

Data Center & AI Infrastructure

The systems behind the services. Takes students from server and Linux basics to building, running and monitoring a small GPU cluster for AI workloads, at technician and operator level.

Target roles: Data Center Operations Technician · Junior HPC / GPU Cluster Support Engineer · NOC Engineer (L1)

12 WEEKS	4 MODULES	72 CONTACT HOURS	70% PRACTICAL GRADING	3 / 5 DIFFICULTY
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AT A GLANCE

Your 12-week journey



Capstone = the final team project in Week 12: students apply the whole course to one real-world problem, then present it and write it up.

YOU LEAVE WITH

✓ **Capstone and a lab portfolio**

✓ **Ready for NVIDIA NCA-AIIO**

✓ **DC Technician · GPU Cluster Support · NOC L1**

Course outline is subject to change to reflect industry trends and vendor updates. See Important notes on the last page.

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BEFORE YOU START

Difficulty and prerequisites

WHY IT'S INTERMEDIATE Hardware and GPU concepts are new to most CS students; troubleshooting across hardware, Linux and network at once.

PREREQUISITES · EDUCATION • Final-year bachelor's student or recent graduate • CS, IT, ECE, EEE or a related field • Comfortable reading technical English	PREREQUISITES · SKILLS • Computer organization: CPU, memory, storage • Networking basics • No programming needed; scripting is taught	LAPTOP AND SETUP • 64-bit laptop, virtualization enabled • 8 GB RAM minimum, 16 GB recommended • 50 GB free disk • Stable internet connection
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PROGRAM FORMAT

How every week runs

Session	Format	What happens
Learn class	Instructor-led · 2 hrs	Concepts, terminology and a live instructor demo
Practice class	Instructor-led · 2 hrs	Instructor-led hands-on practice, then a case study discussion
Lab	2 hrs · instructor available	Guided ticket-style task done by the student, with the instructor on hand for questions; submitted with a short written report

Week 1: Foundations Every track opens the same way: a baseline skills quiz, lab and tool setup, how IT systems fit together, Linux and Windows command-line basics, and workplace habits (tickets, documentation, professional email). It levels the batch before track content starts.

Instructor access Students can email the instructor anytime for clarifications, outside class and lab hours.

Assessment 70% of the grade is practical: weekly lab reports, the mid-term practical in Week 6 and the capstone in Week 12. Every module has a required core lab (entry level) and an optional stretch lab (mid-level). The capstone is graded Core or Advanced; Advanced requires the stretch labs.

CAREER LADDER

Entry roles, and where they lead

ENTRY · 0-2 YEARS Data Center Operations Technician · NOC Engineer (L1) · Junior HPC / GPU Cluster Support Engineer Core labs in Modules 1–4 · NVIDIA NCA-AIO	→	NEXT STEP · 2-5 YEARS Data Center Operations Engineer (Linux and hardware) · HPC / Linux Systems Administrator · GPU Cluster / AI Infrastructure Engineer · NOC Engineer (L2) Stretch labs: Redfish automation, Ansible GPU setup, DCGM dashboards, on-call lead · RHCSA, then NCP-AII or NCP-AIO
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Next-step roles need on-the-job experience. Stretch labs and the next certifications give graduates a head start toward them.

CURRICULUM

Four modules, twelve weeks

Module 1 · Data Center and Server Foundations

Weeks 1-3

Outcome: Explains how a data center is powered, cooled and cabled; installs, diagnoses and repairs server hardware.

Week	Learn class	Practice class	Lab (instructor available)	Case study
1. Foundations	Baseline quiz; how an IT service reaches a user, from data center to screen; career map	Linux command-line basics	Set up VirtualBox with Ubuntu and Rocky Linux; first CLI tasks	—
2. Inside the data center	Power (UPS, generators, PDUs), cooling, hot and cold aisles, liquid cooling and power density for GPU racks, Uptime tiers, PUE	Safety, rack and stack, structured cabling, cable management, labeling, asset tracking	Plan a rack layout, power budget and cabling map	OVH data center fire 2021
3. Server hardware and out-of-band management	CPU, memory, PCIe, NICs, disks, power supplies; BIOS/UEFI, firmware, RAID controllers	BMC tools (IPMI, Redfish, iDRAC/iLO): remote power, sensors, hardware logs; diagnostics and the RMA process	Find a failed part from hardware logs, raise the RMA ticket, update firmware	—

STRETCH LAB · MID-LEVEL Script server inventory and health reports through the Redfish API; plan power and cooling for a full row of racks.

Module 2 · Linux, Networking and Storage for Infrastructure

Weeks 4-6

Outcome: Administers Linux servers, configures and troubleshoots server networking, manages storage and backups. Ends with the mid-term.

Week	Learn class	Practice class	Lab (instructor available)	Case study
4. Linux administration	systemd services, users and permissions, packages, journalctl and dmesg, NTP, SSH keys	Filesystems and LVM; disk, memory and CPU troubleshooting	Fix a broken server from a ticket: failed service, full disk, wrong permissions	—
5. Networking for infrastructure	IP and subnetting, VLANs, DNS, DHCP; how traffic reaches a server	Linux interfaces, bonding, MTU; copper, fiber, optics, DAC/AOC; link troubleshooting and when to escalate	Configure bonded, VLAN-tagged interfaces; find and fix a bad link from a ticket	Facebook BGP 2021
6. Storage and backup	RAID, NFS, iSCSI, SAN and NAS; 3-2-1 backups, RPO and RTO	Mid-term assessment (quiz + practical)	Build an NFS share on LVM; back it up and restore it	—

STRETCH LAB · MID-LEVEL Write a health-check script that reports disk, memory, service and link status across 10 servers; build an NFS service with documented failover.

Module 3 · Provisioning and AI Infrastructure Build

Weeks 7-9

Outcome: Provisions servers at scale, brings up and validates GPU nodes, checks GPU fabric links and storage health.

Week	Learn class	Practice class	Lab (instructor available)	Case study
7. Provisioning and virtualization	PXE and bare-metal provisioning, OS images, firmware baselines	Ansible for configuration at scale; virtualization essentials (KVM/Proxmox, VMware)	PXE-boot and Ansible-configure a set of lab nodes to one baseline	AWS us-east-1 outage 2021
8. GPU servers	AI basics for infrastructure: AI, machine learning, deep learning, training vs inference; GPU vs CPU; NVIDIA software stack (CUDA, NGC containers, AI Enterprise)	Anatomy of a GPU server (PCIe and SXM, NVLink, NVSwitch); drivers, CUDA, Fabric Manager; burn-in and acceptance tests	Bring up a GPU node and run nvidia-smi and DCGM diagnostics (cloud GPU)	—
9. AI fabric and storage, operator level	InfiniBand, RoCE and RDMA; rail-optimized cabling; what the fabric does, not how to design it	Link checks (ibstat, ethtool), MTU, flapping links, bad optics; parallel file systems and GPUDirect Storage concepts	Validate a GPU pod's links against its cabling map; escalate a fabric fault with evidence	—

STRETCH LAB · MID-LEVEL

Automate GPU node setup and acceptance tests with Ansible; write a capacity plan for a 32-GPU cluster covering power, cooling and network ports.

Module 4 · Running AI Clusters, NOC and Capstone

Weeks 10-12

Outcome: Runs and monitors AI jobs on a GPU cluster, works NOC tickets and handles an outage end to end.

Week	Learn class	Practice class	Lab (instructor available)	Case study
10. Running AI clusters	Slurm: partitions, jobs, node states, drain and resume	GPU health with DCGM; Kubernetes with the NVIDIA GPU Operator (overview)	Run a multi-GPU job in Slurm; drain a failing node, replace it, return it to service	—
11. Monitoring and NOC operations	Prometheus and Grafana (Zabbix, Nagios in brief); a 24x7 NOC: tickets, SLAs, escalation, handover	ITIL incident, problem and change management; runbooks; root-cause analysis	Handle a simulated GPU-node outage with a runbook; write the root-cause report	CrowdStrike 2024; UPI/NPCI downtime
12. Capstone and career launch	Capstone presentations: build, document and monitor a small GPU cluster	Final practical; NCA-AIIO exam practice; certification and career planning	Capstone report; mock technical interview	Student-chosen

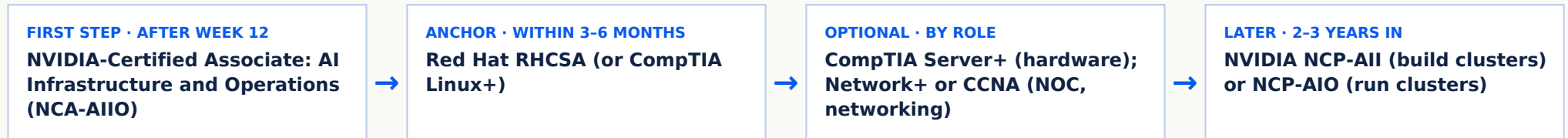
STRETCH LAB · MID-LEVEL

Build GPU health dashboards and alerts from DCGM in Grafana; act as on-call lead for the outage and run the change approval.

TOOLS AND CERTIFICATIONS

What students use and where they go next

Tools: Linux (Ubuntu, Rocky), IPMI and Redfish, PXE, Ansible, KVM/Proxmox, VMware, NVIDIA drivers and CUDA, DCGM, Slurm, Kubernetes with NVIDIA GPU Operator (intro), Prometheus, Grafana. GPU labs run on rented cloud GPU instances.



Third-party certification exam fees are not included in the program. See Important notes.

CAREER SERVICES

Support through all 12 weeks

Service	What the student gets	When
Instructor access by email	Questions answered anytime by email, beyond class and lab hours	Weeks 1-12
Resume builder assistance	A track-specific resume built from lab reports and the capstone; one-to-one review and LinkedIn profile check	Draft by Week 6, final in Week 12
Certification path	Personal plan naming the first exam, the anchor exam and the next step; exam-style practice questions	Plan in Week 1, review in Week 12
Career build assistance	Role map for the track, portfolio of lab work on GitHub, interview prep and a mock technical interview	Weeks 1, 6 and 12
Talent Pool	Top performers, especially those with an Advanced capstone, are considered for Ampleopp Solutions and client opportunities	After Week 12

IMPORTANT NOTES

Curriculum updates	This outline reflects current industry practice. Topics, tools, labs, case studies, sequence and schedule may be updated to keep pace with industry trends, vendor and exam changes, and the needs of each batch. Core learning outcomes are maintained.
Certifications	Certification names, exam codes, content and fees are set by third-party vendors and may change. Exam fees are not included in the program.
Career outcomes	Career opportunities are not guaranteed and are subject to candidate performance, skill suitability, actual client requirements and the respective organization's selection process.
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