Data sets are so large or complex and data can be generated that fast, that traditional data processing applications are inadequate. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy. Big data often refers simply to the use of predictive analytics or certain other advanced methods to extract value from data, and seldom to a particular size of data set. Accuracy in big data may lead to more confident decision making, and better decisions can result in greater operational efficiency, cost reduction and reduced risk.

This specialization focuses on getting acquainted with architectures and programming paradigms to store and process Big Data.

These days many companies collect all kinds of data from their customers; sensors generate a lot of data; many activities of users of a system are logged. All these data is collected to improve the business of a company; to recommend products to customers; to predict future behavior etc...
ECTS: 30  
Semester: September February  
Location: Enschede

Course content  
The specialization focuses on the following competences:  
• Understanding and using Big Data storage platforms  
• Developing programming skills for processing Big Data  
• Understanding and using machine learning and data mining techniques for analyzing and visualizing data

The specialization Big Data Technologies consists of 3 courses to give a theoretical foundation and to get programming experience to process and store Big Data.

The following subjects are planned:  
• Big Data Processing with Hadoop – 5 ECTS with subjects like Hadoop Map–Reduce, Spark, Flink, lambda and kappa architectures. Also some attention is paid to NoSQL databases.  
• Machine Learning Basics – 5 ECTS. – with focus on supervised and unsupervised learning strategies; classification and regression  
• Machine learning Advanced – 5 ECTS with a focus on recommendation and deep learning by using machine learning and data mining techniques.

Several practical assignments have to be performed by the student to pass each course. Most practical assignments consist of solving problems with Java and/or Python.

Besides these modules a group-project of 15 ECTS is done in cooperation with a company which has a Big Data problem to solve. Each project-group consists of 4-5 students. The project consists of three increments and has a total of 15 ECTS.

Enrolment requirements  
This course is meant for third year Software Engineering bachelor students with:  
• Extensive OOP-programming skills in preferably Java or a comparable language.  
• Experience with working in project-groups  
• Knowledge of Agile development, SCRUM and git/svn

Deadline to enrol is 1st of May. If housing is required, deadline is April 15th.

For more information about the Big Data Technologies exchange programme please contact Margriet de Vos M.J.Edevos@saxion.nl
An organization’s data is its lifeblood, now more than ever. Likewise, protecting the availability, confidentiality and integrity of those data is more important than ever. On the other hand, attacks against the availability, confidentiality and integrity are getting more and more sophisticated and ubiquitous. Cyber criminals are no longer solitary hackers, they are well organized and well-funded.

This means information security is getting more complex. Professional information security requires both organizational policies, checks and balances and technical measures. A professional security specialist should know about policies, standards, laws and regulations, and of course should have a solid knowledge of security technologies.

In this exchange programme you will learn about the ins and outs of information security.
Course content
The exchange programme Information Security focuses on the following competences:

- Development of knowledge of information security standards and best practices
- Formulating information security policies and information security plans conforming to the current standards
- Designing and implementing technical IT security measures that realize the information security plan
- Testing the effectiveness of technical IT security measures.

The programme consists of 3 theoretical units (15 ECTS total) and a project of 15 ECTS

- Information security (5 ECTS) : Quartile 1
- Infrastructure Security (5 ECTS) : Quartile 1
- Operational Security (5 ECTS) : Quartile 2
- Integral Project (15 ECTS) : Quartile 1 and 2

Quartile 1: the first 10 weeks
Students will get practical and theoretical course units on:

- Information security overview
- Information security policies and plans
- Standards in information security
- Risk analysis
- Audits
- Theory of security technologies
  - VLANs
  - Firewalls
  - VPN
  - Honeypots, intrusion detection and intrusion prevention
  - Cryptography
  - And others

Students will also do the first part of their project:

- Formulating a project plan
- Performing security best practices
- Risk analysis of the provided case

The student will take a written exam for the module Information Security, a written exam for the module Infrastructure Security and will take an assessment for the first part of the project (project plan and research)

Quartile 2: the last 10 weeks
Students will continue getting practical and theoretical course units on:

- Theory and practice of penetration testing
- Maintaining a secure infrastructure
  - PDCA cycle
  - IT Forensics
  - Recovery
  - SIEM

Students will also finish their project
- Formulate a security plan
- Design technical security measures
- Realize a proof of concept
- Testing the security measures

The student will take a written exam on the theory of security technologies, including penetration testing. The student will take 2 assessments concerning their project:

- Risk analysis and security plan (1st assessment)
- Technical design, realization and testing (2nd assessment)

The student will also write a report on the legal and ethical ramifications of information security

Career prospects
The ever increasing need for security professionals guarantees plenty of job opportunities. This programme will give the student a solid basis on which a career as IT security professional can be built. There is no end of the race between cyber criminals and security professionals in sight, so the long term career prospects are excellent.

Enrolment requirements
This exchange programme is meant for 3rd year and higher bachelor students of ICT (Software Engineering, IT Service Management, Business IT). Students from other studies can also participate, but some experience with and intermediate level knowledge of networking technologies is required. Deadline to enrol is 1st of May. If housing is required, deadline is April 15th.

For more information about the 'Information Security' exchange programme please contact Margriet de Vos

M.J.F.devos@saxion.nl
This course aims to offer an understanding of the process of gathering data, unlock data sets, analyze data and information and visualize this into meaningful information in order to create new value for your business.

This program is meant for students that will work with or come across data flows in their profession. It is subjected to business intelligence, business analytics, information management, open data, hyper-connectivity and information strategy.

Exchange programme: Improve your business with data

Data is generated everywhere and is big business. When all devices are connected and the real world becomes digital there is a huge amount of data that is stored by organizations and people. Personal data (biometric), data about sales and marketing, the weather, finance or data about real world shopping behavior. That data is stored in warehouses but has no value when it is not properly combined, filtered or processed to make it usable and visible for humans.
ECTS : 30
Semester : Fall (Sept.-Jan.)
Location : Enschede

Course content
The following subjects are offered:

**September –November**
- Data acquisition (5 ects)
- Data analysis (5 ects)
- Data visualization (5 ects)

**November – January**
- Project (15 ects)

Data acquisition
The first course will provide you with insight in data and the process of data acquisition and acquisition to transform data into information. You will start with an overall view of data classification and information architecture. Subsequently you will work with relational, non-relational databases and data warehousing. This will be rounded off by designing and implementing the collection of data using an ETL-process.

Data analysis
The second course focusses on data analysis. You will learn to make statistic calculations and use predictive techniques while using a variety of tools and simulation models. You will be able to find trends and patterns in data and reflect on the meaning and value of your data in order to add value to your business.

Data visualization
In the third course you will learn to present abstract information to your stakeholders. We will work on all kind of visualization technics and tools (Tableau, Cliq sense, Power BI). Using smart data visualizations you will be able to create insight for your clients and add value to their business.

Project
Students will execute a project assignment in a team and write a research paper within the field of Data Driven Business for an organization or company. With this assignment students will prove they are competent and that they can apply their knowledge in a new and innovative (research) project.

Various assignments from private and public organizations will be on offer to students for application of knowledge and skills they have acquired. Usefulness of results of these projects to consumers or citizens will be essential.

Enrolment requirements
This exchange programme is meant for students with at least two years of business IT education or an equivalent. It is recommended to have some experience in the use of datasets, databases and/or spreadsheets or another background or knowledge in the usage of Information.

Deadline to enrol is 1st of May. If housing is required, deadline is April 15th.

For more information about the 'Improve your Business with Data' exchange programme please contact Margriet de Vos

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