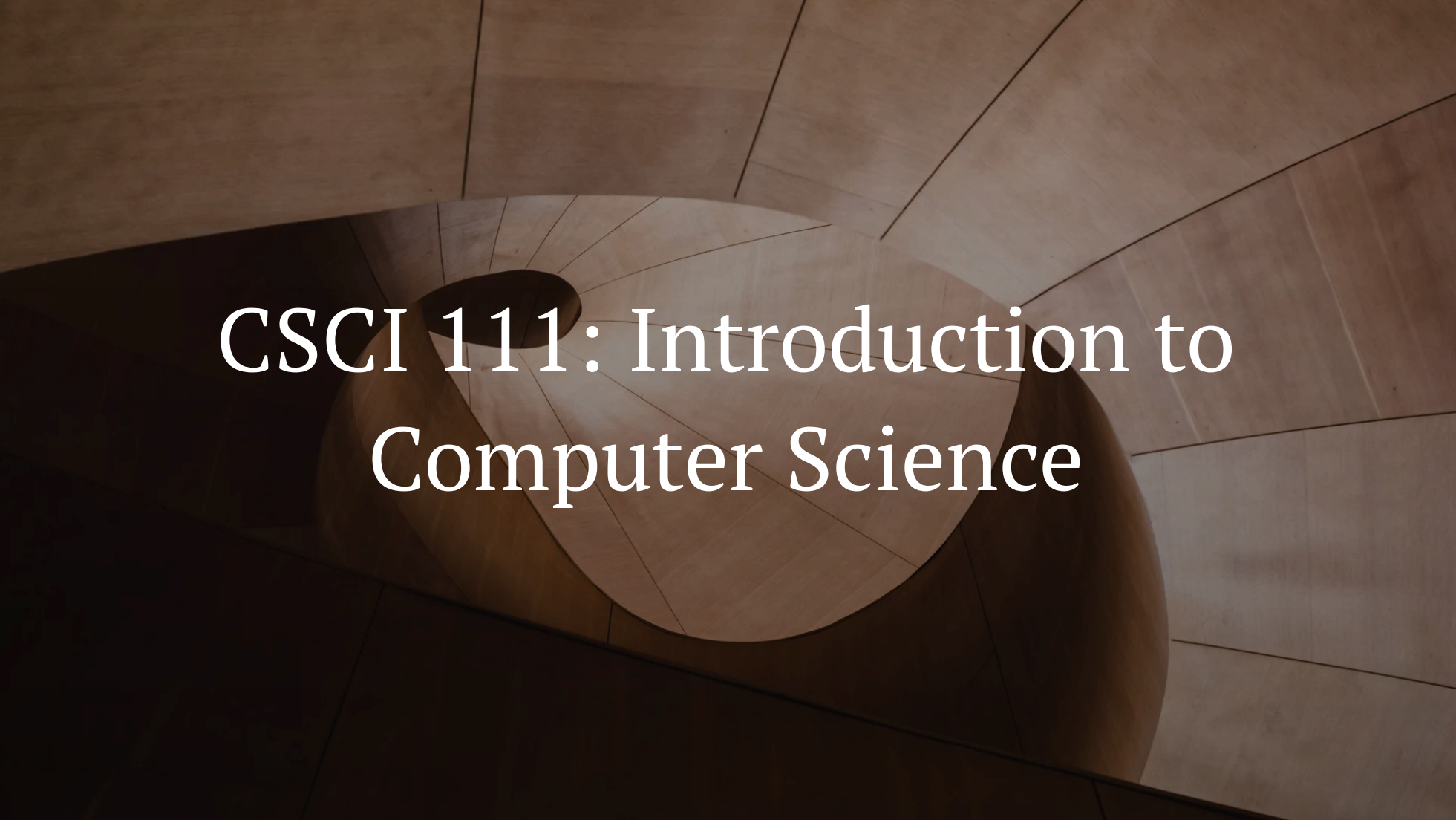

CSCI 111: Introduction to Computer Science

Administravia

Instructor and Course Information

- **Instructor:** William J. Tolley
- **Office:** Parmly 413B
- **Email:** wtolley@wlu.edu
- **Lecture Times:** Monday and Wednesday 8:00 - 9:30 AM
- **Lab Time:** Friday 8:00 - 11:00 AM

Teaching Assistants

- **Payton Crawford**
- **Micah Tongen**

Evening Help Schedule

	6pm – 7pm	7pm – 8pm	8pm – 9pm
Sunday	Saad, Janeet, Lakpa	Saad, Janeet, Lakpa	Janeet, Lakpa
Monday	Mohamed, Evan, Connor	Mohamed, Evan, Connor	Mohamed, Evan
Tuesday	Kidus, Elias	Kidus, Elias	Kidus
Wednesday	Han, Ngoc-Anh	Han, Ngoc-Anh	Lakpa
Thursday	Sanjog, Evan	Sanjog, Evan	Evan

Introductions

Background

- **Hometown**: Chuckey, Tennessee
- **Education**:
  - Bachelor's in **Philosophy** and **Computer Science** from **Berea College**
  - Graduate studies at **University of New Mexico**, **UC Berkeley**, and **Arizona State University**

Personal Life & Interests

- **Family**: I'm married and have a daughter, two cats, and a bunny
- **Hobbies**: Reading, backpacking, camping, hunting, and making music

Favorites

- **Books**: *Neuromancer* and *Shogun*
- **Movie**: *O Brother, Where Art Thou?*
- **Music**: **black metal**, **thrash**, **bluegrass**, and **90s neotraditional country**

Who are you?

What You’ll Learn

- How to think like a computer scientist
- Designing and implementing algorithms
- Fundamentals of Python programming
- Problem-solving techniques and debugging
- Using Linux for development
- Introduction to computing systems and logic

What Is Computer Science?

What is Science?

What is Science?

- **Karl Popper**: Science advances through **falsifiability**, where a hypothesis must be testable and capable of being proven wrong.
- **Thomas Kuhn**: Science progresses through **paradigm shifts**, not linear accumulation of knowledge.
- **Paul Feyerabend**: There's no single **scientific method**; "anything goes" in the advancement of knowledge.

Is computer science **falsifiable**, **progressive**, or **revolutionary**?

What is Computing?

What is Computing?

- **Claude Shannon**: Defined computing as the processing and transmission of information, laying the foundation for **information theory**.
- Is **computing** something humans do, or is it intrinsic to machines?
- How do **algorithms** fit into this?

What is a Computer?

What is a Computer?

- **Turing Machine**: A mathematical abstraction that helps define computation.
- **Physical Computers**: Machines that perform computations following **predefined rules**.

Does a **computer** have to be a machine?

Is Computer Science a Science?

Is Computer Science a Science?

- **Karl Popper**: Does computer science follow the same principles as **falsifiability** in natural sciences?
- **Kuhn's Paradigms**: Has computer science had **paradigm shifts**, or is it still evolving within a single framework?
- **Feyerabend's Anarchy**: Is the structure of computer science methodologically diverse enough to be considered scientific?

Thinking Outside the Box

Thinking Outside the Box

- Are we **creating knowledge** in computer science or simply creating **tools**?
- Can computers **discover** things, or are they always bound by human-made rules?
- What happens when **technology** drives the direction of "science"?

Applications of Computer Science

- Powers everything from mobile apps to self-driving cars
- Enables new fads like **AI**, **machine learning**, and **blockchain**
- Crucial in **healthcare**, **finance**, **entertainment**, and more
- Careers in cybersecurity, software development, research, etc.

Connections to Philosophy, Logic, and Math

- **Philosophy**: What can computers "know"? Ethical considerations in AI and machine learning
- **Logic**: The foundation of algorithms and computational processes
- **Mathematics**: Discrete math, probability, and calculus in problem-solving and analysis

Introduction to Linux

Why Linux?

- Linux is widely used in programming, especially for servers, cloud computing, and software development
- It’s open-source, customizable, and free
- Learning Linux will make you comfortable with many development environments

Basic Linux Commands

- `ls` : List files in the current directory
- `pwd` : Show the current directory
- `cd` : Change the current directory
- `mkdir` : Create a new directory
- `rm` : Remove files or directories
- `cp` : Copy files or directories
- `mv` : Move or rename files
- `cat` : Display the contents of a file
- `grep` : Search for specific patterns or keywords in files
- `find` : Search for files and directories
- `head` / `tail` : View the beginning or end of a file
- `nano` or `vim` : Edit text files

Practical Linux Use Cases

- **Programming**: Running scripts, compiling code, debugging
- **System Administration**: Managing files, processes, and services
- **Cybersecurity**: Network security tools, penetration testing

Introduction to Python

Why Python?

- **Easy to Learn**: Simple syntax, great for beginners
- **Versatile**: Used for web development, data science, AI, automation, etc.
- **Extensive Libraries**: Python has libraries for almost every task, from machine learning (e.g., TensorFlow) to web development (e.g., Django)
- **Growing Popularity**: One of the most in-demand programming languages

Python in the Real World

- **Web Development**: Building websites and APIs (e.g., Instagram, Reddit)
- **Data Science & Machine Learning**: Analyze large datasets, build AI models (e.g., Netflix recommendations, Google search)
- **Automation**: Automate repetitive tasks like file management or web scraping
- **Cybersecurity**: Write scripts to automate penetration testing and security checks

Whodunit

Command Line Murder Mystery

- We’re going to solve a fun mystery using Linux commands!
- Navigate files and directories, and uncover clues to solve the crime
- This interactive activity will teach you key Linux commands and file system navigation

Steps for the Murder Mystery

1. Use `ls` and `cd` to navigate the file system.
2. Open files with `cat` or `nano` to read clues.
3. Use commands like `grep` to search through files.
4. Work together in small groups and solve the mystery!

What We Covered Today

- Introductions and course overview
- Why computer science matters in the real world
- Basic Linux commands
- Introduction to Python and its applications
- Command Line Murder Mystery hands-on activity

For Next Class

- Practice Linux commands we learned today
- Set up Python on your machine if you haven’t already
- Submit your process for solving the murder mystery and your suspect.