



POLITIHØGSKOLEN

CURRICULUM

POSTGRADUATE EDUCATION

In

**NORDIC COMPUTER FORENSIC
INVESTIGATORS**

**MODULE 3R: R, VISUALISATION &
DESCRIPTIVE STATISTICS**

7.5 credits

**Approved by the Education Committee 12th May 2023
Changes approved by the head of department
30th November 2023**

1. Introduction and purpose

For this, students will learn to perform all tasks with the R programming language. R is a popular programming language and environment for statistical computing and visualisation. R is open-source and free. It is not necessary to have any programming knowledge in R, as programming will be taught from scratch and in parallel with theoretical notions. The course will begin by introducing the basics of programming in R to progress to more complex tasks such as cleaning and data preparation. Then, students will learn descriptive data analysis to finish with data visualisation. The goal of the course is to provide education in reasoning how, why, and when to perform all the tasks in the data analysis process. This knowledge is complemented by a highly applied approach where students are expected to perform tasks in R as they learn the theoretical concepts. Finally, the knowledge and skills acquired will be linked to statistical analysis and the visualisation of digital evidence. The course also aims to provide students with a solid foundation of applied knowledge for those who want to learn more advanced data analysis techniques in the future.

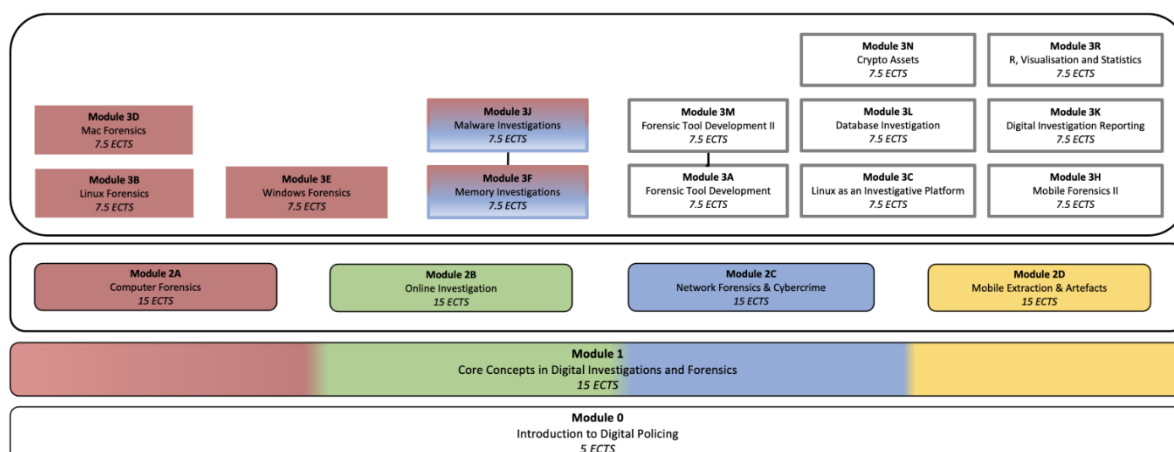
The postgraduate study programme shall contribute to police practitioners being better able to perform investigative and analysis tasks involving digital devices, and thus contribute to the quality and development of digital investigation and forensics.

2. When applicable: Educational pathways and formal approval

2.1. Education

The education gives 7.5 credits and is included as a course in an educational portfolio (the 'NCFI Portfolio') according to the following model depicted below.

Admission requirements, content and organisation of the individual courses are described in more detail in the study plan for each course.



3. Target group and admission requirements

3.1. Target group

The primary target group for this education is police staff in the Nordic countries whose main task is, or will be, handling and investigating digital evidence.

Employees in other international police services or governmental agencies who currently work, or will work, with digital evidence are also eligible to apply.

Applicants must be recommended by the employer.

3.2. Admission Requirements

Applicants must document the following requirements:

Education:

- Bachelor's degree
- have passed at least one NCFI M2X module.¹

Applicants who do not satisfy the requirement for a bachelor's degree must document the following:

- Passed and completed 2-year education at a higher level than upper secondary school, and in addition either:
 - o Minimum 60 ECTS

¹ The former NCFI Module 2 (25 ECTS) is also accepted.

- (of which NCFI Core Concepts of 15 ECTS and any NCFI M2X of 15 ECTS each. The former NCFI Module 1 (5 ECTS) and former NCFI Module 2 (25 ECTS) are also accepted.), or
- 1680 hours of continuing education courses, or
- 5 years of practice

Employment, work experience and additional requirements:

- Current employment in a government agency (e.g., law enforcement agency or other cooperating governmental agencies/organisations)

4. Learning outcomes

4.1. General Competence

After completing the module, students can:

- perform professional and research tasks in digital policing
- see the role of digital policing in a broader perspective during an investigation

4.2. Knowledge

After completing the module, students have knowledge of:

- data analysis and statistics terminology
- data analysis theory and workflow
- the relevance of data analysis for data-driven law enforcement decision making
- good practices and ethical concerns when communicating statistical results of cybercrime-related data

4.3. Skills

After completing the module, students will be able to:

- create visualisations and evaluate their appropriateness and quality
 - utilise R and other appropriate tools and techniques in data analysis
 - analyse findings with a statistical approach
 - communicate statistical / analytical findings
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- conduct data analysis cleaning and preparation tasks in R
 - perform descriptive statistical data analysis in R
 - identify and select the appropriate visualisation methods for digital policing tasks build advanced data visualisations in R
 - apply the acquired knowledge to the statistical analysis and presentation of digital evidence

5. Organisation of teaching and learning activities

The education is organised as an online part-time programme and must be completed within 5 months. The scope of further education is estimated to be approx. 210 hours of study.

Teaching and learning activities shall contribute to providing students with good learning outcomes, and emphasis is placed on flexible and diverse working methods with a high degree of student activity. Furthermore, the study is organised around key issues and challenges in the investigation of electronic traces, which are illuminated with relevant theory.

The teaching and learning activities include lectures, presentations, individual and group work, practical exercises, cases, quizzes, assignments, and literature study. Student support will be delivered via electronic means such as: email, discussion fora, chat, and virtual classrooms. The teaching and learning activities also include optional live online lectures throughout the semester (totalling no more than 8 hours).

An online learning platform is used in the administration and pedagogical implementation of the programme.

Coursework requirements

The following requirements must be approved before the students can take the exam:

- Successful completion of up to 10 automatically graded online quizzes. (Students may have multiple attempts at these tests, if necessary.)
- Two assignments

Guidance will be given related to the coursework requirements.

6. Assessment

Students are assessed along the way through coursework requirements and receive feedback on these according to specified criteria based on the descriptions of learning outcomes.

The module is concluded with an individual take-home exam over 4 hours.

The exam **must** be passed in order to successfully complete the module.

Letter grades are used on a scale from A to F, where A is the highest passing grade, E is the lowest passing grade and F is a failing grade.

7. Literature

7.1. Syllabus

Students will be expected to read several web resources, lessons, reports, and academic research papers. These will form part of the mandatory reading requirements and thus be examinable.

Due to the rapid changes in the fields of digital forensics and cybercrime investigation, such resources must be provided to students during the study. This will ensure that the reference materials are up to date and based on current trends.

The mandatory reading shall not exceed 450 pages.

7.2. Assumed Knowledge

Literature from The Norwegian Police University College's NCFI M1 Core concepts in Digital Investigation and Forensics of 15 ECTS, **and** at least one NCFI M2X module of 15 ECTS (or similar education).