Algonquin College

ALGONQUIN COLLEGE

CST8182
Networking Fundamentals

Course Outline

2025-2026

Pre-requisite(s)	N/A
Co-requisite(s)	N/A
Prepared by	Melissa Sienkiewicz
Approved by	John Dallas, Chair
Approval date	Thursday, August 28, 2025
Normative hours	70.00
Grading system	A+ Through F

Applicable Program(s)	Level	Core/Elective
0150X01FWO - Computer Systems Technician	1	Core
0150X03FWO - Computer Systems Technician	1	Core
0156X01FWO - Computer Systems Technology - Security	1	Core
1560X01FWO - Computer Systems Technician - Networking	1	Core
1560X03FWO - Computer Systems Technician - Networking	1	Core

Land Acknowledgement

Algonquin College campuses in Ottawa, Perth and Pembroke are located on the traditional unceded, and unsurrendered territory of the Anishinàbe Algonquin People. The Algonquin People have inhabited and cared for these lands since time immemorial. We take this time to express our gratitude and respect to them and to the land for all that it has provided and will continue to provide.

As a post-secondary institution, we acknowledge the harms done to Indigenous Peoples and are committed to learning from the past. We pledge to promote healing and resilience as we move forward in partnership with the Algonquin Nations, First Nations, Métis, and Inuit Peoples in a spirit of reconciliation.

While we recognize that territorial acknowledgements are only one step in cultivating greater respect and inclusion of Indigenous Peoples, we commit to accompanying these words with actions. We are dedicated to building a future and community that is better for all.

We pledge to continue exploring and making meaningful contributions to the Truth and Reconciliation Commission of Canada's Calls to Action.

Learn more about the College's commitment to Truth and Reconciliation: https://www.algonquincollege.com/tri

Course Description

The modern world is connected and networking technologies form the foundation of data communication. Students describe the architecture, topology, protocols, components and models of the Internet and other computer networks. Based on the OSI and TCP layered models students examine the function of protocols and services at each layer of the TCP/IP protocol suite. Students design an IP addressing scheme for simple LAN topologies and apply the design to a simple network built using routers and switches.

Vocational Learning Outcomes

This course provides the opportunity for you to achieve the following outcomes:

0150X01FWO - Computer Systems Technician

VLO 2 Contribute to the diagnostics, troubleshooting, documenting and monitoring of technical problems using appropriate methodologies and tools. (T)

VLO 3 Implement and maintain secure computing environments. (T)

VLO 9 Assist with the implementation of computer systems and cloud solutions. (T)

VLO 10 Install, configure, troubleshoot, maintain, upgrade and decommission computing system infrastructures. (T)

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0156X01FWO - Computer Systems Technology - Security

VLO 2 Diagnose, troubleshoot, document and monitor technical problems using appropriate methodologies and tools. (T)

VLO 3 Analyze, design, implement and maintain secure computing environments. (T)

VLO 10 Analyze, plan, design, implement and administer computer systems and cloud solutions. (T)

VLO 11 Research, design, deploy, configure, troubleshoot, maintain, upgrade, and decommission computing system infrastructures. (T)

1560X01FWO - Computer Systems Technician - Networking

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Assessment Levels —T: Taught **A**: Assessed **CP**: Culminating Performance

Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

EES 3 Execute mathematical operations accurately. (T)

EES 4 Apply a systematic approach to solve problems. (T)

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Course Learning Outcomes / Elements of Performance

When you have earned credit for this course, you will have demonstrated the ability to:

1. Explain the layers of communications in data networks based on the TCP/IP protocol suite.

- Describe how physical layer protocols, services, and network media support communication across networks.
- Explain how media access control in the data link layer supports communication across networks.
- Explain how the network layer supports communication across networks.
- Compare the operations of connectionless and connection-oriented transport layer protocols in supporting end-to-end communication.
- Describe the purpose and use of port numbers in the TCP/IP Protocol suite.
- Describe the operation of application layer protocols in providing support to end-user applications.
- Explain how TCP connections are established and torn down.

2. Explain how network protocols enable devices to access local and remote network resources.

- Explain how Ethernet operates in a switched network.
- Explain how ARP enables communication on a local area network.
- Explain how routers use network layer protocols and services to enable end-to-end connectivity.

3. Calculate an IPv4 addressing scheme to efficiently segment a network.

- Describe the importance of addressing and naming schemes at various layers of data networks.
- Calculate numbers between decimal and binary systems.
- Calculate subnets: assign subnet masks and identify address ranges.
- Create and apply variable length subnet masks.

4. Build a network using routers, switches, and end devices.

- Configure an end device for network connectivity including static and dynamic IP addressing, static and dynamic hostname resolution, and default gateway parameters.
- Configure network settings on switches for network connectivity.
- Configure router interfaces for a given network design.
- Configure routers with static routes.

5. Test network connectivity using proven troubleshooting tools and techniques.

- Display device configuration using device-specific commands.
- Verify network connectivity using common troubleshooting tools, such as ping and traceroute.
- Analyze data traffic using common network utilities.

6. Configure switches and routers with device hardening features to enhance security.

- Implement access control.
- Disable unused protocols and services.
- Configure device-dependent security settings.

Learning Resources

Required:
This course is part of the Bring Your Own Device (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the BYOD program initiative can be found at http://www.algonquincollege.com/byod

Required Textbook:
An electronic interactive textbook is provided free of charge through the Cisco Academy website at http://netacad.com

USB Memory Stick
You are advised to have one USB memory stick at hand to hold any PC configuration information that you may wish to preserve between lab sessions. Connectivity to the College network and the Internet is not always possible from the lab.

Lab Notebook:
You will be expected to have and maintain a lab notebook to record anything you may need to repeat or recall in the future. Some lab exercises may instruct you to record certain things in your lab notebook for future reference in follow-on labs. If you are involved in a troubleshoot exercise, the lab book will be particularly valuable for recording troubleshooting steps as you go along. Doing this helps you keep track of what you've done and prevents you from "going around in circles" trying to fix something.

To access your course list, learning resources and costs, visit [Booklist](#).

Please note that a learner must be registered in a specific course or program to view this information.

Program tuition and fees can be found on the [Tuition and Fees Estimator for Full-time Programs](#) page.

Learning Activities

Samples of learning activities include:

1. **Reading and fully understanding the prescribed theory materials:**

· Online Cisco curriculum acts as the foundation for the course knowledge.

· Assigned reading will guide you through the text.

· End of module questions in the online curriculum are used to test your recall and understanding.

· Online module exams on the Cisco Academy website are used to evaluate your knowledge, as well as give you feedback as to which parts of the module need to be reviewed or concentrated on.

2. **Attending lectures that make use of and supplement the text material:**

· Lectures help you discover key points and clarify what is important for tests and final exam evaluation.

3. **Completing "homework" assignments to supplement lecture & lab material:**

· These are designed to encourage creative thinking around a topic area, and to help develop your ability to analyse situations and solve problems.

4. **Completing prescribed lab work:**

· *Lab attendance may involve group work (often in pairs) on dedicated hardware and is therefore mandatory. All lab assignments must be completed in order to be eligible to pass the course. Late assignments will receive a zero grade, but must be completed.*

· No special allowances are made for those who choose not to read course related email, regularly check the college LMS, attend classes or labs and, as a result, get critically behind in the course. Extra consultation and tutoring assistance are only available to those who are actively participating and still having difficulty.

· Lab assignments to guide you through configurations, test procedures, and other activities to familiarise yourself with networking.

· Your added value to an enterprise will ultimately be found in your ability to design, implement, modify, test and troubleshoot applications of networking technology. These activities are complex and require procedures that are primarily innovations stemming from an analysis. Lab exercises requiring you to come up with solutions to problems.

Pre-defined Evaluation / Earning Credit

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Quiz(zes)/Test(s) (5%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 5, CLO 6, EES 3

Midterm Exam(s) (25%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 5, CLO 6, EES 3, EES 4

Final Exam (30%)

Validates Outcomes: CLO 1, CLO 2, CLO 3, CLO 5, CLO 6, EES 3, EES 4

Lab Activity(ies) (10%)

Validates Outcomes: CLO 2, CLO 3, CLO 4, CLO 5, CLO 6, EES 3, EES 4

Demonstration(s) of Skill (30%)

Validates Outcomes: CLO 3, CLO 4, CLO 5, CLO 6, EES 4

Prior Learning Assessment and Recognition

Students who wish to apply for Prior Learning Assessment and Recognition (PLAR) need to demonstrate competency at a post-secondary level in all outlined course learning outcomes. Evidence of learning achievement for PLAR candidates includes:

- Portfolio

- Challenge Exam

- Performance Test

Course Related Information

Assessment of student learning will be done by means of in class tests, final exam, laboratory assignments, and lab tests.

Laboratory attendance is **compulsory**, and **absence from more than two** laboratory sessions will result in a final grade of "F". Students are responsible for keeping a record of the number of laboratory sessions they have missed. Professors will not inform students of an impending failure because of missed laboratory sessions.

All laboratory assignments must be successfully completed in order to obtain course credit. Late assignments will be penalized and receive a mark of zero, but they must still be completed. Any missed evaluation points may result in a grade of "0". In the case of a documented emergency the professor, in consultation with the Chair, will determine how the marks will be made up and/or final grade adjusted.

The Information and Communications Technology Department requires that all course assignments (homework exercises, laboratory work, projects, etc.) be submitted by students using a standard which could be specific to one or more courses. Professors will ensure, throughout the term, that students are advised of the exact details of these course specific submission requirements. Student submissions that do not meet the course published submission standards may not be marked and may incur a penalty of up to 100% of the submission mark.

All students are required to write the final assessment. If, as a result of being off-cycle in your program you note that there is a scheduling conflict in your final assessment schedule, it is your responsibility to alert your course professor no later than one week before final exams start.

Course policy for missed in class tests:
At the discretion of the professor, any major assessment that was missed with an acceptable and documented reason will either;
A) be added to the weighting of a future assessment, to a MAXIMUM weighting of 50%.
B) be addressed with a makeup assessment that may be a different format than the original.

Any missed assessment without an acceptable and documented reason will receive a 0 grade.
There is no provision for making up missed Netacad exams, regardless of the reason.

In order to be eligible to pass this course, students must meet all of the following minimum requirements:
1. Attend at least 8 of 10 compulsory labs in your own lab section.
2. All labs must be completed.
3. **Midterm Exam(s)** and **Final Exam** must have a combined minimum passing grade of 27.5/55.
4. The **Demonstration(s) of Skill** (SBAs) must have a minimum passing grade of 15/30.

Failure to meet all of the requirements, will result in a final grade of "F".

Program Information

0150X01FWO - Computer Systems Technician

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- All students are encouraged to prepare before class, attend class regularly, and actively participate while in class to enrich their learning experience.
- Policy AA42 outlines the requirements for posting class notes or information to Brightspace. Any such information made available by professors is done solely to assist students in understanding the material presented and is not intended to replace attendance to theory class.
- Any and all information presented in class is considered testable material, be it presented verbally, written on the whiteboard, on-screen, or in a document - whether students were in attendance or not.
- It remains the student's responsibility to attend class, listen and take adequate notes, as needed.

Lab Evaluation:

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- Satisfactory attendance and participation in the lab.
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The Lab Professor reserves the right to suspend or deny access to the lab at any time if the above criteria are not being met. No allowances are made in the course for students whose access in the lab are suspended or denied.

Final Examination:

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Program Progression Requirements

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- Fails or Withdraws once from: CST8182; CST8207; CST8202.
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Required:

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0150X03FWO - Computer Systems Technician

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0156X01FWO - Computer Systems Technology - Security

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Level 1 students who are unsuccessful in two or more core courses (CST8182; CST8207; CST8202) will be temporarily withdrawn from the program and must reapply through OCAS or, if International, the IEC. Upon readmission to the program, these students will also be issued a learning contract and must meet with the Academic Advisor prior to return.

Required:

This program is part of the Bring Your Own Device (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the BYOD program initiative can be found at http://www.algonquincollege.com/byod

Cloud Services:

Students in this program may be exposed to Cloud Software through student accounts but they should **never** use their Credit Card for these services. Algonquin College **will not be responsible** for a students' utilization of Online Services or Cloud Based Applications.

Department Information

STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:
- Knowing the due dates for marked out-of-class assignments.
- Attending all classes and knowing the dates of in-class marked assignments and exercises.
- Arriving to class on time and remaining for the duration of the scheduled class.
- Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
- Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
- Regularly checking both Brightspace announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
- Participating in on-line and classroom exercises and activities as required.
- Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07.
Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to

one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act
General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at http://laws.justice.gc.ca/en/C-42 . Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

College Related Information

Algonquin College's policies have been developed to ensure the health, safety and security of all students, faculty and staff, and the proper and fair operation of the College as an academic institution and employer. Please refer to the Algonquin College Policies website for the most current policy information available at http://www.algonquincollege.com/policies/.

Students are especially encouraged to be aware of the following College expectations

Academic Integrity
Algonquin College is committed to the highest standards of academic integrity, and students are expected to uphold these standards throughout their learning journey with the College and post-graduation. Any academic work submitted by a student is expected to be their own work, unless designated otherwise, all human and technological assisted generated sources must be attributed. Refer to the College's Library web site for attribution support and resources. All students are expected to be familiar with the College's AA48: Academic Integrity policy which outlines student and staff roles and responsibilities, the process for addressing, determining and ruling final academic decisions regarding violations of academic integrity as well as what represents academic misconduct. Students with any questions about academic integrity course expectations including but not limited to use of technology, generative AI and other resources to support completion of coursework, are encouraged to speak to their professor and refer to the course weekly schedule, assessment instructions, course announcements and materials.

Centre for Accessible Learning (CAL)
Students with visible and/or non-visible disabilities are encouraged to register with the Centre for Accessible Learning (CAL) in order to be eligible for appropriate learning supports and/or accommodations. Students are strongly encouraged to make an appointment with the Centre for Accessible Learning as early as possible when starting a program. Once your needs are identified, a Letter of Accommodation (LOA) will be issued which you can share with your professors through the CAL Student Portal. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

Test Accommodations for Students Registered with CAL
Students who require testing accommodations will book their tests/exams through the CAL Student Portal. It is important to note the posted test/exam booking deadlines for the term. Test booking deadlines are communicated through CAL Disabilities Counsellors, CAL Testing Services, and other college wide communication. Additional information on the steps to book accommodated tests/exams with CAL Test Services can be found at Step-by-Step Overview.

Retroactive Accommodations
Students are expected to meet evaluation and completion deadlines as stated in course outline and weekly schedule documents. In circumstances where evaluation deadlines are missed or student performance has been affected by a temporary, significant and/or unanticipated change in functional ability related to disability (including mental health), interim or retroactive accommodations may be

considered. For these instances it is advised you reach out to CAL or your professors as soon as possible. For other situations where deferral of evaluations may be warranted, please consult Algonquin College Policy [AA21: Deferred Evaluation](#).

Network Credentials and College Email

Students at Algonquin College are provided with a college email account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course activities. Your network credentials can be found in the [ACSIS portal](#) and you are expected to check your Algonquin email regularly and to use it to send and receive college-related email. Students are required to maintain the privacy of their AC login credentials. Sharing network credentials poses a security risk and is subject to disciplinary action. Your responsibility to protect your login credentials is governed by the [Information Security Policy IT01](#). Support is available through the college Information Technology Service (ITS) at: [https://www.algonquincollege.com/its/](#)

Mental Health and Wellness Supports

Canada has launched a national Suicide Helpline at [www.988.ca](#) and a wide range of mental health and wellness resources for Algonquin students are available at [www.algonquincollege.com/SSS/student-health-wellness](#).

Student Course Feedback

Algonquin College invites students to share their course experience by completing a student course feedback survey for each course they take. For further details consult Algonquin College Policy [AA25: Student Course Feedback](#).

Use of Mobile Devices in Class

With the proliferation of small, personal mobile devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices unless authorized by your professor can be disruptive and disrespectful to others. During examinations, the use of such devices is generally prohibited unless authorized by your professor. Otherwise use is considered academic dishonesty in the form of cheating. For further details consult Algonquin College Policy [AA32: Use of Electronic Devices in Class](#)

Technology Requirements

Students are required to have access to a computer and to the internet. There may also be additional technology-related resources required to participate in a course that are not included in the course materials fee, such as headphones, webcams, specialized software, etc. Details on these requirements can be found in the Weekly Schedule document of the course for each course available on Brightspace.

Transfer of Credit

It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Safe Harbour

In the event of an unexpected major event (pandemic, etc.), your course may have changes that are not reflected in the Course Outline. Should this happen, the Weekly Schedule document will have updated information about your course.