

Course Plan for Bachelor program - Study Plan Development and Updating Procedures/ Software Engineering Department	QF01/0408-4.0E
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Study plan No.	2021/2022		University Specialization		Artificial Intelligence	
Course No.	0142450		Course name		Advanced Data Analytics	
Credit Hours	3		Prerequisite Co-requisite		Introduction into Data Science	
Course type	<input type="checkbox"/> MANDATORY UNIVERSITY REQUIREMENT	<input type="checkbox"/> UNIVERSITY ELECTIVE REQUIREMENTS	<input type="checkbox"/> FACULTY MANDATORY REQUIREMENT	<input type="checkbox"/> Support course family requirements	<input type="checkbox"/> Mandatory requirements	<input checked="" type="checkbox"/> Elective requirements
Teaching style	<input type="checkbox"/> Full online learning		<input type="checkbox"/> Blended learning		Traditional learning	
Teaching model	<input type="checkbox"/> 2Synchronous: 1asynchronous		<input type="checkbox"/> 2 face to face : 1synchronous		3 Traditional	

Faculty member and study divisions information (to be filled in each semester by the subject instructor)

Name	Academic rank	Office No.	Phone No.	E-mail	
Division number	Time	Place	Number of students	Teaching style	Approved model
1					

### Brief description

This course includes the following topics: Data summarization, Data visualization, Model Selection, Linear Regression, forecasting using Gretl, Time series forecasting using RNN, Social Network analysis, recommender systems, association rule discovery, outlier detection.

### Learning resources

Course book information (Title, author, date of issue, publisher ... etc)	1- Data Analytics Made Accessible. Anil Mahishwari, 2020.				
Supportive learning resources (Books, databases, periodicals, software, applications, others)	1-Data Mining, Concepts and Techniques, Jiawei Han, 3 <sup>rd</sup> edition, 2016.				
Supporting websites					
The physical environment for teaching	Class room	<input type="checkbox"/> labs	<input type="checkbox"/> Virtual educational platform	<input type="checkbox"/> Others	
Necessary equipment and software					
Supporting people with special needs					

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For technical support	
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**Course learning outcomes (S= Skills, C= Competences K= Knowledge,)**

No.	Course learning outcomes	The associated program learning output code
<b>Knowledge</b>		
<b>K1</b>	To show excellent knowledge in the basics of data analytics	<b>MK3</b>
<b>K2</b>	To be acquainted with the basics of various advanced data analytics topics.	<b>MK3</b>
<b>K3</b>		
<b>Skills</b>		
<b>S1</b>	To be able to apply data analytics concepts to perform various tasks such as visualization, summarization, and forecasting.	<b>MS3</b>
<b>S2</b>		
<b>S3</b>		
<b>Competences</b>		
<b>C1</b>	To apply the various concepts of data analytics in solving real life problems	<b>MC1</b>

**Mechanisms for direct evaluation of learning outcomes**

Type of assessment / learning style	Fully electronic learning	Blended learning	Traditional Learning (Theory Learning)	Traditional Learning (Practical Learning)
First exam	0	0	%20	0
Second / midterm exam	%30	%30	%20	30%
Participation / practical applications	0	0	10	30%
Asynchronous interactive activities	%30	%30	0	0
final exam	%40	%40	%50	40%

**Note:** Asynchronous interactive activities are activities, tasks, projects, assignments, research, studies, projects, work within student groups ... etc, which the student carries out on his own, through the virtual platform without a direct encounter with the subject teacher.

**Schedule of simultaneous / face-to-face encounters and their topics**

Week	Subject	learning style*	Reference **
1	Data Summarization	Lecture	<b>Handout</b>
2	Data Visualization	Lecture	<b>T: 93</b>
3	Linear Regression	Lecture	<b>T: 135</b>
4	Forecasting LR Using Gretl	Lecture	<b>Handout</b>
5	Time Series Forecasting using RNN	Lecture	<b>Handout</b>

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6	<b>Case Study1</b>	learning through problem solving	<b>Handout</b>
7	Mid Exam	learning through problem solving	-
8	Social Network Analysis	Lecture	<b>Handout</b>
9	Web Analysis	Lecture	<b>T: 224</b>
10	Recommender Systems	Lecture	<b>Handout</b>
11	Association Rule Discovery	Lecture	<b>T: 190</b>
12	Association Rule Discovery	Lecture	<b>T: 210</b>
13	Outlier Detection	Lecture	<b>R: 543</b>
14	<b>Case Study 2</b>	learning through problem solving	<b>Handout</b>
15	<b>Presentations.</b>	participatory learning	
16	<b>Final Exam</b>		

\* Learning styles: Lecture, flipped learning, learning through projects, learning through problem solving, participatory learning ... etc.

\*\* Reference: Pages in a book, database, recorded lecture, content on the e-learning platform, video, website ... etc.

#### Schedule of asynchronous interactive activities (in the case of e-learning and blended learning)

Week	Task / activity	Reference	Expected results
1	Data Summarization		To apply data summarization methods on a given dataset
2	Data Visualization		To apply data visualization methods on a given dataset
3	Linear Regression		To apply forecasting using linear regression on python
4	Forecasting LR Using Gretl		To apply forecasting using linear regression on Gretl
5	Time Series Forecasting using RNN		To apply forecasting using RNN on Python
6	<b>Case Study1</b>		To use data analytics concepts on a real life scenario
7	Mid Exam		
8	Social Network Analysis		To apply social network analysis methods
9	Web Analysis		To apply web analysis methods on a given dataset
10	Recommender Systems		To apply recommender systems concepts on a given dataset
11	Association Rule Discovery		To find frequent itemsets using Apriori

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			on a given dataset
12	Association Rule Discovery		To generate rules using Apriori on a given dataset
13	Outlier Detection		To apply outlier detection methods
14	<b>Case Study 2</b>		To apply various data analytics concepts in a real life scenario
15	<b>Presentations.</b>		To present an advanced topic in data analytics
16	<b>Final Exam</b>		