## Anticipated time schedule:

<table>
<thead>
<tr>
<th>Monday: 23 JAN 2023</th>
<th>Tuesday: 24 JAN 2023</th>
<th>Wednesday: 25 JAN 2023</th>
<th>Thursday: 26 JAN 2023</th>
<th>Friday: 27 JAN 2023</th>
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<td>09:00-10:30</td>
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### Background
- Overview
- Purposes of regression modeling in epidemiology: minimizing confounding vs. prediction
- Terminology and notation
- Experiments as gold-standard for causal inference
- Counterfactual theory of causation
- Use of causal diagrams/directed acyclic graphs (DAG) to include (confounders, mediators) or exclude (colliders) covariables in multivariable models
- Predictive Modeling
- Risk scores
- Development, validation, replication and evaluation of prognostic models
- Goodness of fit
- Added predicted value
- Live-demostrations/exercises

### Linear regression
- Basic bivariate statistical methods
- Equivalence of t-test/analysis of variance and linear regression
- Simple linear regression – intro
- Simple linear regression – output interpretation
- Multiple linear regression
- Assumptions of the linear regression model
- Quantile regression as a robust alternative to linear regression
- Modeling and interpretation of interaction terms in linear models
- Live-demostrations/exercises

### Logistic regression
- 2 by 2 tables, odds and risk ratios
- Mantel Haenszel estimator
- Multiple logistic regression model
- Assumptions of the logistic regression model
- Non-linear modeling: Fractional polynomials
- Modeling and interpretation of interaction terms in binary logistic regression models
- Goodness of Fit: Deviance, AIC, BIC
- Prediction models, calibration, discrimination
- Models for categorical outcomes (ordinal, polytomous)
- Live-demostrations/exercises

### Cox regression
- Characteristics of time-to-event data
- Censoring, truncation
- Survival function, hazard function
- Kaplan-Meier method
- Poisson regression and related count data models
- Interval-censored data
- Semi-parametric regression: Cox regression
- Assumptions of the Cox model
- Extensions of Cox regression
- Parametric survival regression models
- Competing risks
- Live-demostrations/exercises

### Missing / longitudinal data
- Missing Data: Overview, Problems and Terminology
- Techniques for missing-at-random mechanisms: Inverse weighting and Multiple Imputation
- Clustered/Longitudinal data
- Live-demostrations/exercises

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**Applied regression modelling in epidemiological research:**


https://www.uni-greifswald.de/en/research/junior-researchers/graduate-academy/online-course-registration/