PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

HARMONIZATION

MASTER TRAINING OFFER

ACADEMIC/PROFESSIONAL

Establishment	Faculty / Institute	Department			
Mohamed Seddik Benyahia University Jijel	Exact sciences and computer science	Computer science			

Domain: Mathematics and Computer Science

Field: Computer Science

Specialty: Information Systems and Decision Support

Academic year: 2016/2017

I – Half-yearly teaching organization sheet

1- Semester 1:

Teaching Unit	HVS WH					Coeff	Credits	Assessment method	
	14-16 weeks	С	DW	PW	Others			Continuous	Exam
Fundamental TU									
FTU1	450 h	6h00	1h30	6h00	4h30	9	18		
Database and Internet	100 h	1h30		1h30	3h40	2	4	\checkmark	\checkmark
Data warehouses	150 h	1h30	1h30	1h30	5h30	3	6	\checkmark	\checkmark
FTU2									
Advanced Software	100 h	1h30		1h30	3h40	2	4	\checkmark	~
Engineering									
Simulation and prototyping	100 h	1h30		1h30	3h40	2	4	\checkmark	\checkmark
Methodology TU									
MTU1	225h	3h00	3h00	1 h	8h00	5	9		
Data Analysis	125 h	1h30	1h30	1 h	4h20	3	5	~	✓
Modeling in decision support	100 h	1h30	1h30		3h40	2	4	\checkmark	\checkmark
Discovery TU									
DTU1	47h30	1h30	1h30		12h10	2	2		
Business management and organization	62h30	1h30	1h30		12h10	2	2	~	~
Transversal TU									
TTU1	10h30	1h30				1	1		
Foreign language	10h30	1h30				1	1		✓
Total Semester 1	745 h	12h	6 h	7 h	24h40	17	30		

2- Semester 2:

Teaching Unit	HVS	WH				Cooff	Credits	Assessment method	
	14-16 weeks	С	DW	PW	Others	Coen	Creans	Continuous	Exam
Fundamental TU									
FTU3	450 h	6h00	4h30	3h00	4h30	9	18		
Service-oriented architecture and emerging technologies	100 h	1h30	1h30		3h40	2	4	~	\checkmark
Distributed operating systems	150 h	1h30	1h30	1h30	5h30	3	6	\checkmark	\checkmark
FTU4									
Stochastic optimization	100 h	1h30	1h30		3h40	2	4	\checkmark	\checkmark
Meta-heuristics	100 h	1h30		1h30	3h40	2	4	✓	\checkmark
Methodology TU									
MTU2	225h	3h00	3h00	1 h	8h00	5	9		
Data mining	125 h	1h30	1h30	1 h	4h20	3	5	✓	✓
Models and methods for solving scheduling problems	100 h	1h30	1h30		3h40	2	4	~	~
Discovery TU									
DTU2	10h30	1h30				1	1		
Expert systems (optional)	10h30	1h30				1	1	✓	\checkmark
Introduction to e-business (optional)	10h30	1h30				1	1	\checkmark	\checkmark
Transversal TU									
TTU2	47h30	1h30		1h30	12h10	2	2		
Technical reports	47h30	1h30		1h30	12h10	2	2		\checkmark
Total Semester 2	745 h	12 h	7h30	5h30	24h40		30		

II - Detailed program by subject

Semester: 1 TU title: FTU1 Subject title: Databases and the Internet

Credits: 4 Coefficients: 2

Teaching objectives

The objectives, after reminders on the main objects which define a relational schema with procedural extensions, are on the one hand to acquire the main notions linked to the XML model and finally to overview the SGBD and Web servers and the way to link the two.

Recommended prior knowledge

- Database foundations, Merise, SQL. Java

Content of the subject

Chapter 1: Relational DBMS

- The main objects of a relational schema (tables, constraints, views)
- Procedural extensions (triggers, stored procedures).
- Chapter 2: Databases and XML
 - The objectives are on the one hand to acquire the main
 - Concepts related to the XML model
 - Typing (DTD, XML- schema)
 - Transformation or query languages (Xpath, XSLT, XQuery)
 - The links between databases and XML.

Chapter 3: RDBMS and the Web

- General principles of web servers
- General principles of DBMS servers
- Linking a DBMS to a WEB server.
- Dynamic page management (CGI, ASP, JSP, Servlet, PHP)
- The Java approach through Servlets, JSPs and EJBs using JDBC
- Administering a J2EE server

Assessment method: Subject average = (Test mark*2+ Work mark)/3

References (Books and handouts, websites, etc.).

- First Web 2.0 applications with Ajax and PHP: January 2008 Editions Eyrolles,
- PHP 5 MySQL 5 AJAX: 1st edition, 12/2007 Editions ENI, ISBN13: 978-2-7460-4057-1 ISBN13: 9782212120905

Master's title: Information Systems and Decision Support Semester: 2 TU title: FTU1 Subject title: Data warehouses

Credits: 6 Coefficients: 3

Teaching objectives

This course covers data warehouses on a theoretical level by presenting the foundations, and on a practical level by presenting the associated tools and techniques.

Recommended prior knowledge

- License databases
- The relational model

Content of the subject

- Decision-making systems and data warehouses
- Multidimensional modeling
- The ETC process
- OLAP analysis
- Data warehouse administration

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- Data Warehouses: A Practical Guide to Dimensional Modeling. R. Kimball and M. Ross, 2002.
- A. Berson and SJ Smith (2004), Ed. TATA McGraw- Hill: Data warehousing, Data Mining, & OLAP

Semester: 1 TU title: FTU2 Subject title: Advanced Software Engineering

Credits: 4 Coefficients: 2

Teaching objectives

This course is divided into two parts. The first presents advanced design techniques, while the second focuses on generative design and programming techniques through modeldriven engineering.

Recommended prior knowledge

Software engineering courses (Software Engineering 1 and Software Engineering 2, respectively from the 2nd ^{and} 3rd ^{year} of the degree.

Content of the subject

Part 1 : Advanced Design Techniques

- The objective is to offer students the discovery of a set of techniques and best practices allowing better mastery of software development.

Part 2 : Model-Driven Engineering

- The objective is to raise awareness among students about model-driven engineering The course outline follows the implementation of a model-driven approach :

- specification of the business domain in the form of a metamodel to enable modeling specific to business needs,
- specification of the implementation technology in the form of a metamodel to introduce implementation details use of code generation to produce all or part of the system implementation .

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- Christopher Alexander. The origins of pattern theory: The future of the theory, and the generation of a living world. IEEE Software, 16(5):71–82, September / October 1999.
- Giuliano Antoniol, Bruno Caprile, Alessandra Potrich, and Paolo Tonella. Designcode traceability recovery: Selecting the basic linkage properties. Science of Computer Programming, special issue on program understanding, 40(2–3):213–234, July 2001.

Master's title: Information Systems and Decision Support Semester: 1 TU title: FTU2 Subject title: Simulation and prototyping

Credits: 4 Coefficients: 2

Teaching objectives

The objective of this course is to allow the student to simulate a process and to see the behavior of his system through the prototype produced.

Recommended prior knowledge

- Master a graphical programming language like C++

Content of the subject

- Modeling tools: state of play
- Declarative modeling
- State-based approaches: finite-state automata and Markov chains
- Finite event automata
- Hybrid approaches: Petri nets and state charts
- Simulation Method
- Application to real cases.

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- Xiren Cao. Some common misconceptions about performance modeling and validation. Performance Evaluation Review, 21(2), 1993.
- Luc Devroye. Non-Uniform Random Variate Generation. Springer-Verlag, New York, NY, USA, 1986.

Master's title: Information Systems and Decision Support Semester: 1 TU title: MTU1 Subject title: Modeling to support decision-making

Credits: 4 Coefficients: 2

Teaching objectives

This course addresses the modeling of various decision-making problems. Its objective is to develop students' ability to develop and implement relevant models in decision-making situations.

Recommended prior knowledge

- Concepts of operational research from the license (linear programming, etc.)

Content of the subject

- Presentation of non-trivial modeling of decision problems using various modeling frameworks (graphs, linear programming, etc.).
- Presentation of modeling and resolution tools (modelers and solvers).

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- HP Williams. Model building in mathematical programming. J. Wiley, New York, 1999. 4th edition
- Ph. Vallin and D. Vanderpooten . Decision support: a case-based approach. Ellipses, Paris, 2002, 2nd edition

TU title: MTU1 Subject title: Data analysis

Credits: 5 Coefficients: 3

Teaching objectives

Data analysis is a set of methods that allow us to describe and explain phenomena. The objective of this subject is to familiarize the student with common data analysis techniques.

Recommended prior knowledge

- Concepts of probability and statistics

Content of the subject

- Chapter 1: Descriptive Methods
 - o principal component analysis)
 - AFC (factor analysis)
- Chapter 2: Structuring Methods
 - Hierarchical classification
 - Examples
- Chapter 3: Structuring Methods (continued)
 - Non-hierarchical classification
 - o Examples
- Chapter 4: Explanatory Methods
 - Linear regression
 - Discriminatory analysis

Assessment method: final exam with continuous assessment of knowledge

- J. Benzekri, "Data Analysis"
- G. Saporta "Statistics and Data Analysis"
- Chadon and Pinson "Typological Analysis", Ed. Amod , 1981
- Jambu "Data Classification".

Master's title: Information Systems and Decision Support Semester: 1 TU title: DTU1 Subject title: Management and business organization

Credits: 2 Coefficients: 2

Teaching objectives

Understand the different ways companies are organized, particularly the organizations of Information Systems departments

Recommended prior knowledge

Content of the subject

- Organizational Theory
- Structures and dynamics of organizations
- The role of information systems in organizations

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

References

• Mintzberg H. Structure and dynamics of organizations, Editions d'Organisation, 1982.

Master's title: Information Systems and Decision Support Semester: 1 TU title: TTU1 Subject title: Foreign language

Credits: 1 Coefficients: 1

Teaching objectives

Learn to use a foreign language (e.g. English) in order to be able to read specialist computer magazines.

Recommended prior knowledge

Basic English for the degree

Content of the subject

- Reading scientific articles and papers
- Drafting documents

Assessment method: Exam + continuous assessment

- Scientific articles in the field
- Scientific communications
- Current Affairs Documents

Semester: 2 TU title: FTU3 Subject title: Service-oriented architectures and emerging technologies

Credits: 4 Coefficients: 2

Teaching objectives

Deepen knowledge of new system architectures and associated technologies.

Recommended prior knowledge

- Bachelor's degree web technology courses
- Bachelor's degree network courses

Content of the subject

- Introduction to service-oriented architectures.
- Web services: vision and underlying technology.
- Standards around SOAP-based architectures (WS-*, WS-I Standards, etc.).
- Service composition, choreography vs orchestration, BPEL.
- REST and related services (Google Maps , FlickR , Yahoo! Geocoding , etc.).
- Application integration through the user presentation layer: AJAX, service mashups.

Assessment method: Subject average = (Test mark*2+ Work mark)/3

- Service-Oriented Architecture Compass Business Value, Planning and Enterprise Roadmap IBM Press Books by Pearons plc. <u>ISBN 0-13-187 0 02-5</u>
- Berg (Martin van den), Bieberstein (Norbert), Ommeren (Erik van), SOA for Profit: A Manager's Guide to Successful SOA, Sogeti and IBM, 2007

Master's title: Information Systems and Decision Support Semester: 2 TU title: FTU3 Subject title: Distributed operating systems

Credits: 6 Coefficients: 3

Teaching objectives

To introduce the issue of parallelism in operating systems and to study the implementation of synchronization and mutual exclusion mechanisms in a distributed environment. To teach the student the basic concepts and tools of distributed systems .

Recommended prior knowledge

- Operating system concepts covered in the bachelor's degree.

Content of the subject

Introduction to parallel architectures + Concept of parallel architecture + Typology

Generalities on distributed systems + definitions

Fundamental problems in distributed systems + maintaining a global invariant

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

References

JP VERJUS et al., "Synchronization of parallel programs - Expression and -

implementation in centralized and distributed systems "BORDAS, 1983

- M. RAYNAL, " Distributed systems and networks : concepts, tools and algorithms" -EYROLLES, 1987
 - M. RAYNAL "Algorithmics of parallelism : the problem of parallel exclusion " DUNOD, 1984

Semester: 2 TU title: FTU4 Subject title: Stochastic optimization

Credits: 4 Coefficients: 2

Teaching objectives

Know the techniques related to stochastic optimization such as static and dynamic modeling, dynamic programming, etc.

Recommended prior knowledge

Content of the subject

- Stochastic Dynamic Programming: Theory and Applications
- Stochastic Linear Programming: robust solution, simulation and scenario analysis
- Chance constraint model
- Two-stage recourse model, equivalent deterministic model, multi-stage model
- Edmundsen-Madarsky formulas
- Mixed integer recourse models, stochastic Lagrangian relaxation, stochastic branch and bound

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

References

• Michalewicz, Z. and Fogel, DB (2000), *How to Solve It: Modern Heuristics*, Springer-Verlag, New York.

Master's title: Information Systems and Decision Support Semester: 2 TU title: FTU4 Subject title: Meta-Heuristics

Credits: 4 Coefficients: 2

Teaching objectives

Know the different concepts: genetic algorithms, neural networks, etc.

Recommended prior knowledge

Basics of Operational Research

Content of the subject

- Genetic algorithms and unitary human systems
- Neural networks
- Cellular automata
- Swarm algorithms

Assessment method: Subject average = (Test mark*2+ Work mark)/3

- Neural networks By DAVALO .E , NAÏM .P, published by EYROLLES.
- Neurocomputing: picking the human brain, NIELSON. H, IEEE Spectrum. 1988.

Master's title: Information Systems and Decision Support Semester: 2 TU title: MTU2 Subject title: Models and resolution methods for scheduling problems

Credits: 4 Coefficients: 2

Teaching objectives

Present models and methods used in practice to solve workshop and service scheduling problems.

Recommended prior knowledge

Content of the subject

- The scheduling function in business
- Presentation of scheduling and optimization software.
- Branch and Bound Procedures: Application to the Job Shop Scheduling Problem
- Constraint programming and scheduling: application to single-machine and job shop problems.
- Mathematical modeling and scheduling: application to timetable problems.

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- Group GOTHA, Models and Algorithms in Scheduling, Ellipses, 2004
- P. Esquirol and P. Lopez, scheduling, Economica, 1999.
- P. Brucker, Scheduling algorithms, Springer, 1998.
- M. Pinedo, Planning and Scheduling in Manufacturing and Services, Springer, 2005.

Master's title: Information Systems and Decision Support Semester: 2 TU title: MTU2 Subject title: Data mining Credits: 5 Coefficients: 3

Teaching objectives

Learning to mine large databases through supervised and unsupervised learning.

Recommended prior knowledge

- Databases
- Statistics
- Probabilities

Content of the subject

- Chapter 1: Introduction to data mining (definitions, processes, applications, models, etc.)
- Chapter 2: Statistics reminders (types of variables, graphical representations, etc.)
- Chapter 3: Automatic Classification
- Chapter 4: Searching for Association Rules
- Chapter 5: Decision Trees
- Chapter 6: Bayesian Networks

Assessment method: Subject average = (Test mark*2+ Work mark)/ 3

- Hans-Hermann Bock, Edwin Diday (January 2000): Analysis of Symbolic Data . Exploratory methods for extracting statistical information from complex data. Springer Verlag, Heidelberg, 425 pages, ISBN 3-540-66619-2. (Second edition)
- E. Diday, Y. Kodratoff, P. Brito, M. Moulet (2000): "Digital symbolic induction from data". Cépadues . 31100 Toulouse. www.editions-cepadues.fr. 442 pages.

Master's title: Information Systems and Decision Support Semester: 2 TU title: DTU2 Subject title: Expert systems Credits: 1 Coefficients: 1

Teaching objectives

This subject aims to introduce students to intelligent decision support systems. It will allow them to learn about a range of applications that exploit human reasoning mechanisms. This integration of human cognition is particularly relevant in situations where the information available to make a decision is either uncertain or incomplete.

Recommended prior knowledge

Information systems

Content of the subject

- 1. Introduction to expert systems (definition, architecture, typology, examples of SE, etc.)
- 2. Cognition (forward chaining, backward chaining, mixed reasoning)
- 3. The fact base, the rule base and inference
- 4. Uncertainty in expert systems.
- 5. Knowledge-based systems.

Assessment method: Subject Average = Exam Grade

References (Books and handouts, websites, etc.).

- Pierre Lévine , Jean-Charles Pomerol, Interactive decision support systems and expert systems, ed. Hermès, Paris, 1989.
- H. Farreny, Expert Systems, principles and examples, ed. Cepadues, 1985.

Master's title: Information Systems and Decision Support Semester: 2 TU title: DTU2 Subject title: Introduction to e-Business Credits: 1 Coefficients: 1

Teaching objectives

The aim of the module is to introduce the concepts of E-commerce and E-marketing.

Recommended prior knowledge

Content of the subject

- E-commerce
- E-marketing

Assessment method: Subject average = (Test mark*2+ Work mark)/3

- Michelle JEAN-BAPTISTE, Creating and Operating an Electronic Commerce Business, Editions LITEC, 1998 (<u>ISBN</u> 0-7111-2924-X)
- Michelle and Philippe JEAN-BAPTISTE, Online Marketing Legal and Practical Guide, Editions Eyrolles, 2008 (<u>ISBN</u> 978-2-212-53982-0)
- Love, Daniel, <u>The E-Business (R)Evolution</u>, 2nd Edition, Prentice Hall, New York, 2002, (<u>ISBN</u> 0130670391)

Semester: 2 TU title: TTU2 Subject title: Technical reports

Credits: 2 Coefficients: 2

Teaching objectives

The course mainly covers two aspects: one is about reading technical documents, the other is related to their writing. The student will learn how to analyze a scientific document and compare it to other content in the same field. He will also learn how to write and present high-level, good-quality manuscripts.

Content of the subject:

- I. Reading a technical report
- ✓ Analysis of technical scientific content
- ✓ Comparison methods
- II. Writing a scientific document
- ✓ Using LATEX
- ✓ Creation and management of bibliography with LATEX
- ✓ Creating a document with LATEX
- ✓ Creating a presentation with LATEX

Assessment method: Average Subject = exam grade

- L. Chan-Sun. LaTeX Tutorial, June 2004. http://www. supinfoprojects.com/fr/2004/latex/ .
- T. Nemeth. Course document on the use of Latex2e, Dec. 2000. http://www.commentcamarche.net/ccmdoc/index.php3?Mot=latex.
- C. Rolland. LaTeX through practice. O'Reilly , 1999. ISBN 2841770737.