

**Chapter 14:  
Nested & Split-plot Designs**  
Class 24, 5/6/09 W

**Slide 1 Chapter 14:**

Nested & Split-plot Designs

NOTES:

**HW 16 due Tues 5/12/09 Noon**

**Submit as Myname-HW16.doc (or \*.rtf)**

- Read Chapter 14 Multifactor studies without replication
- For Weds read Chapter 23: Elements of Research Design
- For Monday Chapters 18-19: Comparisons of Proportions or Odds
- Final Class: Weds May 13 Research designs Designs
- Class schedule May 6 (Nesting and Experimental Designs), May 11 (Overview of generalized linear models) Exptl design May 13 W Last class
- Wimba Sessions: new times: Monday night 8 pm-9
- Homework 16: Due Tuesday 5/12/09 Noon
- Final Exam 5/22/09 Friday 8-11 am. This is the official time  
• Or 5/19/09 Tuesday 8-11 am. I'll find a room

**Slide 2 HW 16 due Tues 5/12/09 Noon**

NOTES:

Display 23.4



**Checklist of tasks involved in the design of a study**

- 1. State the objective. *What is the question of interest?*
- 2. Determine the scope of inference.  
*Will this be a randomized experiment or an observational study?*  
*What experimental or sampling units will be used?*  
*What are the populations of interest?*
- 3. Understand the system under study.
- 4. Decide how to measure a response.
- 5. List factors that can affect the response.  
Design factors  
Factors to vary (treatments & controls)  
Factors to fix  
Confounding factors  
Factors to control by design (blocking)  
Factors to control by analysis (covariates)  
Factors to control by randomization
- 6. Plan the conduct of the experiment (time line).
- 7. Outline the statistical analysis.
- 8. Determine the sample size ← Attempt this

last ork (16), is due ay 5/12 moved 5/11)

**Slide 3**

NOTES:

<p style="text-align: center;"><b>Nested (=hierarchical) ANOVA</b></p> <p style="text-align: center;">                 A) Testing the Chimp Gender Effect                  B) Testing abundances on the Skagit flats                  C) Testing the Spock Judge Effect (Case 5.2)                  D) Testing airplane training facilities             </p>	<p style="text-align: center;"><b>Slide 4 Nested (=hierarchical) ANOVA</b></p> <hr/> <p>NOTES:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p style="text-align: center;"><b>Pseudoreplication= model misspecification</b></p> <p style="text-align: center;">Pseudoreplication: tests using an inappropriate error MS</p> <ul style="list-style-type: none"> <li>● 8 buckets enclosing areas of the Skagit intertidal zone</li> <li>● 4 treatments (2 buckets per treatment)                     <ul style="list-style-type: none"> <li>▸ Ambient (only buckets)</li> <li>▸ 50 <i>Eogammarus</i></li> <li>▸ 25 <i>Crangon</i></li> <li>▸ 300 <i>Eogammarus</i></li> </ul> </li> <li>● 8 0.9-cm<sup>2</sup> cores per bucket after 3 days, 64 total samples</li> <li>● Is there a treatment effect:                     <ul style="list-style-type: none"> <li>▸ Did predators reduce oligochaete abundance?</li> </ul> </li> </ul> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	<p style="text-align: center;"><b>Slide 5 Pseudoreplication= model misspecification</b></p> <hr/> <p>NOTES:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
<p style="text-align: center;"><b>Nested design (Experimental units [buckets] nested within treatment)</b></p> <p style="text-align: center;">Can't be handled as a simple One-way ANOVA</p> <ul style="list-style-type: none"> <li>● 8 buckets enclosing areas of the sandy intertidal on the Skagit flats</li> <li>● 4 treatments                     <ul style="list-style-type: none"> <li>▸ Ambient (bucket, no predators)</li> <li>▸ 50 <i>Eogammarus</i></li> <li>▸ 25 <i>Crangon</i></li> <li>▸ 300 <i>Eogammarus</i></li> </ul> </li> <li>● 8 0.9-cm<sup>2</sup> cores per bucket after 3 days</li> <li>● Is there a treatment effect:                     <ul style="list-style-type: none"> <li>▸ Did predators reduce oligochaete abundance?</li> </ul> </li> </ul>	<p style="text-align: center;"><b>Slide 6 Nested design (Experimental units [buckets] nested within treatment)</b></p> <hr/> <p>NOTES:</p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>



































