

		Specification table						
		code: 328059-M3 (fall, block 1; spring, block 3)						
		name: Data Preparation & Workflow Management						
		Test Type: Computer exam (60%), open and closed questions						
		Cognitive skills						
	Tested subjects (corresponding learning goal*). student are able to	Knowledge	Comprehen sion	Analysis	Application	Evaluation	Synthesis	Number of questions/ percentage score points per learning goal
1	Use R to clean and transform data for analysis (e.g., aggregation, merging, de-duplication, reshaping, data conversions, regular expressions)						20%	20%
2	Use GitHub for managing empirical research projects (e.g., GitHub Issues and Project Boards)					10%		10%
3	Use Git/GitHub for versioning files and collaborating on privately-shared and publicly-available (open science) GitHub repositories				20%	10%		30%
4	Use R for generating automatic reports (e.g., to assess data quality, to report research findings in a paper) and deploying research findings in novel ways (e.g., apps)		5%		10%			15%
5	Use Workflow Management Tools to create and run portable, automated, and reproducible research pipelines				20%	5%		25%
	Number of questions/ percentage score points per thinking skill	0%	5%	0%	50%	25%	20%	100%

**Specification table**

code: 328059-M3 (fall, block 1; spring, block 3)  
 name: Data Preparation & Workflow Management  
 Test Type: Team assignment (40%; 8% individual component assessed via self- and peer assessment)

		<b>Cognitive skills</b>						Number of questions/ percentage score points per learning goal
	<b>Tested subjects (corresponding learning goal*)</b>	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis	
1	Use GitHub for managing empirical research projects (e.g., GitHub Issues and Project Boards)			15%				15%
2	Use Git/GitHub for versioning files and collaborating on privately-shared and publicly-available (open science) GitHub repositories			20%				20%
3	Use R to clean and transform data for analysis (e.g., aggregation, merging, de-duplication, reshaping, data conversions, regular expressions)						25%	25%
4	Use R for generating automatic reports (e.g., to assess data quality, to report research findings in a paper) and deploying research findings in novel ways (e.g., apps)						20%	20%
5	Use Workflow Management Tools to create and run portable, automated, and reproducible data pipelines						20%	20%
	Number of questions/ percentage score points per thinking skill	0%	0%	35%	0%	0%	65%	100%

<b><i>Cognitive skill</i></b>	<b><i>Explanation</i></b>	<b><i>Verbs</i></b>
<b>Knowledge</b>	Students should be able to remember information and reproduce it.	Name, mention, summarize, recall, reproduce, define, describe
<b>Comprehension</b>	Students have to interpret the study material and give account of it in their own words.	Prove, demonstrate, identify, interpret, explain, clarify, justify
<b>Application</b>	Students use the taught material "plug and play" in a new situation. (In case application in a practical situation goes beyond "plug and play" it is a combination of analysis and evaluation.)	Illustrate, use, assess, construct, apply, calculate, determine
<b>Analysis</b>	Students analyze and break up the study material and then relate the various pieces to each other.	Compare, analyze, relate, prove, split, discriminate, distinguish
<b>Evaluation</b>	Students give reasoned judgments of information on the basis of internal and external criteria, principles and ideas.	Comment on, evaluate, review, interpret, give opinion, argue, reason
<b>Synthesis/ Creation</b>	Students bring components together to create something new/unique. (For example different theories, concepts, disciplines, models, or studies.)	Deduce from, conclude, design, draw, devise, put together, unravel