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## AARMENA –Master Program in Digital Humanities Cooperation between the University of Jordan & Freidrich Schiller University - Jena, Germany

619258-EPP-1-2020-1-DE-EPPKA2-CBHE-JP

Role	Region	Participant Organisation Name	Country
Contractor	EU	FRIEDRICH-SCHILLER-UNIVERSITAT JENA	DE
Partner	R3	AL AZHAR UNIVERSITY GAZA	PS
Partner	R3	AL-ISTIQLAL UNIVERSITY	PS
Partner	R3	PETRA FOR EDUCATION	JO
Partner	R3	UNIVERSITE D EL OUED	DZ
Partner	R3	UNIVERSITE SETIF 2	DZ
Partner	R3	UNIVERSITY OF JORDAN	JO
Partner	EU	UNIVERSITAET INNSBRUCK	AT



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## ORIENTATION MODULE UNIT

### AARMENA Digital Humanities Master at the University of Jordan

- We propose a modular system in already existing masters at the University of Jordan
- The master program already exists in master's in computer science and holds the title: Master's in computer science: **“Digital Humanities for reconciliation and peace studies”**
- We will proceed through an equivalence method to guarantee the inclusion of peace and reconciliation content in already existing fundamental education units for the study of data science using computer science applications and methods.

## ORIENTATION MODULE UNIT

### **Master Program overview:**

The MA degree program ,Digital Humanities for Reconciliation Studies is a promising approach for researching Data Science into transforming and understanding violent conflicts and spurring social and cultural change in the MENA region.

### **General Objectives:**

Graduates of the program have gained insight into the fundamental research questions of the participating concentrations. They have developed the ability to examine research positions and analysis in the field of Peace, Conflict Transformation, and Reconciliation Studies in the Middle East and North Africa exploring Data Science.

### **Qualification Profile of AARMENA – Graduates:**

AARMENA – Master Graduates develop the ability to analyze and interpret the causes of domestic and international conflicts in their social, political, and cultural contexts using methods of computer science research methodologies.

### **Requirements of the Degree Program**

- AARMENA Master Program is an internationally oriented master's program with 120 ECTS(33 Credit Hours). The European Credit Transfer and Accumulation System (ECTS) serves as a reference for calculating the workload of the respective partner universities.
- The Master is offered in hybrid form, where international scholars can record their lectures or provide them via Zoom, and WebEx, and integrate highly integrated technological interactive presentation platforms. The partner countries' universities decide in which language they offer their study program.



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## How to include revision of the already accredited master?



Location: University of Jordan

Earliest start date: October 2021

Languages: Arabic (English)

Pace: Full-time

Duration: 2 years

Application Deadline: request info\*

Study type: hybrid (campus + online)

Tuition fees: based on the Tuition fees policy of the University of Jordan, and If applicable support students from different grants such as the Faculty of Scientific and Research, DADD etc.

### Curriculum Program: Master of Science in Computer Science (Digital Humanities):

- A module usually consists of three courses and a final module examination. The partner universities are responsible for their module descriptions and forms of examination. In addition, the partner universities can decide to acquire the type of degree appropriate to their institutions; at the University of Jordan, it will be a Master's program in computer science in the field of Digital Humanities.
- Depending on the national conditions, the program is divided into modules from the subject mentioned above areas (total of 90 ECTS) including research modules, and the module Master's thesis (30 ECTS).

### General Rules Conditions:

- 1- This plane conforms to the valid regulations of the program of graduate studies.
- 2- Specialties of admissions either of:
  - a- Bachelor of Computer sciences (Cs)
  - b- Bachelor of Computer Information Systems (CIS)
  - c- Bachelor of Software engineering
  - d- Bachelor of Business Information System
  - e- Bachelor of Computer engineering
  - f- Bachelor of any speciality within Information technology.

### Module 1: Computer Science Core Module

1901715	Theory of Algorithms	3
1901761	Operating Systems	3
1901765	Computer Networks	3
1902723	Data Base	3

### Module 2: Digital Humanities

1901790	Digital Humanities Research Methods	3
1901789	Computational for Digital Humanities and Reconciliation	3
1901791	Ethics, Politics In Digital Humanities	3



1901755	Advanced Method in Modeling and Simulation	3
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**Module 3: Database and Programming Languages**

Course Number	Course Title	Credit Hours
1901738	Spatial and Temporal Database	3

1901757	Image Processing	3
1901775	Programming Language Design	3
1902724	Distributed Database	3

**Module 4: Distributed Computing and Networking**

Course Number	Course Title	Credit Hours
1901717	Theory of Computations and Complexity	3
1901752	Parallel and Distributed Computing	3
1901767	Computer Networks Security	3
1902768	Mobile Location-Based Services	3

**Module 5: Thesis**

Course Number	Course Title	Credit Hours
1901799	Thesis	9

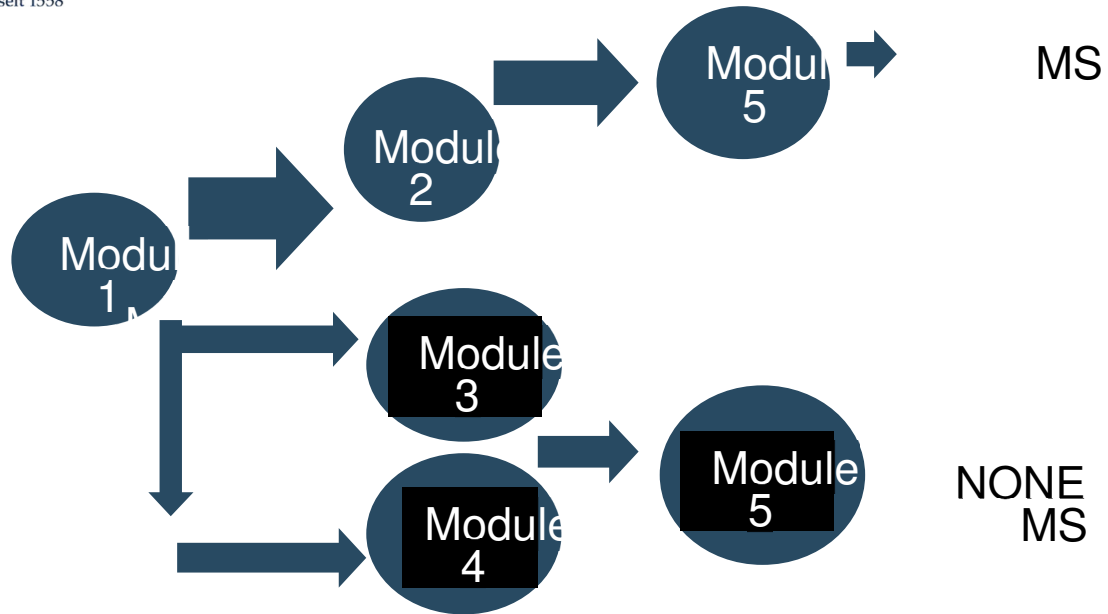
- In The first year of study modules, students will take the core Module for Graduate Computer Science Classes (Module 1).
- For the DH track, students must take Modules 1, 2, and 5.
- For none DH track students, they must take, Modules 1, and 5, and select either Module 3 or 4 According to the Model in the next page.



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### Model Description

- Students may complete modules amounting to 45 ECTS (12 CR) as international modules at one of the partner universities.
- The students may take the Thesis Module (30 ECT, 9 CR) in cooperation with the partner university.
- Finally, a student must take Module 1 (Core Module for Computer Science, 45 ECT, 12 CR) at the University of Jordan.

### Assessment:

- The prerequisite for admission to the research modules in the individual subjects is completing the corresponding subject modules.
- The prerequisite for admission to the Master's thesis module is completing the two modules of the first academic year (90 ECTS, 24 CR).

### Referencing Requirements

- Researchers must write according to the rules and regulations of Graduate School at the UJ for the written assignment when citing any resources and when providing support examples based on the researcher's knowledge and expertise.

### Technical Requirements

The researchers must have the ability to use computer-assisted software to gain the maximum ability of the program; such software is the following:

1. Microsoft word office, PowerPoint office.
2. Adobe Acrobat Reader.



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3. Computer-Assisted Qualitative Software: Such as MXQDA, Atlas-Ti, or Nvivo for Windows
  4. Microsoft Azure software for Machine Learning.
- For any technical assistance, the researcher needs to contact the technical team at the local university.

### Access to Future Studies

- When the student completes the program, he has access to enter into a PhD program at the University of Jordan.
- Continue a PhD at AARMENA in Germany.

### Jordan University Experience

#### •Six Students finished Modules 1, and 2, and already started Module 5 as follows:

- Byan Mohammad Fayomi, The Prediction & Influence for online education on higher education institutions using Netnography & machine learning in Jordan.
- Sajedah Nouyran, Measuring the academic students' performance at the University of Jordan using Netnography methodology.
- Abeer Abu Zaid, A qualitative content analysis of the social media discourses on the Internet of things at Jordanian universities.
- Nancy shaar, A decision support system(DSS) for traffic prediction and building a dynamic social media community using Netnography technology.
- .....

### Conclusion

- The Masters in Computer Science (Digital Humanities) is an innovative and Interdisciplinary & Transdisciplinary program of the University of Jordan with the universities forming the consortium of the AARMENA CBHE Project.
- The University of Jordan will be the first university in the MENA region to start a master's program in digital humanities for reconciliation studies.
- In the near future, we already started a plan of study to have an Independent MS in DH, expected to be in the Faculty of Information Technology.

### Courses Description

- **(1901710) Research Methodologies in Computer Science** **3 Credit Hours**  
This course focuses on research methods, research process, use of research tools and techniques, and writing and presentation skills for young researchers. This course is intended to provide the students with a broad overview of methods and concepts (both quantitative and qualitative research). Students should be confident in using the right methods and tools to analyze data. They will also be able to better design their primary research studies as well as to quickly enter and analyze this information.
- **(1901715) Theory of Algorithms** **3 Credit Hours**  
This course provides Strategies for algorithms synthesis and analysis. Design methodologies of classical algorithm categories such as divide-and-conquer, greedy method, dynamic programming,



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search and traversal, backtracking, and branch-and-bound. Computational complexity and important theoretical results from lower and upper-bound studies, NP-hard, and NP-complete problems will be addressed.

- **(1901717 )Theory of Computation and Complexity** **3 Credit Hours**  
 Finite Automata and Regular Languages, Properties of Finite Automata, Regular Expressions, The Pumping Lemma and Closure Properties; Universal Models of Computation, Encoding Instances, Choosing a Model of Computation, Model Independence, Turing Machines as Enumerators and Acceptors; Computability Theory, Primitive Recursive Functions, Partial Recursive Functions, Arithmetization: Encoding a Turing Machine, Programming Systems, Recursive and R.E. Sets, Rice's Theorem and the Recursion Theorem, Degrees of Unsolvability; Complexity Theory, Reductions, Classes of Complexity, Complete Problems; Some Important NP-complete Problems, The Complexity of Approximation, Models of Parallel Computation, Communication and Complexity, Interactive Proofs and Probabilistic Proof Checking.
- **(1901752) Parallel and Distributed Computing** **3Credit Hours**  
 The course is centred on three concepts: Architecture, Algorithms and programming. Parallel and Distributed Architectures: Parallel and Distributed computer taxonomy, the example of Parallel and Distributed computers, fundamental communication operations, and performance metrics. Parallel algorithms: design and analysis of parallel algorithms with emphasis on sorting, matrix problems, and graph problems. Parallel programming: types of parallelism, parallel programming paradigms, message passing programming, data and parallel programming.  
<sup>1</sup>Theory.
- **(1901755 )Advanced Methods in Modeling and Simulation** **3 Credit Hours**  
 Advanced concepts of computer simulation; models for computer simulation; random numbers: Pseudorandom number generation and testing, Monte Carlo methods. distribution functions. Simulation modelling: discrete-event simulation, continuous simulation; verification and validation of simulation models: input analysis, output.
- **(1901761) Operating Systems** **3 Credit Hours**  
 This course provides Distributed operating systems; Synchronization in distributed operating systems; Process Management in distributed operating systems; Distributed file systems; Distributed shared memory; Real-time operating systems; Scheduling in real-time operating systems.
- **(1901765) Computer Networks** **3 Credit Hours**  
 This course discusses Computer Networks and the Internet, Data Link Layer, Network Layer, Transport Layer Options (Silly Window Syndrome, Delayed ACK, Selective Acknowledgments, Selective Retransmission Request (SRR), Time Stamp, Window Scale); VLANs (Virtual Local Area Networks); Advanced Multimedia-Networking Protocols: Real-time Transmission Protocol (RTP), Real-time Transmission Control Protocol (RTCP), Session Initiation Protocol (SIP); Network-Management Protocols: Simple Network Management Protocol (SNMP),



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Structure of Management Information (SMI), Management Information Base (MIB); Quality of Service (QoS): Integrated Services (Intserv), Resource Reservation Protocol (RSVP), Differentiated Service (Diffserv); Asynchronous Transfer Mode (ATM).

Advanced data modelling concepts: advanced relational data modelling, object-oriented data modelling, database design theory, advanced relational algebra, database normalization, object-oriented database design, advanced query languages, advanced relational SQL constructs, object-oriented query languages, database integrity, concurrency control, concurrency problems, concurrency approaches, database recovery, recovery solutions and approaches, database security.

- **(1901713) Formal Compiling Methods** **3 Credit Hours**  
This course explores the foundation of Compiler design, principles, techniques & tools. Topics include Compilation Phases, Run-time environments, Machine-Independent Optimization, Instruction-Level Parallelism, Optimizing for Parallelism as Locality, and Interprocedural analysis.
- **(1901738) Spatial and Temporal Databases** **3 Credit Hours**  
This course considers models of spatial databases, and how data is structured, stored, indexed, retrieved, and displayed. Other topics include fuzzy spatial databases, temporal databases, multidimensional access methods, query processing, Spatio-temporal data management, remotely-sensed data, and spatial data mining.
- **(1901755) Advanced Methods in Modeling and Simulation** **3 Credit Hours**  
Advanced concepts of computer simulation; models for computer simulation; random numbers: Pseudorandom number generation and testing, Monte Carlo methods. distribution functions. Simulation modelling: discrete-event simulation, continuous simulation; verification and validation of simulation models: input analysis, output analysis. Queuing theory models; design codes, test and debug simulation programs. Sample applications.
- **(1901757) Image Processing** **3 Credit Hours**  
The course provides mathematical foundations and practical techniques for the digital manipulation of images, image acquisition, representation, preprocessing, segmentation, and compression. Other topics include multiresolution image processing, wavelets, morphological image processing, noise reduction and restoration, simple feature extraction and recognition tasks, image registration.
- **(1902724) Distributed Database** **3 Credit Hours**  
Distributed database management system (DDBMS) architecture: Standardization, Models, Alternative, Distributed Database Design, Strategies, Design issues, fragmentations, allocation, distributed database interoperability, distributed database heterogeneity, schema translation, global schema construction, global and local query processing, distributed transaction management, distributed DBMS concurrency control, distributed DBMS recovery and reliability.





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- **(1901767) Computer Network Security** **3 Credit Hours**  
Advanced topics in Cryptography; Authentication; Integrity; Key Distribution and Certification; Access Control:  
Firewalls; Attacks and Countermeasures: Mapping, Packet Sniffing, IP Spoofing, Denial-of-Service and  
Distributed Denial-of-Service Attacks, Hijacking; Security in Many Layers: HTTPS, Secure E-mail, Secure Sockets Layer (SSL) and Transport Layer Security (TLS), IPsec, Security in wireless networks such as IEEE 802.11, Mobile agents security.
- **(1901768) Mobile Location-Based Services (MLBS)** **3 Credit Hours**  
MLBS applications: usage area, taxonomy, privacy, marketing; The development of MLBS: performance considerations; Navigation systems: spatial database, gateway services, route determination location utility services,...; MLBS and data management: middleware for MLBS protocol, content modelling, update management, linear referencing; MLBS interoperability and standards; MLBS data collection: satellite positioning systems, indoor positioning systems, network-based positioning; MLBS data transmission in Mobile communication systems: cellular-based mobile, wireless local area networks, ad-hoc networking, and service discovery.
- **(1901775) Programming Languages Design** **3Credit Hours**  
This course discusses advanced principles underlying current programming languages and models. Topics include control and data abstractions, language processing and binding, indeterminacy and delayed evaluation, and languages and models for parallel and distributed processing. A variety of computational paradigms are discussed: functional programming, logic programming, object-oriented programming and data flow programming.  
<sup>1</sup>Theory