UNIVERSITY OF AMSTERDAM

FACULTY OF SCIENCE

EDUCATION AND EXAMINATION REGULATIONS
PART B: programme-specific section

Academic year 2016-2017

MASTER'S PROGRAMME
SYSTEM AND NETWORK ENGINEERING

26 July 2016

Chapter 1.   General Provisions

Article 1.1 – Definitions
In addition to part A, the following definitions are used in part B.

Research Project 1	A component of 6 EC comprising research into the literature and/or contributing to scientific research and/or an internship, always resulting in a written report.
	Research Project 1 is not considered part of the Master's thesis.
Research Project 2	A component of 6 EC comprising research into the literature and/or contributing to scientific research and/or an internship, always resulting in a written report.
	Research Project 2 is considered the Master's thesis and graduation project, to which is referred in the Rules and Regulations of the Examination Board, art. 5.32.3.b.1.

Article 1.2 – Study programme information
1. The Master's programme System and Network Engineering, CROHO number 60227, is offered on a full-time and part-time basis (part-time means taking the curriculum in two years). The language of instruction is English. This means that the Code of Conduct for Foreign Languages at the UvA applies for this programme (see Code of Conduct Governing Foreign Languages at the University of Amsterdam 2000 at the website: http://www.uva.nl/en/about-the-uva/uva-profile/rules-and-regulations/teaching/teaching.html).
2. The programme consists of a one-year programme with a total study load of 60 EC.
3. Within the programme the following tracks are offered:
    1. Networking
    2. Security

Article 1.3 – Enrolment
The programme is offered starting in the first semester of the academic year (1 September).

Chapter 2.   Programme objectives and exit qualifications

Article 2.1 – Programme objectives

The Master's programme System and Network Engineering (SNE) is a scientific, professionally oriented one year study programme with a compulsory curriculum. The objective of the programme is the training of system and network engineers who:

1. have knowledge on an abstract level of the operation of computers and networks with respect to interfaces, protocols and software;
2. are able to translate this abstract knowledge into concrete system and network configurations, independent of underlying vendor technology;
3. are able to acquire knowledge about innovative technologies and evaluate their potential;
4. are able to accommodate those innovations in an evolutionary way into existing systems;
5. are familiar with the philosophy and practice of Open Source Technology and are able to evaluate its strength and possibilities in relation to proprietary technology;
6. are able to build innovative systems using Open Source Components;
7. are able to recognize security aspects of systems on all levels and to take adequate measures to eliminate security problems where needed.

Article 2.2 – Exit qualifications

1. The Exit qualifications of the Master's programme System and Network Engineering are defined as follows:
   1. In the field of system and network engineering, graduates of the Master's programme in System and Network Engineering should have insight into the most important technological developments and related scientific results.
   2. In the interests of the innovation and modernisation of systems and networks graduates of the Master's programme in System and Network Engineering should have the capacity to apply this insight.
   3. Graduates of the Master's programme in System and Network Engineering have participated in active scientific research as is being performed in the Informatics Institute of the University of Amsterdam or in comparable scientific research groups or R&D divisions of companies.
   4. Graduates of the Master's programme in System and Network Engineering should have the capacity to address system and network engineering problems using abstraction and model formation, and they should be capable of formulating solutions in general, mathematical and technical terms.
   5. Graduates of the Master's programme in System and Network Engineering should have the capacity to communicate clearly, both orally and in writing; they should be skilled in giving presentations to groups and should know how to explain problems and solutions at the appropriate level of abstraction.
   6. Graduates of the Master's programme in System and Network Engineering should be able to function well in teams. They should be capable of discussing technical topics in both small and large groups, and they should be well equipped to distribute and coordinate technical tasks among group members.
   7. Graduates of the Master's programme in System and Network Engineering should be aware of the societal, ethical and social aspects of system and network engineering.
   8. Graduates of the Master's programme in System and Network Engineering should be skilled in exploring (searching, reading and evaluating) the many forms of documentation and literature concerning system and network engineering, with regard to both content and medium. They should be familiar with the Internet Society (ISOC), the World Wide Web Consortium (W3C), the Institute of Electrical and Electronics Engineers (IEEE) and other international bodies that develop standards and publish in the area of computer systems and networks.

9. Graduates of the Master's programme in System and Network Engineering should be highly familiar with the usual configurations and procedures for the regular and crisis administration of a variety of current systems and networks, middleware and applications.

10. Graduates of the Master's programme in System and Network Engineering should have knowledge about methods and principles of systems based on Open Technology, which consists of Open Standards, Open Software (including Open Source) and Open Security. Graduates should be able to apply this knowledge in existing, complex environments and to integrate Open Technology with (partly) proprietary solutions.

11. Graduates of the Master's programme in System and Network Engineering should be highly familiar with the security functions of systems and networks, and they should be capable of contributing actively to the architecture and the configuration of systems and networks that conform to current security standards. Graduates should also be able to determine whether systems or networks conform to particular security standards.

2. In addition to Article 2.2.1, the following exit qualifications apply for the track *Networking*:

1. Graduates of the *Networking* track of the Master's programme in System and Network Engineering should have the technical knowledge of communication protocols, network components and business systems that they will need to accurately justify choices and steps relating to administration and security, including those regarding configuration, procedures and security architecture.

2. Graduates of the *Networking* track of the System and Network Engineering master should have a good understanding of the world of Internet Service Providers and routing issues in local networks and the global Internet.

3. Graduates of the *Networking* track of the Master's programme in System and Network Engineering should have sufficient insight into the organisational contexts within which systems and networks function, to channel the needs of organisations and users, and to translate them into appropriate technical support.

4. Graduates of the *Networking* track of the Master's programme in System and Network Engineering should have sufficient technical knowledge and intellectual capacity to assume positions of leadership in the field of system and network engineering within a few years. They should have the capacity to develop their own vision of the field of system and network engineering, thus contributing to evolution and innovation in concrete system environments.

3. In addition to Article 2.2.1, the following exit qualifications apply for the track *Security*:

1. Graduates of the *Security* track of the System and Network Engineering master should understand methods for gathering digital traces from a computer system and have the knowledge to assure that information gathered is suited for forensic or security analysis.

2. Graduates of the *Security* track of the System and Network Engineering master should have the knowledge and capabilities to build systems supporting the forensic or security investigation process with tools enhancing the human capacity to perceive, understand and reason about complex and dynamic data and situations.

3. Graduates of the *Security* track of the System and Network Engineering master should be able to understand and develop the tools and techniques for analysing and fighting cybercrime.

4. Graduates of the *Security* track of the System and Network Engineering master should be able to gather and manage the computational resources required to analyse large amounts of complex, dynamic, and distributed data.

5. Graduates of the *Security* track of the System and Network Engineering master should understand the relation between security processes and cybercrime on the one hand and the security and vulnerability of systems on the other hand.

Chapter 3.   Further admission requirements

Article 3.1 – Admission requirements
1. Admission to the Master's programme System and Network Engineering is possible, under the conditions as described in paragraph 2, for students with the following qualifications:
   1. A Bachelor Computer Science or a closely related programme from a Dutch university.
   2. A foreign qualification, comparable to 3.1.1.1, under the condition of sufficient active and passive knowledge of the English language. For details, see article 3.5.
   3. A Bachelor Informatics, Technical Informatics or a closely related vocational education (HBO).
2. All students, as mentioned under 3.1.1. can only be admitted to the Master's programme under the condition of a successful result in an assessment procedure.
   This assessment considers knowledge and motivation and evaluates
   A. General scientific skills:
      1. Writing skills: reading and outlining a technical document
      2. Verbal skills: presenting earlier work
      3. Analytical skills: elementary basic and discrete mathematics, and logic
   B. Specific SNE-skills:
      1. Elementary knowledge of Unix and/or Linux
      2. Elementary knowledge of TCP/IP-networks
      3. Elementary knowledge of shell-scripting
      4. Elementary knowledge of Python programming
3. In special cases the Examinations Board may decide to admit a prospective student based on other relevant qualifications, for instance equivalent work experience. The Examinations Board decides on an appropriate assessment for each case.
4. Every submission will be reviewed by the Examinations Board. Admission is only possible with explicit approval from this board.

Article 3.2 – Pre-Master's programme
Not applicable.

Article 3.3 – Limited programme capacity
Components within the Master's Programme in System and Network Engineering, as described under Chapter 4, are exclusively open to students registered in the SNE programme.

Article 3.4 – Final deadline for registration
1. Not applicable.

Article 3.5 – English language requirements
1. The proficiency requirement in English as the language of instruction can be met by the successful completion of one of the following examinations or an equivalent:
    1. IELTS-test: minimum score 6.5, at least 6 on each sub-score (listening/reading/writing/speaking).
    2. TOEFL Test: the minimum scores required are:
        - Internet-based test (iBT): 90
        - Computer-based test (CBT): 235
        - Paper-based test (PBT): 580
        Please note the TOEFL-code for the Faculty of Science of the Universiteit van Amsterdam is: 8628.
    3. A Cambridge Examination Score with a minimum test result of CAE A or B will also be accepted. For the CPE test a minimal score of C is required.
2. Those possessing a Bachelor's degree from a Dutch university or HBO or have an English-language 'international baccalaureate' diploma satisfy the requirement of sufficient command of the English language.

Article 3.6 – Free curriculum
1. Subject to certain conditions, the student has the option of compiling a curriculum of his/her own choice which deviates from the curricula prescribed by the programme.
2. The concrete details of such a curriculum must be approved beforehand by the most appropriate Examinations Board.
3. The free curriculum is put together by the student from the units of study offered by the University of Amsterdam and must at least have the size, breadth and depth of a regular Master's programme.
4. The following conditions must at least have been met in order to be eligible for the Master's degree:
    1. at least 48 EC must be obtained from the regular curriculum;
    2. the level of the programme must match the objectives and exit qualifications that apply for the programme for which the student is enrolled.

Chapter 4.   Curriculum structure

Article 4.1 – Composition of programme
1. The programme consists of the following components:
    1. General compulsory components amounting to 42 EC;
    2. General compulsory Research Project 1 amounting to 6 EC;
    3. Track specific compulsory component amounting to 6 EC;
    4. Track specific Research Project 2 amounting to 6 EC
2. Every component will be tested. In the course catalogue this is described per component.
3. Within the programme different types of teaching methods are used. In the course catalogue this is described per component.

Article 4.2 – Compulsory components
1. Programme Track Networking

Component	Code	Study load (EC)	Semester	Teaching method	Assessment
Essential Skills	5384ESSK6Y	6	1	L, PLE	Written
Classical Internet Applications	5384CLIA6Y	6	1	L, PLE	Written
Security of Systems and Networks	5384SESN6Y	6	1	L, PLE	Written, oral
Distributed Systems (VU)	52848DIS6Y	6	1	L	Written
Research Project 1	53841REP6Y	6	1	PR	Written, oral
Large Installation Administration	5384LAIA6Y	6	2	L, PLE	Written, oral
InterNetworking and Routing	5384INRO6Y	6	2	L, PLE	Written
Offensive Technologies	5384OFTE6Y	6	2	L, PLE	Written, oral
Advanced Networking	5384ADNE6Y	6	2	L, PLE	Written
Networking Research Project 2	53842NRP6Y	6	2	PR	Written, oral

L = Lectures, PLE = Practical Lab Exercises, PR = Practical Research,

2. Programme Track Security

Component	Code	Study load (EC)	Semester	Teaching method	Assessment
Essential Skills	5384ESSK6Y	6	1	L, PLE	Written
Classical Internet Applications	5384CLIA6Y	6	1	L, PLE	Written
Security of Systems and Networks	5384SESN6Y	6	1	L, PLE	Written, oral
Distributed Systems (VU)	52848DIS6Y	6	1	L	Written
Research Project 1	53841REP6Y	6	1	PR	Written, oral
Large Installation Administration	5384LAIA6Y	6	2	L, PLE	Written, oral
Cybercrime and Forensics	5384CYFO6Y	6	2	L, PLE	Written
Offensive Technologies	5384OFTE6Y	6	2	L, PLE	Written, oral
Advanced Security	5384ADSE6Y	6	2	L, PLE	Written

Security Research Project 2	53842SRP6Y	6	2	PR	Written, oral

L = Lectures, PLE = Practical Lab Exercises, PR = Practical Research,

Article 4.3 – Practical exercise
In addition to, or instead of, classes in the form of lectures, the elements of the Master's programme often include a practical component as defined in article 1.2 of part A.

Article 4.4 – Elective components
Not applicable.

Article 4.5 – Sequence of examinations
1. The student may participate in examinations of a component only after the student has shown that he/she has the necessary prerequisite knowledge. To that end, a student must have passed the components stated in the course catalogue, which are considered to be prerequisite knowledge.
2. The student may start with the final project of the study programme (Research Project 2) only if Research Project 1 has been completed and a maximum of 12 EC of the complete programme, meaning all obligations as stated in Article 4.2, have not yet been passed successfully.
3. The final project (Research Project 2) must be approved by the staff members and also by the ethics committee (EC OS3).
4. Resits are not allowed in case the component consists of practical training.
5. Written work has to be handed in for assessment in time. In case this condition is not met, the component has to be taken again in the next year. After the first assessment written work can be handed in once more for final improvements.
6. The assessment of projects in which several students have worked on an assignment will only be made at the end of the relevant teaching period. In principle, an individual resit is not possible.
7. At the request of a student, the Examinations Board may deviate from the conditions in paragraphs 1, 2 and 5 for the benefit of the student.

Article 4.6 – Participation in lectures, practical exercise and study group sessions
1. All parts and activities of the curriculum are obligatory (presence and participation). This includes lectures, seminars, practical work, colloquia and site visits.
2. Exemptions for activities have to be granted in advance by the examiner.
3. If no exemption has been granted and the conditions as stated in paragraph 1 were not met, the component has to be taken again.

Article 4.7 – Maximum exemption
Not applicable.

Article 4.8 – Validity period of examinations
The validity period of interim examinations and exemptions from interim examinations is limited, as described in part A, article 4.8.

Article 4.9 – Degree
Students who have successfully completed their Master's examination are awarded a Master of Science degree. The degree awarded is stated on the diploma.

Chapter 5. Transitional and final provisions

Article 5.1 - Amendments and periodic review
1. Any amendment to the Teaching and Examination Regulations will be adopted by the dean after taking advice from the relevant Board of Studies. A copy of the advice will be sent to the authorised representative advisory body.
2. An amendment to the Teaching and Examination Regulations requires the approval of the authorised representative advisory body if it concerns components not related to the subject of Section 7.13, paragraph 2 sub a to g and v, and paragraph 4 of the WHW and the requirements for admission to the Master's programme.
3. An amendment to the Teaching and Examination Regulations is only permitted to concern an academic year already in progress if this does not demonstrably damage the interests of students.

Article 5.2 – Transitional provisions
Not applicable.

Article 5.3 - Publication
1. The Dean of the faculty will ensure the appropriate publication of these Regulations and any amendments to them.
2. The Teaching and Examination Regulations will be posted on the faculty website and deemed to be included in the course catalogue.

Article 5.4 – Effective date
These Regulations enter into force with effect from 1 September, 2016.
Thus drawn up by the Dean of the Faculty of Science on 18 July, 2016

Appendix 1   List of articles that must be included in the OER pursuant to the WHW (articles in framed boxes)

Section A
Art. 1.1   7.13, para 1, WHW
Art. 2.1   7.13, para 2 sub w
Art. 3.2   7.13, para 2 sub e
Art. 4.2   7.13, para 2 sub h and l
Art. 4.3   7.13, para 2 sub n
Art. 4.4   7.13, para 2 sub o
Art. 4.5   7.13, para 2 sub j, h
Art. 4.7   7.13, para 2 sub r
Art. 4.8   7.13, para 2 sub k
Art. 4.9   7.13, para 2 sub p
Art. 4.10   7.13, para 2 sub q
Art. 4.11   7.13, para 2 sub a
Art. 5.1   7.13, para 2 sub u
Art. 5.2   7.13, para 2 sub m

Section B
Art. 1.2   7.13, para 2 sub i
Art. 2.1   7.13, para 1 sub b, c
Art. 2.2   7.13, para 2 sub c
Art. 3.1   7.25, para 4
Art. 4.1   7.13, para 2 sub a
Art. 4.2   7.13, para 2 sub e, h, j, l
Art. 4.3   7.13, para 2 sub t
Art. 4.4   7.13, para 2 sub e, h, j, l
Art. 4.5   7.13, para 2 sub s
Art. 4.6   7.13, para 2 sub d
Art. 4.8   7.13, para 2 sub k

Appendix 2   Overview of guidelines pursuant to Section 9.5 WHW UvA

The structure is a **format** *established as a guideline:*   date of decision: 20 November 2012
                                                                   entry into force: 1 September 2013

Section A
Art. 4.5   para 3   *most recent result applies*   date of decision: 14 February 2008
                                                                   entry into force: 14 March 2008

Art. 4.6   *Marks*
                    (5.5 as pass mark boundary)   date of decision: 14 February 2008
                                                                   entry into force: 14 March 2008

                    (5.1 to 5.9 not awarded as final marks)   date of decision: xxxx 2014
                                                                   entry into force: 1 September 2014

Art. 4.11 para 3   *Final examination dates, 12 per year*   date of decision: 14 February 2008
                                                                   entry into force: 14 March 2008

Art. 4.13   *Fraud and plagiarism*   date of decision: 25 May 2010
                                                                   entry into force: 1 September 2010

Section B
Art. 3.1 para 6   *Entry requirements for Master's programme*   date of decision: 22 June 2006
                                                                   entry into force: 22 June 2006
                                                                   withdrawn on 1 September 2014