



STA 4853/5856 (20303/20314)

Fall 2018

Time Series/Forecast

T 08:30-10:25, R 09:35-10:25 FLO 100

**Instructor:** Demetris Athienitis

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**Course Website:** [e-Learning](#)

**Course Communication:**

- Discussion forum in Canvas.
- Office hours (posted under “Pages” in Canvas).
- E-mail for questions regarding course policies. (Ensure that **4853** or **5856** is in the subject line. Failure to do so may result in a non-response.)

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussion and chats. Please refer to [expected class netiquette](#).

The instructor reserves the right to update any parts of this syllabus as necessary.  
Students will promptly be notified of any changes.

**Required Text(s):** *Time Series Analysis and Its Applications With R Examples*, Fourth Edition (and link to [companion site](#)).

**Author(s):** Robert H. Shumway, David S. Stoffer

**ISBN:** 978-3-319-52452-8

**Optional Text:** *Time Series Analysis: Univariate and Multivariate Methods*, 2nd edition (2005), by William W.S. Wei.

**Course Description:** Stationarity, autocorrelation, ARMA models; frequency domain methods and the spectral density; forecasting methods; and computationally-oriented application to case studies.

**Prerequisite(s):** STA 4210 and STA 4321

**Credit Hours:** 3

**Software:** You will need a computer for the homework assignments and practise. There will not be any lessons on how to use software, but questions are welcomed especially in office hours. The main software used in class will be R. You can use other software if you wish as long as you yield similar results: Minitab is a user-friendly alternative, SPSS, SAS, JMP, Matlab etc. For more help visit <http://www.stat.ufl.edu/~athienit/software.html>

**Purpose of Course:** To comprehend basic concepts of time series and autocorrelated responses, and learn how to build time series models and how to apply the models to real world problems.

**Topics:**

1. Fundamental concepts of time series and autocorrelated responses
2. AR, MA, ARIMA, and SARIMA Models
3. Forecasting
4. Model Identification
5. Parameter Estimation
6. Intervention Analysis
7. Unit Root Testing and Cointegration
8. ARCH and GARCH Models (time permitting)
9. Spectral Domain (time permitting)
10. State Space Models and the Kalman Filter (time permitting)

## Course Policies

### Assignments

- Students are expected to work independently, unless otherwise specified in writing. **Offering and accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor or teaching assistant.
- **No late assignments will be accepted under any circumstances.**
- Students are expected to show and explain how the answers were obtained. When asked to submit textbook problems/exercises, simply copying the solution manual without performing, showing and explaining your work is not sufficient for a grade and may be considered an act of plagiarism. (There are software to test for plagiarism).
- All electronically **submitted work must be in pdf format** or a standard file format such as doc, jpeg, etc.

## Homework/Quizzes

There will be homework assigned on a regular basis as *suggested homework* (not to be turned in) containing data analysis problems and/or book exercises. Suggested homework will be posted under “Assignments”.

A *timed* quiz assignment based on the topics covered in class (and loosely based on the suggested homework) will be administered the day of the suggested homework deadline as either

- In-class (closed notes).
- Online (Only 1 attempt. It is highly encouraged to use a **reliable device** with a **reliable wired ethernet internet connection**. As soon as work is submitted a grade of 0 will show up as a placeholder until the assignment is graded.)

but which format will not be announced prior. For the best preparation students are encouraged to complete the full suggested homework set by the deadline posted on the suggested homework, indicating when you should be ready to take the quiz.

Solutions to suggested homework will not be posted, but solutions to the quizzes will be.

## Exams

There will be three (3) in-class exams that will comprise of multiple choice questions ( $\approx 20\%$ ) and some open-ended questions ( $\approx 80\%$ ). Exams will emphasize more on conceptual questions while HW/Quizzes will be more computational (not always).

### Allowed material:

- Double sided, one page formula sheet of your own creation not to exceed the dimensions of 260mm by 330mm (normal letter sized page). Only formulas are allowed on the formula sheet. Failure to adhere to these conditions may result in failing the assignment. Provided is an example of a [proper formula sheet](#).
- Scientific/Graphing Calculator.

### Important dates:

Exam #1 ..... September 25  
Exam #2 ..... October 30  
Exam #3 ..... December 12 at 08:30

## Grading

**Change of grade:** Grades will be changed only when an error has been made by the instructor.

### Grade distribution:

Exams 1, 2 and 3    75% (15% lowest, 27.5% second best, 32.5% best)  
Homework/Quizzes    25% (lowest 2 scores are dropped)

## Letter grade distribution:

	A	91 to 100	A-	88 to < 91	
B+	84 to < 88	B	80 to < 84	B-	77 to < 80
C+	74 to < 77	C	70 to < 74	C-	67 to < 70
D+	64 to < 67	D	60 to < 64	D-	55 to < 60
E	< 55				

**Final grades shown on Canvas are not accurate because they do not account for the conditional weighing of exams and quizzes.**

Final grade can be calculated with exams as a % (out of 100) and quizzes out of 10 points

$$0.15(\text{worst}) + 0.275(\text{second best}) + 0.325(\text{best}) + 0.25(100) \frac{\sum \text{quizzes} - \sum \text{two lowest}}{10(\# \text{ of quizzes} - 2)}$$

There will be *no rounding up* of scores. Students who actively participate in the discussion forum will be awarded **extra credit** (to the discretion of the instructor). To view the result of the letter grades to your GPA please visit

<http://www.registrar.ufl.edu/catalog1011/policies/regulationgrades.html>

## Attendance/Make-up

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

**Make-up policy:** Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

### (Additional) Make-up policy requirements:

- Every effort should be made to complete the assignment/exam during the open period. Only extreme situations will warrant a makeup. Contact the instructor prior to the exam - as soon as you realize you will be unable to take the assignment/exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a makeup under such extenuating circumstances.
- If you have an emergency on the day of the assignment/exam, the instructor must be contacted by midnight of the day of the assignment/exam.
- Make-ups need to be scheduled within a week from the assignment deadline. Student is responsible for scheduling.
- Additional Note: Being on vacation or booking a trip prior to the completion of the semester is not a valid reason to request a makeup. Please reference the [Academic Calendar](#)

**Incomplete:** An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which the student has completed a major portion of the course with a passing grade, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details please visit [CLAS incomplete grade policies and forms](#).

## Electronic devices

During class time, only laptops and tablets are allowed. Cell phones, smartphones, and phablets are not permissible unless otherwise specified by the instructor. A student found using said device during class time will be asked to leave the classroom which may result in missing any remaining assignments administered during class time.

## Getting help

For issues with technical difficulties for e-learning in Canvas, please contact the UF Help desk via Canvas “Help” tab or <https://my.it.ufl.edu/CherwellPortal/UFITServicePortal>

Any requests for make-ups due to technical issues MUST be accompanied by the **ticket number** received from e-Learning when the problem is reported to them. The ticket number will document the time and date of the problem. You MUST contact your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

**Complaints/Praises:** Should you have any complaints/praises with your experience in this course you can always address them to the instructor at [athienit@ufl.edu](mailto:athienit@ufl.edu), or you may contact the Department of Statistics to submit a complaint. You may submit anonymous e-mail.

For complaints that are not satisfactorily resolved at the department level or which seem to be broader than one department, students are encouraged to review the [UF Complaints Policy](#).

## UF Policies

**Accommodating Students with Disabilities:** Students requesting accommodation for disabilities must first register with the [Dean of Students Office](#). The Dean of Students will provide documentation to the students who must then provide this documentation to the instructor when requesting information. You must submit this documentation prior to submitting any assignments for which you are requesting accommodation.

**Academic Misconduct:** Students are held accountable to the [UF Honor Code](#).

**Evaluations:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

## Tentative Course Outline

Chapter	Content	Textbook
1	Characteristics of Time Series	1.1 - 1.5
2	Time Series Regression and Exploratory Data Analysis	2.1 - 2.3
Exam 1		
3	SARIMA Models	3.1 - 3.9
Exam 2		
4	Spectral Analysis and Filtering	4.1 - 4.7
5	ARCH/GARCH	5.3
Exam 3		