UNIVERSITEIT GENT

Studiefiche

Vanaf academiejaar 2024-2025

Data Intelligence in Sustainable Drug Discovery (J000530)

Cursusomvang *(nominale waarden; effectieve waarden kunnen verschillen per opleiding)*

Studiepunten 6.0 **Studietijd 180 u**

Aanbodsessies en werkvormen in academiejaar 2024-2025

A (semester 1)	Engels	Gent	werkcollege
			zelfstandig werk
			hoorcollege

Lesgevers in academiejaar 2024-2025

Pattyn, Filip	FWO1	Verantwoordelijk lesgever
Hertleer, Carla	FWO2	Medewerker
Van Nieuwerburgh, Filip	FWO1	Medelesgever

Aangeboden in onderstaande opleidingen in 2024-2025	**stptn**	**aanbodsessie**
International Master of Science in Sustainable Drug Discovery	6	A

Onderwijstalen

Engels

Trefwoorden

Omics technologies, genetic analyses using bioinformatics, data visualization, data management, FAIR data, databases, differential expression/pathway/gene ontology analysis, R & SQL

Situering

This course will introduce omics technologies, and bioinformatic concepts and tools as applied in the context of drugging.

Inhoud

Pharmacogenomics
- Basics in genetics (human genome, epigenome, gene expression regulation, genetic variants)
- Omics techniques such as microarrays, and NGS/MPS
- Application of omics in GWAS, clinical diagnosis, neoantigen cancer treatment, etc.
- Practical sessions on BLAST, NGS read mapping, variant calling and genetic databases such as PharmGKB

Transcriptome data analysis
- Pipeline for analysis of transcriptome data in context of downstream pathway analysis of drugs
  - Data pre-processing, quality control, visualization/exploration
  - Differential expression analysis
  - Gene ontology and pathway analysis
- Public databases
- Single-cell versus bulk transcriptome data

Data management: sustainable storage and usage of data
- Data models and technologies, especially details on the pros and cons of these models/technologies in some existing use cases. Hereby, we will pay particular attention to relational data models. We will highlight fundamental operations on that model, which will lead us to the world of query languages. In addition, metadata annotation and data standardization in drug discovery research will be

handled.
- Usage of data in practical scenarios. This means we will see some best practices to make data available for internal and external sharing and re-use, which brings us to FAIR principles. This is of huge importance in a setting where re-validation and confirmation is becoming more and more important. Also, scenarios with public data initiatives will be handled.
- Some practical skills will be developed by bringing the theoretical principles to live by tackling some use cases. We will work with simple tools to setup a data pipeline and learn how to inspect datasets in a critical way.

Begincompetenties

Basics in statistics

Eindcompetenties

1 Implement simple algorithms in R for transcriptome analysis
2 Understand and perform a data-mining pipeline on genome and transcriptome data, including visualisation and differential expression analysis
3 Explain the different omics technologies and approaches
4 Extract useful drug discovery information from different datasets
5 Understand and apply data management using relational databases and FAIR data principles in the context of drug discovery

Creditcontractvoorwaarde

Toelating tot dit opleidingsonderdeel via creditcontract is mogelijk mits gunstige beoordeling van de competenties

Examencontractvoorwaarde

Dit opleidingsonderdeel kan niet via examencontract gevolgd worden

Didactische werkvormen

Werkcollege, Hoorcollege, Zelfstandig werk

Toelichtingen bij de didactische werkvormen

Pharmacogenomics, data management and FAIR data topics will be handled during lectures often combined with demonstrations and with practical sessions.
The pipeline for analysis of transcriptome data will be explained during lectures.
During the practical sessions, step by step students will learn the basics of R and more advanced analysis of transcriptome data.

Studiemateriaal

Type: Syllabus

Naam: Recent manuscripts
Richtprijs: Gratis of betaald door opleiding
Optioneel: nee

Referenties

Vakinhoudelijke studiebegeleiding

Evaluatiemomenten

periodegebonden evaluatie

Evaluatievormen bij periodegebonden evaluatie in de eerste examenperiode

Schriftelijke evaluatie met open vragen, Schriftelijke evaluatie open boek, Schriftelijke evaluatie, Werkstuk

Evaluatievormen bij periodegebonden evaluatie in de tweede examenperiode

Schriftelijke evaluatie met open vragen, Schriftelijke evaluatie open boek, Schriftelijke evaluatie, Werkstuk

Evaluatievormen bij niet-periodegebonden evaluatie

Tweede examenkans in geval van niet-periodegebonden evaluatie

Niet van toepassing

Eindscoreberekening

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.