mates

Maritime Alliance for fostering the European Blue Economy through a Marine Technology Skilling Strategy

Co-funded by the Erasmus+ Programme of the European Union

Introduction to Big Data Technologies and Best Practices in Data Governance and Management

Learning Outcomes

May 2022

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Course Title	Introduction to Big Data Technologies and Best Practices in Data Governance and Management
Course Type	Training Workshop
Entry Level	Trainees should have basic computer skills. Knowledge of one of programming languages Java or Python is beneficial. No prior knowledge on Big Data required.
Level and Relevant Framework	EQF level 4
Delivery Method	Online learning of which: - Lectures 75% - Practical cases 25%

Unit 1	Big Data Technologies: Introduction, Reference Architecture, Big Data algorithms
Entry Level	Basic understanding of computer systems. No prior knowledge on Big Data required.
Learning Outcome 1	**Outline the basic concepts of Big Data and related technologies, and apply them to analyze both general use cases and those related to their organizations.**
Knowledge + Skills	1. Know & understand basic concepts of: Big Data and Big Data Reference Architecture (BDRA) as defined by NIST standards. 2. Outline basic concepts of the above. 3. Apply Big Data concepts (general and specific).
Evidence requirements	Candidates must be able to apply the Big Data concepts for use (general & specific) cases. Candidates must be able to make specific use of general case knowledge, to carry out an analysis of specific organisational needs, presented either in written or oral form.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	(Self-)test questions (multiple choice) after workshop. Presentation to the seminar session after workshop assessed by lecturer.
Learning Outcome 2	Specify requirements to, and make informed decision on assessing different options for the enterprise Big Data infrastructure and Data Analytics services implementation.
Knowledge + Skills	1. **Know & understand** typical Big Data cases. 2. **Know & understand** corresponding Big Data infrastructure tools and applications used. 3. **Analyse** different organisational processes. 4. **Choose** between different relevant options.
Evidence requirements	Candidates must show that they can specify Big Data infrastructure and services based on analysis of organisational processes. Candidates must show that they can select the Big Data services needed for functionalities of organisation of Big Data infrastructure.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	Open book open question at the end of workshop, assessed by the instructor.

Unit 2	Big Data Platforms for Data Analytics, Big Data service providers, Hadoop platform overview
Entry Level	Basic understanding of computer systems operation (Windows, UNIX, or MacOS).
Optional Supplementary Information	Knowledge of one of programming languages Java or Python.
Learning Outcome 1	Specify requirements to and make informed decision on assessing different options for the enterprise Big Data infrastructure and Data Analytics services implementation.
Knowledge + Skills	1. **Know and understand** typical Big Data use cases. 2. **Know and understand** corresponding Big Data infrastructure tools and applications used. 3. **Assess** different options for enterprise Big Data infrastructure. 4. **Specify** requirements for Big Data Analytic services implementation.
Evidence requirements	Candidates must be able to specify requirements to Big Data infrastructure and services based on analysis of organisational processes. Candidates must be able to select Big Data services needed for required functionalities by organisational Big Data infrastructure.
Assessment method	Open book open question at the end of workshop, assessed by the instructor.
Learning Outcome 2	Comparison and selection of the Big Data Infrastructure services from the major Cloud Service Providers to use them for enterprise data management and analysis.
Knowledge + Skills	1. **Know** typical Big Data use cases. 2. **Know** corresponding Big Data infrastructure tools and applications used. 3. **Know** which applications are currently in use. 4. **Compare** available Big Data infrastructure services from major Cloud Service Providers. 5. **Select** appropriate Big Data infrastructure services from major Cloud Service Providers.
Evidence requirements	Candidates must be able to select required Big Data services from major Cloud and Big Data providers to realise functionalities required for organisational Big Data infrastructure and data analytics processes, using existing guidelines, under supervision and independently.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	(Self-)test questions (multiple choice) after workshop. Optionally, development of educational project on designing organisational data infrastructure.

Unit 3	Data Management and Governance, DAMA Architecture. Data Management Plan (DMP)
Entry Level	No prior knowledge required.
Optional Supplementary Information	Beneficial to understand data handling processes in organisation.
Learning Outcome 1	Outline the major components and processes of the enterprise Data Governance Architecture and corresponding organisational roles.
Knowledge + Skills	1. **Know and understand** the major components and processes of the enterprise DGA. 2. **Know and understand** the major components and processes of the enterprise DGA. 3. **Know and understand** the corresponding organisation roles. 4. **Know and understand** the best practices and standards of enterprise Data Management and Governance (DAMA BoK (International Data Management Association Body of Knowledge), DAMA Data Management Architecture). 5. **Outline** components and processes of the above. 6. **Map** DAMA concepts & models of organisational data management processes & roles.
Evidence requirements	Ability to map DAMA concepts and models to organisational data management processes and roles as and when requested by instructor.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	Develop organisational Data Governance Policy, including definition of required roles and implementation plan, using existing recommendations and proposed templates. Results assessed by instructor.
Learning Outcome 2	Develop the company's Data Management Plan (DMP) and corresponding implementation plan.
Knowledge + Skills	1. **Know and understand** all aspects of the organisational data management. 2. **Know** how to carry out data quality assurance.
Evidence requirements	Ability to create DMP for own organisation or for fictitious organisation.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	Creation of the Organisational Data Management Plan (DMP), including implementation plan, using existing recommendations and proposed templates. Written and/or oral presentation.

Unit 4	Case Study: Research Data Management
Entry Level	No prior knowledge required.
Optional Supplementary Information	Beneficial to understand data handling processes in the participant's research or academic organisation.
Learning Outcome 1	Outline the major components and processes of the Data Governance Architecture in a research organisation.
Knowledge + Skills	1. **Know and understand** best practices and recommendations on the Research Data Management and Governance (RDM) Research Data Alliance (RDA), FAIR (Findable – (Accessible – Interoperable – Reusable) data principles, EU recommendations on RDM). 2. **Know and understand** how to apply RDM and FAIR principles. 3. **Know and understand** the functions of Data Stewards in organisational RDM. 4. **Develop** organisational research DMP supporting typical research data lifecycle, using existing recommendations and proposed templates.
Evidence requirements	Candidates must be able to apply RDM and FAIR principles to organisational data management processes, to understand specific functions of Data Stewards in organisational RDM.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	Development of organisational research DMP that supports typical research data lifecycle, using existing recommendations and proposed templates. Written and/or oral presentation assessed by instructor.
Learning Outcome 2	Develop the organisational Data Management Plan (DMP) and corresponding implementation plan.
Knowledge + Skills	1. **Know and understand** all aspects of the organisational data management and data quality assurance during the whole research data lifecycle from data collection to data processing and publication. 2. **Know and understand** the role of staff training for achieving quality RDM process in organisation. 3. **Deliver** a DMP, including an implementation plan.
Evidence requirements	Candidates must create DMP for own organisation or for fictitious organisation.
Assessment method ***Accreditation: EUROPEAN Digital Credentials/ Micro-credential***	Creation and delivery of the Organisational Data Management Plan (DMP), including implementation plan, using existing recommendations and proposed templates. Written and/or oral presentation of created DMP, assessed by instructor.

Contact

Yuri Demchenko, University of Amsterdam
y.demchenko@uva.nl

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