**Sabancı Business Analytics for Professionals (Non-Thesis) Program   
Spring 2022**

**PBAN 892 – Advanced Applied Analytics**

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DROPBOX LINK: <http://bit.ly/pban892>

**Office Hours:** By appointment

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| --- | --- | --- | --- |
| **Type** | **Time** | **Days** | **Where** |
| Class | 19:00-21:00 | Tue | Altunizade & Online  [https://sabanciuniv.zoom.us/j/4603991779](https://www.google.com/url?q=https://sabanciuniv.zoom.us/j/4603991779&sa=D&source=calendar&usd=2&usg=AOvVaw093FawNSFRsY--efi2B09i) |
| Class | 9:30-12:30 | Sat | Altunizade & Online  <https://sabanciuniv.zoom.us/j/4603991779> |

**Course Objective:**

Advanced Applied Analytics course teaches is tailored to the professional business analytics students. The course aims at teaching the process of implementing analytical solutions at organizations, development of advanced analytical models including statistics, optimization, and machine learning.

The course builds on the previously covered topics and makes use of acquired skills such as statistics, coding in SQL, R and Python. The main objectives of this course are as follows:

1. Analytics maturity models and selected advanced topics in analytics
2. Introducing analytics suites (workbench) such as KNIME, Weka, Enterprise Miner.
3. Applied research topics from a variety of disciplines via guest speakers.
4. Assist and advise students with their graduation projects.

**Learning Outcomes:**

Upon successful completion of the course, the student should be able to:

1. Follow CRISP-DM methodology in analytics projects.
2. Choose appropriate analytics software suite and be able to create prototypes.
3. Choose the most appropriate analytics technique to solve an analytical problem.
4. Discuss alternative solutions effectively.
5. Determine/set the best course of action.
6. Demonstrate understanding of data-driven decision modeling.
7. Be able to communicate the marketing analytics project with stakeholders

**Course Material:**

This course relies on several readings and participative learning. While we make references to textbooks depending on the context, students are not required to purchase any textbook.

**List of Readings**

Depending on the speaker, required readings will be posted on SUCourse

**Course Web:**

All course related materials will be posted on SUCourse. I will also be sharing on-demand material using course Dropbox folder to save time (see link in the intro). Students are required to check course web often.

Sabanci University uses a very powerful web-based tool called Turnitin. Turnitin is the worldwide standard in online plagiarism prevention. It allows instructors to compare student papers against a database composed of millions of articles. Every paper you submit will be scanned by Turnitin, and results will be reflected in your grades.

**Instructional Design:**

This course will be delivered through online (face-to-face if conditions permit) lectures. Students must bring their laptops, and make sure that required software is installed (Excel, KNIME, RStudio, Python etc.) are installed and functional on their machines.

**Grading**:

25% Assignments, mini-assignments & readings

25% In-class discussions, exercises & participation, including attendance

25% Deliverable 1 (Graduation project outline)

25% Deliverable 2 (Graduation project draft & presentation)

**Requirements:**

Each student is expected to contribute to discussions. To do well, students should learn from active participation in presentations and discussions. In evaluating the quality of participation is important. In particular, I will try to assess how your contributions enhance both the *content* and *process* of a discussion:

• Do your comments add to our understanding of the issues or is it frivolous / lacking of substance and serious thinking — an attempt to get "air time" that day? (i.e., you have only one thing to say and want to say it no matter how irrelevant it is to the on-going discussion).

• Are your comments timely and linked to the comments of others?

• Do your comments move the discussion along by providing a new perspective?

• Are your comments clear, or obscure?

• Do your comments reflect a concern for maintaining a constructive and comfortable classroom atmosphere?

If you are unable to attend a particular session please inform me as early as possible. Also prepare for “cold calls” during class meeting. If you attend, but are unprepared to participate in the day's discussions, notify me prior to the beginning of the class to avoid any embarrassment.

I will be taking role in each class and maintaining class-by-class participation marks and will provide feedback to you during the term.

**Mini Assignments**

Short Assignments: There will be short assignments during the semester. These assignments may include doing reading before the class. The assignments will be announced weekly.

**Project**

A significant portion of the material presented in this course will be delivered through guest speakers, and is difficult to learn from a textbook. The objective is to get students exposed to different facets of analytics.

A major element of the course is to guide students towards completing a graduation project, which comprises an interim deliverable and a final project draft and presentation.

Project Details:

The project for this course will serve as a basis for your graduation project. The graduation project is the degree requirement for MSc in Business Analytics. While there are no legal requirements on the structure and the coverage/depth of the project, it aims at demonstrating your knowledge and competency in a certain format. Given a topic, (for example, employee churn) your project could be structured differently:

1. Applied/practical: Solve an already-defined analytical problem using tools and techniques that you have acquired during our program on a problem/dataset. Example: apply different techniques on the employee churn project, given employee data.
2. Conceptual/theoretical: Define the problem, conduct a literature review, determine techniques to be employed, layout a practicable (project) plan using standard processes for analytics. Example: Develop a project plan for the employee churn problem, that links data analysis, to a strategic retention plan.
3. Survey: The analytics field is rapidly growing. While there is an abundance of methods and tools, often problems are domain specific, and require domain knowledge. This domain knowledge is often embedded within organizations. A graduation project could also focus on a particular area of application (such as employee churn or employee analytics) and review the state-of-the-art of the tools and techniques, and theoretical groundwork for these applications. Example: survey of the state-of-the art of the employee retention and churn.

There will be 2 project deliverables on the 4th, and 7th weeks of the semester. A more detailed project information will be provided during the semester. The projects will be carried out individually.

Grading Components are given under “Grading” section.

**Academic Honesty:**

Learning is enhanced through cooperation and as such you are encouraged to work in groups, ask for and give help freely in all appropriate settings. At the same time, as a matter of personal integrity, you should only represent your own work as yours. Any work that is submitted to be evaluated in this class should be an original piece of writing, presenting your ideas in your own words. Everything you borrow from books, articles, or web sites (including those in the syllabus) should be properly cited. Although you are encouraged to discuss your ideas with others (including your friends in the class), it is important that you do not share your writing (slides, MS Excel files, reports, etc.) with anyone. Using ideas, text and other intellectual property developed by someone else while claiming it is your original work is *plagiarism*. Copying from others or providing answers or information, written or oral, to others is *cheating*. Unauthorized help from another person or having someone else write one’s paper or assignment is *collusion*. Cheating, plagiarism and collusion are serious offenses that could result in an F grade and disciplinary action. Please pay utmost attention to avoid such accusations.

**Classroom policies and conduct**

Sabancı Business Analytics for Professionals (Non-Thesis) Program values participatory learning. Establishing the necessary social order for a participatory learning environment requires that we all:

* Come prepared to make helpful comments and ask questions that facilitate your own understanding and that of your classmates. This requires that you complete the assigned readings for each session before class starts.
* Listen to the person who has the floor.
* Come to class on time.
* Laptop policy: Students are required to bring their laptops to class. Do not use your laptops or personal computers unless you are instructed to do so.

**Course Schedule and Tentative List of Topics:**

**Topics:**

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| --- | --- | --- |
| **Week 1** | **Date:** |  |
| Topic: | | Tue-Writing your graduation projects  Sat-Collaborative Filtering |
| Speaker: | |  |
| **Week 2** | **Date:** |  |
| Topic: | | Time Series Analysis  Data Envelopment Analysis (Fuat Kosanoglu) |
| Speaker: | |  |
| **Week 3** | **Date:** |  |
| Topic: | | Analytics Maturity Models,  MLOps (Emin Uzun, DgPays)  Causality (Structural Equation Modeling) |
| Speaker: | |  |
| **Week 4** | **Date:** |  |
| Topic: | | Panel Regression (Murat Güven)  Deep Learning (Ömer Faruk Beyca, İTÜ) |
| Speaker: | |  |
| **Week 5** | **Date:** |  |
| Topic: | | Analytic Hierarchy Process & Fuzzy Logic (Huseyin Selcuk, Marmara)  Speech Analytics (Cenk Demiroglu, Özyeğin) |
| Speaker: | |  |
| **Week 6** | **Date:** |  |
| Topic: | | NLP (Altug Tanaltay, Sabancı) |
| Speaker: | |  |
| **Week 7** | **Date:** |  |
| Topic: | | Blockchain (Masoud Shahmanzari) |
| Speaker: | |  |

**Other topics (as time permits):**

Tying the loose ends: Ggplot, Cost Sensitive Classifiers, Feature Engineering, Model evaluation, Regex, sensitivity analysis, variable selection, distance metrics, bias correction, variable encoding.

Applications in Analytics:

LCW Datathon

Vidhya Datathon: Soccer

SCOR Datathon – Weather in India,

Finance: Netting application

Marketing: Harvard case on marketing analytics

Workbench integration with R and Python

Time Series Analysis