless approved by the Department Chairperson and School/College Dean); (2) under academic or social suspension; or (3) concurrently registered at North Carolina A&T State University. No transfer credit(s) will be awarded for a course in which a grade below a 'C' was earned.

Other Programs, Policies, and Information

Please refer to the Undergraduate Bulletin for several other information including:
https://www.ncat.edu/provost/academic-affairs/bulletins/2022-23undergraduatebulletin.pdf

Change of major, Double major, Declaring minor

Course withdrawal	Transfer students	Suspension/Readmission
Academic Probation	International programs	Honors program
Center for Academic Excellence	Satisfactory Academic Progress (SAP)	

Tuition surcharge, others

CAEE Override Form

Semester/Year: Classification:

Name: Banner:

Email:

Course	Section	Credits	CRN	Days	Time	Reason

Select one:
- ☐ Capacity Override
- ☐ Pre-requisite Override (already passed but system error)
- ☐ Co-requisite Override (already passed)
- ☐ Orverride major or classification restriction

Course	Section	Credits	CRN	Days	Time	Reason

Select one:
- ☐ Capacity Override
- ☐ Pre-requisite Override (already passed but system error)
- ☐ Co-requisite Override (already passed)
- ☐ Orverride major or classification restriction

Course	Section	Credits	CRN	Days	Time	Reason

Select one:
- ☐ Capacity Override
- ☐ Pre-requisite Override (already passed but system error)
- ☐ Co-requisite Override (already passed)
- ☐ Orverride major or classification restriction

Instructions:

--> Complete this form, sign, and get your academic advisor's signature

--> Submit this form + Student Success Curriculum form + Signed Advising form

--> Only CAEE Courses can be overridden. You must go to the designated department for other courses

--> Drop the package at the front desk for processing and allow for 2-days for processing

--> Incomplete information will not be processed

Student Signature:		Date:	
Advisor Signature:		Date:	

ACADEMIC SUPPORT

Center for Academic Excellence (CAE)

https://www.ncat.edu/provost/academic-affairs/center-for-academic-excellence/

- Tutorial Services & Academic Skills Enhancement
- Structured Supplemental Instruction (SSI)
- Mentoring Programs

Upswing Online Tutoring

https://online.ncat.edu/tutoring.html

FREE tutoring to improve your grades in class! North Carolina A&T State University has partnered with Upswing to help students find, schedule and book tutoring sessions virtually. Through a web-based tutoring platform, you can schedule FREE tutoring lessons with Upswing's online tutors for a variety of subjects!

Student Clubs & Organizations

https://www.ncat.edu/campus-life/student-affairs/departments/student-activities/clubs-and-organizations/index.php

NC A&T has over 150 registered student organizations (RSOs) to meet almost any of your academic, cultural, informative, creative, or just fun interests. There are many benefits to joining a student organization: making friends, developing and using new skills and abilities, becoming part of a team, learning to set and achieve goals and just enjoying yourself.

Student organization handbook:

https://issuu.com/ncatosa/docs/student_org_handbook-updated_2020

Faculty Office Hours and Teaching Assistant

Each course instructors are required to conduct “student hours” dedicated to students for questions related to respective courses. Refer to the syllabus and/or at the office door posting for details and take advantage of the opportunity of meeting with the instructor one-on-one.

In addition, you should contact course-assigned graduate teaching assistants during designated office hours for one-to-one interaction for course-related questions.

RESOURCES

Office of Accessibility Resources (OARS)

https://www.ncat.edu/provost/academic-affairs/accessibility-resources/index.php

North Carolina A&T State University (N.C. A&T) is committed to following the requirements of the Americans with Disabilities Act Amendments Act (ADAAA) and Section 504 of the Rehabilitation Act.

If you need an academic accommodation based on the impact of a disability, you must initiate the request with the Office of Accessibility Resources (OARS) and provide documentation in accordance with the Documentation Guidelines at N.C. A&T. Once documentation is received, it will be reviewed. Once approved, you must attend a comprehensive meeting to receive appropriate and reasonable accommodations. If you are a student registered with OARS, you must complete the Accommodation Request Form to have accommodations sent to faculty.

OARS is located in Murphy Hall, Suite 01 and can be reached at 336-334-7765, or by email at accessibilityresources@ncat.edu. Please note: Accommodations are not retroactive and begin once the Disability Verification Form is provided to faculty.

Title IX

https://www.ncat.edu/legal/title-ix/index.php

North Carolina A&T State University is committed to providing a safe learning environment for all students—free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are inconsistent with the university's mission and core values, violate university policies, and may also violate federal and state law. Faculty members are considered "Responsible Employees" and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit the Title IX website to access information about university support and resources. If you would like to speak with someone confidentially, please contact the Counseling Services at 336-334-7727 or the Student Health Center at 336-334-7880.

Technical Support

https://hub.ncat.edu/administration/its/dept/ats/index.php

If you experience any problems with your N.C. A&T account, you may call Client Technology Services (formerly Aggie Tech Support and Help Desk) at 336-334-7195 or visit the website.

STUDENT ORGANIZATIONS

ASCE - American Society of Civil Engineers

Faculty Advisor: Dr. David Wang (ywang124@ncat.edu)

Student Body: (2024-25)

President	Alexis Beatty (ncatasce.pres@gmail.com)
VP	Mikal Ali (ncatasce.vp@gmail.com)
Secretary	Markel Alston (ncatasce.secr@gmail.com)
Treasurer	Braxton Johnson (ncatasce.treas@gmail.com)
Solicitor	Manuel Mejia (ncatasce.solicitor@gmail.com)
Chief of Staff	Sedric Felton (ncatasce.cos@gmail.com)
Misses ASCE	Mariah Couch (ncatasce.miss1@gmail.com)
Mister ASCE	Elijah Diggs (ncatasce.mister@gmail.com)
Historian	Sanaa Ratliffe (ncatasce.hist@gmail.com)
Conf. Chair	William Joseph (ncatasce.cc@gmail.com)
Interns	TBA (ncatasce.intern@gmail.com)

Membership # 63 Students
Membership fee: $15
Membership fee of the National Society= $75
Currently active with the COP: yes

List of Activities year around:

General Body Meetings
- Welcome to ASCE!
- What is Civil Engineering?
- Game Night! (Collaboration with AEI)
- ASCE Conference Info-Session
- Gingerbread House Competition
- Stacking up for 2023
- Life after the T!

Company Sponsored Workshops
- Resume and LinkedIn Workshop (Jacobs Engineering)
- PE vs Graduate School (Walter P. Moore)

Community Service:
- Snack Packing; Backpack Beginnings; Habitat for Humanity

Fundraising: Krispy Kreme Donuts

Campus Activities: Coronation; Fashion Show

STUDENT ORGANIZATIONS

AEI – Architectural Engineering Institute

Faculty Advisor: Dr. Hyosoo Moon (hmoon1@ncat.edu)

Student Body: (2024-25) [ncataei@gmail.com]
President William Joseph (wbjoseph@aggies.ncat.edu)
VP Taylor Wherry-Rice(tvwherryrice@aggies.ncat.edu)
Secretary
Treasurer
Chief of Staff
Comm. Ser. Chair:
Social Media Co-Chairs:
Conference Chair:

Membership # 64 Students
Chapter Membership fee: $10
National Membership fee: $120 (graduate)
Currently active with the COP: yes

List of Activities year around:
General Body Meetings
- Architecture VS. Architectural Engineering
- Family Feud: AEI vs. ASCE
- Gingerbread House Competition
- Meet & Greet
- AEI Declassified Engineering College Guide
- Career Fair Prep

Community Service:
- Community Housing Solutions
- Walk for Alzheimer's
- Habitat for Humanity
- Backpack Beginnings

Other Programs:
- Architecture Tour; Mentorship Program
- Night of Bowling

STUDENT ORGANIZATIONS

AIAS – American Institute of Architecture Students

Faculty Advisors: Dr. Shuva Chowdhury (schowdhury@ncat.edu)

Student Body: (2024-25)

President	Jamarie Green (jgreen7@aggies.ncat.edu)
Vice President	Jordan Bullock (jmbullock1@aggies.ncat.edu)
Secretary	
Treasurer	
Media Corres.	
Comm. Service	

Membership fee: $10
Currently active with the COP: yes

Mission Statement:
The mission of AIAS is to PROMOTE excellence in architectural education, training, and practice; FOSTER an appreciation of architecture and related disciplines; ENRICH communities in a spirit of collaboration; ORGANIZE students and combine our efforts to advance the art and science of architecture.

Chapter Goals:
The goal of the NC A&T State University Chapter of AIAS is to increase membership and outreach towards architecture students attending our university. There is a lack of support and resources for those embarking on the journey towards the Architecture Engineering degree and we would love for AIAS to become an imperative piece of their time as A&T! We hope and strive to grow membership as well become more actively involved on campus as well as in the community.

THE AMERICAN INSTITUTE OF ARCHITECTURE STUDENTS

STUDENT ORGANIZATIONS

AWWA – American Water Works Association

Faculty Advisors: Dr. Renzun Zhao (rzhao@ncat.edu)

Student Body: (2024-25)
President Dawn Deaton (dedeaton@aggies.ncat.edu)
VP

Established: 2016
Membership # 20 Students
Membership fee: $0
Membership fee of the National Society = $20
Currently active with the COP: yes

List of Activities year around:
Conduct guest speakers:
tentative # of events over the year = 4
Service-Learning activities:
Community service with different organizations
On site visits to water treatment plants

STUDENT ORGANIZATIONS

ITE – Institute of Transportation Engineers

Faculty Advisor: Venktesh Pandey (vpandey@ncat.edu)

Student Body: (2024-25) [ite.aggies.ncat@gmail.com]
President: Ty'Ron Williams (tmwilliams6@aggies.ncat.edu)
VP: Isiah Smith (irsmith@aggies.ncat.edu)
Secretary: Mikal Ali (mmali@aggies.ncat.edu)
Treasurer: Da'Niyah Crawford (djcrawford1@aggies.ncat.edu)

Established: 1994
Membership # 21 Students
Membership fee: $0
Membership fee of the National Society = $0 for undergraduates
Currently active with the COP: Yes

List of Activities year around:
General Body Meetings
- Welcome to ITE!
- Bridge Building Competition
- Can You Solve the Problem?

Company Sponsored Workshops
- Partnership with ASETTS digital badge program
- Transportation Research Board Annual Meeting

Community Service:
- Trivium Racing Events

Campus Activities and Fundraising:
- NCSITE Annual Meeting
- Traffic Bowl

STUDENT ORGANIZATIONS

ASHRAE – American Society of Heating, Refrigeration, and AC Engineers

Faculty Advisor: Dr. Ahmed C. Megri (acmegri@ncat.edu)

Student Body: (2023-24)

President	Akilah Holder (akholder@aggies.ncat.edu) Ismail Zayd (izmegri@aggies.ncat.edu)
VP	Zainab Samir: zjsamir@aggies.ncat.edu
Treasurer	Kaelyn Hendrix: krhendrix@aggies.ncat.edu
Secretary	Jada Green: jsgreen3@aggies.ncat.edu

Membership fee: $25 (sponsored by ASHRAE North Piedmont Chapter)
Membership fee of the National Society = $25
Currently active with the COP: yes

List of Activities year around:

- Technical tours of HVAC&R (heating, ventilation, air conditioning, and refrigeration) facilities, manufacturing plants, and research institutions, power plant, etc.
- Guest lectures and workshops by industry experts, academics, and researchers on various topics related to HVAC&R
- Volunteer projects related to energy efficiency, sustainability, and green building initiatives.
- Networking events, such as industry mixers, career fairs, and social gatherings.
- Attend monthly meetings of ASHRAE North Piedmont Chapter
- Professional development opportunities, such as resume reviews, mock interviews, and career counseling.
- Training events for the use of ANSYS in HVAC Applications
- Fundraising events to support chapter activities, scholarships, and community outreach programs.
- Others

TEACHING LABORATORIES

Construction Materials Lab

Location: Graham 110
Course: CAEE 335
Instructor: Prof. Joshua Robbins
Equipment:

- Forney Machine
- Freeze Thaw Chamber
- Concrete cylinders
- Cement, fine and coarse aggregates
- Scales: digital and manual

Electrical, Lighting, and Indoor Environment Lab

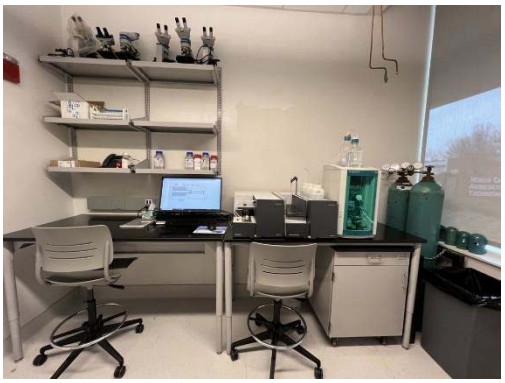
Location: Graham 302/304
Course: AREN 344
Instructor: Dr. Ahmed Megri
Equipment:

- Integrating Sphere
- VFD installations
- Ceiling fixtures with a separate panel
- Power quality analyzer
- Illuminance lighting meters
- Power and voltage monitoring
- Temperature and relative humidity sensors

Environmental Engineering Lab

Location: Monroe 201
Course: CIEN 311
Instructor: Dr. Renzun Zhao
Equipment:

- Turbidity meters
- pH probes
- DO probes
- Microscopes
  Analytical balance
- HACH spectrophotometer
- Various glassware
- Freeze dryer
- General purpose oven



TEACHING LABORATORIES

Fluids & Hydraulics Lab

Location: Graham 108
Course: CAEE 363
Instructor: Dr. Manoj Jha
Equipment:

- Hydraulic Bench
- Dead-weight pressure gage
- Orificemeter
- Venturimeter
- Air fan/pump
- Hydrostatic force apparatus
- Water Jet apparatus
- Thin-crested weir
- Broad-crested weir
- Hydraulic channel water flow apparatus

Soils/Geotechnical Lab

Location: Graham 110
Course: CIEN 321
Instructor: Dr. Miguel Picornell
Equipment:

- Unconfined compression tester
- Direct shear test devices (manual and with a data acquisition system)
- Oedometers (manual and with a data acquisition system)
- Triaxial test device with a data acquisition system

TEACHING LABORATORIES

HVAC Lab

Location: Graham 304
Course: AREN 363
Instructor: Dr. Raymond Tesiero
Equipment:

- Central Unit Heat Pump HP connected to a complete air distribution system (ADS) including five diffusers and one DDC
- Independent-pressure variable air volume VAV box, with BACnet
- Web-Server Building Automation System BAS with one global and two local controllers

Structural Engineering Lab

Location: Graham 110
Course: CAEE 335
Instructor: Dr. Taher Abu-Lebdeh
Equipment:

- Forney Universal Testing (400kip load capacity and a load rate of 12,000 lbs)
- MTS (Material Test System - MTS 810 Landmark Servohydraulic Testing system)
- Monotonic and cyclic loading testing frame data acquisition
- Hydraulic actuator

Surveying Lab

Location: Graham 110
Course: CAEE 204
Instructor: Prof. Joshua Robbins
Equipment:

- Leica Geosystems
- Automatic level
- Reflector pole
- Anticrush bipod
- Site pro-60’ level rod
- Flagging
- 25’ tape, Folding ruler, Tripod

RESEARCH PROGRAMS

Digital Urban Research Innovation Lab (DURI)

Lab Director: Dr. Shuva Chowdhury
Lab Location: MERIC 280

Research Interest/Questions:

- Developing and evaluating hybrid mixed-reality (AR-VR) applications in real-time collaboration to measure cognitive and physiological behavior at the design decision making phases of building design and construction.
- Developing and evaluating digital twin model as an integral part of building.
- Developing and assessing of AI algorithm on optimizing building forms, plans and façade design.
- Developing and evaluating an integrated system with the drones and robotic arms to sync computer-agents and human-agents to collaborate remotely effectively in data collection (as point-cloud data) and automating design and construction phases.

Computational Tools:

- Rhinoceros-Grasshopper
- Unreal Engine
- Unity 3D
- Open AI
- Autodesk Software
- Fuzor
- Arkio

Courtesy LO Tian Tian, An AR based Urban Dynamics Collaboration, Harbin Institute of Technology, Shenzhen, China

Instruments:

Equipment	Purpose
Dell Alienware Desktop Computers (quantity 5)	To develop AR-VR application in remote virtual collaboration, simulation and analyses
Oculus Meta Pro Headset (quantity 4)	Head-mounted Headsets for immersive virtual reality experience
EPOC Flex Saline Sensor Kit (quantity 2)	To measure the mixed-reality cognitive behavior
Microsoft Holo lens 2 (quantity 2)	Augmented –reality headset to use in real construction or design sight in semi-immersive environment
Ipad Pro (quantity 1)	Affordable LiDAR Scanning and Integrating with the real-time augmented or non-augmented design collaboration.
DJI Phantom 4 Pro V2.0 /EXO DRONE (quantity 1)	Making photogrammetry model of a large building in different elevation
UFACTORY xArm 5 Lite Robotic Arm (quantity 1)	Developing a scaled toolpath for robotic arm to collaborate in fabricating modular assembly of building automation.
Licenses of Rhinoceros and Unity3D	Network licenses for Rhinoceros 7 and Unity3D to develop the application packages.

RESEARCH PROGRAMS

Energy, Lighting, and Indoor Environment

Lab Director: Dr. Ahmed Megri
Lab Location: Graham 302

Research Interests:

- Integration of Zonal Models/Building Energy Simulation Models
- Zero Net Energy (ZNE) building
- Airflow in Multizone Buildings & Smoke Control
- Thermal Comfort & Indoor Air Quality (IAQ)
- Integrating Renewable Energy Systems in Buildings
- Energy, HVAC, Plumbing & Fire Protection Systems
- Computational Fluid Dynamic (CFD)
- BIM & REVIT: Electrical/Lighting Design Systems & MEP
- Data Mining and Machine Learning: Support Vector Machine tools
- Ontology Development, Big Data
- 3D printing and Advanced Manufacturing

Computational Tools:

- Transient Heat Transfer Simulation Programs
- Computational Fluid Dynamics programs
- Building Energy Simulation Software, such as EnergyPlus
- Lighting Simulation Programs
- Zonal Models: POMA, POMA+, POMME, POMME+, and others

Instruments:

Equipment	Purpose
Integrating Sphere (1 meter diameter)	Lighitng Measurement: Illuminance, Luminance, lighting Spectrum
Kestrel Heat Stress Tracker	Heat Stress measurements
Kestrel Indoor Environment & Thermal Comfort	Thermal Comfort measurement
Lighting Meter measurement	Illuminance
FLIR E8xt IR Camera w/MSX and Wi-Fi, 320 x 240 Resolution, 9Hz	Energy Audits
Plastic 3D-printers	Outreach Programs & Education
Onset HOBO and In Temp Data Loggers	Thermal Environment measurement, Energy Audit
Three-Phase Power Quality Analyzer	True Power, Apparent power, Reactive Power
Kestrel Indoor Environment & Thermal Comfort	Heat Stress, Thermal Comfort, & Indoor Environment

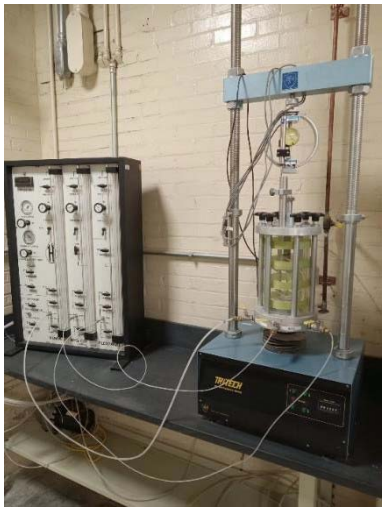
RESEARCH PROGRAMS

Geotechnical/Soils Lab

Lab Director: Dr. Miguel Picornell
Lab Location: Graham 110

Research Emphasis:

- Soil identification tests
- Permeability of soils in laboratory and in the field
- Mechanical and chemical stabilization of soils
- Consolidation of fine-grained soils
- Shear strength of coarse- and fine-grained soils



Computational Tools:

- Transient Heat Transfer Simulation Programs
- Computational Fluid Dynamics programs
- Building Energy Simulation Software, such as EnergyPlus
- Lighting Simulation Programs
- Zonal Models: POMA, POMA+, POMME, POMME+, and other

Research Facility:

- One thousand square feet laboratory space
- All basic equipment of a traditional geotechnical lab
- Several consolidometer cells and loading frames hooked to a data acquisition unit with an ADU/PC
- An unconfined compression tester hooked to a data acquisition unit monitored with a PC
- A direct shear testing device attached to a data acquisition unit with an ADU/PC
- A traditional triaxial test set up
- A stress path triaxial test device will available at the end of the Spring semester.

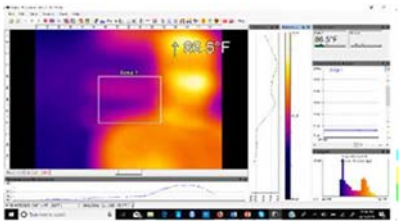
RESEARCH PROGRAMS

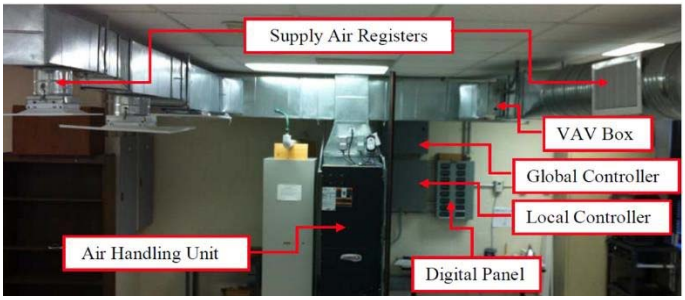
Heating Ventilation & AC Research Lab (HVAC)

Lab Director: Dr. Raymond Tesiero
Lab Location: Graham 304

Research Interests:

- Integration of Zonal Models/Building Energy Simulation Models
- Zero Net Energy (ZNE) building
- Airflow in Multizone Buildings & Smoke Control
- Thermal Comfort & Indoor Air Quality (IAQ)
- Integrating Renewable Energy Systems in Buildings
- Energy, HVAC, Plumbing & Fire Protection Systems
- Computational Fluid Dynamic (CFD)
- BIM & REVIT: Electrical/Lighting Design Systems & MEP
- Data Mining and Machine Learning: Support Vector Machine tools
- Ontology Development, Big Data
- 3D printing and Advanced Manufacturing





Computational Tools:

- Trane Trace 3D
- eQuest
- BeOpt
- REVIT (BIM)

Instruments:

Equipment	Purpose
Central Unit Heat Pump with ADS (Lennox CBX32MV-036-230-6-04)	Air Distribution System (5 diffusers and one DDC independent-pressure variable air volume (VAV) box for labs).
BACnet Web-Server Building Automation System (BAS)	One global and two local controllers with Web based BAS for HVAC system labs
Digital Readout Panel	Easy Access to Data Parameters
Multiple Psychrometric Handheld Digital Meters	Collecting Real-time Psychrometric Data for HVAC labs
Lab-Volt Heat Pump Skills Trainer 3411-20	HVAC labs and System and Principles of Heat Pumps
Lab-Volt Air Conditioning Skills trainer 3415-20	HVAC labs and System and Principles of Air Conditioning
Frigidaire 8000 BTU Window –Mounted Room Air Conditioner with Supplemental Heat (FRA08PZU1)	HVAC labs and System and Principles of Room Air Conditioning
Frigidaire 5000 BTU Portable Room Air Conditioner (FRA053PU1)	HVAC labs and System and Principles of Room Air Conditioning

RESEARCH PROGRAMS

Solid Liquid Innovation Lab (SLI)

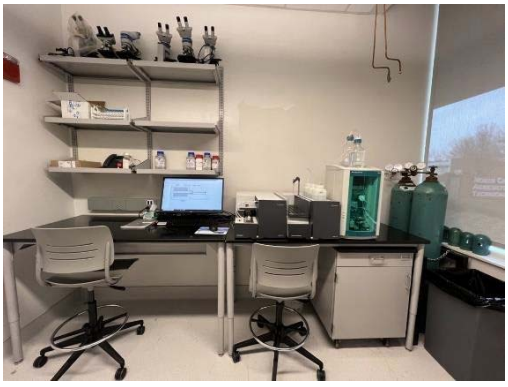
Lab Director: Dr. Renzun Zhao
Lab Location: MERIC 270

Research Interests:

- New emerging contaminants (PFAS, PAH, 2,4-D, etc.) detection and treatment.
- Recalcitrant organic matter (e.g. humic substances) identification, characterization and remediation.
- Short-cut Biological Nitrogen Removal (BNR) development and applications
- Organic nitrogen detection, characterization and treatment.

Lab Instruments:

- Shimadzu TOC-VCSN Total Organic Carbon Analyzer
- HACH DR6000 Spectrophotometer with Auto Sipper and HACH DRB 200 Digester
- HACH DR3900 Spectrophotometer
- Eppendorf BioFlo 120 Fermentor with 1 L and 5 L vessels
- Shimadzu UV 1700 UV-vis spectrometer
- YAMATO SM52 Autoclave
- INNOVA 4230 Refrigerated Incubator Shaker
- Precision Mechanical Convection Incubator
- HACH 2100AN Turbidmeter
- LABCONCO Fume Hood
- Two Phipps & Bird Six Paddle Jar Testers
- Two Thermo EASYPURE Deionized Water Generators
- Fisher Water Bath
- Two Fisher Microbalances
- Thermo Micro Furnace
- Pellet Press for FTIR
- Challenge Technology Respirometer
- Two VWR Refrigerator for Research Samples



RESEARCH PROGRAMS

Structural Engineering Lab (SEL)

Lab Director: Dr. Sameer Hamoush
Lab Location: Graham 115

Research Interests:

- Preparing and testing reinforced and unreinforced concrete elements.
- Subsurface detection and mapping of pipe networks and elements.
- Non-destructive inspection and assessment of reinforced concrete elements.

Computational Tools:

- GSSI post-processing software (RADAN)
- Defect detection machine learning models (Python)
- Modeling and visualization tools (MATLAB)

Testing and Inspection Equipment:

Equipment	Purpose
IPA10023, 100 Ton, H-Frame Hydraulic Press with RC10010 Single-Acting Cylinder	Three point testing machine of small-scale beams
MTS 50 Universal Testing Machines	Compression or tension testing of concrete and steel elements
GSSI SIR 4000	Ground penetrating radar used for underground scanning and mapping
Proceq GS8000	GPR for Mapping and visualizing underground elements
GSSI StructureScan Mini	Portable GPR used for subsurface scanning of concrete structures and mapping reinforcement
50 ton- Full Scale Test system, Monotonic and cyclic	Loading and testing of full scale beams and vertical walls

RESEARCH PROGRAMS

Sustainable Civil Engineering Infrastructures Lab (SCEI)

Lab Director: Dr. Taher Abu-Lebdeh
Lab Location: Graham 110/115

Research Interests:

- Investigating sustainable construction materials.
- Utilization of recycled and waste materials in various construction applications
- Constitutive modeling of material behavior
- Damage and Fracture Mechanics
- Modeling and simulation of powder behaviors using Discrete Element Method
- Modeling and simulation of structural behaviors using Finite Element Method
- Effect of supplemental material on the Hydration Kinetics of Cement
- Evaluation of the Raking Energy in Damping System of Steel Structures
- Seismic assessment of reinforced concrete frames
- Flexural and tensile characteristics of micro-fiber reinforced very high strength concrete thin panels

Computational Modeling and Simulation Tools:

- Finite Element Analysis/Simulation Software: ANSYS, ABAQUS
- Discrete Element Analysis/Simulation Software: LIGGGHTS
- Structural Analysis Software: STAAD Pro
- Software for calculating fire dynamics: Fire Dynamics Simulator
- Modeling and visualization tools (MATLAB)

Instruments:

Equipment	Purpose
Mechanical testing and sensing machine (MTS)	Strength testing of steel and concrete
Universal Testing Machine (Forney) – 400 kips	Strength and modulus of elasticity of concrete
Fourier Transfer Infrared Spectroscopy (FTIR)	Monitor the chemical transformations of the cement paste
Scanning Electron Microscopy (SEM)	Microstructure characterization of the materials
Morphologi G4-ID Malvern	Physical and chemical particle characterization
Advantech L3P Sonic (Sifter Separator)	Sieve analysis of power
Quantachrome Pycnometer	Solid density analyzers
Nova Quantachrome 2200s	Surface area and pore size analyzer

RESEARCH PROGRAMS

Transportation Modeling Lab

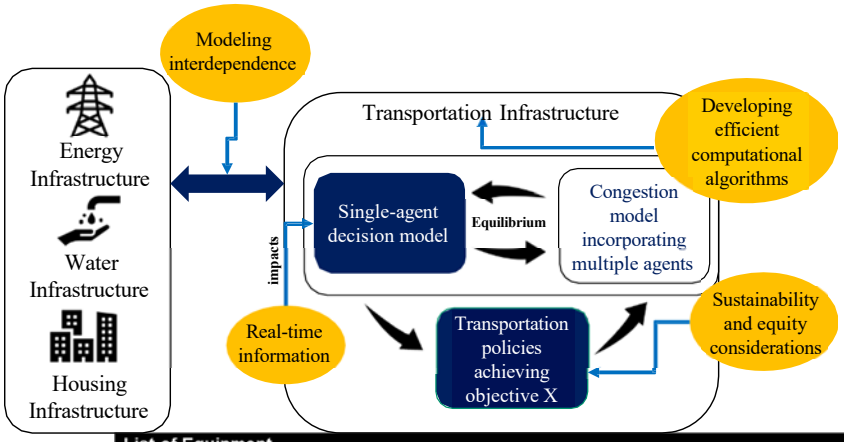
Lab Director: Dr. Venktesh Pandey
Lab Location: MERIC 280

Research Interests:

- Modeling equity and sustainability in design and delivery of future transportation systems
- Developing efficient computational algorithms to solve current transportation and logistics problems with innovative integration of foundational transportation principles
- Transportation planning and operations in the era of real-time information and mobility-as-a-service (such as express lanes, parking search, real-time logistics, and ridesharing)
- Interpretable, multiobjective stochastic control of intelligent transportation services and autonomous systems using data-driven algorithms
- Smart cities and integrated infrastructure models using networks theory

Computational Tools:

- Transportation planning: TransCAD, PTV Visum
- Traffic operations and simulations: TransModeler, PTV Vissim
- Spatial Analysis: ArcGIS Pro, QGIS
- Statistical analysis: R, Python
- Modeling and visualization programming: Java, Python, and MATLAB
- Traffic and driver behavioral surveys (Qualtrics)



Instruments:

List of Equipment

Equipment	*Purpose*
Dell Precision 7920 Tower (Intel Xeon Gold 6230, 3.9GHz Turbo, 20 Cores, 512 GB SSD Hard Drive, Windows 10, 64 GB RAM)	• Simulation of transportation software • Programming of efficient transportation algorithms • Spatial Analysis • Parallel computing and simulations
Dell Precision 7920 Tower (Intel Xeon Gold 5217 CPU @3.00 GHz x 32, 187.6 GB RAM, 500GB SSD)	
Dell Precision 7820 Tower (Intel Xeon Silver 4208 2.1GHz, 8 Cores, 512 GB SSD Hard Drive, Windows 10, 32 GB RAM)	
Dell Precision 7820 Tower (Intel Xeon Silver 4208 2.1GHz, 8 Cores, 512 GB SSD Hard Drive, Ubuntu Linux 18.4, 32 GB RAM)	

RESEARCH PROGRAMS

Water Resources Research Lab (WRRL)

Lab Director: Dr. Manoj Jha
Lab Location: Monroe 325

Research Interests:

- Analysis and modeling of hydrological processes of surface and subsurface water bodies
- Watershed modeling for hydrologic responses, and fate and transport of point and nonpoint source pollution
- Evaluation of agricultural and urban best management practices (BMPs) for its effectiveness to reduce sediment and nutrient losses.
- Development of modeling tools for planning and management of water resources
- Impact assessment of land use change and climate change on water resources

Computational Tools:

- Spatial Analysis: ArcGIS
- Watershed modeling: SWAT, APEX, HSPF, etc.
- Stormwater modeling (SWMM)
- Statistical analysis (SAS, R)
- Modeling and visualization tools (MATLAB)

Instruments:

Equipment	*Purpose*
DELL Precision Tower 5810 (16 CB memory, 1 TB storage, Xeon Processor; other versions (quantity 5)	Watershed modeling; In-stream water quality modeling and analyses
ISCO Model 6712 Full-Size Portable Sampler with 24-bottle configuration (Teledyne, Inc.)	Sampling of flow for lab analysis; digitally monitor flow in streams in high temporal scale
ISCO Model 750 Area-Velocity Flow module with low-profile sensor (Teledyne, Inc.)	Velocity profile measurement
ISCO Model 674 Tipping Bucket Rain Gauge (Teledyne, Inc.)	Rainfall measurement integrated with flow sampler
Flowlink 5.1 data retriever for ISCO equipment (Teledyne, Inc.)	Software with handheld device to retrieve data from the deployed sampler
ISCO Model 2150 Flow Module Accessories (Teledyne, Inc.)	Standalone flow measuring unit for streams
Troll 9500 Professional water quality module accessories (In-Situ, Inc.)	Record water level and water quality indicators in streams (PH, dissolved oxygen, turbidity, nitrate, chloride etc.)
Peristaltic Pump Kit, Level Tape (In-Situ, Inc.)	Groundwater sampling for water quality for shallow depth
600QS Multi-probe Water Quality Analyzer (YSI, Inc.)	Multiple parameter water quality data on spot measurement (groundwater, reservoir, stream, etc.)
Laboratory scale of Groundwater Flow Model	Lab demonstration of groundwater flow patterns
Adjustable side pole mount solar Panel	Power source for ISCO flow sampler
8-ft Measuring rod; 300-ft measuring tape; Chest waders; Buckets;	Additional accessories to support field work

COURSE DESCRIPTIONS

Source: Undergraduate Bulletin 2022-23
https://www.ncat.edu/provost/academic-affairs/bulletins/2022-23undergraduatebulletin.pdf

CAEE: CIVIL, ARCHITECTURAL, AND ENVIRONMENTAL ENGINEERING

CAEE 101. Graphics in CAEE **Credit 2(0-4)**
This course is critical to the development of visualization skills, which are important in engineering. Covered by the course are hand drawing skills including drafting, freehand sketching, perspective sketching, and lettering. Visualization skills are developed by stressing freehand techniques. Drafting skills will include plans, elevations, details, scaling, and units (US and Metric) and will relate to the three professions housed in the department. In addition to orthographic projections, oblique and isometric drawings will be taught. A brief introduction to computer graphics package such as AutoCAD will also be presented. (F)

CAEE 121. Colloquium **Credit 0(0-1)**
This course includes lectures, seminars and activities important to the retention and matriculation of civil and architectural engineering students. Topics covered include learning styles, group dynamics, and career development. Students are also provided with group advisement regarding department, college, and university-level policies and procedures. (S)

CAEE 202. Sophomore Colloquium **Credit 0(0-1)**
This colloquium assists students in their preparation for the End-of-Year exam required for CAEE Sophomores. Topics covered include: Math, Chemistry, Statics, Dynamics, and Strength of Materials. The course is pass/fail. (S)

CAEE 204. Fundamentals of Surveying **Credit 3(2-3)**
This course covers the theory and practice of plane, boundary, and topographic surveying instruments, theory of measurements, differential and profile leveling, traverse calculations, and topographical surveying and mapping. An introduction to horizontal and vertical roadway layout, site planning and development, and an overview of Geographic Information Systems and Global Posting Systems is also included. Prerequisite: MATH 102 or consent of instructor. (F;S)

CAEE 230. Statics Lab **Credit 1(0-3)**
This course provides hands-on practical approaches for solving engineering problems. Students will work in groups for solving engineering statics problems. Students must take this course as a co-requisite to CAEE 231. (F)

CAEE 231. Mechanics I – Statics **Credit 3(3-0)**
This course introduces the theory and application of engineering mechanics as it relates to statically determinant systems. Topics include basic forces, free body diagrams, vectors, resultants, equilibrium, pulley systems, rigid bodies, truss analysis, frame, pulleys, machines, internal forces in structural members, friction, center of gravity and centroids, moment of inertia, and composite bodies and areas. Prerequisites: MATH 131, PHYS 241 and CAEE 101. (F)

CAEE 232. Engineering Solid Mechanics I **Credit 3(3-0)**

This course covers stress and strain, axial and torsional loadings, bending moment and shear distributions from transverse loads, combined stress analysis, deformation and deflection of shafts and beams, transformation of stress and strain, column buckling, and an introduction of the analysis of statically determinate beams. Prerequisites: CAEE 231 and MATH 132. (S)

CAEE 240. Numerical Methods and MATLAB **Credit 3(0-6)**

This course covers the basic of MAT LAB programming language and the use of the language in solving problems in linear algebra, matrix theory, and manipulation of polynomials, interpolation, differentiation and integration. Computational methods for the solution of mathematical problems are presented. Prerequisites: MATH 231, Corequisite MATH 341. (S)

CAEE 304. Applied Statistics Reliability Decision Theory in CAEE **Credit 3(3-0)**

This course will introduce the students to probability theory and statistics. Reliability theory and Decision analyses are introduced. The course will incorporate simplified examples of applications of decision analysis, modeling of system response, and system reliability in the different areas of the civil and architectural engineering. The use of common statistical tools in the selection of design parameters will be presented. Students will be introduced to concepts of sampling distributions and confidence intervals. Prerequisite: Junior standing. (S)

CAEE 325. Structural Analysis **Credit 3(3-0)**

This course introduces the concepts of structural analysis for determinate and indeterminate structural systems using both hand calculations and computer applications. Prerequisite: CAEE 232. (F;S)

CAEE 330. Construction Materials and Methods **Credit 3(3-0)**

The course covers the manufacture and properties of mineral and bituminous cements and mineral aggregates. It explores the mechanical and chemical properties of Portland cement concrete, bituminous concrete, masonry units, and timber products. Also, this course will introduce the student to the use of construction materials in buildings. Prerequisites: CAEE 204 and CAEE 332. (F)

CAEE 334. Engineering Mechanics II Dynamics **Credit 3(3-0)**

This course covers the basic principles of classical mechanics applied to the motion of particles, systems of particles, and rigid bodies; kinematics; rectilinear and curvilinear motions; kinetics: force, mass, and acceleration; energy and momentum principles. Topics include coordinate systems, work-energy, impulse-momentum, and selected topics from three-dimensional rigid bodies. The course also includes the use of computational software to solve numerical problems. Prerequisites: MATH 132, PHYS 242 and CAEE 331. (F;S)

CAEE 335. Construction Materials Laboratory **Credit 1(0-2)**

This course offers an introduction to testing techniques for construction materials including concrete, masonry, wood, and bitumen and introduce the student to experimental to evaluate behavior of structural systems such as reinforce structural members. Prerequisite: CAEE 232. Corequisite: CIEN 330. (F)

CAEE 362. Engineering Fluid Mechanics and Hydraulics **Credit 3(3-0)**

This is the first level engineering fluid mechanics course which also integrates fundamental hydraulics concepts and applications pertinent to Civil, Architectural, and Agricultural Engineering. Topics include properties of fluids, hydrostatic pressure and manometry, forces on submerged surfaces, Pascal's Law, Archimedes' Principle, the Bernoulli and energy equation for steady state flow, Reynold's transport theorem, energy and hydraulic grade lines, head loss calculations, momentum principle, flow and velocity measurement, pumps, branched and looped pipe systems and analysis of open channel flow, sub and super-critical flow, hydraulic jump, and dimension analysis. Prerequisites: CAEE 231 and MATH 231. (F;S)

CAEE 363. Engineering Fluid Mechanics and Hydraulics Laboratory **Credit 1(0-2)**

This course includes a set of laboratory exercises designed to reinforce and demonstrate engineering fluid mechanics and hydraulics concepts. Topics include graphical analyses of experimental data, fluid properties, manometry, and hydrostatic forces on surfaces. Bernoulli and energy equations demonstrations, impact of a jet, orifice flow and coefficients of contraction, velocity and discharge, pipe friction, broad and sharp-crested weirs, water surface profiles, Hydraulic jump, and flow through sills and throats. Prerequisite: CAEE 362 or consent of instructor. (F)

CAEE 400. Engineering Topics Review **Credit 1(1-1)**

This course covers and reviews the engineering topics included in the General Engineering Sections of the Fundamentals of Engineering (FE) exam. The course emphasizes extensive problem solving and helps students prepare for the FE exam. Prerequisite: CAEE 232. (F)

CAEE 401. Engineering Topics Review **Credit 0(0-2)**

This course is a review course for students taking the Fundamentals of Engineering Exam. (S)

CAEE 430. Structural Design in Steel **Credit 3(3-0)**

This course will introduce the students to the preliminary design of structural systems and element design in structural steel. The students will be taught to define structural system layouts, structural loads and design simply supported steel joists, beams, and columns. Prerequisite: CAEE 232. Corequisite: CAEE 325. (F, S)

CAEE 436. Reinforced Concrete **Credit 3(3-0)**

This course is a continuation of CAEE 430 emphasizing the concepts of reinforced concrete theory. The design of doubly reinforced beams, continuous beams, and beam-column behavior of concrete columns is addressed. Such topics as beam deflections, reinforcing bar bond stresses, and development lengths are also presented. Prerequisite: CAEE 325. (F)

CAEE 450. Construction Engineering and Management **Credit 3(3-0)**

This course is an introduction to construction engineering emphasizing project site and field engineering and construction cost estimating, including project planning methodology, management and material testing. The course will also introduce construction equipment and methods, contracts, project specifications, general conditions and requirements including project safety and environmental health and other related topics. Prerequisite: Senior standing. (S)

CAEE 481. Construction Engineering **Credit 3(3-0)**

This course is an introduction to construction engineering emphasizing project site and field engineering and construction cost estimating, including project planning methodology, management and material testing. The course will also introduce construction equipment and methods, contracts, project specifications, general conditions and requirements including project safety and environmental health and other related topics. Prerequisite: Senior standing. (F)

CAEE 482. Construction Project **Credit 3(1-4)**

This course is an introduction to engineering project management, with particular emphasis placed on the project planning and control of the engineered design project and systems including buildings and other engineered structures. Topics covered include, project planning, control, resource leveling and optimization. Manual and automated methods will be addressed. Prerequisite: CAEE 481. (S)

CAEE 485. Special Topics in Civil and Architectural Engineering **Credit 3(3-0)**

Study is arranged on a special civil and architectural engineering topics of interest to students and faculty. Topics are to reflect new technologies on the civil and architectural engineering areas. (DEMAND)

CAEE 496. Special Projects in Civil and Architectural Engineering **Credit 3(3-0)**

Study is arranged on special civil and architectural engineering projects of interest to students and faculty. Projects discussed can be design, analysis or experimental studies. (DEMAND)

CIEN: CIVIL ENGINEERING

CIEN 101. Civil Engineering Professional Issues & Problem-Solving **Credit 1(0-2)**

This course provides the student with some exposure to civil and environmental engineering problems. Lectures from faculty and consulting engineers are components of this course as well as working in teams and presentation techniques. This course will provide help in engineering applications of calculus, chemistry, and physics. In addition, issues related to civil engineering licensure and professional practice will be discussed. Prerequisite: Freshman standing. (F;S)

CIEN 102. Professional Issues & Problems in Civil Engineering **Credit 1(0-2)**

This course provides the student with exposure to civil and environmental engineering issues and problems. This is accomplished with lectures from faculty and professional engineers and other practicing civil engineers. This course will provide help in engineering applications of Calculus II, and/or Physics I and Chemistry. Prerequisite: Freshman standing. (F;S)

CIEN 212. Fundamental Principles in Environmental Engineering **Credit 3(3-0)**

This course is an introduction of biological, chemical, and physical principles that are foundational in environmental engineering. Topics include mass balance, biological and microbiological processes, solution precipitation reactions, Henry's law, chemical kinetics, diffusion, and mass transfer. Prerequisites: CHEM 106, MATH 131 and 132. Corequisite: MATH 431. (F;S) (DEMAND)

CIEN 280. Civil Engineering Graphics and Computer Aided Design **Credit 3(1-4)**
This course is critical to the development of important visualization skills in Civil Engineering (CE). Covered in the course are hand-drawing skills including engineering lettering, orthographic projections, oblique and isometric drawings. A brief introduction to computer graphics package such as AutoCAD will also be presented. This course will also provide an introduction to a computer-based design/drawing application such as AutoDesk and AutoCAD or Bentley Microstation. A land-based design software package such as Land Development Desktop (LDD) will be used to enter, create, edit and analyze point, line and polygon objects relevant to CE applications. Basic functions include creating surfaces, contours, calculation of cut and fill volumes and the generation of finished cross-sections. Prerequisites: CAEE 100, CIEN 101 (F;S)

CIEN 281. Civil Engineering Land CAD **Credit 1(0-2)**
A land-based design software package such as Land Development Desktop (LDD) will be used to enter, create, edit and analyze point, line and polygon objects relevant to CE applications. Basic functions include creating surfaces, contours, calculation of cut and fill volumes and the generation of finished cross-sections. Prerequisite: CAEE 101. (S)

CIEN 310. Environmental Engineering **Credit 3(3-0)**
This course provides an introduction to environmental pollution. Topics include physical, chemical and biological water quality parameters, water purification processes in natural systems, air pollution and solid waste management, and general design of waste control systems. Prerequisite: Junior standing. (S)

CIEN 311. Environmental Engineering Laboratory **Credit 1(0-3)**
This course provides selected experiments on the measurement of environmental pollutants. Topics include use of microscope, Gram stain, conform analysis, pH, alkalinity, hardness, DO, BOD, and control of microorganisms. Corequisite: CIEN 310. (S)

CIEN 320. Geotechnical Engineering **Credit 3(3-0)**
This course introduces the following topics: engineering mechanics and properties of soils, stresses and settlements in soils, earth pressures on structures, stability of slopes and embankments, and fundamentals of foundation selection and design. Prerequisites: CIEN 366 and CAEE 363. (S)

CIEN 321. Geotechnical Engineering Laboratory **Credit 1(0-3)**
This course will provide laboratory experiences in soil identification, classification, permeability, consolidation, indexing, and laboratory evaluation of shear and bearing strength of soils. Prerequisites: CAEE 362 and 363. Corequisite: CIEN 320. (S)

CIEN 350. Transportation Engineering **Credit 3(3-0)**
This course focuses on one mode of transportation, highway engineering. The major aspects of highway engineering covered are administration and finance, traffic engineering, traffic operations and safety, geometric design, highway materials, structural design, and highway planning and economics. Corequisite: CAEE 204. (F)

CIEN 364. Engineering Hydrology **Credit 3(3-0)**

This is a study of hydrologic cycle with emphasis on the application of surface and subsurface hydrology in water systems. Topics include hydrologic cycle and hydrologic abstractions, Rainfall-runoff relationships, characterization of watersheds, unit hydrograph analysis, stream flow measurement, flood routing, storm water management and design of detention systems, and frequency analysis of hydrologic data. Prerequisite: Junior standing. (S)

CIEN 403. Senior Seminar **Credit 1(0-2)**

This course is used to prepare the student for the Senior Exam, which is given as the final exam for the course. Included also are discussions on the ethics and professionalism. Each student prepares and presents to the class an original paper on a topic of engineering importance. Prerequisite: Senior standing. (F)

CIEN 405. Civil Engineering Topics Review **Credit 1(0-2)**

This course covers and reviews the Civil Engineering topics of the Fundamentals of Engineering (FE) exam. The course emphasizes extensive problem solving and helps students prepare for the FE exam. Prerequisite: Senior standing. (S)

CIEN 412. Environmental Engineering Design **Credit 3(3-0)**

This course defines the analysis and design of water and wastewater treatment systems. Topics included in the course are analysis and functional design of physical, chemical and biological treatment processes, pump stations, and sludge treatment processes.

CIEN 416. Solid Waste Management **Credit 3(3-0)**

This course is the study of the collection, storage, transport and disposal of solid wastes. Examination of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation will take place. Prerequisite: Senior standing. (DEMAND)

CIEN 422. Geotechnical Engineering II **Credit 3(3-0)**

This course is a continuation of CIEN 320 with emphasis on the behavior and design of retaining walls and shallow and deep foundations. Also, it will introduce the following topics: earth pressure, bearing capacity, settlement, behavior and design of anchored bulkheads, excavation bracing and buried structures, and response of deep foundations to vertical and horizontal loads. Prerequisites: CIEN 320 and 321. (F)

CIEN 453. Transportation Design **Credit 3(3-0)**

This course introduces students to the transportation design process through a series of comprehensive transportation design projects. Emphasis is placed on the utilization of existing facilities and creation of efficient new facilities through transportation systems management techniques. Energy, environment, mobility and community impacts are considered as measures of effectiveness in the design process. Prerequisite: CIEN 350. (S)

CIEN 460. Water Resources Engineering **Credit 3(3-0)**

This course is the study of the application of hydrologic and hydraulic principles in the analysis and design of water resources systems. Topics include hydraulic structures, system economics, water law, irrigation, hydroelectric power, navigation, flood control, and water resources planning. Prerequisite: CIEN 360. (DEMAND)

CIEN 483. Civil Engineering Systems Design I **Credit 1(0-3)**

In this course students work in teams to solve a practical and comprehensive civil engineering design project. Real world parameters including local codes, ordinances, and pertinent engineering practices are emphasized. Professional-level team presentation of civil engineering design projects using modern presentation tools/software is required. A final report and presentation are required. Corequisite: At least 2 of: CIEN 510, 520, 550, 560, CAEE 430, 536. (F)

CIEN 484. Civil Engineering Systems Design II (Capstone) **Credit 2(0-4)**

This is the capstone design course for the Civil Engineering program. Team solution, working with inter/intra-disciplinary sub teams, and professional-level team presentation and reporting are emphasized. A comprehensive final report with professional quality drawings and a presentation to a panel of faculty and local professionals is required. Prerequisite: CIEN 598. (S)

AREN: ARCHITECTURAL ENGINEERING

AREN 112. History of American Architecture **Credit 3(3-0)**

This course is an illustrated lecture course. It provides an analytical study of the major architectural and engineering developments that have shaped the American built environment from the arrival of the Europeans to the present. (F)

AREN 221. Building Sanitation and Fire Protection **Credit 3(3-0)**

This course is the study of the following: waste water, water supply and distribution; plumbing systems and fixtures; soil, water and venting systems; pipe sizing fire protection systems for buildings and pumps, sprinklers, gravity and pressure vessels, and controls. Lecture-problems course. (S) (DEMAND)

AREN 231. Materials and Methods of Construction **Credit 3(3-0)**

This course will introduce the student to the use of construction materials in buildings. An evaluation of both the function and form of the major building systems such as walls, floors and roofs will be presented. (F)

AREN 281. BIM and Introduction to Building Systems **Credit 2(0-4)**

This course presents an advanced series of problems for study of space analysis, space organization, form and function. The student applies the integration of design, construction methods, and methods of the organization of structural components to a design project. Prerequisite: CAEE 101. (S)

AREN 315. Advanced BIM **Credit 1(0-3)**

An advanced comprehensive building design course integrating architectural and engineering skills. This course is a course focused on Building Information Modeling (BIM) implementation on building design and construction projects. This course will explore how implementing BIM's new technology in the building design toward a collaborative building approach and how this relationship can lead to better project outcomes and maximize efficiency. Prerequisites: AREN 215. (S)

AREN 343. Heat Transfer and Applied Thermodynamics **Credit 2(2-0)**

This course provides the concepts of thermodynamics and heat transfer. Throughout the course, applications of these concepts will be discussed. In particular, real-world applications include heating and cooling buildings, and refrigeration. Specifically, the course covers the various forms of energy, how energy is transformed from one form to another, and the laws that govern energy transfer. Prerequisite: MEEN 241. (F)

AREN 344. Lighting and Electrical Power Laboratory **Credit 1(0-2)**

This laboratory provides hands on experiences that supplement the topics presented in AREN 448. Corequisite: AREN 348. (F)

AREN 348. Fundamentals of Illumination and Electrical Power **Credit 3(3-0)**

This course combines the basic study of building lighting and electrical distribution systems. Topics include light sources, numerical methods for lighting design, energy efficiency, basic electric circuits, single and three phase power, panel boards, circuit design and protection, motors loads, and transformers. Prerequisite: 242. Corequisite: AREN 344. (F)

AREN 363. HVAC Principles / Systems Laboratory **Credit 1(0-2)**

This laboratory provides hands on experiences that supplement the topics presented in AREN 364. Corequisite: AREN 364. (S)

AREN 364. HVAC Principles and Systems **Credit 2(2-0)**

This course is the study of heating, ventilation, and air conditioning (HVAC) principles and systems. Topics include heating loads, cooling loads, psychrometrics, the refrigeration cycle, energy efficiency; residential, commercial, and industrial HVAC systems; and air distribution. Prerequisites: PHYS 242, AREN 343, Corequisite: AREN 363. (S)

AREN 382. Architectural Design I **Credit 3(0-6)**

The student is introduced to the basic fundamentals of design, which includes space relationships, form, and visible structure. The course includes perspective drawing, plans, elevations, sections, shades, and shadows. Prerequisites: MATH 132, CAEE 232, and junior standing. (F)

AREN 387. Architectural Design II **Credit 3(0-6)**

This course presents a series of problems in space organization and planning. Presentation composition and the integration of structures in the design process are studied. Prerequisite: AREN 382 or junior standing. (S)

AREN 462. HVAC Design and Plumbing Systems **Credit 3(3-0)**

The course offers a complete and practical introduction to the design and operation of mechanical and plumbing systems in buildings. Prerequisite: AREN 364. (F)

AREN 467 Electrical Systems and Smart Buildings **Credit 3(3-0)**

Analysis and design of electrical systems in buildings using the National Electrical Code (NFPA_70). The topics include panel boards, motors, transformers, electrical distribution in buildings, grounding, methodology of reducing the available short circuit, and power systems harmonics. As well, this course includes the foundations of a smart building, communications systems, system control, electrical power management systems, and economics. Students will perform design project. Prerequisite: AREN 348. (S)

AREN 480. Senior Project I – Design Development **Credit 2(0-6)**

This course teaches students how to prepare the preliminary and design development documents for a building project. The materials covered include engineering calculations, preliminary and design development drawings, and preliminary cost estimate. Computer programs are used to assist the students with program development, floor plan development, site plan development, and the conceptual cost estimate. Prerequisites: Senior standing, AREN 382, CAEE 430, AREN 364, and 348 or consent of chairperson. Corequisite: AREN 462. (F)

AREN 483. Senior Project II – Construction Documents **Credit 3(0-6)**

This course teaches the student how to prepare a final set of discipline specific construction documents, including engineering calculations production drawings, and specifications. The student will discuss contracts, ethics, and construction administration as they relate to the project. Prerequisite: Senior standing, AREN 364, or AREN 383, or CAEE 430, or AREN 348 or consent of chairperson. (S)

Graduate Courses: MSCE: Master of Science in CIVIL ENGINEERING

Source: Graduate Catalog 2022-23
https://www.ncat.edu/tgc/graduate-catalog/grad-catalog-2022-23.pdf

CIEN 614 - Stream Water Quality Modeling **Credit 3.0**

This course includes mathematical modeling of water quality in receiving streams. Topics include the generation of point and nonpoint sources of pollutants, modeling and prediction of the reaction, transport and fate of pollutants in the stream, and the formulation and solution of simulation models. Prerequisite: CIEN 410. (DEMAND) 3.000 Credit hours

CIEN 616 - Solid Waste Management **Credit 3.0**

This course emphasizes the study of the collection, storage, transport and disposal of solid wastes. Examination of various engineering alternatives with appropriate consideration for air and water pollution control and land reclamation are considered. Prerequisite: Senior or graduate standing. (DEMAND) 3.000 Credit hours

CIEN 620 - Foundation Design I **Credit 3.0**

This course will introduce the following topics: behavior and design of retaining walls and shallow foundations, earth pressure, bearing capacity and settlement, stress distribution and consolidation theories, and settlement of shallow foundations. Prerequisite: CIEN 520. (DEMAND) 3.000 Credit hours

CIEN 640 - Advanced Structural Analysis **Credit 3.0**

This course emphasizes the more complex concepts of structural analysis for determinate and indeterminate structural systems using both hand calculations and computer software. Prerequisite: CAAE 325. (F;S) 3.000 Credit hours

CIEN 658 - Pavement Design **Credit 3.0**

This course is the study of the design of highway and airport pavement structures. Topics include flexible and rigid pavement, cost analysis and pavement selection, drainage, earthwork, pavement evaluation and maintenance. Prerequisite: CIEN 350. (DEMAND) 3.000 Credit hours

CIEN 670 - Construction Engineering & Management **Credit 3.0**
This course concentrates on the solution to problems in construction engineering and management. A variety of problems from the construction industry are presented to the students. The students form teams to develop solutions to these problems. Topics vary with available projects and student interest. Graduate students select a project in their area of interest for intensive study and submit a report. Prerequisite: Senior or graduate standing. (DEMAND) 3.000 Credit hours

CIEN 699 - Special Projects **Credit 3.0**
This course provides study arranged on a special civil engineering topic of interest to the student and faculty. Topics may be analytical and/or experimental with independent study encouraged. Prerequisite. Consent of instructor. Note: May be repeated for credit. 3.000 Credit hours

CIEN 700 - Emerging Technologies in Civil Engineering **Credit 3.0**
Provides an overview of the applications of emerging technologies (such as decision support systems and Geographic Information Systems) in civil engineering. The students are required to complete a project which includes the design and implementation of one of the types of systems covered in the course. 3.000 Credit hours

CIEN 702 – Civil Engineering Systems Analysis **Credit 3.0**
Introduces mathematical modeling techniques for the solution of civil engineering problems. These include the formulation of mathematical representation of complete civil engineering systems and their evaluation via linear programming, dynamic programming and the use of formal heuristics. Multiobjective analysis, project management and civil engineering planning and design are also presented. 3.000 Credit hours

CIEN 735 - Wind & Earthquake Design **Credit 3.0**

CIEN 754 - Modeling of Transportation Systems **Credit 3.0**
This course is concerned with the development and use of system models associated with transportation decision making. The modeling techniques that will be used are the following: multiple 3.000 Credit hours

CIEN 785 - Selected Topics **Credit 3.0**
Allows a student to select a civil engineering topic of interest to the student to investigate in depth. The topic will be selected by the student and a faculty advisor before the beginning of the semester. The topic must be pertinent to the study program of the student and must be approved by the faculty advisor. Note: May be repeated for credit. 3.000 Credit hours

CIEN 786 - Special Projects **Credit 3.0**
Student must select a project on a special civil engineering topic of interest to the student and a faculty member, who will act as an advisor. The student and faculty advisor must agree upon the project and scope of work before the beginning of the semester. The project may be analytical

and/or experimental and encourage independent work. The topic must be pertinent to the program in which the student is enrolled and approved by the faculty advisor. (F;S) Note: May be repeated for credit. 3.000 Credit hours

CIEN 792 - CIEN Master's Seminar **Credit 1.0**

Discussion and presentations of reports of subjects in Civil Engineering and allied fields are included. Prerequisites: Graduate Standing. (F;S) 1.000 Credit hours

CIEN 793 – Master's Supervised Teaching **Credit 3.0**

Students will gain teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student completion of the assignment. 3.000 Credit hours

CIEN 796 – Master's Project **Credit 3.0**

The student will conduct advanced research of interest to the student and the instructor. A written proposal, which outlines the nature of the project, must be submitted for approval. This course is only available to project option students. 100 Uncompromising Excellence: A Blueprint for the Future. 3.000 Credit hours

CIEN 797 - Master's Thesis **Credit 3.0**

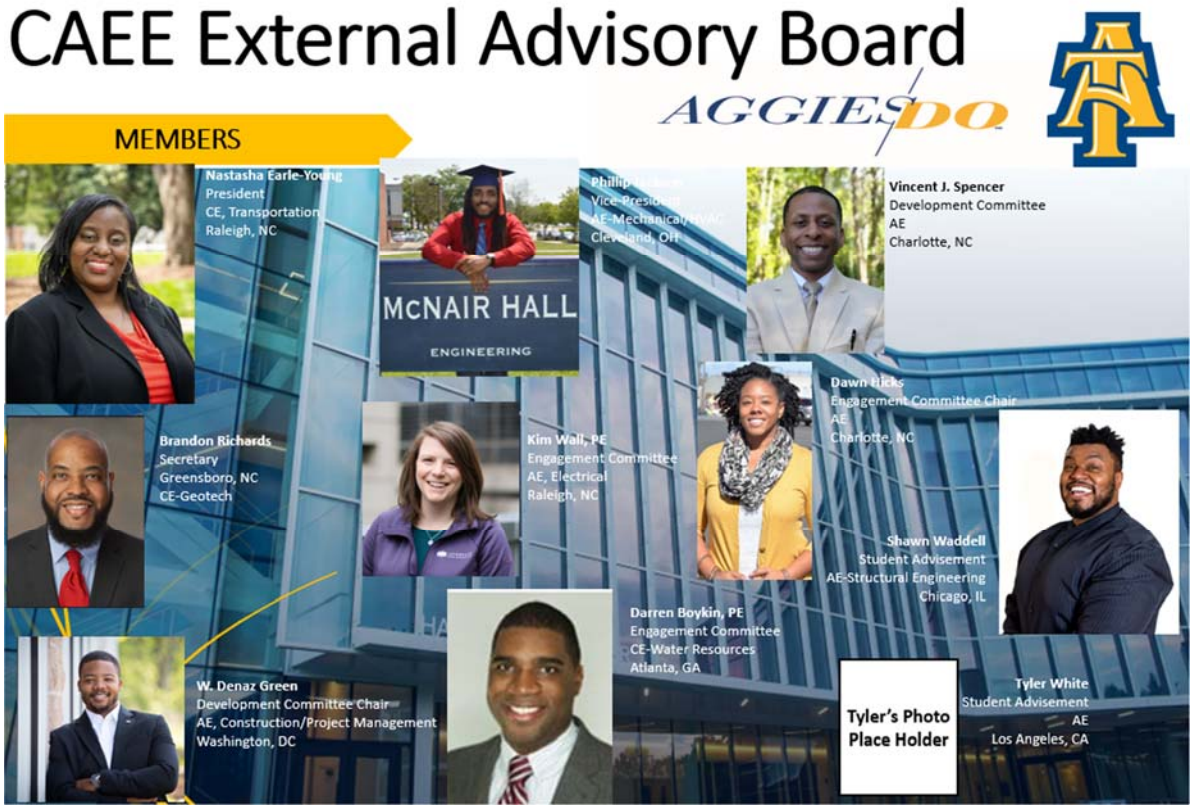
Master of Science thesis research will be conducted under the supervision of the thesis committee chairperson leading to the completion of the Master's Thesis. This course is only available to thesis option students. Note: May be repeated for credit. 3.000 TO 6.000 Credit hours

CIEN 799 - Continuation of Thesis **Credit 1.0**

This optional course allows the student to maintain full-time enrollment status after the completion of the Masters' Project (CIEN 796) or Masters' Thesis (CIEN 797) credit-hour requirements. The course may also be taken to allow the student time to complete a Masters' project, thesis write-up and preparation for Masters' project or thesis defense. Completion of all required course work and Masters' project or thesis credit-hour requirements. (F;S) Note: May be repeated for credit.

MESSAGE FROM THE External Advisory Board

The Department of Civil, Architectural and Environmental Engineering (CAEE) External Advisory Board (EAB) began in the Fall of 2017 under the leadership of the current Interim Dean of the COE, Dr. Stephanie Luster-Teasley, with a vision to serve both the department faculty, alumni and students. Over the years our Board Members, both past and present have acted on a collaboration of ideas to promote the vision of service to our Aggie Family in the form of presentations, donation solicitations directly to the CAEE Department, advisement, resume development support, Senior Project critiques, and even Department Chair support for Southern Association of Colleges and Schools (SACS) Accr editation. Your EAB looks forward to continuing development and support relationships with the faculty, alumni and students of the CAEE department. We would love to hear how we could implement any ideas you have that would facilitate the academic growth of our department. Please engage with our future communications and workshops so you can provide input or ask questions. Feel free to contact me at the email below. And, remember family, Aggies DO!



Best Wishes for your Success

Thanks for Choosing North Carolina A&T

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https://www.ncat.edu/coe/departments/caee/index.php