Test #2 is scheduled for :

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| **Index** | **Section** | **Exam Code** | **Final Exam Day and Time** |
| **12976** | 01 | C | Thursday, May 07, 2020: 12:00 PM - 3:00 PM |

I will place the test in Canvas as an Assignment for release at 11:45 am and assign the deadline to submit answers at 3:15 pm.

Answers can be submitted as .txt, .docx, .pdf files or as pictures taken with your mobile phone in any combination. One way to return the test is to take a picture of each page of your answer sheet and upload the pictures into Canvas. If you have difficulty uploading your answers into Canvas then send by e-mail from your mobile phone to my Rutgers e-mail: [mardekia@stat.rutgers.edu](mailto:mardekia@stat.rutgers.edu). Sending separate e-mails for each page of the answer sheet is OK.

The following statement from the Honors Pledge is in effect for Test #2: *“On my honor, I have neither received nor given any* ***unauthorized*** *assistance on this examination.”*

* The test is **open book, open notes, open online resources. You are to work alone.**
* No R coding questions will be asked on this test.
* There will be ~8 questions.
* No calculations are needed.
* Use the sample questions provided for Test 1 and the questions on Test 1 as a guide to the questions to be asked on Test 2. Additional guidance regarding sample questions will be provided during HW Review on 5/1.
* **Text Material:** Use the lecture notes as a guide to the sections of the text to review:

Section Page

8.2 Weighted Least Squares 116

10 Model Selection 149

10.1 Hierarchical Models 150

10.2 Testing-Based Procedures 151

10.3 Criterion-Based Procedures 153

10.4 Summary 159

11 Shrinkage Methods 161

11.1 Principal Components 161

11.3 Ridge Regression 174

11.4 Lasso 177

Material covered during the lectures will be emphasized.

* **Lecture 11 25Feb2020**
  + Lecture11\_Outline.pptx
  + FatModelSelection.R
  + Model Selection.pdf
  + Example\_olsrr.R
  + Example\_olsrr\_Output.txt
  + Example\_olsrr\_Figure.pdf
  + Cross-Validation Essentials in R - Articles - STHDA.pdf
  + Ex\_Cross\_Validation.R
  + Cross\_Validation\_Example\_Output.txt
  + ex\_cross\_validation\_graph.pdf

**After Lecture 11 you can proceed to Lecture 16**

* **Lecture 16 through Lecture 26 can be found in the module “Lectures After Spring Break” The following is a list of files in Lectures 16 through 25 you can ignore for Test #2**
* Lecture 16
  + How to Flatten the Curve.pdf
  + flatten-curve-tutorial.R
  + flatten-curve-animated.gif
* Lecture 17
  + Cross Validation Metrics.pdf
* Lecture 18
  + SASlowess.pdf
* Lecture 19
  + k-medoids PAM Wikipedia.pdf
* Lecture 20
  + 10 Interesting Use Cases for the K-Means Algorithm - DZone AI.pdf
  + k\_means\_paper1.pdf
* Lecture 23
  + An Introduction to the logisticPCA R Package.pdf
  + PowerAnalysisbySimulationusingRandsimglm.pdf
  + Statisticalprimer\_sample\_size.pdf
* Lecture 24
  + UnderstandingPowerandRulesofThumbSampleSize.pdf
  + UsingRforPowerAnalysis.pdf

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| **Material covered since Midterm Exam**  **(highlighted documents can be ignored)** | |
| **Lecture11\_Outline.pptx** | |
| Model Selection.pdf | |
| Example\_olsrr.R | |
| Example\_olsrr\_Output.txt | |
| Example\_olsrr\_Figure.pdf | |
| FatModelSelection.R | |
| Cross-Validation Essentials in R - Articles - STHDA.pdf | |
| Ex\_Cross\_Validation.R | |
| Cross\_Validation\_Example\_Output.txt | |
| ex\_cross\_validation\_graph.pdf | |
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| **Lecture16\_Outline.pptx** | |
| How to Flatten the Curve.pdf | |
| flatten-curve-tutorial.R | |
| flatten-curve-animated.gif | |
| ModelSelectionCriteria.pdf | |
|  | |
| **Lecture17\_Outline.pptx** | |
| FatModelSelection\_Out.txt | |
| FatModelSelection\_Graph.pdf | |
| FatModelSelection\_pvalues.pdf | |
| CrossValidationOverview.pdf | |
| Cross\_Validation\_Metrics.pdf | |
|  | |
| **Lecture18\_Outline.pptx** | |
| ChoiceofKinKfold.docx | |
| Ex\_Cross\_ValidationRepeats.R | |
| Ex\_Cross\_ValidationRepeats\_Out.txt | |
| Ex\_Cross\_Validation\_Output.txt | |
| Weighted Least Squares.pdf | |
| WLSexample\_show.pdf | |
| Loess\_Chapter.pdf | |
| SASlowess.pdf | |
|  | |
| **Lecture19\_Outline.pptx** | |
| sma.R | |
| sma\_Out.txt | |
| sma\_Figure.pdf | |
| sma\_show.xlsx | |
| Diag.R | |
| Diag\_Figure.pdf | |
| loess\_intro.R | |
| loess\_intro\_Figure.pdf | |
| loess\_intro2.R | |
| loess\_intro2\_1.pdf | |
| loess\_intro2\_2.pdf | |
| KmeansClusteringIntro.docx | |
| KmeansClustering.R | |
| KmeansClusteringR\_out.txt | |
| KmeansClustering\_Figure.pdf | |
| k-medoids PAM\_Wikipedia.pdf | |
| k-nearest neighbors algorithm - Wikipedia.pdf | |
|  | |
| **Lecture20\_Outline.pptx** | |
| loess\_intro3.R | |
| loess\_intro3\_CV.pdf | |
| loess\_intro3\_Out.txt | |
| loess\_intro3\_Figure\_show.pdf | |
| 10 Interesting Use Cases for the K-Means Algorithm - DZone AI.pdf | |
| k\_means\_paper1.pdf | |
| KmeansClustering\_iris.R | |
| KmeansClustering\_iris\_Out.txt | |
| KmeansClustering\_iris\_Figure.pdf | |
| k\_NN algorithm - Wikipedia.pdf | |
|  | |
| **Lecture21\_Outline.pptx** | |
| sensitivity\_specificity\_stat\_psu\_edu.pdf | |
| Logistic\_as\_a\_Classifier.R | |
| Logistic\_as\_a\_Classifier\_Output.pdf | |
| Logistic\_as\_a\_ClassifierR\_Figure.pdf | |
| A Simple Introduction to K-Nearest Neighbors Algo - SAS Support Communities.pdf | |
| K Nearest Neighbor \_ Step by Step Tutorial.pdf | |
| HowtobreaktiesinKNN.docx | |
| k-NN Example.pdf | |
| k\_NN\_classification.R | |
| k\_NN\_classificationR\_Out.txt | |
| k\_NN\_classification\_Figure.pdf | |
| k\_NN\_regression.R | |
| k\_NN\_regressionR\_Out.txt | |
| k\_NN\_regression\_Figure.pdf | |
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| **Lecture22\_Outline.pptx** | |
| Principal Component Analysis with SAS.pdf | |
| PCA\_Intro.pptx | |
| Properties\_matrix\_eigen\_Out.pdf | |
| Properties\_matrix\_eigen.R | |
| What Is Dimension Reduction In Data Science\_ - FinTechExplained - Medium.pdf | |
| PCAexample1.R | |
| PCAexample1\_Out.pdf | |
| PCAexample1\_Figure.pdf | |
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| **Lecture23\_Outline.pptx** | |
| PCAexample2.R | |
| PCAexample2\_Out.txt | |
| PCAexample2\_Figure.pdf | |
| PCARegression.pdf | |
| An Introduction to the logisticPCA R Package.pdf | |
| Logistic\_PCA.R | |
| Logistic\_PCA\_R\_Out.txt | |
| Logistic\_PCA\_Figure.pdf | |
| Calculating required sample size in R and SAS.pdf | |
| Statisticalprimer\_sample\_size.pdf | |
| A simple example\_Power.pdf | |
| Power Analysis by Simulation using R and simglm.pdf | |
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| **Lecture24\_Outline.pptx** | |
| PowerSampleSizeExamples.R | |
| PowerSampleSizeExamples\_Out.txt | |
| PowerSampleSizeExamples\_Figure.pdf | |
| Simulating Power.pdf | |
| PowerSampleSizeExamplesSimulation.R | |
| PowerSampleSizeExamplesSimulation\_Out.pdf | |
| PowerSampleSizeExamplesSimulation\_Figure.pdf | |
| UnderstandingPowerandRulesofThumbSampleSize.pdf | |
| Using R for Power Analysis.pdf | |
| MSE\_Estimator.pdf | |
| Ridge\_LASSO\_Regression.pptx | |
| ridgevslasso.sas | |
| ridgevslasso.pdf | |
| Ridgeexample\_mpg.sas | |
| Ridgeexample\_mpg.pdf | |
| LASSOexample\_mpg.sas | |
| LASSOexample\_mpg.pdf | |
| lasso\_prostate1.R | |
| lasso\_prostate1\_Out.txt | |
| lasso\_prostate1\_Figure.pdf | |
| Lasso\_prostate\_binary.R | |
| Lasso\_prostate\_binary\_Out.txt | |
| Lasso\_prostate\_binary\_Figure.pdf | |
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| **Lecture25\_Outline.pptx** | |
| Naive\_Bayes\_Classifier.pptx | |
| NaiveBayesExample1.R | |
| NaiveBayesExample1R\_Out.pdf | |
| NaiveBayesExample1R\_Out.txt | |
| NaiveBayesExample2.R | |
| BayesClassifierExample2R\_Out.pdf | |
| BayesClassifierExample2R\_Out.txt | |
| BayesClassifierExample2R\_Figure.pdf | |
| Bayes\_regression.pptx | |
| Introduction to Bayesian Regression Modeling in R using rstanarm.pdf | |
| NaiveBayescomparedtoRandomForest.pdf | |
| BayesianregressioninSASsoftware.pdf | |
| Bayesianregression\_Example.pdf | |