

# Syllabus

## CNIT- 381 Network Programmability and Automation SECTION 1

University of Wisconsin-Stout

Fall/2020

3 Credits

### Instructor contact information

Instructor name:

Nam Son Nguyen

Instructor email:

nguyens@uwstout.edu

Instructor phone:

175/232-1311

Instructor office:

148 1<sup>st</sup> floor, Com & Tech

Office Hours/Instructor Availability:

2:00 pm to 3:00 pm Monday, and Wednesday

### Required Materials and Textbooks

*None*

### Attention:

#### Course information:

Lecture videos will be upload on the course [web-page](#) and Canvas two times per week (Tuesday and Thursday morning).

Discussion Section (not required but highly recommended) will be **in-class and face to face**:

- Schedule Meeting-[Group 1](#): 9:40 am to 10:40 am, Tuesday
- Schedule Meeting-[Group 2](#): 9:40 am to 10:40 am, Thursday

### Course Description

Networks infrastructure established the basis for how applications can be deployed, managed, and serviced. Python is an excellent programming language for network engineers to examine previously available tools to software developers. Students will begin on a Python-based walk to transition from traditional network administration to next-generation network automation.

This course starts with an overview of Python and teaches students how software can interact with legacy and API-enabled network devices. Students will learn to utilize high-level Python packages and frameworks to implement network automation jobs, monitoring, management, and enhanced network security.

## Prerequisites

CS 144 & CNIT 134 or Instructor permission.

## Course Learning Objectives

Introduction to the practical aspect of network programmability, including tools and skill-set to automate networking.

## General Education Learning Objectives

1. Python and basic networking concepts:
  - a. Review the basics of the Python language, such as types, operators, loops, functions, and packages.
  - b. Review the fundamental technologies that makeup internet communication today.
  - c. Hand-on how to use Python to execute commands on a network device (Cisco, Juniper).
2. API in Networking:
  - a. Discuss the newer network devices (CiscoNX, Meraki, Juniper PyE) that support Application Programming Interfaces.
3. Introduce to the python automation framework- Ansible:
  - a. Discuss the basics of Ansible, an open-source, Python-based automation framework.
4. Network Security with Python:
  - a. Introduce several Python tools to help to secure network.
  - b. Using Ansible to implement access lists quickly and using Python for network forensic analysis.
5. Network monitoring with Python:
  - a. Cover monitoring the system using various tools such as PySNMP, Netflow, pygal.
6. (Optional) Automate basic tasks of AWS/Azure, Network Data Analysis with Elastic Stack.

## University Policies

Please see the university website regarding policies that affect all classrooms on campus: [Campus Policies](#)

## Grading Policies

Homework: 10% x 6

Midterm: 10%

Final exam/project: 30%

Letter Grade	Test Score Cutoff
A	$\geq 89$
A-	$\geq 85$
B+	$\geq 81$
B	$\geq 74$
B-	$\geq 70$
C+	$\geq 66$
C	$\geq 59$
C-	$\geq 55$
D+	$\geq 51$
D	$\geq 44$
D-	$\geq 40$

## Course Time Table/Schedule

Week 1-3: Module 1: Programing With Python

Week 4-6: Module 2: Low-level Interactions and Agent-Based Networking.

Week 6-9: Module 3: Agentless Network Automation Tools.

Week 9-10: Module 4: Network Security and Monitoring.

Week 11- 12: Module 5: Web and Cloud Network Service, Data Analysis.

## Course Policies

### Homework

Homework assignments are uploaded to our canvas course page.

- No late homework will be accepted.
- It is acceptable to discuss the concept in general terms, but unacceptable to discuss specific solutions to any homework assignment.
- You may not collaborate with anyone else on any homework. Each homework represents your own, individual work.

### Exams

There are two exams, midterm and final exam, each measuring the performance of course modules.

They are take-home exams. Students can replace the final exam with a project.

Students who cannot take an exam at the scheduled time due to illness, personal emergency should make every effort to contact the instructor before the exam is given.

## Accommodations

In case a student believes the course requirements create a conflict with his or her practice of religious holidays, please inform the instructor within the first week of the course to design suitable alternative options.

## Student Services

### Accessibility

UW-Stout aims for an inclusive learning environment. If a student anticipates or experiences any barriers related to this course's format or requirements, reach the instructor to discuss ways to ensure full access.

If a student decides that supplementary disability-related accommodations are required, contact the Disability Services office for assistance 715-232-2995 or contact the staff via [Disability Services](#).

### Academic Honesty and Misconduct

Students are responsible for the honest completion and representation of their work and respect for others' academic efforts. The disciplinary procedures can be found on the [Student Academic Misconduct/Academic Discipline Procedure website](#).

### Syllabus Change Policy

*The instructor reserves the right to make changes throughout the semester to the syllabus and schedule if necessary. It is each student's responsibility to be present and regularly review the course management system for updates.*