COURSE DESCRIPTION

1. Information about the programme

1.1 Institution of higher education	**„Alexandru Ioan Cuza” University of Iasi**
1.2 Faculty	**Faculty of Economics and Business Administration**
1.3 Department	**Department of Accounting, Business Information Systems and Statistics**
1.4 Field of study	**Business Information Systems**
1.5 Level	**Master**
1.6 Study programme/ Qualification	**Software Development and Business Information Systems (SDBIS)**

2. Information about the course

2.1 Course name	**Data Warehouses, Data Mining and Knowledge Discovery**						
2.2 Course coordinator 2.3 Lab coordinator	**lecturer Daniel HOMOCIANU, PhD Habil.**						
2.4 Year of study	I	2.5 Semester	II	2.6 Type of assessment	**Ongoing assessment + Exam**	2.7 Discipline status	**OB**

* *C – Compulsory / E - Elective*

3. Total estimated time (hours alloted to didactic activity per semester)

3.1 Total number of hours per week	3	of which: 3.2 lecture	1	3.3 seminar/lab	2
3.4 Total number of hours in the curriculum	42	of which: 3.5 lecture	14	3.6 seminar/lab	28

Time distribution	Hours
Study of the handbook, coursebook, bibliography and notes	32
Additional research in the library, online and on the field	15
Preparation of seminars / lab homeworks / practical project modules	32
Tutorials	15
Assessment	14
Other activities.....	-

3.7 Total number of self-study hours	108
3.9 Total number of hours per semester	150
3. 10 Number of credits	6

4. Prerequisites (if applicable)

4.1 curriculum-based	• Databases (or similar)
4.2 competence-based	• Not applicable

5. Conditions (if applicable)

5.1. for lectures	• Internet access , Video projector, Phisical / online attendance
5.2. for seminars/labs	• Oracle Virtual Box & the virtual machne at: tinyurl.com/z47h6y2

6. Assimilated specific competences

Professional competences	C4 Competence to integrate data, components and services in business systems and applications C4.1 Gaining detailed knowledge on all aspects of methodological and technological regarding the representation and persistence of data formats, the protocols and means of communication and integration of applications and services within distributed business information systems (1 credit) C4.2 Identification of technically and economically feasible solutions for data, applica-tions and services integration using existing methodologies and tools (1 credit) C5 Competence to manage IT projects and provide IT services C5.4 Development of decision and analysis models to be applied in the dynamic IT environment (2 credits) C6 Competence to manage and develop business processes using IT C6.2 Identification and orchestration of information processes in business using BPM (Business Process Management) tools (1 credit)
Transversal competences	CT1 – The ability to communicate and collaborate in teams of different professionals (0.5 credits) Continuous improvement of specific skills and knowledge towards approaching information systems CT3 – Continuous improvement of specific skills and knowledge towards approaching information systems, development of new software technologies and management of information systems (0.5 credits)

7. Discipline objectives (provided by the assimilated specific competences grid)

7.1 The general objective of the discipline	• To provide the knowledge of Data Warehouse (DWH) technologies in order to efficiently implement them in organizations , including programmatic operation.
7.2 Specific objectives	• Basic knowldge of multidimensional data models and implementation methodologies • Knowledge of main DWH products • Ability to design and implement a DWH • Basic Knowledge of exploiting DWH technologies in organizations

8. Content

8. 1 **COURSE / LECTURE**	Teaching methods	Observations
Introduction to the DWH discipline including the presentation of requirements and planning those at least 12 specific presentations (20%) of the master students teams about: 1.retail sales, 2.inventory, 3.procurement, 4.order management, 5.accounting, 6.CRM, 7.HRM, 8.financial services, 9.telecommunications, 10.transportation, 11.education, 12.healthcare, 13.e-commerce, 14.insurance (20% in the final grade. Details: tinyurl.com/jogo5uy (Kimball&Ross,2013)	PPT presentations, examples , explanations, conversations and questioning	1 lecture (2 hours)
Brief history (Inmon &Linstedt,2015). **Data Architecture** (Kimball&Ross,2016) + time for 2 specific theoretical presentations		1 lecture (2 hours)
Dimensional Modeling (Kimball&Ross,2016) + time for 2 specific theoretical presentations		1 lecture (2 hours)
Technical Architecture Considerations (Kimball&Ross,2016) + time for 2 specific theoretical presentations		1 lecture (2 hours)
Extract Transform Load and Data Quality (Kimball&Ross,2016) + time for 2 specific theoretical presentations		1 lecture (2 hours)
DWH Lifecycle (Kimball&Ross,2013) **Trends in the evolution of DWH: Extended RDBMS Architecture** (Kimball&Ross,2013), **Pushing into the Future**		1 lecture (2 hours)

(Reeves,2009), **DWH 1.0 vs. 2.0** (Krishnan, 2013) + time for 2 specific theoretical presentations		
Presenting and discussing the possible topics of the theoretical evaluation + time for 2 specific theoretical presentations		1 lecture (2 hours)

Bibliography:

http://portal.feaa.uaic.ro/Master/SDBIS/an1/zsem2/depozite/Pages/default.aspx
01-Airinei, D., Depozite de date, Polirom, Iași, 2002, portal.feaa.uaic.ro/Master/SIA/anul1/dd/Pages/default.aspx
02-Inmon,W.H.,Linstedt, D., Data Architecture:A primer for the data scientist, MK, MA, 2015 (tinyurl.com/h7dcq66)
03-Kimball, R., Ross, M., The Data Warehouse Toolkit Third Edition. The Definitive Guide to Dimensional Modeling, John Wiley & Sons, New York, 2013 (tinyurl.com/jogo5uy)
04-Kimball, R., Ross, M., The Kimball Group Reader. Relentlessly Practical Tools for Data Warehousing and Business Intelligence – Remastered Collection, Second Edition, Wiley, New York, 2016 (tinyurl.com/johox4v)
05-Krishnan, K, Data Warehousing in The Age of Big Data, Morgan Kaufmann (MK), MA, 2013 (tinyurl.com/zrjo75j)
06-Reeves, L.L., A Manager’s Guide to Data Warehousing, Wiley, New York, 2009 (tinyurl.com/htsslk8)
07-https://drive.google.com/drive/folders/0B6qmI5LYdWSeS3AwbmhILXZBdVU

8. 2 **LAB / SEMINAR**	Teaching methods	Observations
Creating a DWH project comparatively by using Microsoft SQL Server Analysis Services / SSAS (two examples starting from different types of databases) and Excel Power Pivot add-in (plus homework for teams of 2 members for 3rd week: your own examples – 1/2 cubes, 3 dimensions, 3 hierarchies and 3 measures using SSAS)	demonstration, tutorials, questioning	3 labs (3rd in **3rd week** for verifying the specific home work – 6.66% in final grade)
Creating SSAS MDX (MultiDimensional eXtension) queries to get data from a multidim. DWH cube (2 members team homework for 5th week: your own examples with at least 6 queries)	demonstration, query execution, questioning	2 labs (2nd in **5th week** for verifying the specific home work – 6.66% in final grade)
Using ADOMD (ActiveX Data Object MultiDimensional) objects to connect to a DWH cube in Microsoft Visual Studio .NET 2013 (2 members team homework for 7th week: your own examples with at least 2 forms including charts, grids and interactive controls for customizing at least one generic support MDX query for each form)	demonstration, code execution, questioning	2 labs (2nd in **7th week** for verifying the specific home work – 6.66% in final grade)
Creating Data Mining (DM) models starting from DWH cubes / relational data sources / tables by using comparatively MS SSAS and the Data Mining add-in and further verifying them by using different types of regressions in STATA - https://tinyurl.com/v9t84cy , StataMP.exe executable file after mounting and copying the content of the .iso file (2 members team homework for 9th week: your own examples with at least 4 models based on different algorithms)	demonstration, tutorials, questioning	2 labs (2nd in **9th week** for verifying the specific home work – 6.66% in final grade)
Creating SSAS DMX (DataMining eXtension) queries in relation to the DM models previously defined (2 members team homework for 11th week: your own examples with at least 6 queries, 1/2 per model)	demonstration, query execution, questioning	2 labs (2nd in **11th week** for verifying the specific home work – 6.66% in final grade)
Using ADOMD objects to connect to DM models in Microsoft Visual Studio .NET 2013 (2 members team homework for 13th week: your own examples with at least 2 forms including charts, grids and interactive controls for customizing at least one generic support DMX query for each from)	demonstration, code execution, questioning	2 labs (2nd in **13th week** for verifying the specific home work – 6.66% in final grade)

Data Cubes in on-line environments (e.g. nesstar-demo.nsd.uib.no/webview/).Computing practical evaluation results.	tutorials, questioning	1 lab (6 * 6.66% = 40%)

Bibliography:

08-Airinei, D., Dopspinescu, O., Huiban, A., Aplicatii practice cu sisteme OLAP si Depozite de date, Editura Sedcom Libris, Iaşi, 2008
09-Sarka, D., et. al., Implementing a Data Warehouse with Microsoft SQL Server 2012. Training Kit, O'Reilly Media, Sebastopol, 2012 (tinyurl.com/jk6lclk)
10-Sheldon, B., et. al., Professional Visual Basic 2012 and .NET 4.5 Programming, John Wiley & Sons, Indianapolis, 2013 (tinyurl.com/hrb6j9u)
11-Homocianu, D., Sistemele de asistare a deciziilor in contextul societatii cunoasterii, (ssrn.com/abstract=2384380), Editura UAIC, Iasi, 2009
12- Homocianu, D., Teza de abilitare: Technologies for supporting decision making, Iasi, 2019, tinyurl.com/y2gsptt4
13-http://www.nesstar.com/export/sites/default/doc/nesstar_cubes.pdf
14-https://drive.google.com/drive/folders/0B6qmI5LYdWSeM1ZXcm04VHJBc2M

9. Corroboration of the discipline content with the expectations of epistemic community representatives, professional associations as well as of representative employers in the programme related field.

The content of this discipline has been decided upon by taking into account both the curricula of some prestigious Western Universities and the demands of the economic environment provided by potential employers, either in the public or in the private IT companies.

10. Assessment

Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Share of final grade
Practical ongoing evaluation regarding the development of support components for a DWH based app.prototype	real-world application, complexity, validity and originality	Six face-to-face lab presentations of the homework about: the design of DWHcubes & DM models implemented, corresponding MDX & DMX queries and app.prototypes (e.g. .NET forms bound to multidim.cubes &mining models) -weeks No.: 3,5,7,9,11 &13. Both queries & apps' sources and presentations (video captures of their execution) sent before the begining of the weeks No.3,5,7,9,11 and 13. ***The archives should be electronically sent via https://wetransfer.com/ (NOT e-mail with attach) at: daniel.homocianu@uaic.ro***	40% (6 * 6.66%)
Theoretical evaluation of presentations during lecture hours (14 themes on domains, section 8.1, pp.2)	format, validity of sources, consistent pro-or-cons arguments, controversial theme and originality of comments and conclusions	Theoretical presentations (.ppt/.pptx/.pdf) delivered in real-time (presented and debated during lecture hours) or accompanied by audio&video narration (besides .ppt/.pptx/.pdf)**.** ***The archives should be electronically sent via https://wetransfer.com/ (NOT e-mail with attach) at least a week before, at: daniel.homocianu@uaic.ro***	20%

Theoretical exam based on answers to questions	solid theoretical knowledge of DWH applied in real-world scenarios	Final theoretical evaluation starting from at least ten questions (online survey)	40%

10.6 Minimum performance standard

- Design and implement a DWH cube, 4 DM models and corresponding application prototypes with dynamic and interactive user interface components to programmatically query them (MDX&DMX);
- **The resulting average of those 6 face-to-face lab modules/homeworks' scores** (section 8.2, pp.3) **should be >= 5**; Each such individual score from those six above is:
  >= 1 and <=10 when presenting the homework in time (corresponding week / another week in advance);
  >=1 si <=5 when exceeding the deadline (another week with delay);
- **The grade for the theoretical exam must be >= 5**.
- **The final grade must be >= 5**.

Date of completion
09/22/2020

Course and lab coordinator
lecturer Daniel HOMOCIANU, PhD Habil.

Date of aproval within the department
09/25/2020

Head of the CIES Department
professor Florin DUMITRIU, PhD