CONCEPT MSc Course: Methods in Biodiversity Analysis 2018

27 November -- 22 December

Naturalis Biodiversity Center

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| Place: Sylvius Building  Room 1.4.01/06  **Except**:  Dec. 14-16 Room 1.4.11/16  21-22/12 Free to prepare for examination  23/12 Evaluation: room 1.4.11/16  Examination: room 1.4.11/16 | Course times: 9.00 - 12.45 h.  13.30 - 17.15 h.  Lecture times: I: 9.00 - 9.45 h.  II: 10.00 - 10.45 h.  III: 11.00 - 11.45 h.  IV: afternoon, no fixed time  Breaks: 9.45 – 10.00 h.  10.45 - 11.00 h.  12.45 - 13.30 h. |
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Lecturers:

Rutger Vos (coordinator)

Pim Kaskes

Maarten van ’t Zelfde

Aidan Couzens

Additional guest lecturers to be announced

**PROGRAM**

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| **Date** | **Theme** | **Lect.** | **Topics** | | **Lecturers** | **Practical** |
| 27-11 | Biodiversity and the analysis of sequential  data | I  II-III | Introduction to the course  Introduction to molecular biodiversity  Clevering Oratie: tussen 15.00-18.00 onderwijs vrij | | Vos | Species diversity  DNA barcoding  Metabarcoding |
| 28-11 | I-II  III | High-throughput sequencing  HTS Data analysis | | Vos | HTS data pre-processing |
| 29-11 | I-II III | Biodiversity analysis on HPC  UNIX | | Vos | Data management operations (git)  UNIX-like operating systems |
| 30-11 | I-II  III | Scripted metabarcoding  HTS barcode chcker | | Vos | Analysis with BLAST (UNIX)  Pipeline example (UNIX) |
| 1-12 |  | No lectures | |  | Preparation of report.  Presentations |
| 4-12 | Two-dimensional data from images, occurrences, and GIS | I-II | 2D data challenges | | Vos | Pixels, grid scales, coordinate systems |
| 5-12 | I-II | Image processing | | Vos | Extracting data from bitmap images (R) |
| 6-12 | I-II | Species occurrences | | Vos | Processing GBIF data (R, git) |
| 7-12 | I-II | GIS | | Vos | ArcGIS |
| 8-12 | I-II | Species distribution modeling | | Vos | MAXENT |
| 11-12 | Scanning and analyzing three-dimensional objects | I-II | 3D data challenges | | Vos | 3D data capture and management |
| 12-12 | I-II | Scanning live objects | | Vos | *Nepenthes* pitcher development (Python) |
| 13-12 | I-II | Scanning (long) dead objects | | Vos | Paleontology of the early jaw |
| 14-12 | I-II | Scanning from above | | Vos | LIDAR |
| 15-12 | I-II | Navigating 3D objects in code | | Vos | Mirroring 3D objects (Python) |
| 18-12 | The physical through time (4D) | I-II | The physical through time | | Vos | Field seasons at the *Triceratops* dig |
| 19-12 | I-II | Course wrap-up lecture | | Vos | Data management and provenance  Automation and reproducibility |
| 20-12 | Question time | I | | Opportunity for evaluation and questions about the examination.  Otherwise free to prepare for the examination | | |
| 21-12 | No lectures |  | | Free to prepare for examination | | |
| 22-12 | Examination |  | | **11.00 to 13.00** | | |