North Carolina Agricultural and Technical State University

College of Engineering

Department of Computational Science and Engineering

Introduction of Computational Software Tools

Course Syllabus

Course Information

Course Number/Section:	*CSE 620*	*CRN: 10759*
Term:	*Fall 2020*	
Semester Credit Hours:	*3*	
Times and Days:	*Tuesday/Thursday*	*2:00 – 3:15pm*
Class Location:	*TBD*	
Virtual Location if needed:	*https://ncat.zoom.us/j/92225363182?pwd=MnhnSVlTNUgvRnhlOUljTTI2L2VGdz09&from=addon*	

Instructor Contact Information

Instructor	*Dr. Kristen L. Rhinehardt*
Office Location	*117 Fort IRC*
Office Phone	*(336) 285-2881*
Email Address	*klrhineh@ncat.edu*

Student Hours: Tuesdays/Thursdays 12:30-1:15pm via virtual media with additional hours by appointment if you request assistance.
https://ncat.zoom.us/j/97513235532?pwd=bjkyUXA2Q0xpWE1nZVRGTUVRWG5VQT09&from=addon

Note: Students are responsible for reading, understanding, and following their syllabi.

Course Pre-requisites:
Permission of the Instructor

Course Description

This course covers the introduction and application of commonly used computational tools including computer algebra systems, interpreted languages used as scripting languages, and programming. This course also covers the basics of computational science including finite precision arithmetic, logic, and algorithmic design. Specifically, the course covers the introduction and application of commonly used tools including computer algebra systems, interpreted languages such as scripting languages, and time permitting compiled programming languages. All the course presentations and exercises require the use of Linux systems.

SACS and ABET Student Learning Objectives/Outcomes

SACS Outcomes:

1. **Objective:** Effectively employ critical thinking skills in written and oral communication *Outcome:* Students will demonstrate the ability to employ critical thinking skills in written response to essay questions on examinations and assessment in assigned projects.
2. **Objective:** Use analytical thinking skills to evaluate information critically. *Outcome:* Students will demonstrate the ability to employ analytical skills in written responses to exercises, in class discussions, analysis of case studies and on questions on examinations.
3. **Objective:** Apply multiple modes of inquiry, including quantitative and qualitative analysis, to formulate, describe, evaluate, and solve problems. *Outcome:* Students will demonstrate the ability to employ multiple modes of inquiry in class discussions and written responses to exercises and examinations.

Measurement of learning the objectives:

- Problem sets with exercise assignments and exams will be used regularly to measure both the understanding of the fundamental concepts presented as well as students' abilities to apply this understanding to problems in classical field theory. Both exercise sets and exams provide an opportunity to evaluate the progress of the students' reasoning and mathematical skills.

ABET Outcomes:

The goal of this course is to give students a working knowledge of the tools used in computational science and the other core courses in the CSE curriculum.

Key outcomes include:

- Understanding computing systems for developing computational models, performing data analysis and scientific communication.
- Proficiency with interpreted languages used for scripting to modify files, extract data and combine system commands.
- Mastery of programming languages to implement complex models and develop fast performing solutions.

Required Textbooks and Materials

Required Texts:

1. *Practical C++ Programming, by Steve Oualline, O'Reilly Media. ISBN 978-0-596-00419-4*
    a. *Note: A digital copy is available upon request*

Required Materials:

Access to a computer with a minimum of 4GB of Ram, 10GB of available storage and a dual core processor. Windows 10, Linux or Mac OS.

Suggested Course Materials
Suggested Readings/Texts:
See instructor for suggestions.

Suggested Materials:
See instructor for suggestions

Grading Policy

Assignments and Grading Policy

94% and above	A	76% - 74%	C
93% - 90%	A-	73% - 70%	C-
89% - 87%	B+	69% - 67%	D+
86% - 84%	B	66% - 64%	D
83% - 80%	B-	63% - 60%	D-
79% - 77%	C+	60% - 00%	F

Grading Allocation
Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows:

Discussions, Attendance and Participation:	5%
Quizzes*:	10%
Final Project:	15%
Assignments:	20%
Mid-Term Exam:	20%
Final Exam:	30%

*Computer activities and quizzes may also be given at various times throughout the semester and may be part of this assessment. Emphasis will be on competency and communication of the material. It is a student's responsibility to regularly calculate his or her point total and confer with the instructor for verification.

Course Policies

Use of Blackboard as the Learning Management System
Blackboard is the primary platform for instructor announcements, access to the syllabus and graded assignments. Students are expected to access Blackboard daily for pertinent information regarding the course.

Make-up exams
Excused absences will comply with the following university policy on make-up work: Illness (written verification needed); death of relative (immediate family); participation in an approved university-related activity; acting in the capacity of a university representative (band, choir, sports related travel, etc.); extraordinary circumstances (e.g. court appearances, family emergencies), at

the discretion of the instructor, may require a signed statement. **Other reasons for class absences are not acceptable.** For those situations where absences are anticipated, the instructor is to be notified as soon as possible, no less than two weeks prior to the expected absence. Written verification of excused absences is required. Written verification must be provided within a week of the absence. Informing the instructor in advance of an excused absence (see acceptable excused absences above) will still require written documentation explaining why the absence occurred. The instructor reserves the right to verify all written excuses for veracity. For make-up work, points will be assigned based on either completion of the work, or the instructor has the option to assign the student points based on a normalized score from other similar assessments in the semester.
See 2018-2019 Undergraduate Bulletin:
http://www.ncat.edu/divisions/academic-affairs/bulletin/2018-2019/

Extra Credit
If extra credit assignments are offered, these assignments will be open for all students to complete. ***No individual extra credit assignments will be made.***

Late Work
Assignments not turned in when collected will be considered incomplete and there is no guarantee that they will receive any credit.

Class Attendance
It is University policy and my expectation that you will attend class. Poor class attendance results in poor grade performance. Make-up examinations will be given in accordance with University policy (2017-2018 Undergraduate Bulletin).

Classroom Citizenship*:* Courtesy, civility and respect must be the hallmark of your interactions.

Compliance with the Americans with Disabilities Act
North Carolina A&T State University is committed to complying with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 by providing equal access to the programs, services and benefits to qualified students with disabilities. All reasonable efforts must be made to accommodate the needs of students with documented disabilities. **If a student has a disability that qualifies under the American with Disabilities Act Amendments Act (ADAAA) and requires accommodations, he/she should contact or visit the Office of Accessibility Resources (OAR) located in Murphy Hall, Suite 01 or at (336) 334-7765 for information on appropriate policies and procedures. Disabilities covered by ADA may include learning, psychiatric, physical disabilities, or chronic health disorders. Students can contact the Office of Accessibility Resources if they are not certain whether a medical condition/disability qualifies. *Please note that approved accommodations must be adhered to by law but cannot be performed retroactively!***

Title IX
North Carolina A&T State University is committed to providing a safe learning environment for all students, is 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 or Student Health Center.

Technical Support
If you experience any problems with your A&T account you may call Aggie Tech Support (formerly Help Desk) at 336.334.7195 or http://www.ncat.edu/divisions/its/dept/ats/

Student Handbook: http://www.ncat.edu/student-affairs/student-services/dean/student-handbook.html

Student Travel Procedures and Student Travel Activity Waiver http://www.ncat.edu/student-affairs/division-assets/downloads/information/studen_activity_travel_waiver.pdf
Description of any travel and/or risk-related activity associated with this course.

Other Policies (e.g., copyright guidelines, confidentiality, etc.)
Student Handbook http://www.ncat.edu/student-affairs/student-services/dean/student-handbook.html

Sexual Misconduct Policy http://www.ncat.edu/student-affairs/student-services/dean/sexual-misconduct.html

Family Educational Rights and Privacy Act http://www.ncat.edu/registrar/ferpa/

Student Complaint Procedures: http://www.ncat.edu/student-affairs/student-resources/student-complaint-form.html

Student Conduct & Discipline
North Carolina A&T State University has rules and regulations that govern student conduct and discipline meant to ensure the orderly and efficient conduct of the educational enterprise. It is the responsibility of each student to be knowledgeable about these rules and regulations.

Please consult the undergraduate bulletin: http://www.ncat.edu/divisions/academic-affairs/bulletin/2018-2019/index.html, graduate bulletin: http://www.ncat.edu/tgc/graduate-catalog/2018-2019/NCAT%20Graduate%20Catalog%202017-18.pdf , and Student Handbook ***http://www.ncat.edu/student-affairs/student-services/dean/student-handbook.html*** about specific policies such as academic dishonesty, cell phones, change of grade, disability services, disruptive behavior, general class attendance, grade appeal, incomplete grades, make up work, student grievance procedures, withdrawal, etc.

Academic Dishonesty Policy
Academic dishonesty includes, but is not limited to, the following:

1. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty;
2. Plagiarism (unauthorized use of another's words or ideas, as one's own), which includes, but is not limited to, submitting exams, theses, reports, drawings, laboratory notes, or other materials as one's own work when such work has been prepared by or copied from another person;
3. Unauthorized possession of exams or reserved library materials; destroying or hiding source, library or laboratory materials or experiments or any other similar actions;
4. Unauthorized changing of grades, or marking on an exam or in an instructor's grade book or such change of any grade record;
5. Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct;

6. Hacking into a computer and gaining access to a test or answer key prior to the test being given. A&T reserves the right to search the emails and computers of any student suspected of such computer hacking if a police report of the suspected hacking was submitted prior to the search; and
7. Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action but may also affect the evaluation of a student's level of performance. Any student who commits an act of academic dishonesty is subject to **disciplinary action**.
In instances where a student has clearly been identified as having committed an act of academic dishonesty, *an instructor may take appropriate disciplinary action, including a loss of credit for an assignment, exam or project; or awarding a grade of "F" for the course, **subject to review and endorsement by the chairperson and dean**.*

Assignments & Academic Calendar
Topics, Assignments, Due Dates, Exam Dates are listed below. For Withdrawal Dates, Pre-registration and Registration Dates, all Holidays, and Convocations see academic calendar.

Date	Lesson	Due Dates
Week 1	Introduction to Computational Software Tools	
	Computer Basics: Basic Requirement	Group Contact
Week 2	Operating Systems: PC, Mac, & Linux	
	Introduction to Linux	
	Linux: Command Basics	
Week 3-4	Pseudo Code: Communication	
	Pseudo code: Analysis	
Week 5-7	Bash Scripting: Introduction	Assignment 1 Due
	Bash Scripting: Command Basics	
	Bash Scripting: Analysis of Data	
	Bash Scripting: Constructs	Assignment 2 Due
Week 8	Mid Term Review	
	Midterm Exam	Project Assigned
Week 9-11	Scientific Computing: Introduction to C++	
	Scientific Computing: Condition Statements	
	Scientific Computing: Condition Statements	
	Scientific Computing: Loops and Iterations	
	Scientific Computing: Loops and Iterations	
	Scientific Computing: Communication (Input/Output)	
	Scientific Computing: Functions	Assignment 3 Due
	Scientific Computing: Functions	
Week 12-14	Intro to Programing Review	
	Intro to R	
	R Statistics	
	R Analysis	Assignment 4 Due
	R Analysis and Visualization	

Week 15	Project Presentations	Final Project Due
TBD	Final Exam	

These descriptions and timelines are subject to change at the discretion of the Instructor.