# FAU

**FLORIDA ATLANTIC UNIVERSITY**

## NEW COURSE PROPOSAL
## Graduate Programs

**Department :** Information Technology and Operations Management

**College :** Business
*(To obtain a course number, contact erudolph@fau.edu)*

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner _____
Catalog _____

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|---|---|---|---|
| **Prefix** ISM <br> **Number** 7405 | *(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* <br> **Lab** <br> **Code** | **Type of Course** <br> Lecture/Lab | **Course Title** <br> Advanced Business Analytics |

| | | |
|---|---|---|
| **Credits** *(Review Provost Memorandum)* <br><br> **3** <br><br> **Effective Date** *(TERM & YEAR)* <br><br> **Fall2021** | **Grading** *(Select One Option)* <br><br> **Regular** <br><br> **Sat/UnSat** | **Course Description** *(Syllabus must be attached; see Guidelines)* <br><br> An in-depth examination of business analytics methods of data manipulation and visualization, data mining, text mining, and web mining, using various analytical tools, such as Python, R, and others. The business analytics methods are explained using detailed case studies and real datasets. |

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|---|---|---|
| **Prerequisites** <br><br><br><br><br><br><br><br><br> *Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.* | **Academic Service Learning (ASL) course** <br><br> Academic Service Learning statement must be indicated in syllabus and approval attached to this form. | |
| | **Corequisites** <br> N/A | **Registration Controls** *(For example, Major, College, Level)* <br><br> Admission to an FAU PhD program or faculty approval |

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|---|---|
| **Minimum qualifications needed to teach course:** <br> Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.) | **List textbook information in syllabus or here** <br> McKinney, Wes (2018) Python for data analysis: Data wrangling with Pandas, NumPy, and IPython, Second Edition, O'Reilly Media, Inc. ISBN-13: 978-1491957660 ISBN-10: 1491957662. |
| **Faculty Contact/Email/Phone** <br> Chul Woo Yoo/yooc@fau.edu/561-297-2532 | **List/Attach comments from departments affected by new course** <br> N/A |

| **Approved by** | | **Date** |
|---|---|---|
| Department Chair | _signature_ | 02/11/2021 |
| College Curriculum Chair | _signature_ | 3/15/21 |
| College Dean | Ken Johnson  Digitally signed by Ken Johnson Date: 2021.03.22 14:04:28 -04'00' | 3/22/21 |
| UGPC Chair | _signature_ | Apr 4, 2021 |
| UGC Chair | _signature_ | Apr 5, 2021 |
| Graduate College Dean | _signature_ | Apr 5, 2021 |
| UFS President | | |
| Provost | | |

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

FAUnewcourseGrad, created Fall 2019

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## MEMORANDUM

**To:**      UGC
**From:**    Kevin Wagner, Chair MS in Data Science Committee
**Date:**    4/1/21
**Re:**      **New Business PhD Classes**


The MSDS committee met 3/31/21 at noon. The committee has no objections to MAN 7926 and ISM 7886.

The committee has no objections to ISM 7405, provided the following sentence is added to the syllabus, under the Other Course Requirements:

"Students in this course are focused in producing business publications and it is not appropriate for students outside the Ph.D. in Business administration program."

**ISM 7405**
**CRN #: XXXX**

# Advanced Business Analytics

3 Credit Hours
Spring 202X
Prof. XXX
Office: FL XXX
Telephone: XXX-XXX-XXX
Office Hours (Phone or Zoom): Wed. and Fri. 3:30 pm – 5:00 pm
Email: XXX@fau.edu

## Course Description

" An in-depth examination of business analytics methods of data manipulation and visualization, data mining, text mining, and web mining, using various analytical tools, such as Python, R, and others. The business analytics methods are explained using detailed case studies and real datasets."

This doctoral-level course equips students with advanced data analytics skills commonly used in academia and practice. It is designed to help doctoral students to collect data from new sources such as web and social media and clean and visualize big datasets. Additionally, it helps students apply advanced analytical methods on datasets using most common analytical tools, such as Python and R. The main objective of this course is to acquaint doctoral students with the common advanced analytical tools to facilitate related research projects for dissertation purposes.

## Course Objectives

Upon successful completion of this course, students will be able to:

1. Apply Advanced Business Analytics Methods Using Python

   - Understand, write, and run Python codes.
   - Scrape data from websites in different formats with Python.
   - Store your data in databases and retrieve it with Python.
   - Clean and manipulate data with Python.
   - Visualize data with Python.
   - Use different libraries in Python, such as Pandas, to analyze data.

2. Apply Advanced Business Analytics Methods Using R

   - Understand, write, and run R codes.

- Cleaning and manipulating data with R.
- Visualize data with R (using ggplot2).
- Use available packages in R to analyze data.

# Required Texts & Materials

- Main research articles for reading are downloadable.
- McKinney, Wes (2018) *Python for data analysis: Data wrangling with Pandas, NumPy, and IPython*, **Second Edition**, O'Reilly Media, Inc. ISBN-13: 978-1491957660 ISBN-10: 1491957662.
- Ohri, Ajay (2013) *R for Business Analytics*, Springer-Verlag New York. ISBN: 978-1-4614-4342-1, eBook ISBN 978-1-4614-4343-8.

## Other Course Requirements

Students in this course are focused in producing business publications and the course is not appropriate for students outside the Ph.D. in Business administration program.

**Software:** We will use Python 3 and R in this course. Python and R are open source programming languages. Please follow my instructions in the first session to install Anaconda on your computer.

# Minimum Technology & Computer Requirements

## HARDWARE & SOFTWARE REQUIREMENTS

**Hardware**

- Dependable computer

**Software**

- Microsoft 365 Suite
- Reliable web browser (recommended Chrome or Firefox)
- Canvas mobile app: Download instructions for iOS device or Android device
- Adobe Reader
- Adobe Flash Player

## Computer Requirements

**Basic Computer Specifications for Canvas**

- Operating system: Windows 10 or macOS Sierra (or higher).
- A Windows-based PC is preferred; Macs are fine for the most part, but the commands can be slightly different.  I write my codes on a Windows-based PC.
- Specifications

**Peripherals**

- A backup option should be available to minimize the loss of work. This can be an external hard drive, a USB drive, cloud storage, or your folder on the FAU servers.

## <u>Minimum Technical Skills Requirements</u>

The general and course-specific technical skills you must have to succeed in the course include but are not limited to:

- Accessing the Internet.
- Using Canvas (including taking tests, attaching documents, etc.).
- Using email with attachments.
- Creating and submitting files in commonly used word processing program formats such as Microsoft Office Tools.
- Copying and pasting functions.
- Downloading and installing software.
- Using presentation, graphics, and other programs.
- Posting and commenting in an online discussion.
- Searching the FAU library and websites.

# Course Prerequisites and Credit Hours

Admission to a Ph.D. program or faculty approval. This course is 3 credits.

# Course Assessments, Assignments & Grading Policy

**Grading Criteria**

## <u>Assignments (40% total course grade)</u>

- Around 10 Assignments, up to 100 points each

You will complete an assignment almost every week. You will apply the skills and concepts covered in the module. Detailed instructions, helpful resources, and grading rubrics are provided in the Canvas course. Assignment pages will close at the stated due date and time. Late submissions will not be possible.

## <u>Discussion (10% total course grade)</u>

For each module, students should add at least one post under the discussion of that module. The post can be an exciting idea, application of the materials, assignment, general opinion, etc. Students also should comment under <u>at least two posts</u> from other students.

## <u>Final Project (50% total course grade)</u>

You will be required to participate in a team project that will involve collaborating with other students to define an interesting question about an online business, collect related data from the web with Python,

store them in a database with Python, clean the data, analyze the data, and finally report your findings and recommendations.

Please read the sample paper by Ethan Mollick (2014)[1] for an excellent project example. In this paper, the author studied factors that affect the success of Kickstarter campaigns. He extracted data from the largest crowdfunding site, i.e., Kickstarter. With analyzing the data, he found that "personal networks and underlying project quality are associated with the success of crowdfunding efforts, and that geography is related to both the type of projects proposed and successful fundraising" Mollick (2014).

This assignment offers you the opportunity to practice virtual collaboration skills that are applicable to the 21st Century global workforce. Though group work is often challenging, it is a reality in nearly every employment setting. Learning to be a supportive team member, resolve conflicts, and discover your role preferences within group projects is an important part of the skills you will develop through your FAU education.

This project is broken down into tasks, in order to facilitate the success of your group project:

1. **Project Deliverable 1: Team Charter** (up to 10 points)
   You will connect with your group and create a Team Charter.
2. **Project Deliverable 2: Website and Question** (up to 10 points)
   Your group will select a business for your final project, draft an interesting question about the business, and describe your plan for answering the question (such as describing data collection process, type and definition of variables in your data, and your plan for analyzing the data).
3. **Project Deliverable 3: Data** (up to 10 points)
   You will share the data that you have collected from the web and stored in your database or other sources. You will learn about scraping websites in the first four weeks of the class. If it is possible, please use a website's API to collect data. Since collecting data may take a lot of time, I expect you to collect only a portion of available data on your selected website. However, your dataset should be big enough to apply statistical analyses on it.
4. **Project Deliverable 4: Data Analytics Final Project** (up to 100 points)
   Your group will post the final project.

Detailed instructions, helpful resources, and grading rubrics are provided in the Canvas course. Most assignment pages will close at the stated due date and time. Late submissions will not be possible.

## Grading Scale

| A | 93.00-100% | C | 73-76.99% |
|---|---|---|---|
| A- | 90-92.99% | C- | 70-72.99% |
| B+ | 87-89.99% | D+ | 67-69.99% |
| B | 83-86.99% | D | 63-66.99% |
| B- | 80-82.99% | D- | 60-62.99% |
| C+ | 77-79.99% | F | < 60 % |

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[1] Mollick, Ethan. (2014). The Dynamics of Crowdfunding: An Exploratory Study. Journal of Business Venturing. 29. 1–16. 10.1016/j.jbusvent.2013.06.005 Retrieved from
https://www.sciencedirect.com/science/article/pii/S088390261300058X

## Late Assignments Policy

Canvas assignment pages will close at the stated due dates and times. Late work will not be accepted without a university-recognized excuse. Students must e-mail instructor to inquire whether late work will be accepted. If an assignment is not submitted on time, it will earn a score of 0 points.

## Make-up Policy for Tests: N/A

## Incomplete Grade Policy

The University policy states that a student who is passing a course but has not completed all work due to exceptional circumstances, may, with the consent of the instructor, temporarily receive a grade of incomplete ("I"). The assignment of the "I" grade is at the discretion of the instructor but is allowed only if the student is passing the course.

## Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. Use your own judgment if you have to miss any class or assignment due to your personal or professional commitment. Because of the condensed nature of this course, if you miss more than one class (with the exception of true emergencies or university-approved disasters), your grade will be at most a B.

## Etiquette and/or Netiquette Policy

Due to the casual communication common in the online environment, students are sometimes tempted to relax their grammar, spelling, and/or professionalism. Please remember that you are adult students and professionals—your communication should be appropriate. For more in-depth information, please see the FAU Statement on Netiquette.

- Each student is responsible for keeping up with the class schedule, checking your FAU email account, and checking the course Canvas site on a regular basis.
- If you use a non-FAU email address as your primary address, arrange for FAU email to be forwarded.
- **Please use email to contact me**

## Anti-plagiarism Software

- Written components of any assignment or project may be submitted to anti-plagiarism software to evaluate the originality of the work. Any students found to be submitting work that is not their own will be deemed in violation of the University's honor code discussed above.

## Student Responsibilities

**Students are responsible:**

- To read the required material (designated chapters) for each week.
- To review the class schedule provided on Canvas often to know important course due dates (Tests, quizzes, etc).
- For all material covered and assignments/exams announced during their absence.

<div align="center">**Selected University and College Policies**</div>

**Code of Academic Integrity Policy Statement**
Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty.

For more information, please see FAU Regulation 4.001 at:  FAU Regulation 4.001.

**Disability / Accessibility Policy Statement**
In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with **Student Accessibility Services** (SAS) and follow all SAS procedures.  SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses.  For more information, please visit the SAS website at www.fau.edu/sas/.

**Counseling and Psychological Services (CAPS) Center**
Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling.

**Religious Accommodation Policy Statement**
In accordance with rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices, observances, and beliefs with regard to admissions, registration, class attendance and the scheduling of examinations and work assignments.

For further information, please see FAU Regulation 2.007 at: FAU Regulation 2.007.

**University Approved Absence Policy Statement**
In accordance with rules of the Florida Atlantic University, students have the right to reasonable accommodations to participate in University approved activities, including athletic or scholastics teams, musical and theatrical performances and debate activities.  It is the student's responsibility to notify the course instructor at least one week prior to missing any course assignment.

**Incomplete Grade Policy Statement**
A student who is passing a course, but has not completed all work due to exceptional circumstances, may, with the consent of the instructor, temporarily receive a grade of incomplete

("I"). The assignment of the "I" grade is at the discretion of the instructor, but is allowed only if the student is passing the course.

The specific time required to make up an incomplete grade is at the discretion of the instructor. However, the College of Business policy on the resolution of incomplete grades requires that all work required to satisfy an incomplete ("I") grade must be completed within a period of time not exceeding one calendar year from the assignment of the incomplete grade. After one calendar year, the incomplete grade automatically becomes a failing ("F") grade.

## Withdrawals
Any student who decides to drop is responsible for completing the proper process required to withdraw from the course.

## Grade Appeal Process
A student may request a review of the final course grade when s/he believes that one of the following conditions apply:
- There was a computational or recording error in the grading.
- Non-academic criteria were applied in the grading process.
- There was a gross violation of the instructor's own grading system.

The procedures for a grade appeal may be found in FAU Regulation 4.002.

## Disruptive Behavior Policy Statement
Disruptive behavior is defined in the FAU Student Code of Conduct as "... *activities which interfere with the educational mission within classroom.*" Students who behave in the classroom such that the educational experiences of other students and/or the instructor's course objectives are disrupted are subject to disciplinary action. Such behavior impedes students' ability to learn or an instructor's ability to teach. Disruptive behavior may include, but is not limited to: non-approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor's expectations for classroom conduct.

## Faculty Rights and Responsibilities
Florida Atlantic University respects the right of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions which do not impede their exercise. To ensure these rights, faculty members have the prerogative:
- To establish and implement academic standards
- To establish and enforce reasonable behavior standards in each class

To refer disciplinary action to those students whose behavior may be judged to be disruptive under the Student Code of Conduct.

# Course Topical Outline

This schedule serves as a **_tentative_** overview of the course progression. It is subject to change **infrequently**. Please be sure to check your FAU emails on a regular basis for the latest class information.


Module 1: Basics of Python Programming Part 1
Module 2: Basics of Python Programming Part 2
Module 3: Web Scraping with Python Part 1
Module 4: Web Scraping with Python Part 2
Module 5: Using Databases with Python
Module 6: Data Analysis with Python Part 1
Module 7: Data Analysis with Python Part 2
Module 8: Data Analysis with Python Part 3
Module 9: Basics of R Programming Part 1
Module 10: Basics of R Programming Part 2
Module 11: Data Visualization with R
Module 12: Data Analysis with R Part 1
Module 13: Data Analysis with R Part 2

# Articles for Reading

1. Cui, R., Gallino, S., Moreno, A., & Zhang, D. J. (2018). The operational value of social media information. *Production and Operations Management*, *27*(10), 1749-1769.
2. Kruse, T., Schneider, J. C., & Schweizer, N. (2021). A toolkit for robust risk assessment using F-divergences. *Management Science*.
3. Law, R., Li, G., Fong, D. K. C., & Han, X. (2019). Tourism demand forecasting: A deep learning approach. *Annals of Tourism Research*, *75*, 410-423.
4. Xu, Y., Armony, M., & Ghose, A. (2021). The interplay between online reviews and physician demand: An empirical investigation. *Management Science*.
5. Liu, X., Mishra, A., Goldstein, S., & Sinha, K. K. (2019). Toward improving factory working conditions in developing countries: An empirical analysis of Bangladesh ready-made garment factories. *Manufacturing & Service Operations Management*, *21*(2), 379-397.
6. Park, S. Y., & Pan, B. (2018). Identifying the next non-stop flying market with a big data approach. *Tourism Management*, *66*, 411-421.
7. Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 1165-1188.
8. Kadiyala, B., Özer, Ö., & Şimşek, A. S. (2020). Data-Driven Approaches to Targeting Promotion E-mails: The Case of Delayed Incentives. *Production and Operations Management*.
9. Li, C., & Lim, A. (2018). A greedy aggregation–decomposition method for intermittent demand forecasting in fashion retailing. *European Journal of Operational Research*, *269*(3), 860-869.
10. Kumar, N., Qiu, L., & Kumar, S. (2018). Exit, voice, and response on digital platforms: An empirical investigation of online management response strategies. *Information Systems Research*, *29*(4), 849-870.
11. Bastani, K., Asgari, E., & Namavari, H. (2019). Wide and deep learning for peer-to-peer lending. *Expert Systems with Applications*, *134*, 209-224.

12. Baechle, C., Huang, C. D., Agarwal, A., Behara, R. S., & Goo, J. (2020). Latent topic ensemble learning for hospital readmission cost optimization. *European Journal of Operational Research*, *281*(3), 517-531.
13. Shi, Y., Wang, T., & Alwan, L. C. (2020). Analytics for Cross-Border E-Commerce: Inventory Risk Management of an Online Fashion Retailer. *Decision Sciences*, *51*(6), 1347-1376.

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**<u>The instructor reserves the right to adjust this syllabus as necessary.</u>**