

SAS Lab 6 For Statistics 514**Topics:**

Chapter 24. Random and Mixed Effects Models

```
*Attendance 6, 24.1 single factor ANOVA II;
*drug response;
DATA DRUGRESPONSE;
  INPUT RESPONSE DRUG $;
DATALINES;
5.9 1
5.92 1
5.91 1
5.89 1
5.88 1
5.51 2
5.5 2
5.5 2
5.49 2
5.5 2
5.01 3
5 3
4.99 3
4.98 3
5.02 3
;
PROC GLM DATA=DRUGRESPONSE;
  TITLE '24.1 single factor ANOVA II, drugs';
  CLASS DRUG;
  MODEL RESPONSE = DRUG;
  MEANS DRUG;
RUN;
QUIT;
```

```
*Attendance 6, 24.3;
*two--factor ANOVA II or ANOVA III;
DATA MICEROC;
    INPUT ROC TEMPERATURE $ NOISE $;
DATALINES;
10.3 1 1
7.2 1 1
9.1 1 2
5.4 1 2
6.1 1 3
2.1 1 3
1.8 2 1
9.8 2 1
12.1 2 2
4.2 2 2
5.1 2 3
6.2 2 3
1.2 3 1
8.1 3 1
6.5 3 2
4.1 3 2
1.2 3 3
2.1 3 3
12.4 4 1
15.1 4 1
16.1 4 2
17.2 4 2
18.1 4 3
19.1 4 3
;
PROC GLM DATA=MICEROC;
    TITLE '24.3 two-factor ANOVA II or ANOVA III';
    CLASS TEMPERATURE NOISE;
    MODEL ROC = TEMPERATURE | NOISE;
    MEANS TEMPERATURE | NOISE;
RUN;
QUIT;
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```
*Attendance 6, 24.4;
*two--factor ANOVA II or ANOVA III;
DATA MICEROC;
    INPUT ROC TEMPERATURE $ NOISE $;
DATALINES;
10.3  1    1
7.2   1    1
9.1   1    2
5.4   1    2
6.1   1    3
2.1   1    3
1.8   2    1
9.8   2    1
12.1  2    2
4.2   2    2
5.1   2    3
6.2   2    3
1.2   3    1
8.1   3    1
6.5   3    2
4.1   3    2
1.2   3    3
2.1   3    3
12.4  4    1
15.1  4    1
16.1  4    2
17.2  4    2
18.1  4    3
19.1  4    3
;
PROC GLM DATA=MICEROC;
    TITLE '24.3 two-factor ANOVA II or ANOVA III';
    CLASS TEMPERATURE NOISE;
    MODEL ROC = TEMPERATURE | NOISE;
    MEANS TEMPERATURE | NOISE;
RUN;
QUIT;
```

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*Attendance 6,24.5 three-factor ANOVA,
*random effects, mice ROC;
DATA MICEROC;
  INPUT ROC GENDER $ TEMPERATURE $ NOISE $;
DATALINES;
10.3 1 1 1
7.2 1 1 1
9.1 1 1 2
5.4 1 1 2
6.1 1 1 3
2.1 1 1 3
1.8 1 2 1
9.8 1 2 1
12.1 1 2 2
4.2 1 2 2
5.1 1 2 3
6.2 1 2 3
1.2 1 3 1
8.1 1 3 1
6.5 1 3 2
4.1 1 3 2
1.2 1 3 3
2.1 1 3 3
12.4 1 4 1
15.1 1 4 1
16.1 1 4 2
1.2 1 4 2
18.1 1 4 3
19.1 1 4 3
9.3 2 1 1
6.2 2 1 1
8.1 2 1 2
5.4 2 1 2
8.1 2 1 3
7.1 2 1 3
2.8 2 2 1
9.8 2 2 1
10.1 2 2 2
4.2 2 2 2
5.1 2 2 3
6.2 2 2 3
4.2 2 3 1
5.1 2 3 1
7.5 2 3 2
4.1 2 3 2
6.2 2 3 3
7.1 2 3 3
5.4 2 4 1
5.1 2 4 1
11.1 2 4 2
12.2 2 4 2
8.1 2 4 3
9.1 2 4 3
;
PROC GLM DATA=MICEROC;
  TITLE '24.5 three factor ANOVA, random effects';
  CLASS GENDER TEMPERATURE NOISE;
  MODEL ROC = GENDER | TEMPERATURE | NOISE;
  MEANS GENDER | TEMPERATURE | NOISE;
RUN;
QUIT;

```

```
*Practice Quiz 3, 24.7 single factor ANOVA II;  
*sodium content;  
DATA SODIUMCONTENT;  
  INPUT SODIUM BRAND $ BOTTLE $;  
  DATALINES;  
24.4 1 1  
22.6 1 2  
23.8 1 3  
22 1 4  
24.5 1 5  
22.3 1 6  
25 1 7  
24.5 1 8  
10.2 2 1  
12.1 2 2  
10.3 2 3  
10.2 2 4  
9.9 2 5  
11.2 2 6  
12 2 7  
9.5 2 8  
19.2 3 1  
19.4 3 2  
19.8 3 3  
19 3 4  
19.6 3 5  
18.3 3 6  
20 3 7  
19.4 3 8  
17.4 4 1  
18.1 4 2  
16.7 4 3  
18.3 4 4  
17.6 4 5  
17.5 4 6  
18 4 7  
16.4 4 8  
13.4 5 1  
15 5 2  
14.1 5 3  
13.1 5 4  
14.9 5 5  
15 5 6  
13.4 5 7  
14.8 5 8  
21.3 6 1  
20.2 6 2  
20.7 6 3  
20.8 6 4  
20.1 6 5  
18.8 6 6  
21.1 6 7  
20.3 6 8  
;  
PROC ANOVA DATA=SODIUMCONTENT;  
  TITLE '24.7 single factor ANOVA II, sodium';  
  CLASS BRAND;  
  MODEL SODIUM = BRAND;  
  means brand;  
RUN;  
QUIT;
```

```

*Practice Quiz 3,24.8,sodium content;
*single factor ANOVA II, mls;
DATA SODIUMCONTENT;
  INPUT SODIUM BRAND $ BOTTLE $;
DATALINES;
24.4 1 1
22.6 1 2
23.8 1 3
22 1 4
24.5 1 5
22.3 1 6
25 1 7
24.5 1 8
10.2 2 1
12.1 2 2
10.3 2 3
10.2 2 4
9.9 2 5
11.2 2 6
12 2 7
9.5 2 8
19.2 3 1
19.4 3 2
19.8 3 3
19 3 4
19.6 3 5
18.3 3 6
20 3 7
19.4 3 8
17.4 4 1
18.1 4 2
16.7 4 3
18.3 4 4
17.6 4 5
17.5 4 6
18 4 7
16.4 4 8
13.4 5 1
15 5 2
14.1 5 3
13.1 5 4
14.9 5 5
15 5 6
13.4 5 7
14.8 5 8
21.3 6 1
20.2 6 2
20.7 6 3
20.8 6 4
20.1 6 5
18.8 6 6
21.1 6 7
20.3 6 8
;
PROC ANOVA DATA=SODIUMCONTENT;
  TITLE '24.7 single factor ANOVA II, sodium';
  CLASS BRAND;
  MODEL SODIUM = BRAND;
  means brand;
RUN;
QUIT;

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*Practice Quiz 3, 24.15 two factor ANOVA II;
*miles per gallon;
DATA GASCONSUMPTION;
  INPUT CONSUMPTION DRIVER $ CAR $;
  DATALINES;
25.3 1 1 1
25.2 1 1 2
28.9 1 2 1
30 1 2 2
24.8 1 3 1
25.1 1 3 2
28.4 1 4 1
27.9 1 4 2
27.1 1 5 1
26.6 1 5 2
33.6 2 1 1
32.9 2 1 2
36.7 2 2 1
36.5 2 2 2
31.7 2 3 1
31.9 2 3 2
35.6 2 4 1
35 2 4 2
33.7 2 5 1
33.9 2 5 2
27.7 3 1 1
28.5 3 1 2
30.7 3 2 1
30.4 3 2 2
26.9 3 3 1
26.3 3 3 2
29.7 3 4 1
30.2 3 4 2
29.2 3 5 1
28.9 3 5 2
29.2 4 1 1
29.3 4 1 2
32.4 4 2 1
32.4 4 2 2
27.7 4 3 1
28.9 4 3 2
31.8 4 4 1
30.7 4 4 2
30.3 4 5 1
29.9 4 5 2
;
PROC GLM DATA=GASCONSUMPTION;
  TITLE '24.15 two-factor ANOVA II, miles';
  CLASS DRIVER CAR;
  MODEL CONSUMPTION = DRIVER | CAR;
  RANDOM DRIVER | CAR / TEST;
RUN;
QUIT;

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*Practice Quiz 3, 24.17 two factor ANOVA III;
*imitation pearls;
DATA IMITATIONPEARL;
  INPUT VALUE COATS $ BATCH $;
DATALINES;
72 1 1 1
74.6 1 1 2
67.4 1 1 3
72.8 1 1 4
72.1 1 2 1
76.9 1 2 2
74.8 1 2 3
73.3 1 2 4
75.2 1 3 1
73.8 1 3 2
75.7 1 3 3
77.8 1 3 4
70.4 1 4 1
68.1 1 4 2
72.4 1 4 3
72.4 1 4 4
76.9 2 1 1
78.1 2 1 2
72.9 2 1 3
74.2 2 1 4
80.3 2 2 1
79.3 2 2 2
76.6 2 2 3
77.2 2 2 4
80.2 2 3 1
76.6 2 3 2
77.3 2 3 3
79.9 2 3 4
74.3 2 4 1
77.6 2 4 2
74.4 2 4 3
72.9 2 4 4
76.3 3 1 1
74.1 3 1 2
77.1 3 1 3
75 3 1 4
80.9 3 2 1
73.7 3 2 2
78.6 3 2 3
80.2 3 2 4
79.2 3 3 1
78 3 3 2
77.6 3 3 3
81.2 3 3 4
71.6 3 4 1
77.7 3 4 2
75.2 3 4 3
74.4 3 4 4
PROC GLM DATA=IMITATIONPEARL ALPHA = 0.025;
  TITLE '24.17 two-factor ANOVA III';
  CLASS COATS BATCH;
  MODEL VALUE = COATS | BATCH;
  means coats | batch;
RUN;
QUIT;

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