

## LECTURE / SESSION<sup>1</sup> PLAN

<b>Name Lecturer:</b> Sofia Gil-Clavel	<b>Date session:</b> 10	<b>Expected number of students:</b> 20
Course title	R-Workshop	
Topic of lecture or session	Parallelizing with R.	
Situational factors (e.g. group size, prior knowledge, expected motivation)	The class lasts 3hrs. The students are in different career stages, from PhD students to professors. The students have different backgrounds, from qualitative researchers that have never used R to quantitative researchers that want to learn new topics or move out of SPSS/STATA. The students use different Operating Systems (Windows, Mac, or Linux).	
Intended learning outcomes of this session	At the end of the session the students will be able to: <ol style="list-style-type: none"><li>1. Use VU <a href="#">JupyterHub</a> to run R-scripts.</li><li>2. Identify processes that can be parallelized.</li><li>3. Use different R-functions to parallelize.</li><li>4. Determine whether parallelizing is beneficial to their problem.</li></ol>	
Learning material (book, chapters, ...)	The lecture is based on the book: <ul style="list-style-type: none"><li>• Wickham, Hadley. <i>Welcome / Advanced R</i>. Accessed March 31, 2025. <a href="https://adv-r.hadley.nz/">https://adv-r.hadley.nz/</a>.</li></ul>	
Media, equipment, tools	The students use their own laptops. The teacher needs access to a projector and a whiteboard.	

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<sup>1</sup> A session means a teaching and learning session for university students in the bachelor or master. It can be a lecture, a seminar or a specific type of educational meeting with a group of students that is relevant for the discipline where the lecturer can demonstrate a whole range of teaching skills. It means that in one session each of the six didactic elements appears at least once. Your lesson plan should show that you are using a powerful learning environment and that students are activated.

Preparation for students	The students have access to the slides and codes before the class: <a href="https://github.com/SofiaG11/R_Course/tree/master/R4SocialScientists/Session10_Servers_and_Parallelizing">https://github.com/SofiaG11/R_Course/tree/master/R4SocialScientists/Session10_Servers_and_Parallelizing</a>
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Time <sup>2</sup> (min.)	Didactic element (goal) <sup>3</sup> and topic <sup>4</sup>	What the teacher does <sup>5</sup> (teacher activity)	What students do (learner activity)	Evaluation <sup>6</sup> (feedback/assessment)
20	<ul style="list-style-type: none"> <li>Recap of the previous session.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to remind the students what they learned during the previous session:               <ul style="list-style-type: none"> <li>Branches and Loops</li> <li>Pseudocode</li> <li>Functions</li> <li>“Apply” functions</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> </ul>	<ul style="list-style-type: none"> <li>The students will use these concepts during the workshop. So, the teacher will detect when a student confuses them. Based on these confusions the teacher will be able to correct the student.</li> </ul>
10	<ul style="list-style-type: none"> <li>Introduction to this session.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to motivate and explain what parallelizing is.</li> <li>The teacher explains the structure of the class.</li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> </ul>	<ul style="list-style-type: none"> <li>The students will use these concepts during the workshop. So, the teacher will detect when a student confuses them. Based on these confusions the teacher will be able to correct the student.</li> </ul>

<sup>2</sup> Indicate the planned duration in minutes

<sup>3</sup> State the number(s) of the relevant ILO at each didactic element

<sup>4</sup> Only key words

<sup>5</sup> Specify the type of activity and write down also the questions that you prepared to ask in the session

<sup>6</sup> Specify the type of evaluation, i.e. the way in which you assess if the objective(s) has/have been achieved

20	<ul style="list-style-type: none"> <li>Use VU <u>JupyterHub</u> to run R-scripts.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to explain what JupyterHub is and why we will be running the scripts there.</li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> <li>The students access JupyterHub using their computers.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher walks around the classroom to check on the students and provide feedback their R-codes. When the teacher detects a common error, then the teacher uses her computer to clarify.</li> </ul>
20	<ul style="list-style-type: none"> <li>Identify processes that can be parallelized.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to introduce the students with different problems that benefit from being parallelized.</li> <li>The teacher uses the slides to introduce an exercise where the students need to turn some loops into parallel running. This is done using pseudocode.</li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> <li>The students independently start working on their pseudocode. This is based on what the teacher explained using the slides.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher walks around the classroom to check on the students and provide feedback. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.</li> </ul>
40	<ul style="list-style-type: none"> <li>Use different R-functions to parallelize.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to explain two packages to run things in parallel: <ul style="list-style-type: none"> <li>foreach</li> <li>doParallel</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> <li>The students independently start working on translating their pseudocode into R-scripts using these packages.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher walks around the classroom to check on the students and provide feedback when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.</li> </ul>
40	<ul style="list-style-type: none"> <li>Determine whether parallelizing is</li> </ul>	<ul style="list-style-type: none"> <li>The teacher uses the slides to explain how test whether running</li> </ul>	<ul style="list-style-type: none"> <li>The students passively digest what the teacher is explaining.</li> </ul>	<ul style="list-style-type: none"> <li>The teacher walks around the classroom to check on the students and provide feedback</li> </ul>

	beneficial to their problem.	something in parallel is beneficial to their problem.	<ul style="list-style-type: none"> <li>The students independently start filling out the missing parts of the R-script. This is based on what the teacher explained using the slides.</li> </ul>	when something is not working on their computers. When the teacher detects a common error, then the teacher uses the whiteboard to clarify.
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