[BIA 6315 AW1]

[Time Series and Forecasting]

[Fall, 2019]

# Course Information

## Instructor Information

Dr. Xuan Pham, Assistant Professor of Business Intelligence and Analytics

Division of Decision Sciences

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Office: Conway Hall, Room 333

Office: [(816) 501-4044

## Instructor Availability

My office hours are on Mondays and Wednesdays between 9:00 AM and 10:30 AM. If you would like to stop by to say hello or ask a quick question about class content or homework assignment, you do not need an appointment. Please feel free to stop by at your convenience. If you have question or concern that requires substantive time and attention, please do send me an email before your visit. Some examples of longer meetings include exam preparation, final project discussion, and exam reviews.

I am also available for appointments outside of my normal office hours for graduate students. I am usually in the office before my evening class begins. Please send me an email to set up an appointment.

I strive to respond to student emails within 24 hours during weekdays. I do not check work emails during weekends.

## Class Meeting Information

The course is conducted in a hybrid format. On ground students meet every Tuesday 5:45 PM – 9:00 PM in Conway Hall, Room 204. The class sessions are recorded and posted on Canvas.

Online students are expected to login the Canvas course site weekly to access class session recordings and materials.

The course is scheduled to last for eight weeks, starting on August 19, 2019 and ending on October 15, 2019.

Hardware Requirements

BIA 6315 is designated as a Bring Your Own Laptop (BYOL) course. Each student is expected to bring a fully charged laptop to each class session. Each student’s laptop must meet the technical requirements as specified by the College. Please visit this hyperlink to review the laptop technical requirements: <https://www.rockhurst.edu/helzberg/undergraduate-programs/laptop-requirements>.

Software Requirements

Furthermore, each student must have access to Microsoft Office365 (which includes Word, Excel, and PowerPoint), R, and R Studio. All applications are available free of charge.

Instructions to install Office365 are available by visiting this hyperlink: <https://help.rockhurst.edu/installing-office>.

Instructions to install R and R Studio are available by watching this YouTube video: <https://youtu.be/ii5SPVqWCgI>.

## Catalog Course Description

## Forecasting is used to predict the future events or conditions. Therefore, it allows us to make better decisions with low uncertainty. The primary objective of this course is to deliver the students with an understanding of the fundamentals of forecasting and its applications in the economic and business environment. The basic regression, time series econometrics, ETS, ARIMA model building and specification, and hypothesis testing will be reviewed, followed by in-depth examination of various modern forecasting techniques used in economics and business. The course will conclude with a final project that is purpose built for solving a real business problem related to forecasting. Prerequisite: BIA 6301 or BIA 6309. 2 credit hours.

## Required and Recommended Materials

* Hyndman, R. J. and Athanasopoulos, G. (2019). Forecasting: Principles and Practice. ISBN: 0987507117. Retrieved from <https://otexts.com/fpp2/>. Required.

This textbook is required and can be accessed online for free. The benefit of using the online textbook is that it is continually updated, and this is my recommendation. You can purchase a paperback copy from Amazon, but updates are intermittently made.

* Student online subscription to the *Wall Street Journal*
* Articles and videos may also be assigned as needed.

## Learning Objectives

Students will be able to:

* Understand role of forecasting in business
* Obtain skill in using statistical forecasting models
* Gain familiarity with features of time series such as
  + Autocorrelation
  + Exponential smoothing and differencing
  + Seasonality
* Use regression models, understanding how to deal with
  + Trend
  + Seasonal variables
  + Lagged variables
  + Autocorrelated errors
* Gain familiarity ARIMA models
* Get exposure to advanced forecasting techniques and time series topics

## Canvas

The source of truth for BIA 6315 is the Canvas course site. Here is a list of things that we will use Canvas for in this course:

* All class materials will be posted on Canvas.
* All class assignments are posted on Canvas. Please always check Canvas before you call and/or email me with questions about due dates.
* Students must submit all assignments via Canvas. I do not grade assignments given to me on papers and/or email to me.
* I grade and provide feedback to all assignments on Canvas.

## Evaluation

Please submit all required documents as stated in the instructions for each assignment. Please do not email me your assignments. Please also note that Canvas will stop accepting assignments once the due date has passed.

Since you have access to Canvas 24x7, it is your responsibility to get your work done on time. I will not accept late submissions unless you have received prior permission from me. If you are sick and/or have an emergency, please email me before the due date. If you will be out of town for non-emergency related reasons, please plans your schedule accordingly. I expect that you submit your assignments on time.

I do not have a problem with students working together to complete assignments, but I do expect each student to turn in his or her own individual work. I define “individual work” to mean that you write out the answers. Individual work does not include copying, pasting, or changing a few words or R scripts from someone else’s assignment and claiming it as your own. Canvas will scan your submission against all your class peers. You will receive a plagiarism/copying evaluation report. I also get access to the same report that you have. If I determine that you have copied/cheated/plagiarized on an assignment, I will report the transgression to the Dean’s Office. I do not provide “second chances.”

The semester grade for this course will be based on the following:

1. DataCamp tutorials
2. Tune up exercises
3. Homework assignments
4. Final project

### Summary of Possible Points

I use a weighted grading system for this course. The table below shows the weights for the assignments.

| Performance Opportunity | Grade Weight |
| --- | --- |
| DataCamp tutorials | 10% |
| Tune up exercises | 10% |
| Homework assignments | 60% |
| Final project | 20% |
| Total Weighted Percent | 100% |

### Assignment of Letter Grade

Your letter grade will be based on the percentage of the total possible points that you have earned as described in the following table.

| **Letter Grade** | **Total Weighted Percent** | **Catalog Description of Graduate Letter Grade** |
| --- | --- | --- |
| A | 100 – 93 | Denotes superior academic performance at the graduate level. |
| A- | 92 – 90 | Denotes superior academic performance at the graduate level. |
| B+ | 89 – 87 | Denotes above average academic performance at the graduate level |
| B | 80 – 86 | Denotes average academic performance at the graduate level |
| C | 70 – 79 | Denotes below average, but passing academic performance at the graduate level |
| F | < 70 | Denotes academic performance of poor quality which will not be accepted for degree credit for any Rockhurst degree program. A letter grade of “F” automatically results in dismissal from a graduate program. |

### Course Requirements

* **DataCamp Tutorials** – You will complete a series of DataCamp tutorials to further develop your R programming and forecasting skills. The tutorials will be assigned on a weekly basis.
* **Tune Up Exercises** – You will complete weekly tune up exercises. The exercises are made up of questions to ensure you have a conceptual understanding of the forecasting methods and models examined in class. Most questions will begin with “In your own words, explain…”.
* **Homework Assignments** – You will complete four homework assignments. The assignments provide opportunities to learn the forecasting methods and models discussed in class.
* **Final Project** – You will choose one of three options for your final project: 1) choose a forecasting project using a business question from your employment or personal interest; 2) completing a set of exercises (determined by the instructor) to reinforce materials learned in the course; or 3) completing a set of exercises to advance your knowledge of methods and models not covered in the course. You will need to contact me by Week 5 of class if you are interested in completing the first option as your final project.

# Course Policies

## Makeup Exam Policy

BIA 6315 does not have exams, so there is no makeup exam policy.

## Attendance Policy

You are expected to come to each class session unless the following conditions apply: 1) illness; 2) personal emergency; 3) business travel; or 4) must be present for a university sponsored event. If you will be absent from class, please send me an email with information about your absence.

## Computers and Mobile Devices

While this course is designated as Bring Your Own Laptop (BYOL), I expect that you use your laptop for class purposes. Please do not watch videos or play games during class time.

Please also put your cell phone on silent mode during class time. If you are expecting an important phone call during class period, please do inform me beforehand.

Headphones should also be put away unless you have a medical necessity. Please contact the Disability Resource Center (DRC) to request accommodations. You can learn more about the DRC here: <https://ww2.rockhurst.edu/disability-resource-center>.

## Class Participation

I expect that you

* Attend classes unless you are sick, have a personal emergency, traveling for work, or must be present at a university sponsored event.
* Come to class on time.
* Participate in class discussions about assigned course materials.
* Pay attention during class (i.e. not playing with electronic devices or talking to peers).
* Have a positive and constructive attitude towards your peers.

## Late Assignments

I do not accept late assignments unless you have received prior approval from me. I only give prior approvals for illness and/or a personal emergency. Please expect that I will ask for a doctor’s note or similar documentation.

# Rockhurst University and College of Business, Influence, and Information Analysis Policies and Statements

## Academic Honesty Policy:

Plagiarism and cheating will not be tolerated. The Rockhurst University Catalog provides examples of academic dishonesty and outlines the procedures, penalties, and due process accorded students involved in academic dishonesty. All infractions will be immediately referred to the Dean's office. This includes copying, or the offering, requesting, receiving or using of unauthorized assistance or information in examinations, texts, reports, computer programs, term papers or other assignments. In all your writing, make sure you provide citations for all ideas and information that are not your own.

[Graduate Catalog Statement on Academic Honesty](http://catalog.rockhurst.edu/content.php?catoid=9&navoid=452#Academic_Honesty_Policy)

## Student Complaint Process

For course-related issues, students who feel that they have a non-trivial complaint, either academic or nonacademic, should contact either Paul Nunez, Director of Undergraduate Advising, or Jonnae Hill, Director of Graduate Advising, for guidance on submission.

## Course Assessments:

Rockhurst University is committed to a comprehensive, ongoing learning assessment process. On occasion students are expected to participate in aspects of this program so that the institution can document its strengths and identify opportunities for improvement. Student involvement is integral to the University’s success in this endeavor.

## ADA Statement

Rockhurst University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act (ADA). If you have a disability which may impact your ability to access or participate in any aspect of my class, please contact the Disability Resource Center (DRC) at [drc@rockhurst.edu](mailto:drc@rockhurst.edu) or Mindy Pettegrew at 816-501-4689. The DRC will work with you to determine what disability documentation/information is needed in order to provide accommodations. Accommodations are determined on an individualized basis and may take some time to put in place, so early notification to DRC is helpful. If accommodations have already been approved, please communicate with the instructor(s) of this course.  More information is available at <https://ww2.rockhurst.edu/disability-resource-center>.

## Student Resources

Rockhurst University provides a variety of programs and services that are designed to support you as you pursue your education and navigate challenges, both expected and unexpected.  These include, but are not limited to: the Dean of Students Office, Dining Services, Bookstore, Counseling Center, Career Services, Access/Disability Services, Campus Ministry, Student Health Insurance and Clinic, Student Organizations & Greek Affairs (alumnus advisors), Athletics/Intramurals/Workout spaces, International and Multicultural Student Services, Security, Financial Aid, Student Accounts, Computer Services, The Registrar, The Library, Service Learning, and the Learning Center.  For information on any of these, please visit the University’s website at [www.rockhurst.edu](http://www.rockhurst.edu) – or call/visit Student Development at 816-501-4030 or Massman Hall, Room 1.

## Crisis Management

The Crisis Management Team for Rockhurst University, out of a concernfor the safety and welfare of all community members, urges you to familiarize yourself with Campus Emergency Procedures as well as emergency, evacuation, and shelter signage located within and outside of buildings across campus.  They also request that you sign up for RockAlerts, the University’s emergency communications system.  All community members must comply with University staff instructions during regularly scheduled fire/tornado drills as well as actual emergencies.  Information regarding the above resources can be found on the [Emergency Procedures](https://ww2.rockhurst.edu/campus-security/emergency-procedures) website.

## University Communication with Students

Clear and timely communication allows students to receive information related to policies, programs, events, and other practical matters (i.e. billing, grades, etc.) affiliated with their education at Rockhurst. The University has established several key routes for communication with students including:

* Rockhurst E-mail Account: All Rockhurst students receive a University e-mail account. All e-mail communication from the University is directed exclusively to the Rockhurst electronic mailbox system. Students are expected to access their e-mail account on a regular basis in order to stay abreast of important and time-sensitive information. University departments, faculty, and staff will routinely use e-mail to communicate important campus, academic, and extra-curricular/co-curricular information. It is the responsibility of each student to clean their e-mail boxes to allow capacity for incoming messages (i.e. empty deleted items, keep a limited number of sent items, etc.). For further information on your Rockhurst e-mail account, please see Computer Services (Conway Hall 413; x4357; [www.rockhurst.edu](http://www.rockhurst.edu/)).
* Addresses and Phone Numbers: Students are required to maintain accurate local, billing, permanent, and emergency contact information so that attempts to communicate by the U.S. Postal System as well as phone will not be impeded. To make changes to your addresses or phone numbers of record, please visit the Rockhurst website ([www.rockhurst.edu](http://www.rockhurst.edu/); Rockweb section under Registrar) or contact the University Registrar (Massman Hall 110).
* Campus Mailboxes: Undergrad Students who live in Rockhurst’s residence halls and Townhouse Village are assigned a campus mailbox located in Massman Hall where U.S. Postal Service mail and other University communications are delivered. For assignment inquiries please connect with Residence Life (Massman Hall 3) and for mailbox malfunctions please speak with the Mailroom staff (Massman Hall, Lower Level).

## University Counseling Center

In the spirit of cura personalis, the community of Rockhurst University would like to remind you to continue to care for your mental health, alongside your physical health, throughout the school year. The [University Counseling Center](https://ww2.rockhurst.edu/counseling-center) offers a comprehensive array of counseling and psychological services to Rockhurst students. Services include individual therapy for personal concerns, couples counseling, psychoeducational support groups and therapy groups, psychological testing, drug/alcohol assessments, and consultation.

## Reporting Violations of Rockhurst University’s Harassment, Discrimination, and Retaliation Policy

Preventing prohibited discrimination, harassment and retaliation on the basis of protected status (such as sex, gender, pregnancy status, and gender identity) is the responsibility of all members of the University Community. Students should report a potential violation of this policy as soon as possible to a Residence Life staff member, Security (Community Center; 816-501-4010), or one of the Associate Deans of Students:

Mr. Mark Hetzler or Ms. Mindy Pettegrew

Student Development, Massman 3

816-501-4843 or 816-501-4689

[Mark.Hetzler@Rockhurst.edu](mailto:Mark.Hetzler@Rockhurst.edu) or [Mindy.Pettegrew@rockhurst.edu](mailto:Mindy.Pettegrew@rockhurst.edu)

## Student Handbook

The [Student Handbook](https://ww2.rockhurst.edu/campus-life/student-handbook) is the University’s official notification of its policies, rules, regulations, and standards of conduct. The student is responsible for knowledge of these policies, rules, regulations, and standards of conduct; enrollment is considered acceptance of all conditions specified in this handbook.

## Course Withdrawals

Course withdrawals are the responsibility of the student. The [RU Catalog](https://ww2.rockhurst.edu/academics/registrar/university-catalog) lists the procedures for a student to withdraw from one or all courses and will be upheld.  If the student does not process course withdrawal(s) correctly, it will result in a failing grade.

Updated July 2019

# Course Schedule

The following course schedule is subject to change. All changes will be announced in class.

| Week Day | Date | Topic | Readings and/or Activities | Assessment |
| --- | --- | --- | --- | --- |
| Tues. | 8/20 | EDA  TS structure  Statistical tests  Using R with TS data | Hyndman, Chapters 1 & 2 | Tune up exercise  Load up-to-date version of R and R Studio & forecast package  DataCamp: Data wrangling tutorial |
| Tues. | 8/27 | Stationarity  ACF, PACF  Correlation  White noise, outliers  Seasonality  More statistical tests | Hyndman, Chapters 2 & 3 | Tune up exercise  Homework assignment 1 due  DataCamp: Intro to Extensible XTS and Zoo |
| Tues. | 9/3 | Smoothing, Part 1 | Hyndman, Chapter 6 | Tune up exercise  DataCamp: Data visualization |
| Tues. | 9/10 | Smoothing, Part 2 | Hyndman, Chapter 7 | Tune up exercise  DataCamp: First order of business |
| Tues. | 9/17 | Leadership & Ethics Day—Guest Speaker  ARIMA, Part 1 | Hyndman, Chapter 8 | Homework assignment 2 due  Tune up exercise  DataCamp: Merging and modifying |
| Tues. | 9/24 | ARIMA, Part 2 | Hyndman, Chapter 9 | Tune up exercise  DataCamp: Apply and aggregate |
| Tues. | 10/1 | AR Regression | Hyndman, Chapter 5 | Homework assignment 3 due  Tune up exercise  DataCamp: Advanced ETS |
| Tues. | 10/8 | Advanced Topics | Hyndman, Chapters 11 & 12 | Homework assignment 4 due |
| Sat. | 10/12 | Final project due at 11:59 PM. |  |  |

## Dates to Remember:

09/03/2019 Last day to withdraw and receive 50% refund

09/17 2019 Leadership & Ethics Day (Tuesday 8:00 AM – 6:00 PM)

10/01/2019 Last day to withdraw and receive a “W” on transcript or change from

Credit to Audit.

10/12/2019 Final Project deadline

# Revisions

The instructor reserves the right to revise and adjust this syllabus as deemed necessary to cover the material and maximize learning.