COMPUTER SCIENCE LAB TECHNOLOGY GUIDE

DEPARTMENT OF COMPUTER SCIENCE

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Labs and Facilities

1. Linux Lab (SIC 206)

Purpose: The Linux Lab supports courses on computer science fundamentals. This lab is used extensively for programming, networking, and systems courses.

Hardware: 40 workstations, including Lenovo ThinkStation P3 Ultra and P350 SFF models with Intel Core i7 processors, NVIDIA T600 GPUs, 32GB RAM, and 1TB SSDs.

OS: **Students:** Rocky Linux 9
Instructor: Dual boot (Rocky and Windows)

Applications and Resources: Includes compilers, IDEs, network simulation tools, and more. Suitable for programming, OS, and networking classes.

Read more about the Linux Lab's facilities on page 6.

Switching OS (Dual Boot Podium Machine Only): Reboot the machine, select Rocky Linux or Windows from the GRUB boot menu using the arrow keys ↑↓, and press Enter ↵.

Access: Linux accounts are managed by the CS department and are created automatically for students the first time they register for a CS class. Upon account creation, students receive a welcome email with instructions. Physical access to the lab is allowed outside of class hours. Remote access is available through SSH to the SIC 206 lab machines (on campus only) or through the Adams Hall machines (on and off campus) – see below.

Logging In to Linux

Your username is your Hofstra Network ID, e.g. h702345678, the same as your Hofstra Portal username. However, your Linux account has a *different password*. If you have never logged in before, you must login with the **default password**, which is your 700 number (e.g. 702345678). It would then require you to set a new password (see below). If a lab computer exhibits persistent login issues, you are advised to try using another computer. If you can rule out that the issue specific to your account, you can restart the problematic lab machine. Otherwise, if you forget your password or still have trouble logging in, you can seek assistance from room 227.

Logging In for the First Time and Setting a New Password

The very first time you login, you must login with the default password (your 700 number) and then set a new password. After entering your 700 number as the password, it will ask you to enter the current password (your 700#) *a second time*. Then you will need to provide your new password twice.

The new password must consist of at least 3 different character categories (uppercase, lowercase, numbers, special characters), must be no less than 8 characters long, and cannot contain your name or common dictionary words. Please note that if you are setting your new password over SSH, nothing will

appear on the screen as you are typing it. That is normal behavior. After you set your new password successfully, you will have to login again.

If you get the error "Password change failed. Server message: Failed to update password", then the system is refusing to set the new password you provided as it does not meet the password complexity requirements. Please make sure it meets all of the above criteria and try again.

Once you do set a new password, please record it securely (in a password manager app).

Changing Your Password: You can change your password at any time by running the `passwd` command. **Important:** *Nothing* will appear as you are typing in your password. This is normal behavior. If you encounter issues, contact the department's systems support (cstech@hofstra.edu).

Remote Access (SSH)

You can use SSH to remotely login to the Linux Lab machines. Currently, we use the computers in Adams Hall. To do this on a Windows computer, you can use SSH through WSL or install Cygwin. If you are using a Mac, SSH is already installed and can be accessed through Terminal.

From a Terminal (e.g. WSL or Cygwin on Windows), enter the following command:

`ssh -p 5010 `*`username`*`@adams204`*`xx`*`.hofstra.edu`

The username is your Hofstra Portal username (e.g. h702345678) and the ***xx*** is a number from 01 to 30. Type yes and press Enter. Type in your Linux account password and press Enter. If the machine number you try is unreachable, try a different number.

If this is the first time you are logging in to your Linux account, you need to login with the **default password**, which is your 700 number (e.g. 702345678) and it will require you to set a new password. After entering your 700 number as the password, it will ask you to enter the current password *again* (your 700#). Then you will need to provide your new password twice.

The new password must consist of at least 3 different character categories (uppercase, lowercase, numbers, special characters), must be no less than 8 characters long, and cannot contain your name or common dictionary words. Please note that if you are setting your new password over SSH, nothing will appear on the screen as you are typing it. That is normal behavior. After you set your new password, you will have to login again.

At this point, you should be logged in to a lab computer and have access to your Linux account. If you forget your Linux account password or have trouble logging in, ask for assistance at SIC 227.

X11 Forwarding (For GUI access)

To access GUI applications over SSH, you will need to enable X11 forwarding by adding the -Y option. For this to work, you need to have an X client installed. On Windows, you can use Cygwin/X or MobaXterm. On macOS, you would need to install XQuartz (www.xquartz.org). For more information see cs.hofstra.edu/x11forwarding.

2. Architecture Lab (SIC 100)

Purpose: The Architecture Lab is equipped with specialized hardware for computer architecture and embedded systems courses.

Access: Access is provided for students enrolled in computer architecture courses. Tap/swipe access is requested through the department (computerscience@hofstra.edu).

Resources: The lab contains various electronics components, tools, and instruments. Students are provided architecture lab kits that they get to keep as part of CSC 110A. Designated storage locations are provided for students taking computer architecture courses to store their lab kits.

3. Systems and Graphics Lab (SIC 205)

Purpose: Supports courses requiring Windows-based software, including graphics and systems courses.

Access: Students and faculty login with their Hofstra network account. Physical access available during lab hours.

Software: Microsoft Windows with specialized software for graphics and simulation tasks. This includes: Unity 3D, MATLAB w/ Computer Vision Toolbox, and FlexSim.

Hardware:

- 27x Lenovo P3 Tower: 13th Gen i7-13700K, NVIDIA RTX 3080, 32GB RAM, 1TB SSDs
- 5x Lenovo ThinkStation P520 Tower: Xeon W-2225, 32GB RAM, 1TB SSD, NVIDIA RTX 3070 Ti 8GB

Login Issues: Contact the ITS Service Desk (help@hofstra.edu) for help with Windows account issues.

4. Big Data Lab (SIC 126)

Purpose: The purpose of the Big Data Lab is to educate students in all aspects of large and distributed information systems (e.g., system development, testing, maintenance, data security and privacy, data integration, networking, cybersecurity, and application development) and prepare them for highly skilled jobs in emerging and fast growing IT industries such as cloud computing, health care informatics, finance, data integration, and data analytics.

Access: Tap/swipe access is provided to students taking classes scheduled in the Big Data Lab. The lab's workstations can be used for courses and projects. Linux accounts are provided by the CS department and are automatically created for students the first time they register for a CS class. Upon account creation, students receive a welcome email with instructions. Physical access to the room is allowed outside of class hours. Remote access is available through SSH (on campus only), which can be used at any time. SSH access through Adams Hall is available on and off campus (see the SSH Access section for the Linux Lab).

Hardware: 33x Lenovo P3 Tower - i7-13700 vPro, NVIDIA T1000 8GB GPU, 32GB RAM, 3x 512GB M.2 SSD.

OS:	**Students:**	Rocky 9 Linux
	Instructor:	Dual boot (Rocky and Windows)

Switching OS (Dual Boot Podium Machine Only): Reboot the machine, select Rocky Linux or Windows from the GRUB boot menu using the arrow keys ↑↓, and press Enter ↵.

5. Intelligent Systems/Cognitions/Robotics Lab (SIC 127)

Purpose: The Intelligent Systems/Cognitions/Robotics Lab is a facility dedicated for research and projects in artificial intelligence, cognitive modeling, robotics, and related areas.

Hardware: Two high-end data science workstations.

Access: Access is restricted to authorized individuals only for research and projects. To request tap/swipe access, contact computerscience@hofstra.edu.

Rules: Maintain a clean and secure environment. Do not allow unauthorized individuals into the lab. Report any issues to the department.

6. VR Lab (SIC 236)

Purpose: The VR Lab is a facility for research and projects in virtual reality, augmented reality, modeling, rendering, simulation, and computer graphics applications.

Hardware: 6x P3 Tower, Intel 13th Gen i7-13700K, 32GB RAM, 1TB M.2 SSD, GeForce RTX 4080 16GB

Software: Virtual reality development tools and software, including support for Microsoft HoloLens.

Access: This lab is restricted to individuals engaged in research and projects activities. Contact computerscience@hofstra.edu to request access.

7. Cyber Security Lab (Starr 108)

The Cybersecurity Innovation and Research Center is facility for a specialized facility for training the next generation of cybersecurity professionals that is shared between the Department of Computer Science and the Department of Information Systems & Business Analytics (ISBAN). The center consists of the Cyber Lab (aka. Cybersecurity War Room) and a mini server room. The lab features 36 Tiny-in-one (TIO) workstations, 5 large wall-mount displays, Cisco networking hardware, servers, and IoT devices. The lab is supported by a mini server room that houses the lab's infrastructure with an isolated network and dedicated internet connection. The lab is designed to provide an immersive environment through its Cyber Range and VMware environments. The cyber range allows faculty to build scenarios that students can engage in for hands-on lab exercises.

- **On-premises virtualization environment:** A virtual environment built on VMware vSphere
- **Cyber Range environment**: A virtual cyber range environment powered by Silensec
- **Cisco networking hardware**: The lab has advanced routers, switches, and firewalls by Cisco Systems

The lab systems are equipped with software like:

- **Cellebrite UFED Touch2** – software used by law enforcement, military, and intelligence agencies to protect, extract and maintain the integrity of data on a mobile device.
- **CryptTool2** – e-learning cryptology software that detects items that are not strictly malicious but pose some sort of risk to the user.
- **Metasploit Pro** – professional penetration testing software, made available to Hofstra students through Hofstra University's partnership with Rapid7

8. Advanced Computing Research Lab (SIC 234)

Hardware:

- 3x Linux workstations - Lenovo ThinkStation P3 Ultra, Core i7-13700 vPro, 32GB RAM, 1TB SSD M.2.
- 2 large LCD displays for presentation and collaboration.

Software: Linux-based research tools and collaboration software.

Access: Limited to faculty and designated students for projects and research.

9. Research Labs

Purpose: Dedicated spaces for faculty-led research projects.

Access: Access is restricted to authorized personnel only. Tap/swipe access is granted by the department only for select research and projects. Direct inquiries to computerscience@hofstra.edu.

Rules: Maintain a clean and secure environment. Do not allow unauthorized individuals into the lab. Only use lab equipment as directed. Report any issues to the department.

10. SIC Data Center (SIC 122)

The SIC 122 server room was built to house cloud infrastructure, the Star cluster, and research servers for faculty within the Computer Science department and the Fred DeMatteis School.

Computing Resources and Services

The Computer Science department, ITS, and Hofstra partners provide many services for students and faculty. Highlights are given below. For a more complete list, please see cs.hofstra.edu/services.

11. Linux Lab

Purpose: The Linux Lab is used extensively for teaching both computer science fundamentals and advanced topics, including programming, networking, and systems courses. The lab is equipped with 40 Linux workstations with software development tools for Java, Python, and C/C++. The Linux Lab is the heart of the Computer Science department, in no small part due to the importance of Linux.

GNU/Linux is a free and open-source, Unix-like operating system that is widely used by developers, engineers, administrators, security professionals, researchers, enthusiasts, small to large businesses, technology companies, multinational enterprises, telecommunications providers, governments, and non-profits. Linux is known for its stability, security, and flexibility, making it a popular choice for everything from home automation and embedded systems to critical infrastructure, cloud services, and supercomputing. Linux dominates the World Wide Web, with over 96.4% of the top one million web servers running Linux. Linux also powers all of the world's top 500 fastest supercomputers.

Hardware:

40 workstations, including Lenovo ThinkStation P3 Ultra and P350 SFF models with Intel Core i7 processors, NVIDIA T600 GPUs, 32GB RAM, and 1TB SSDs.

Software:

The Linux Lab runs Rocky Linux, which is based on Red Hat Enterprise Linux (RHEL). The department has a custom deployment of Rocky with a rich collection of development tools, productivity applications, and utilities, including:

- GNU toolkit
- Java Development Kit
- Visual Studio Code
- Netbeans
- Qt Creator
- Python 3 with IDLE
- VirtualBox
- Unity 3D
- Google Chrome
- Mozilla Firefox
- Anaconda
- Eclipse IDE
- MATLAB
- LibreOffice
- TeX Live
- Inkscape
- GIMP
- Dia (Visio alternative)
- VLC
- Gedit
- FileZilla

Remote Access (SSH)

You can use a Secure Shell (SSH) client to remotely access the Linux Lab machines. SSH provides command-line access, but if you install Cygwin/X or XQuartz, you can do X11 forwarding to also access GUI applications remotely. Please see the directions for using SSH on page 2.

12. VMware Environment

Purpose: The Computer Science department's VMware environment provides virtualized resources for various courses and research projects. The environment hosts virtual machines (VMs) of various operating systems and configurations to serve the needs of many courses, including software engineering, operating systems, machine learning, data science, web application development, databases, networking, etc.

Hardware: ProLiant DL360 Gen9, HPE DL380 Gen11 servers with high-performance CPUs and up to 1.5TB RAM.

Access: You can request access through the CS department systems support. These resources are typically provided for specific courses or projects. Once access is granted, you would use the vSphere Client (vc1.cs.hofstra.edu), Remote Desktop, or SSH. Directions for accessing your specific VMs are provided when the request is fulfilled.

Loggin In: To access the vSphere Client, login with your Hofstra network account:

- Students: students*network_id*
- Faculty: employees*network_id*

Your Network ID (username) and password are the same as for logging into the portal.

For Remote Desktop or SSH access to VMs, the username and password varies. Ask your professor or the CS department systems support (cstech@hofstra.edu) for assistance.

13. Star HPC Cluster (SIC 122)

Purpose: The Star High-Performance Computing (HPC) cluster supports parallel computing, simulations, large-scale data processing, and other applications that require significant computing resources for research in artificial intelligence, machine learning, molecular modeling, bioinformatics, cognitive modeling, scientific computing, engineering, and other domains.

Access: Reserved for faculty and students involved in research requiring HPC resources. Request access through support@starhpc.hofstra.io. Directions for using the cluster are available at docs.starhpc.hofstra.io.

Please note that you currently need to be connected to the CS VPN to access the login node. Visit cs.hofstra.edu/csvpn for directions on how to set up your CS VPN connection.

Resources: Consists of several types of nodes with high-end CPUs, GPUs, and large memory capacities.

- **Head node**: 1x DL325 Gen10+v2 Server (16c, 128GB RAM, 2x 960GB SSDs)
- **Login node (temporary)**: IBM System x3550 w/ 128GB RAM
- **Compute nodes**:
  - 1x HPE A30 node (2x NVIDIA A30 GPUs)
  - 2x HPE Apollo 6500 nodes (8x NVIDIA A100 GPUs each)
  - 2x DL385s (2x NVIDIA PCIe H100 GPUs each)
  - 2x Cray XD665 nodes (4x NVIDIA HGX H100 80GB GPUs each)

    - 1x Cray XD670 (8x NVIDIA HGX H100 80GB GPUs)
- **HPE Parallel File System Storage (PFSS)** - 64TB usable
- **Networking**: Mellanox HDR 200Gb/s InfiniBand Fabric

Login and Job Submission: SSH into the head node of the cluster using your provided credentials:

```
ssh -p 5010 portal-username@binary.star.hofstra.edu
```

Documentation on how to use the cluster: docs.starhpc.hofstra.io

Support: Please see the FAQ section of the cluster documentation at cs.hofstra.edu/starhpcfaq. If you still need help, reach out to support@starhpc.hofstra.io.

14. Mac Minis

The department hosts Mac minis in its server room that run Xcode for CSC 184/285 (Mobile Device Programming). Upon faculty request, remote access is provided to students taking the course who do not have a personal Mac computer for iOS development.

Visit cs.hofstra.edu/macminis for instructions on accessing the Mac Minis.

Students: For access, please ask your professor to request access for your class.

Faculty: Please request access for your class and provide your class roster to the department's systems support (cstech@hofstra.edu).

15. Virtual Machines

The CS datacenter provides cloud computing infrastructure supported by the VMware vSphere platform. VMware vSphere is a virtualization platform for running virtual machines (VMs) in a large-scale computing environment. These VMs can be accessed through the vSphere Client, Remote Desktop (Windows VMs), or through SSH (Linux VMs). Big Data Lab VMs are subject to the Virtual Machine Policy (cs.hofstra.edu/vmpolicy) and the ITS department's Acceptable Use Guidelines (hofstra.edu/scs/aug).

For directions on using the vSphere Client, please see cs.hofstra.edu/vsphereclient.

16. VPN Access

The Computer Science Virtual Private Network (VPN) allows students and faculty to access the department's VMware environment from off campus over the Internet. Connecting to the VPN requires having the OpenVPN client software installed and a client profile obtained from csconnect.hofstra.edu. To get started, please see the VPN guide at cs.hofstra.edu/csvpn.

The Hofstra University VPN (HUVPN) allows faculty and staff (only) to access the University network from off campus. For access to HUVPN, you must request access through the VPN Access Request Form on the ITS Service Portal (hofstra.service-now.com/sp). For assistance or more information, please contact the ITS Service Desk (help@hofstra.edu or 516-463-7777).

17. Laptops

Laptops are loaned to faculty through the provost's faculty laptop lease program. ITS facilitates periodic lease swaps and can provide loaners to new faculty in-between lease cycles. Faculty laptop requests are administered by the dean's office. Direct all inquiries to Elizabeth Downey.

ITS does not provide student loaner laptops, but the Computer Science department has obtained a limited number of Lenovo laptops that can be loaned to CS students based on need.

Policies and Procedures

18. Facility Hours

The Science and Innovation Center and Computer Science labs are normally open **7 AM to 9 PM, Monday through Friday**. Access outside these hours may be considered by the department on a case-by-case basis. In such cases, students must have a pass from the department secretary (SIC 209a) to present to Public Safety.

19. Account and Access Management

Linux Lab: Linux accounts are managed by the CS department and are automatically created for new students when they register for a CS class for the first time.

Windows Systems: Managed by ITS. Password and account issues should be directed to the ITS Service Desk (help@hofstra.edu).

VMware and HPC Cluster: Requests go through CS department systems support (cstech@hofstra.edu). Access is granted based on course enrollment or research requirements.

Tap/Swipe Access: Request access from the department (computerscience@hofstra.edu).

20. Support Resources

Tutoring: The Department of Computer Science runs an in-person Tutoring Center in Room 226 Science and Innovation Center. No appointment is necessary. Just stop by during tutoring hours with your textbook, laptop, and/or homework, and ask your questions. The tutors are not supposed to give away answers, rather they will help you understand the material so you find the answer yourself, or they will find errors in your solutions and guide you to fix them yourselves. Tutoring is available typically for the following courses CSC005, CSC14, CSC15, CSC16, CSC17, CSC24 and CSC110. The schedule will be posted on the door of Room 226 and in the announcements section in this course. Direct any inquiries to computerscience@hofstra.edu.

Tutoring for non-computer science courses is provided through Hofstra's Undergraduate Tutorial Program (UTP) or by the respective department. Go to www.hofstra.edu/tutoring for more information.

ITS Service Desk: The ITS Service Desk provides support for general IT issues, email, and Windows account management. Contact them through the Service Portal (hofstra.service-now.com/sp), by emailing help@hofstra.edu, or by calling them at (516) 463-7777.

CS Systems Support: The Department of Computer Science supports the Linux Lab, VMware, HPC, and other specialized resources. For assistance with these systems, contact cstech@hofstra.edu.

Classroom Support: For urgent in-class technology issues, request help at SIC 227.

Canvas Support: Canvas-related inquiries should be directed to the ITS Service Desk at help@hofstra.edu or (516) 463-7777.

Facilities: Requests and non-urgent issues are submitted to the Plant Department by placing a work request. For urgent matters, such as with electrical or HVAC/heating/cooling issues, call (516) 463-6619.

21. Purchases and Procurement

Computer Purchases: Client devices (laptops, desktops, tablets) are procured through itorders@hofstra.edu. For specialized equipment (e.g., high-end GPUs, servers), contact cstech@hofstra.edu.

Office Supplies: General office supplies are ordered from W.B. Mason by the department secretary (Lynda.Callahan@hofstra.edu).

Lab Supplies: Lab supplies, electronics, tools, instruments, and equipment are ordered through the department. Contact Alexander.J.Rosenberg@hofstra.edu.

Faculty Laptop Lease Program: Managed by the provost's office. Direct all inquiries to the dean's office (Elizabeth.K.Downey@hofstra.edu).

22. Software and Software Licensing

Lab Software

- **Administration**: Software licensing is managed by the CS department and ITS.
- **Requesting Software**: Faculty can request software for courses through the CS department (cstech@hofstra.edu) or ITS (help@hofstra.edu) for general needs. Linux software and specialized requests are accommodated by the CS department. Software used university-wide is supported by ITS. For more information, see https://cs.hofstra.edu/softwarecatalog.

Software Downloads

For directions and download links, please go to cs.hofstra.edu/essentialsoftware.

Microsoft Azure Dev Tools for Teaching

Hofstra students and faculty can download Microsoft software through Microsoft Azure Dev Tools for Teaching, formerly known as Microsoft Imagine/Dreamspark. The program provides volume licensing for Microsoft products on lab computers and gives students and faculty access to select Microsoft developer tools and platforms for academic/non-commercial use.

To access it, go to: https://azureforeducation.microsoft.com/devtools

VirtualBox

VirtualBox is used to run virtual machines on your computer. It is used by several classes and is installed in all teaching labs (except the architecture lab/SIC 100). VirtualBox does not run on Arm-based Macs. Students who have a MacBook would need to use VirtualBox in the labs.

Go to cs.hofstra.edu/virtualbox for installation directions.

MATLAB

Current students can download and use MATLAB, Simulink, and add-on products on personal computers through Hofstra's MathWorks Total Student Headcount (TSH) license. To obtain MATLAB and Simulink, log into the Hofstra Portal and click on the MATLAB icon in the "My Apps" menu. Please see cs.hofstra.edu/matlab.

23. Contact Information

Emergencies (police, fire or medical)	(516) 463-6789
Public Safety Information	(516) 463-7878
Public Safety Front Desk	(516) 463-6606
ITS Service Desk	(516) 463-7777
Facilities and Operations	(516) 463-6619
HofstraCard Services (Campus Access & Security Systems)	(516) 463-6942

24. Lab Rules

- No food, drinks, or gum is allowed in the labs.
- Labs are for the use of computer science students (majors and minors) and faculty only.
- Computer use is subject to the Acceptable Use Guidelines.
- Lab computers are to remain plugged in and powered on at all times.
- Physical access to SIC 206 is allowed outside of class hours only.
- Students and faculty are responsible for leaving labs in the condition they were found.
- Root/sudo access is not allowed, but software may be installed in your home directory, subject to the quota.
- Only authorized individuals are permitted in the research labs. If granted tap/swipe access, it must be used only by the authorized individual and not shared with others. Propping open the door is not allowed.

Lab maintenance and outages: Be aware that labs may be closed periodically for maintenance or system upgrades. Plan your work accordingly and adhere to any maintenance schedules posted by the department.