

Course information for Routing and Switching in complex networks I

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1 About

This course is based upon the materials available in CCNP: Enterprise Core. Besides this, supplementary materials will also be given to keep the academic standard of the course. Parts of the materials in the CCNP Enterprise Core curriculum will not be included in the course, however, if you plan to take the CCNP ENCOR certification you must read the entire curriculum.

2 Course Objectives

After finishing the course, the participants will know how to:

- Create an effective and scalable enterprise network
- Configure, monitor and troubleshoot equipment in a network infrastructure

- Explain in detail and justify the use of routing protocols
- Combine different support mechanisms to optimize routing in complex networks
- Explain and calculate basic theory of wireless networks
- Plan and design wireless networks
- Explain the concept of network virtualization and compare it to traditional networks
- Give examples of configuration automation tools

3 Course outlines

The following section covers the outline of this course.

3.1 Account at Cisco Network Academy

You will use the same account in Cisco Network Academy as you used in the course DT204G - Continuation course to network technology.

3.2 How to study

Every lecture given in this course is based on one or several chapters from the CCNP Enterprise Core curriculum. To prepare yourself for the lectures, make sure to read the chapters thoroughly at least once before the lecture. See section 7 to know what chapters to read. Once you have read the chapters you should take the corresponding chapter exam to ensure that you have understood the contents of the chapters you just read. If you do not pass the assessment test¹, consult the personalized feedback that is given to you after a completed test, for information about what parts you must read again before you retake the test.

This course contains a lot of materials to read, therefore make sure to follow the timetable found in section 7.

You must always finish an assessment test if you have started it, otherwise it will lock up and you won't be able to retake it. *Each assessment test can only be taken five times, therefore make sure to practice before each test.*

3.3 Examination

In the end of the course there will be a written exam. This exam will be used for setting the final grade.

The written exam is provided by the University and covers the entire course, including the extra material given through the lectures.

See section 3.3 for an overview of all the assignments and exams in this course and how they corresponds to the course syllabus and credits.

¹60% is considered a pass, however if you aim for a CCNP certification you should score at least 75%

Table 1: Examination in continuation course in network technology

Ladok	Examination	Grade	Credits	Comment
L101	Laboratory assignment	Pass or Fail	3.0 hp	
T101	Written Exam	A, B, C, D, E, Fx, F	4.5 hp	Written exam covering full course.

If you are taking this course off-campus, you need to book a seat at your nearest learning centre (lärcentra) for the written exam. This can be a long process, so start with this process early on in the course.

3.3.1 Assignments and Labs

There will be scheduled tutoring time for each of the modules given in this course, if you have any problems with an assignment or have any questions regarding the material or the course, use these tutoring sessions to get help from the teachers, otherwise consult your classmates in the discussion forum.

Before handing in an assignment or lab, make sure the following criteria is met.

- The assignment must be submitted in a passable state. A passable state means that:
 - The assignment is complete.
 - All questions are answered and the answer is relevant to the question. An answer that is just a rewrite of the question is not an answer!
 - Proper references are given for all answers.
 - Always show your calculations.
 - Motivate your answers.
- The assignment must be submitted in time.
- The assignment must be handed in as a PDF document.
- Submissions will be checked against Urkund for plagiarism. See section 6 for information about the consequences of cheating.

Failure to submit an assignment following the above criteria will result in an F. Resubmissions or late submissions will be graded during the next grading period, see section 5 for more information about this.

3.3.2 Taking the exam

You can take the exams on-campus or off-campus, if you chose to take the exam off-campus, consult the following information for instructions:

Off-Campus Examination routines
Rutiner för tentamen på annan ort

The following rules applies for the exam.

- You must identify yourself with a valid ID-card.
- The exam must be guarded by an approved invigilator.
- You are allowed to use an english-swedish dictionary and a blank piece of paper and a pen.
- No communication with anyone except the teacher or invigilator during the exam.
- During the time of the exam, you are not allowed to leave the exam-room the first hour. After that, once you leave the exam room you are no longer allowed in (with the exception of bathroom break of course).

See section 6 for information about what will happen if any attempts of cheating are discovered during the exam.

3.3.3 Written Exam Grading

To pass this exam, you must have shown sufficient knowledge in all of the intended learning outcomes (ILO) that are covered by the exam. If one third of the covered ILO's is failed, you will get the grade Fx, this means that you will, within two week from getting the exam result, get a chance to show that you have sufficient knowledge in those ILOs that you failed on the exam. If the complementary assignment given to you is passed, those ILO grade will be set to grade E. If you fail more than one third of the ILO's, you will get an F.

This can be expressed as following:

Let S be the set of ILOs covered on the exam. Let P be the set of ILO grades that you passed on the exam. Then, if

$$\begin{cases} |S| = |P| & \text{you passed the exam,} \\ |S| > |P| \geq \frac{2}{3}|S| & \text{you must complement, Fx,} \\ \text{otherwise} & \text{you must retake the exam, F.} \end{cases}$$

The final grade of the course will be set based on the average grade of the ILO's. Each ILO grade will be given a weight shown in section 3.3.3.

If the passing criteria given in 3.3.3 has been met. Let the weight table usage be defined as $C(g) = w_g$. Where g is the grade, and w is the corresponding weight. Let the set V contain the weight value of all the Passed ILO grades.

Then the final grade is set accordingly:

$$\begin{aligned} V &= \{v_n \mid v_n \in C(P)\} \\ FinalGrade &= C^{-1}(\lfloor \overline{V} \rfloor) \end{aligned}$$

The mean weight of the grades of each ILO is calculated. In the case the average is a real number, the mean is rounded downwards to the closest integer. That weight is then converted back to a grade, which will be set as final grade in the course.

Table 2: Weights given to grades

Grade	Weight
F	0
Fx	1
E	2
D	3
C	4
B	5
A	6

4 Course literature

The course literature used in this course is the Official Cert Guide for CCNP and CCIE Enterprise Core[1].

5 What if I am not done in time?

Written assignments are graded twice during the course; first, at the latest shortly after the deadline of the assignment; second, before the end of the course, or shortly thereafter. After the course you are offered one more attempt within a year. This attempt will occur during the reexam week in April.

In total you have three chances for having your assignments graded over the period of a year. After that you should come back the next time the course is given.

No tutoring is planned after the end of the course, i.e. after the last tutoring session scheduled in the course schedule. If you are not done with your assignments during the course and want to be guaranteed tutoring you have to reregister for the next time the course is given. Reregistration is a lower priority class of applicants for a course, all students applying for the course the first time have higher priority — this includes students in reserve places too.

If you by the end of the course have a majority of the assignments left undone you will have to reregister for the course the next time it is given. Whether you have completed the majority of the assignments or not is up to the teacher to decide. Talk to the teacher to see if you have to reregister or can just hand in the missing assignments.

A final note, if you feel that you will not be done with the course on time, it is better to stop the course at an early stage. If you register a break within three weeks of the course start, you will be in the higher priority class of applicants the next time you apply for the course. You can register such a break yourself in the Student Portal. Please contact the Student Office for further information regarding this early break from the course.

6 Reprimands

There will be a zero tolerance to cheating in this course. Any attempts of cheating during an exam, that is, using unauthorized aids during the exam, will directly be reported to the disciplinary committee where you will risk suspension from your studies for a predetermined time not exceeding 6 months.

If you talk during the exam you will be asked to abort the exam and come back the next time the exam will be given.

By handing in an assignment you ensure that all the answers are written by you only, or if it is group assignment, only are written by you together with your group members. You are also responsible to make sure that there is no plagiarism in that document.

When you make references and citations to other works, correct references must be made, and in the case of citations, the cited text must be clearly marked. If any part of the document is found to be plagiarized you will risk suspension from your studies for a predetermined time, not exceeding 6 months, due to disciplinary offence.

If it is a group assignment, all group members will risk to be held accountable for the disciplinary offence if it is not clearly marked in the work who is responsible for the plagiarized part.

If the assignment has been done in cooperation without explicit instructions in the assignment that this is allowed, this will be regarded as a disciplinary offence with risk of suspension for a predetermined time, not exceeding 6 months.

7 Class schedule

References

- [1] Brad Edgeworth et al. *CCNP and CCIE enterprise core ENCOR 350-401 official cert guide*. [San Jose, California]: Cisco Press, 2020. ISBN: 9781587145230.

Table 3: Timetable based on course given at 50%.

Course week	Schedule
	CCNAv7: Switching, Routing, and Wireless Essentials
1	Course introduction Lecture Chapter 1 Packet Forwarding Chapter 2 Spanning Tree Protocol Chapter 3 Advanced STP Tuning Chapter 4 Multiple Spanning Tree Protocol Chapter 5 VLAN Trunks and EtherChannel Bundles
2	Chapter 6 IP Routing Essentials Chapter 7 EIGRP Chapter 8 OSPF Chapter 9 Advanced OSPF Chapter 10 OSPFv3
3	Chapter 11 BGP Chapter 12 Advanced BGP Laboratory in Sundsvall
4	Chapter 13 Multicast Chapter 14 QoS Chapter 15 IP Services (Optional)
5	Chapter 17 Wireless Signals and Modulation Chapter 18 Wireless Infrastructure Chapter 19 Understanding Wireless Roaming and Location Services
6	Chapter 20 Authenticating Wireless Clients Chapter 21 Troubleshooting Wireless Connectivity Chapter 26 Network Device Access Control and Infrastructure Security Laboratory in Sundsvall
7	Chapter 22 Enterprise Network Architecture Chapter 23 Fabric Technologies Chapter 24 Network Assurance
8	Chapter 27 Virtualization Chapter 28 Foundational Network Programmability Concepts Chapter 29 Introduction to Automation Tools
9	Practical Final Examination in Sundsvall T101 Written Exam
(10)	Reexams