ERASMUS+

KNOWLEDGE ALLIANCES

AGREEMENT NUMBER – 2017 - 2854 / 001 - 001

PROJECT NUMBER – 588306-EPP-1-2017-1-EL-EPPKA2-KA

Scientific foundations training and entrepreneurship activities in the domain of ICT-enabled Governance

Worldwide training needs on Electronic Governance

Deliverable Form	
Project Reference No.	ICT FP7 288513
Deliverable No.	D2.0
Relevant Workpackage:	WP1: Baseline research
Nature:	R
Dissemination Level:	PU
Document version:	Draft V1
Date:	01/08/2018
Authors:	Dimitrios Sarantis, UNU-EGOV Soumaya Ben Dhaou, UNU-EGOV
Document description:	Identification and presentation of existing education programmes in e-Governance worldwide. Definition of the e-Governance training needs. Propositions for filling e-Governance training gap.

Document History

Version	Date	Author (Partner)	Remarks
Draft v0.10	25/04/2018	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV)	Deliverable Contents
Draft v0.20	20/06/2018	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV)	First Draft
Draft v0.30	15/07/2018	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV)	Second Draft
Draft v0.40	01/08/2018	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV), Ibrahim Rohman (UNU-EGOV)	Third Draft
Draft v0.50	25/10/2018	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV)	Fourth Draft
Final v1.0	DD/MM/YYYY	Dimitrios Sarantis (UNU-EGOV), Soumaya Ben Dhaou (UNU-EGOV)	

Executive Summary

In a world where entrepreneurship, global businesses, fast technological development, and specialization are the norm, the existing education system did not properly integrate the results from education and training on innovation and other fields relevant for the exploitation of research and technology, particularly in the public sector.

The need to leverage e-Governance education and training in Europe is pointed out by many recent reports and studies. The purpose of this deliverable is to pinpoint the gaps in current education and training programmes in relation to e-Governance, highlight opportunities for the future of training and education in Europe, and propose recommendations for improvement.

The analysis scope of the e-GOV 3.0 project is the exploitation of research results in the field of e-Governance. To fulfil these objectives, the present work provides, on the one hand, an overview of the existing e-Governance situation in education and, on the other hand, identifies trends for pointing out training gaps that should be covered.

Chapter 1 presents the purpose and structure of the deliverable, while chapter 2 describes the method applied and tools used to identify the e-Governance training needs. Chapter 3 illustrates the collected data. Lastly, chapter 4 presents the analysis of the results, identifying the e-Governance training needs that should be covered in the next work packages. Work package 2 will set up how future research directions can cover the identified training gaps of existing curricula. Work package 3 will create state of the art course curricula and modules based on the results of work packages 1 and 2.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TERMS AND ABBREVIATIONS

Term/Abbreviation	Definition
BSc	Bachelor of Science
EU	European Union
MOOC	Massive Online Open Course
MSc	Master of Science
PhD	Doctorate
Post-doc	Post-doctorate
R&D	Research and Development
Interview	The process of asking questions to experts or performers to identify training needs.
Questionnaire	A questionnaire is a survey instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents.
Workshop	An educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants developing a skill or common understanding through some types of application

1. INTRODUCTION

1.1 Purpose and Scope

The present report is an outcome of task 2, which captured the needs for training that will drive the design of the curricula and the MOOC courses in work packages 3 and 4. Work package 1 intends to set a baseline for the entire project in terms of existing knowledge in the field of e-Governance and, with the help of the network of affiliated public organizations, in terms of the training needs. The main objectives of this deliverable are to:

- Identify and classify current training e-Governance programs worldwide;
- Derive the e-Governance training needs;
- Define the e-Governance training gaps that should be covered.

1.2 Approach and Structure of the Deliverable

The research presented in this deliverable was conducted using a three phases approach. In the first phase, the research methodology and the data collection tools were designed. The actual data collection took place in the second phase. The collected data were analysed, and training needs in e-Governance were identified in phase 3. The methodology is described in more detail in section 2.1.

1.3 Relation to other Work Packages and Deliverables

The current work package is an essential pre-requisite for the work package 3 and, therefore, all the later work packages as well. The collected data, references and results, described in this report together with the report on the outcomes of task 1 (Report for Electronic Governance research and practice worldwide) and work package 2 (Road-mapping) constitute the primary source of information to create a state of the art course curricula and modules in work package 3.

This report is divided into four sections. The present section (section 1) deals with the scope, approach, and structure of the deliverable and its relation to other work packages and deliverables. The second section describes the methodology applied and the analysis of phase 1 where the data sources were defined and the data collection tools were designed. The collected data from existing e-Governance training programs and questionnaire survey are presented in section 3. Finally, section four contains conclusions, the data collection analysis, and e-Governance training needs identification.

2. Methodology and Tools Design

2.1 Research Methodology

The activities which took place during task 2 of work package 1 were divided into the following three phases (outlined in Figure 1):

Figure1: Task 2 phases – process-tool design, data collection, and data analysis

Phase 1. Initially, the study and research plan has been discussed and decided among the partners. Search keywords regarding training programs in e-Governance area have been defined, and geographical search areas have been allocated to each partner and the training programs metadata to be collected have been specified. The Workshop and questionnaire design, to include the wider e-Governance community in the study, took place in this phase.

Phase 2. During the second phase, partners were requested to identify (desktop research) and collect data regarding training programs in e-Governance worldwide. At the same time, workshops took place, and a survey has been conducted.

Phase 3. The collected data have been analysed in the third phase, where the current e-Governance training situation is illustrated. In this phase, data from task 1 and the conducted workshops and survey were also analyzed, to derive the future training needs in e-Governance. A comparison between the future needs and the current situation took place here to uncover the existing training gaps that should be covered in the next work packages of the project.

2.2 Planning – Tool Design

This subsection describes the activities within Phase 1, Planning – Tool Design. These include the definition of the search keywords regarding the data collection of existing training programs in the e-Governance area, the definition of the geographical search areas, and the specification of a training programme metadata scheme. The activities also include the design of an associated survey and workshops, respectively.

2.2.1 e-Governance Training Programs: Research Keywords and Data Sources

The list of keyword terms and combinations of them (e.g., e-Government Training, e-Governance Program, Digital Government MSc, etc.), to search for training programs worldwide have been defined in this step. Google Search has been used mainly as the web search engine. UNU proposed a list of terms and made it available to all partners for refinement. The search terms have been selected to identify existing e-Governance programs from the international context, offered from different types of institutes. Information regarding the educational programs has been collected through the institutions' web pages around the world. The search combines two types of terms. The first type covered the subject (e.g.,

e-Governance) and the second type covered training/educational degrees (e.g., MSc). The search combined one term of the subject group and one of the training/educational group (e.g., Electronic Governance AND MSc).

Terms for search by subject: Digital Governance, Digital Government, Electronic Governance (e-Governance, eGovernance), Electronic Government (e-Government, eGovernment), Public Administration Information Systems, Digital Transformation, Public Sector Innovation, Digital Government Transformation, Public Sector Digital Transformation

Terms for search by institutional/educational degree: Bachelor, Capacity Building, Certificate, Continuing Professional Education, Diploma, Education, Executive Masters, Graduate, Higher Education, Masters, MSc, PhD, Program, Specialization, Training, Undergraduate, Joint Master, MOOC

Google search engine was the main search source. Websites of related higher education organizations (public and private) and institutes have been searched.

2.2.2 Geographical Regions Allocation

Partners were requested to conduct systematic desktop research to collect data regarding training programs in e-Governance worldwide. The task of searching for training programs has been allocated to partners based on geographical regions (as defined by the UN[1]):

- UNU, Western European and Others Group (WEOG) except USA and Canada
- PwC, USA and Canada
- SILO, Asia-Pacific Group except for China
- UAEGEAN, African Group
- Lisbon Council, Latin American and Caribbean Group (GRULAC)
- DUK, Eastern European Group
- UiA, China

2.2.3 e-Governance Training Programs Metadata

The primary objective of the present step was to define the mechanism that was later used to retrieve and evaluate information of existing e-Governance training/education programs. To gather the necessary information regarding the current situation in e-Governance training, a Training Program Description Worksheet (TPDW) has been constructed, containing all the training program-related information, facilitating data processing by GOV 3.0 project partners. Using the classification provided by the TPDW, a spherical view of training programs on a world level has been obtained, including various educational aspects, such as the academic level of a program, the program name, and the institutional type. The Training Program Description Worksheets (TPDW), which is outlined in the following paragraphs, also dives into details, such as the aims of the program and/or learning goals, the area of program specialization, the admission requirements, and the provided courses. The descriptors were defined in the light of the information available at the institutions' websites as well as on the respective programs.

There are four identified groups of characteristics for a training program, which have the purpose of describing specific aspects of a program methodologically and coherently that will facilitate the organization of the existing e-Governance training programs into a taxonomy. The objective of this taxonomy is twofold: i) to provide the means – based on its structure – for the systematic analysis of the existing programs in order to deduct conclusions regarding, for example, the type of provided courses and the targeted participants; ii) to facilitate the identification of possible training gaps with the use of specified e-Governance training needs. To this end, each characteristic that has been identified describes in a straightforward way certain defining features of the training program, specifically:

---

[1] http://www.un.org/depts/DGACM/RegionalGroups.shtml

- The **Program Description** group represents the generic view of the training program. It includes fields, such as program name, the academic level, the aims of the program and/or learning goals, the area of program specialization, the program overview and the admission requirements.

- The **Program Content** group provides details regarding the courses provided by the program. It consists of the following fields: course code, course name, course type, course description, course credits, learning outcome/goals, course supporting material, course URL and comment.

- The **Program Administration** group contains some additional information about the programs. It includes degree title, credits-ECTS, teaching method, program cost, program duration, language and program URL.

- The **Institution** group states the main characteristics of the organization that offers the training program. It includes the name of the institution, country of the institution, institution type, department of the program and comment.

Regarding the collection of information about the e-Governance training programs, they were selected from existing programs related to e-Governance, taking into account the key information presented in the groups mentioned earlier. The criteria used involved choosing existing programs (diploma, bachelor, certificate, specialization, masters, short courses etc.) from the international context and programs that are currently developed at educational institutes′ offer.

2.2.4 Workshop and Survey Design

To identify the contemporary e-Governance training needs, the e-Governance research and practitioners′ community have been consulted. It has been decided to use a survey-based method as the appropriate tool. At the same time, two workshops took place, where the issues of e-Governance training needs have been discussed thoroughly.

As a first step to designing the survey, interviews have been conducted with e-Governance experts to specify the proper content and structure of the questionnaire. Interviews have also been used as pre-test of the survey, to check the applicability of the questions. The initial draft of the questionnaire has been tested in a small research focus group, to be validated and refined (figure 2). Following this step, the resulting survey was presented to the eGov 3.0 partners with the request to review the survey and to agree to a final version that was later used for data collection and discussion on the ICEGOV conference[2] and Samos Summit workshop[3], as well as subsequently to the wider e-Governance research community.

---

[2] http://2018.icegov.org/

[3] https://samos-summit.blogspot.com/p/the-8th-samos-2018-summit-on-ict.html
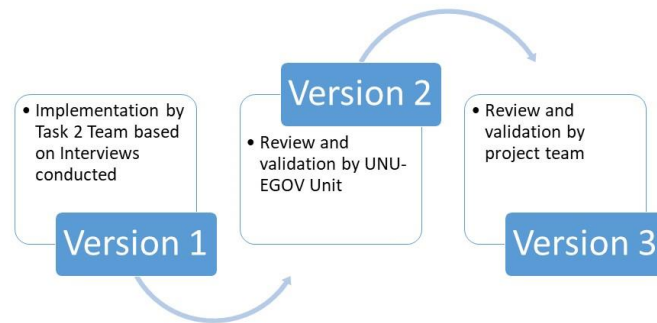
Figure2: Survey design process

The first version consisted of a list of initials questions, based on the existing training programs contents and the results of interviews conducted with e-Governance experts. The second version included specific records of options in each question which were rigorously-refined and clarified amongst the UNU-EGOV team members. The third version was developed and validated by experts of the project team, taking into consideration version two of the survey and the analysis of the data gathered in the analysis of task 1. The third version, which is the final version (ANNEX A), was used in the survey for the e-Governance research community. The respondents were asked to comment on the questions by using the following 5-point Likert scale (figure 3).

Figure3: 5-point Likert scale used in the survey questions

Survey Description

The survey (ANNEX A) focuses on the identification of training needs. Initially, it asks for the key professions/roles in Electronic Governance. Then, it identifies the needed skills in Electronic Governance, alongside with critical knowledge areas and topics that are important and should be covered in an Electronic Governance education program. Thereinafter, it looks at the main objectives and the admission requirements of an Electronic Governance program at a graduate level. It considers the courses (core and elective) and modules that should be included in an Electronic Governance program at a

graduate level. The modules have then been mapped to the courses (ANNEX B). Finally, it collects some basic demographic data about the participants of the survey.

3. RESEARCH FINDINGS

The present chapter illustrates the current e-Governance training status and training needs research findings. The findings are split into two parts, presented in two different sections. Information regarding e-Governance training programs is presented in section 3.1 and survey/workshop results related to e-Governance training needs are presented in section 3.2.

3.1 e-Governance Education and Training Offer Worldwide

This section presents data collected of existing educational programs for e-Governance worldwide. Through an online search on official webpages of universities, a list of programs was identified using the Training Program Description Worksheets (TPDW) metadata. In this section, the features of the training programs are illustrated, based on the facets that have been defined in TPDW. This task enabled the project team to identify higher education institutions and their programs. Since education programs that focus exclusively on e-Governance are limited, it was considered appropriate to include programs that cover or are strongly related to e-Governance aspects. 291 training programs (figure 1) have been classified in the following four clusters:

1. e-Governance related: Programs that are strictly focused on e-Governance area, combing Public Administration and technological aspects (ANNEX C).

2. Governance-related: Programs that are focused on aspects of Governance, like Public Administration and Public Policy.

3. Other Technical: Programs that are focused on technological aspects like Information Systems, Digital Transformation, Software Engineering, Digital Security and include in their programs e-Governance features.

4. Other Non-Technical: Programs that are focused on non-technological aspects like Accounting, Leadership, Change Management, Strategic Management, Management, Project Management, IT management and include in their programs e-Governance features.
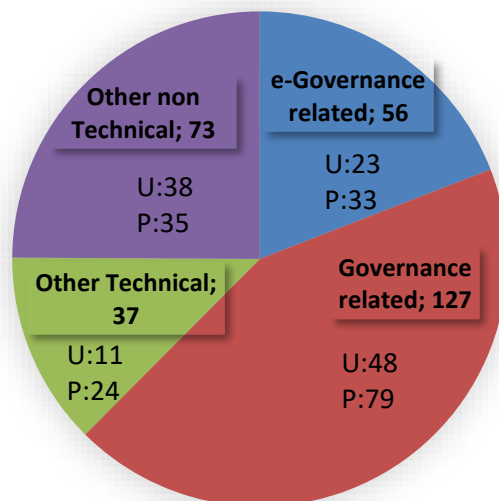
Figure 1: Training Programs (U: Undergraduate, P: Postgraduate)

e-Governance related programs (ANNEX C) have been classified based on the certificate type they award in four categories (figure 2).
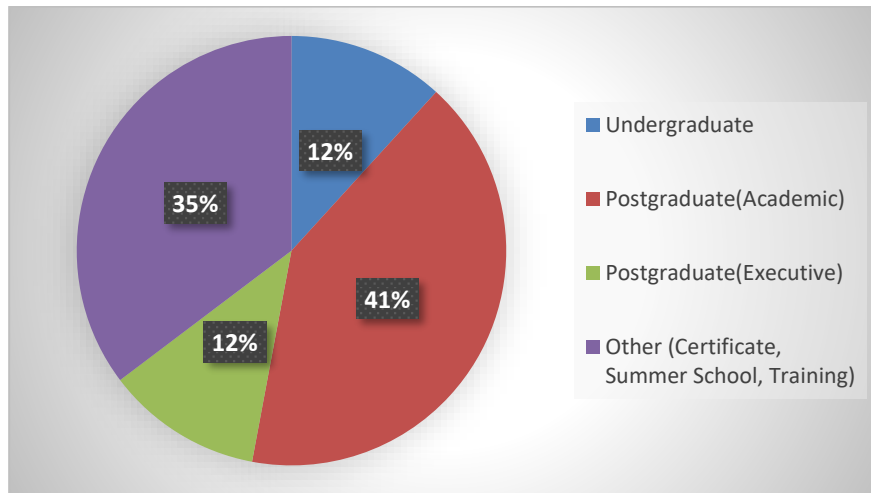
Figure 2: e-Governance training programs categorized based on the certificate they award

3.1.1 Program Name

The names for the identified training programs vary widely around the world. The terms usually given to them depend on the specialisation area (figure 3).

Figure 3: Word cloud of the program names

- 100 programs include the word Government or Governance in their program name.
- 56 programs include the words Public Administration in their program name.
- 26 programs include the word e-Government or e-Governance in their program name.
- 21 programs include the word information in their program name.
- 17 programs include the digital aspect (e.g. electronic government, digital business international) in their program name.

3.1.2 Country of Institutions

The present survey identified 291 education programs, from 60 countries (figure 4).
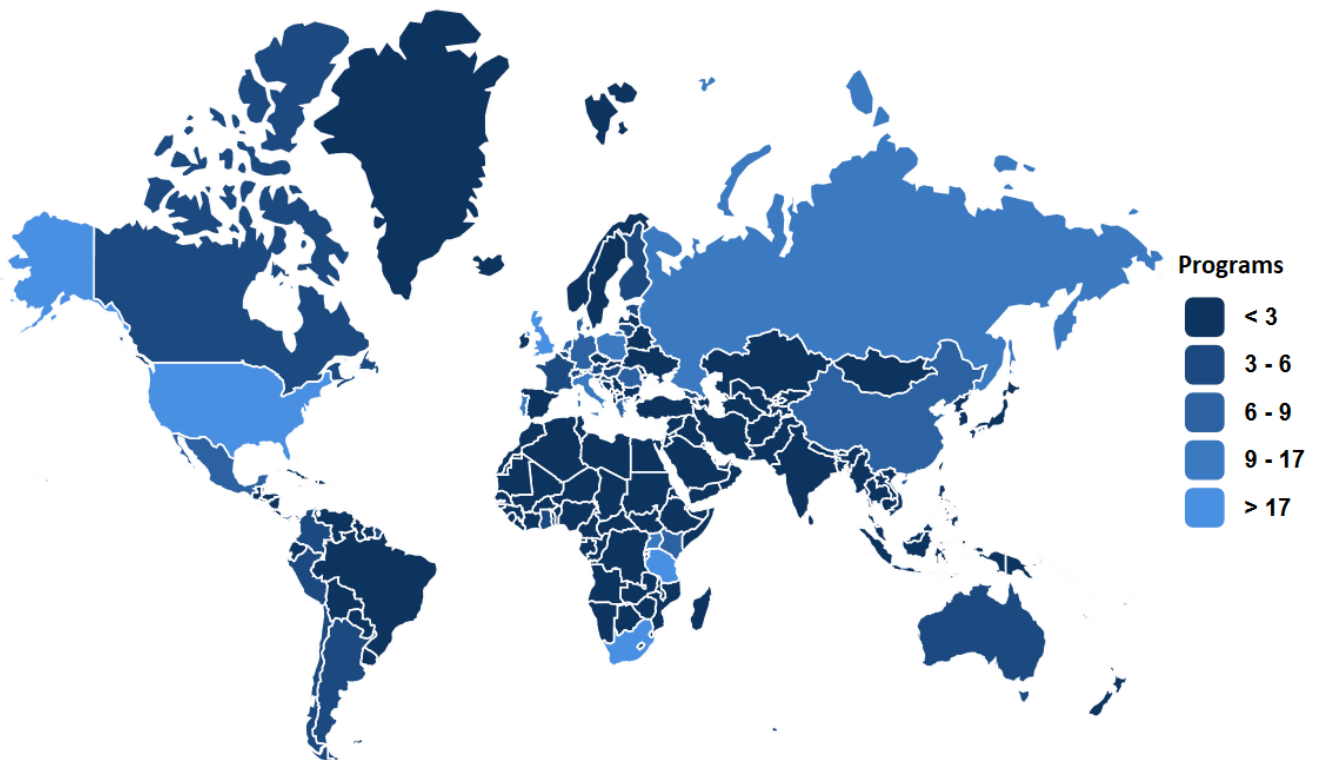
Figure 4: Programs allocated in countries

3.1.3 Aims of the program and/or learning goals

The aims and the learning goals of the programs vary and have been classified in 6 clusters (figure 5), according to the revised version of Bloom's taxonomy (Anderson et al., 2001). Bloom's Taxonomy has been created under the leadership of educational psychologist Dr. Benjamin Bloom, to promote higher forms of thinking in education, such as analysing and evaluating concepts, processes, procedures, and principles. The cognitive domain involves knowledge and the development of intellectual skills. There are six major categories of cognitive processes, starting from the simplest to the most complex: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.
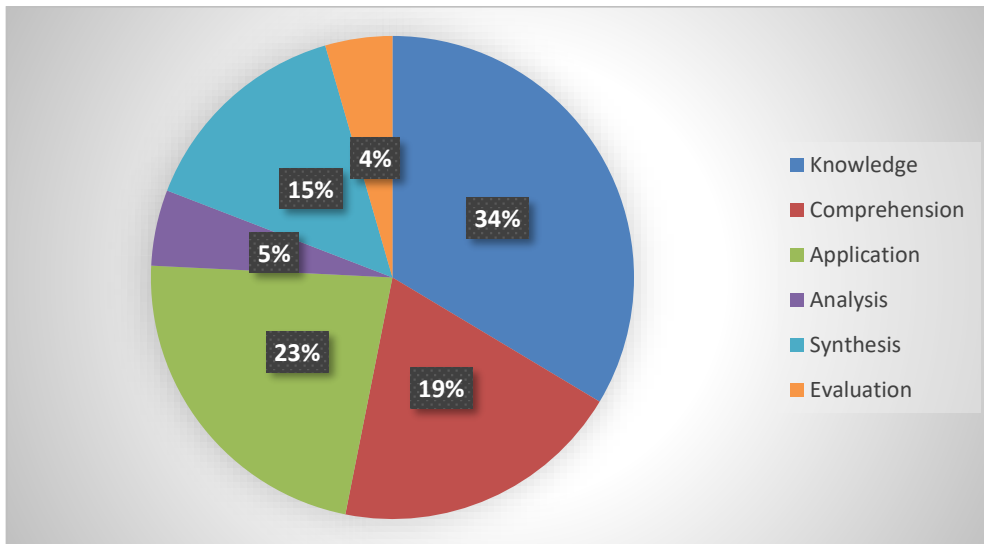
Figure 5: Programs allocation based on Bloom's taxonomy categories

Examples of training programs′ aim and learning goals mapped in Bloom's Taxonomy.

Knowledge

- Explore the e-Governance laws and policies;
- Acquiring/enhancing advanced competencies in different areas of local governance to improve the quality of local government service delivery;
- Formation of the competencies in the field of e-Government, electronic document management, geographic information systems, information and analytical support of state and municipal management;
- Knowledge of industry standards;
- Specialised knowledge in public administration processes (Knowledge).

Comprehension

- Understanding of the major paradigms in, and perspectives on, e-Governance consideration of policies and practices in e-Government formation analysis of processes and performance in e-Government implementation;
- Improve theoretical understanding and practical applications in ICT governance;
- Understand the effect of the digitized environment on public policy-making;
- Describe the whole-of-government approach framework in relation to improved and timely service delivery to enlightened citizenry with limited resources;
- Apprehend the essence of G2C (Government-to-Citizen), C2G (Citizen-to-Government), G2B (Government-to-Business), B2G (Business-to-Government), G2G (Government-to-Government) affairs through the use of interconnected networks and web-based solutions.

Application

- Apply tools for improved coordination across sectors for service delivery;
- Use practical steps for realising effective ICT governance;
- Apply fundamental management principles in a work-based context;
- Establish an open and secure ICT environment;

- Engage the citizens in the policy dialogue;
- Establish a mechanism for engaging relevant stakeholder engagement for better policy dialogue;
- Engage with the technology group to create enabling platforms (Application);
- Plan, create and maintain government portals applying a design methodology focused on the citizen to generate benefits for society;
- Create more efficient public services.

Analysis

- Able to extract data from a variety of sources including databases, text files, multimedia files, social networks, sensor data, geolocation data (Analysis);
- Able to query SQL and non-SQL databases alike prepare data for analysis, build models for data analysis using a variety of mathematical, statistical and computer science tools and formulate hypotheses and opinions using the models;
- Analyse the main theories of the state, government and public administration, as well as the transformations that occur in them as a consequence of the implementation of ICT;
- Analyse, and propose improvements in, the organisation's current strategic plan.

Synthesis

- Develop a strategic map for the organization's strategic plan;
- Implement a performance-based aligned ICT strategy, and understand regulatory requirements for effective ICT governance;
- Develop measurable indicators of governance at both the local government and central government levels;
- Design and conduct service delivery surveys;
- Designing, developing and improving governmental systems and implementing e-Government components on every state level;
- Design software systems and define architectures in open and distributed environments in a holistic and integrative manner (Synthesis);
- Lead change in government departments and manage implications;

Evaluation

- Evaluate existing strategies;
- Monitor policy outcomes and assess the impact of these outcomes;
- Assess competitiveness using a critical review of easily available indicators (and why standard competitiveness reports are not useful);
- Address the processes, structures, and evaluation methods necessary to implement the digital transformation of an organization.

3.1.4 Program Specialisation Area

Each program concentrates on (a) specific area(s) of knowledge. This/These area(s) can be grouped in the following clusters (figure 6): Technology (24), Information Systems (34), Public Administration (56), Management (11), e-Government (16), Social Sciences (10), Business Administration (15), Economics and Political Science (10) and Sustainable Development (1). Programs that define their specialization area have been allocated to the clusters as follows:
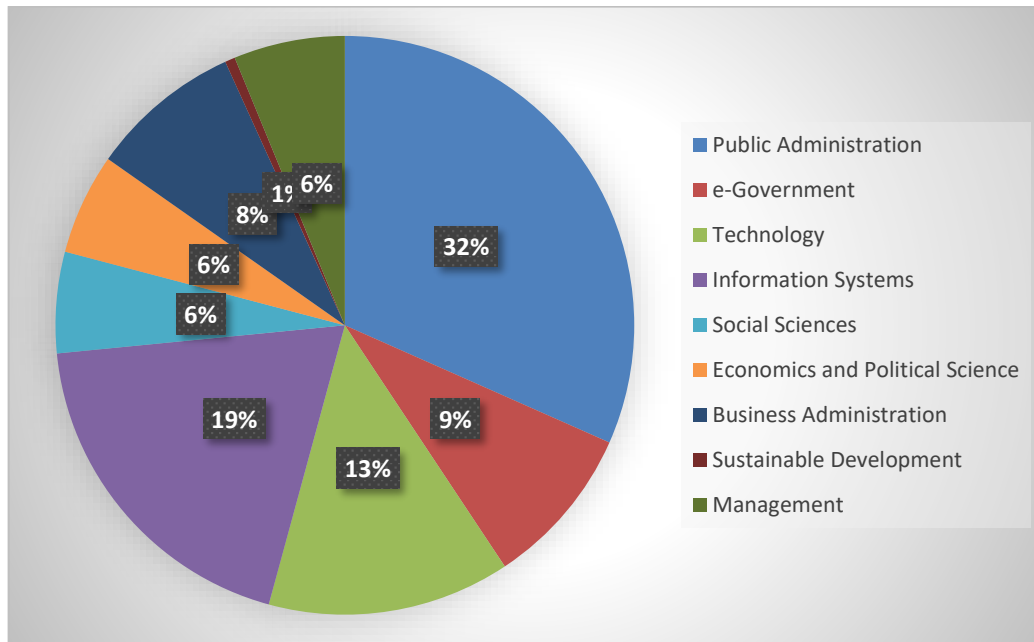
Figure 6: Distribution of Program Specialisation Areas

3.1.5 Degree Title

The degrees that the different e-Governance programs award can be summarized in four main categories, namely PhD, MSc, BSc, and certificate. The following figure (figure 7) is presenting the degrees distribution among e-Governance programs.

Certificate: 80

BSc: 40

MSc: 159

PhD: 12
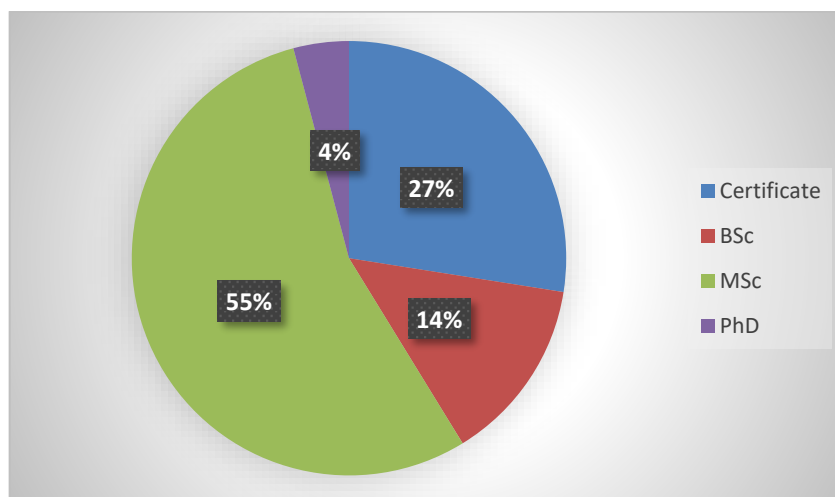
Figure 7: Distribution of Program Degree Titles

3.1.6 Institution Type

The education programs are provided from different types of institutions (figure 8) (Bank, College, Government, Institute, Network, Organisation, Think Tank, Training company, University) assigning various types of degrees (MSc, BSc, executive MBA, certificate, Short Course, Diploma, PhD, Summer school, Statement of Accomplishment).
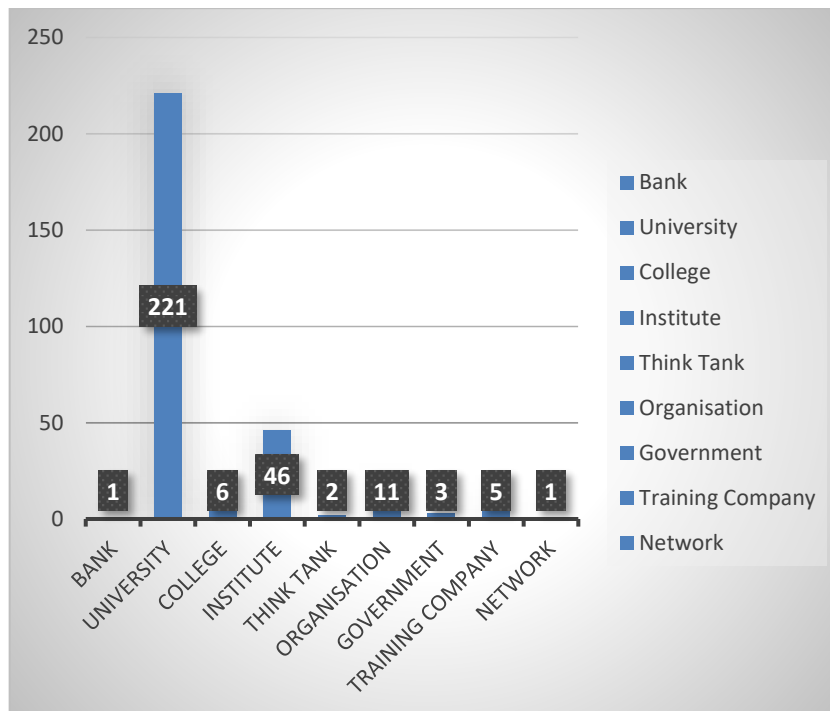
Figure 8: Institution Types

3.1.7 Department hosting the Program

The education programs are provided from different types of departments (figure 9)
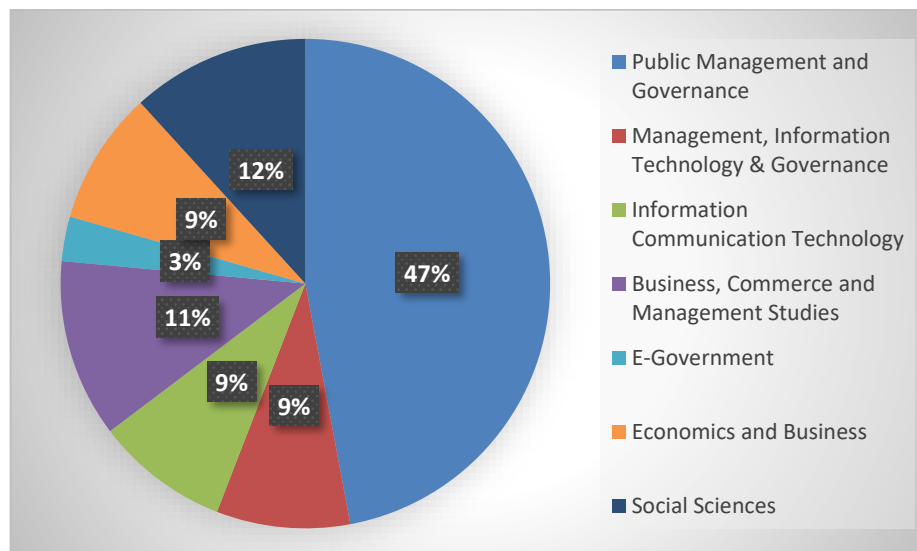
Figure 9: Departments providing the training programs

3.1.8 Credits/ECTS

The European Credit Transfer and Accumulation System (ECTS) is an instrument that favours transparency, fosters relations between institutions and increases the options for students. One academic year corresponds to 60 ECTS credits that are usually equivalent to 1500–1800 hours of total workload, irrespective of standard or qualification type. ECTS credits are used to facilitate transfer and progression throughout the European countries.

Regarding the number of credits or ECTS, there is no uniformity. Each university and each program allocate the credits or ECTS in its own way according to a given specific context and field of knowledge. The allocation of credits/ECTS is as follows:

- 21 postgraduate programs provide 120 credits or ECTS.
- 11 postgraduate programs provide 180 credits or ECTS.
- 5 undergraduate programs provide 120 credits or ECTS.
- 6 undergraduate programs provide more than 121 and less than 360 credits or ECTS.
- 7 undergraduate programs provide 360 credits or ECTS.

3.1.9 Admission Requirements

Each postgraduate training program defines several admission conditions. A list of the identified requirements classified in categories follows:

Academic requirements

Requirements in this category include High-School certificate and Bachelor's degree. Some institutions require specific specialisation (bachelor's degree or specific performance thresholds).

Work experience

Requirements in this category include relevant work experience (e.g. in the public sector), a minimum working time period (e.g. 2 years).

Knowledge

Requirements in this category include specific knowledge possession (e.g. practice of IT, content management, background in economics, public administration, politics, etc.).

Research interest

Requirements in this category include specific material to ground the research interest (e.g. research proposal, motivation letter, Curriculum Vitae etc.).

Assessment

Requirements in this category include specific assessment tests (e.g. competency assessment, GCE ordinary level examination, mathematics, and English language test etc.).

Other (recommendation, age etc.)

Requirements in this category include recommendations, specific age limit, and other special requirements.

3.1.10 Teaching Method

The education programs apply various teaching methods (figure 10).
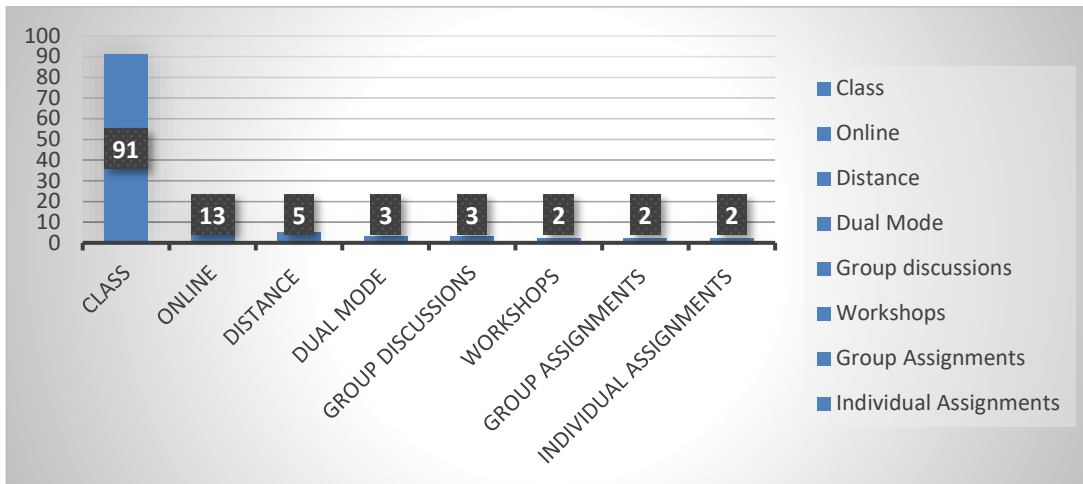
Figure 10: Teaching Methods

3.1.11 Program Duration and Cost

The duration of undergraduate programs is on average between three or four years, and their cost varies. The cost ranges from free-of-charge to 3000 EUR per year or more.

The duration of postgraduate programs is one or two years, and their cost varies. The cost ranges from free-of-charge to 15000 EUR per year or more.

3.1.12 Courses

The courses (full list of e-Governance related programs courses in ANNEX F) of e-Governance related programs have been classified (number relates course to the specific program, ANNEX E) in the following clusters (course examples are provided in each cluster):

e-Governance

Courses in e-Governance category consider aspects such as application of information and communication technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems and services between government and users, back office processes and interactions within the entire government framework, etc.

Course	Institute ID	Country
Phases of e-Government and stages of e-Government development	34	Uganda
Applications of ICT used in public administration and governance	34	Uganda
Impact and measurement of e-Governance	94	Estonia
Diffusion and impact of internet voting	148	Estonia
Development of governmental websites	185	Mexico
Electronic government interoperability	185	Mexico
The smart cities	188	Mexico, Argentina, Colombia
Design the citizen experience: new digital needs	188	Mexico, Argentina, Colombia
Citizen participation in government portals	189	Mexico

Open e-Government and e-Democracy	275	Sweden

Public Policy

The public policy category focuses on the systematic analysis of issues related to public policy and the decision processes associated with them. This includes training in the role of economic and political factors in public decision-making and policy formulation; microeconomic analysis of policy options and issues; resource allocation and decision modelling; cost/benefit analysis; statistical methods; and various applications to specific public policy topics. Public policy courses teach students policy analysis, policy studies, public policy, political economy, urban planning, public administration, public affairs, public management, etc.

Course	Institute ID	Country
Sustainability and innovation in society	146	Romania
Public Innovation and Resistance to Change	186	Argentina
Digital Public Policies	186	Argentina
Importance and Impact of Social Channels on Public Policy	187	Mexico
Information Security Policy and Ethics	196	USA
Policy Design & Implementation	196	USA
Information Policy	203	USA
Implementation and Evaluation of Public Policies	214	Norway
Analytical Methods for Policy	216	UK
Urban Systems Theory	230	UK

Governance

Governance is comprised of all processes of governing, whether undertaken by a government, a market or a network, over a social system and whether through the laws, norms, power or language of an organized society. It relates to the processes of interaction and decision-making among the actors involved in a collective problem that leads to the creation, reinforcement, or reproduction of social norms and institutions. It could be described as the political processes that exist between formal institutions.

Governance courses cover public sector, public organizations, and the concepts of leadership and governance. They study the features of the political structure of countries. They contain information on the institutional, procedural and value components of the political system and public policy in countries, as well as a description of the problems, contradictions, and prospects for the political development of the country. They consider aspects such as the political system and regime, state institutions, political parties, civil society, directions and problems of economic and social policy.

Course	Institute ID	Country
Government Enterprise Architecture	165	Colombia
Democracy and Governance	185	Mexico
Open Government	186	Argentina
Evidence, Institutions and Power	216	UK
Risk Assessment and Governance	216	UK

	271	India
Functions and Structure of Govt. Organization	271	India
Government Process Re-engineering	271	India
Audit of Government Receipts	274	India
Audit of State-Owned Enterprises	274	India
Understanding Organisations / Organisational Forms	303	Germany

Project Management

The project management category covers all aspects that are related to managing technology and innovation projects in the public sector. They include a variety of areas such as effort management, project portfolio management, program management, project risk management, project workforce management, etc.

Course	Institute ID	Country
Software Project Management	94	Estonia
Project Management	96	Belgium, Germany, Estonia
Management of IT Projects in Administration	141	Bosnia & Herzegovina
e-Government Project Management	147	Romania
Project management applied to Electronic Government	183	Colombia
Project Risk Management	196	U.S.A
Managing Information Systems Projects	203	U.S.A
Consulting for e-Governance Projects	271	India

Software Engineering

Software engineering courses consider issues regarding the systematic application of scientific and technological knowledge, methods, and experience to the design, implementation, testing, and documentation of software. They cover activities like computer programming and systems analysis.

Course	Institute ID	Country
Software Process and Quality	94	Estonia
Introduction to Development in Cloud	94	Estonia
Building interoperability and digital data exchange	95	Estonia
Principles of Database Management	96	Belgium, Germany, Estonia
Data Warehouse and Business Intelligence	145	Romania
Remote analysing and processing of medical images	146	Romania
Mobile Apps: Application Development	193	USA
User-Based Design	203	USA
Spatial Data Capture, Storage and Analysis	230	UK
Introduction to coding and data management	313	Italy

Information Systems

Information Systems courses consider aspects such as management of information systems, design, and development of information systems, systems analysis, systems design, data communications, database design, collection, organization, storage, and communication of information, etc.

Course	Institute ID	Country
Business Information Systems	94	Estonia
Virtual Environments Usability	94	Estonia
Information Management in the Public Sector	96	Belgium, Germany, Estonia
Information Systems Architecture	119	Russia
Information security in state and municipal government	119	Russia
Collaborative Systems in Administration	141	Bosnia and Herzegovina
e-Activities Platforms	146	Romania
Digital content management systems	146	Romania
Management of medical information systems	146	Romania
Enterprise Architecture: Concepts and Practice	203	USA

Business Administration

Business administration courses provide a broad knowledge of the functional aspects of a company and their interconnection. They include all aspects of overseeing and supervising business operations and related fields which contain accounting, finance, and marketing. They also consider the performance or management of business operations and decision making, as well as the efficient organization of people and other resources, to direct activities toward common goals and objectives.

Course	Institute ID	Country
International Entrepreneurship	94	Estonia
Advanced Business Process Modelling and Automation	94	Estonia
Transformation and change management	95	Estonia
Start-up world & Prototyping ideas	95	Estonia
Develop an innovative ecosystem	188	Mexico, Argentina, Colombia
Digitally-driven Entrepreneurship	205	Canada
The Open Group Architecture Framework	271	India
Business Process and Case Management	275	Sweden
Decision Making and Business Intelligence	275	Sweden
Business analytics	313	Italy

Management

Management courses consider the administration of an organization, whether it is a business, a not-for-profit organization, or government body. Management includes the activities of setting the strategy of an organization and coordinating the efforts of its employees to accomplish its objectives through the application of available resources, such as financial, natural, technological, and human resources.

Management courses provide a solid foundation in organizational behaviour, human resource management, labour-management relations, negotiation, conflict resolution, compensation systems, and organizational development. In addition to the business management course, it will equip you to understand how organizations work, how they are managed, and how they interact with local, national and international environments.

Course	Institute ID	Country
Management of programs and projects of the Information Society development	119	Russia
Human Resources Management	141	Bosnia and Herzegovina
Leadership and Teamwork	141	Bosnia and Herzegovina
Strategic Planning	145	Romania
Conflict Management	145	Romania
Impact Assessment	145	Romania
Public Management & Leadership	196	USA
Organization Theory & Behaviour	196	USA
Digital Transformation Strategy	201	USA
Security and Crisis Management	204	USA

Public Administration

Public Administration courses study the implementation of government policy and prepare civil servants for working in the public service. They introduce concepts whose fundamental goal is to advance management and policies so that government can function efficiently and effectively. They include aspects of economics, public finance, research methods/statistics, policy analysis, ethics, public management, leadership, planning & GIS, program evaluation/performance measurement and human resources management.

Course	Institute ID	Country
Public Sector Service Design and Implementation	94	Estonia
State and Municipal Administration	119	Russia
Transformation of Public Administration: A Step towards Digital-Era Governance	138	Armenia
Theory of the state and rights	141	Bosnia and Herzegovina
Theory of Administration	141	Bosnia and Herzegovina
Organisation of the Public Sector	141	Bosnia and Herzegovina
Sociology of Administration	141	Bosnia and Herzegovina
Sustainable Development and Public Administration	141	Bosnia and Herzegovina
Public Procurement	145	Romania

Leadership in Public Organisations	214	Norway

Legal Issues

Courses in the legal issues category educate individuals in the principles, practices, and theory of law. It may be undertaken for several reasons such as to provide the knowledge and skills necessary for admission to legal practice in public administration, to provide a greater breadth of knowledge to those working in e-Governance professions such as public administration, politics or business, to provide current lawyers with advanced training or greater specialisation, or to update lawyers on recent developments in the law. They include aspects such as understanding of the potential of e-Governance, the policies, the required legal and institutional frameworks, and insights into an engaging e-Governance involving different stakeholders.

Course	Institute ID	Country
Legal aspects of e-Governance, cyber security & secure governance	95	Estonia
Administrative Law	141	Bosnia and Herzegovina
Legal Organisation of Public Administration	141	Bosnia and Herzegovina
E-Regulation	141	Bosnia and Herzegovina
Legal and ethical issues in e-Governance	164	Barbados
Electronic Government and regulation	183	Colombia
Public Administration and Law	203	USA
Fundamentals of IT law	313	Italy
Business and Digital Law	313	Italy

Scientific Research

Scientific research courses concentrate on the fundamentals of doing research, aimed primarily, but not exclusively, at the postgraduate level. These courses provide an understanding of research approaches and skills, and importantly an ability to deploy them in students´ studies or their professional lives. They aid those who have research as part of their postgraduate studies. Research methods courses prepare the student to design effective, ethical investigations. They teach appropriate frameworks and tools for qualitative and quantitative studies in e-Governance.

Course	Institute ID	Country
Strategy and methods of scientific research	119	Russia
Methods for the study of usability of information resources	119	Russia
Research Methods for Process Analysis	145	Romania
Investigative methods for e-Governance	164	Barbados
Research Protocol	185	Mexico
Introduction to academic writing and research methodology	214	Norway
Research on Public Management and Organizations	214	Norway
Quantitative Methods	230	UK
Research Methodology for Computer and Systems Sciences	275	Sweden

Research training and soft skills in E-Government	302	Germany

Economy

Economy courses include microeconomics, macroeconomics, econometrics, economic statistics, history of economic thought and political economy. They cover aspects such as microeconomic theory, macroeconomic theory, and econometrics.

Course	Institute ID	Country
Public Finance	141	Bosnia and Herzegovina
Public Budgets	145	Romania
Financing Programs for Digital Development	187	Mexico
Health Care Finance	196	USA
Accounting/Finance for Decision-Making	205	Canada
Contemporary Political Economy	250	Portugal
Financial statement analysis	313	Italy

Statistics

The statistics category is concerned with evidence-based reasoning, particularly with the analysis of data. Statistics courses study the collection, analysis, interpretation, and presentation of data.

Course	Institute ID	Country
Statistics in Administration	141	Bosnia and Herzegovina
Statistics	145	Romania
Statistics for Analytics	205	Canada
Probability and statistics	313	Italy

European Institutions

European institutions courses provide structured knowledge of EU fundamentals and focus on selected priority issues for an in-depth understanding and future-oriented approach to EU integration. The institutions of the European Union are the seven major decision-making bodies of the European Union (EU).

Course	Institute ID	Country
European Integration and EU Institutions	141	Bosnia and Herzegovina
European Administrative Law	141	Bosnia and Herzegovina
E-Government in the EU and E-Democracy	141	Bosnia and Herzegovina
EU Funds Management	145	Romania
European Union Governance	303	Germany

Other

The category "other" includes the rest of the provided courses.

Course	Institute ID	Country
Physical Education	141	Bosnia and Herzegovina
Ethics	145	Romania
Publicity	146	Romania
Mathematics for decision sciences	313	Italy
English for Science and Research	94	Estonia

3.2 Training Needs according to e-Governance Research and Practice Community

e-Governance training needs have been derived from the research, and practice e-Governance community, using three sources

1. Desktop Research regarding e-Governance research trends
2. Workshops
3. Survey

3.2.1 Research areas that should be covered from e-Governance education

Results of work package 1, task 1 (refer to D1.1) activities showed that the following topics should be included regarding future e-Governance research challenges. The items are presented classified on relevant categories identified in task 1.

Technological enablers of innovation in the public sector

Big Data

Open Data

Linked Data

Cloud Computing

Service Modules

Disruptive Technologies

Machine Learning

Natural Language Processing

Blockchain

Augmented Reality

Virtual Reality

Internet of Things

Gaming-Based Simulation

Policy Modelling

Paradigms

Service Co-Creation

Customised/Personalised Public Services

Crowdsourcing

Notable realisation of the Government 3.0 technologies

Smart City Government

Community Awareness Platforms

Once Only Principle

e-Identity / e-Signature

Gamification

3.2.2 Workshop Results

The ICEGOV Workshop entitled "Framing Government 3.0: Concepts and research objectives" took place on 3 April 2018 in Galway, Ireland. In total, 18 experts who were either themselves public officials, consultants or scholars from the field of e-Governance participated in this workshop. Originally, the issue of e-Governance science field raised. Can e-Governance be established as a science field and which are the essential ingredients?

Basic ingredients of e-Governance are new ICT technologies, new paradigms in combination with sociology and political sciences. Given the multidisciplinary nature of e-Governance, several gaps appear that should be enclosed in the research perspective. Thereinafter, the elements of different types of e-Government have been provided.

e-Government 1.0: e-Government for centralised institutional governments. It mainly supports centralised provision of e-services of different ministries (e.g. Ministry of Finance, Ministry of Interior, Ministry of Defence). The suggested components are better services, connect the government, interoperability, connectivity, semantic aspects, service provision. The key tools for e-Government 1.0 are the existence of a portal. The main ICT areas are the infrastructure, a service-oriented architecture, the integration of cloud services, as well as facilities and process re-engineering (BPR).

e-Government 2.0 is about open and collaborative governance, social media, open data, and linked open data. Sociologists came in place in this type of e-Government, and other aspects include the use of people and data and enhanced citizen participation.

In e-Government 3.0, concerns are related to problem-solving, smart things deployment, and the use of machine intelligence. It requires models to describe things in a way that machines can understand them. Other aspects include simulation of societal behaviour, ethical issues, gender issues, evidence-based decision and how far machines take over decisions. Machines prepare the alternatives and people choose. Citizens participate in solving the problem, suggesting solutions and then choosing the appropriate policy to solve it.

The academics that participated in the workshop suggested the need to improve existing educational programs in e-Governance, avoiding being too specific, allowing for the broadness and complexity of the e-Governance areas of knowledge and competencies, setting up opportunities for universities and other stakeholders for collaboration and network.

One of the key tasks developed during the workshop is related to the areas of knowledge and competencies required in the e-Governance area. The participants were asked to describe which topics they identify as emerging in e-Governance. The following ones have been identified:

- Argumentation;

- Weak signal detection (ensuring that minority analytical/ethical conclusions are recognised);

- Robotics and augmented reality (considering ethics and awareness);
- URIs for things so that we have unambiguous communication at machine level;
- We should explore augmented reality in e-Government, the opportunities it may provide. i.e. urban planning, construction industry;
- Need to identify areas where data cannot be shared. Access limitation so that personal information (e.g. health, youth criminal justice) does not end up in the hands of those who should not have it;
- Privacy concerns research;
- Crowdsourcing;
- Sensors;
- Administrative data;
- Sharing data;
- Machine learning;
- Visualisation;
- Trustable data;
- Privacy;
- How different technologies interact in optimising decision making;
- Use e-Government assessment towards optimising public administration systems and operations;
- Research in data exchange integration. Use of ontologies;
- Web scraping;
- Technology to improve citizen participation. The government can implement a friendly and accessible network;
- How data can inform policy decision and making;
- The rise of identity as a service. Companies provide named identity for a citizen to interact with government;
- Who decides how technology is used and why? Need to explain the motivation for each use of technology;
- Sentiment analysis, argumentation-visualisation techniques;
- Ways to store collect process data from continuous systems (sensors), algorithms, cognitions systems;
- To solve complex optimisation problems with quantity computing, complex optimisation, evidence-based decision;

3.2.3 Survey Results

This section presents the survey results. The survey was made available in April 2018, initially to the ICEGOV and SAMOS Summit workshops participants and then to the wider e-Government community. There were in total 94 respondents in the study distributed rather disproportionately in terms of gender (figure 11).
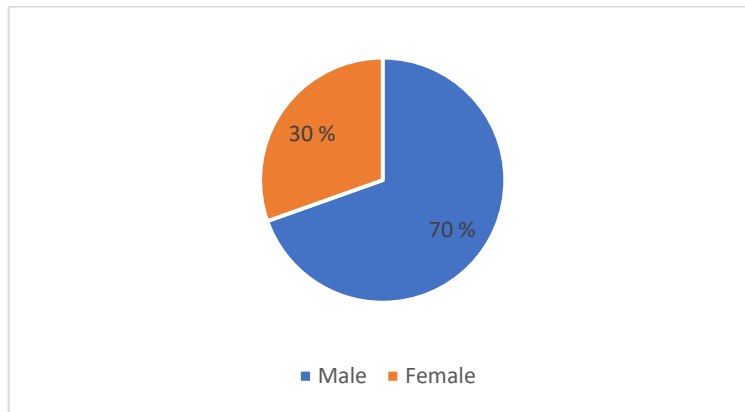
Figure 11: Sex of the respondents

If we divide each of gender-based on age group (table 1), males are the majority in each age interval, while in the age group of 31-40 and 51-60, the proportion between genders is the closer ones.

Gender		
Ages	**Male**	**Female**
<21	100%	0%
21-30	67%	33%
31-40	62%	38%
41-50	84%	16%
51-60	62%	38%
>60	75%	25%

Table 1: Sex of the respondents by age

The profile of respondents with regards to education and occupation is presented below in table 2.

Occupation	High school and Upper	Bachelors	Masters	Doctorate	Total
Civil Servant	7%	0%	71%	21%	14
Private Sector Employ	0%	25%	63%	13%	8
Academic	0%	0%	35%	65%	55
Student	20%	20%	60%	0%	10

Table 2: Education and occupation of the respondents

Except for 5 respondents who have other occupation listed above and or have no degree, the distribution of respondents is centred towards those with master's degree background for occupation of a civil servant, private sector employment and student, while on the group of academician, 65% are with doctorate degrees.

We assessed the relationship between the key role in electronic governance and what skills are required in the underlying option. In other words, a respondent is asked to specify which among 16 key roles play the most critical role in e-Governance (figure 12) and what skills are required to establish that task (figure 13). The results are presented below.
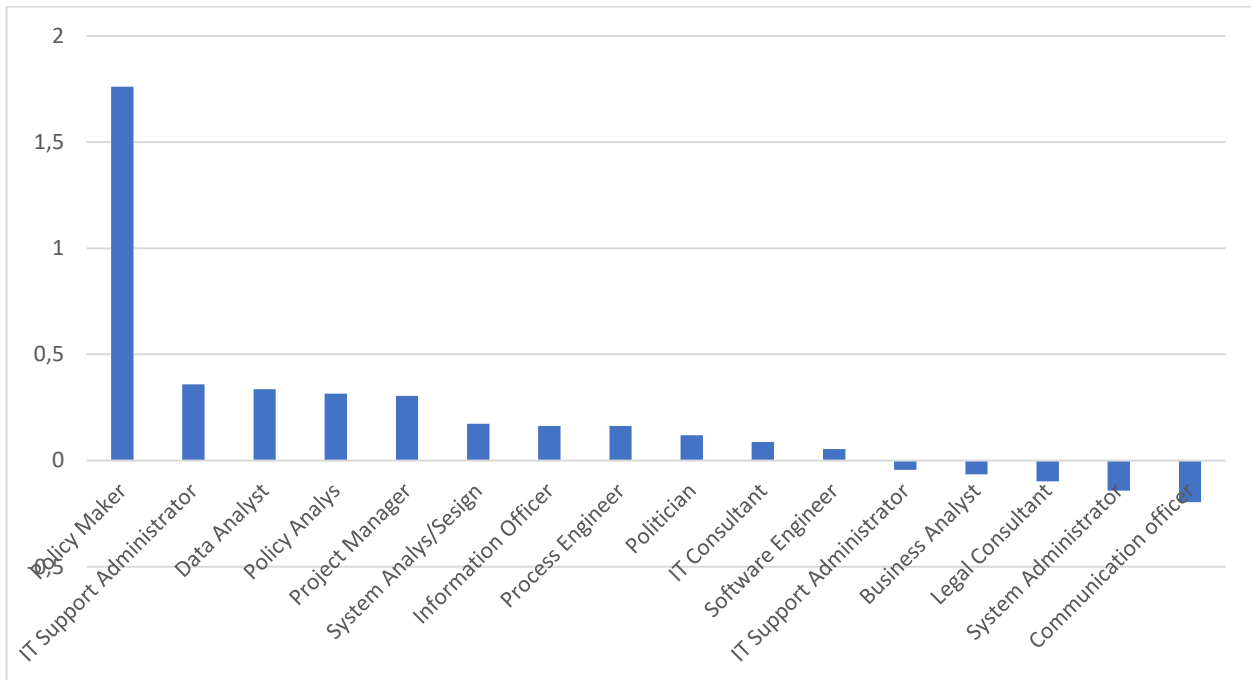
Figure 12: Key roles in e-Governance

We reassign the value from ordinal data in the survey into scale. Hence, we put the value 2 for very important, 1 for important, 0 for neutral, -1 for slightly not important and -2 for not important. The results show that among the top five key roles in e-Governance are Policymaker followed, quite in the distance, by IT support administrator, data analyst, policy analyst, and project manager.
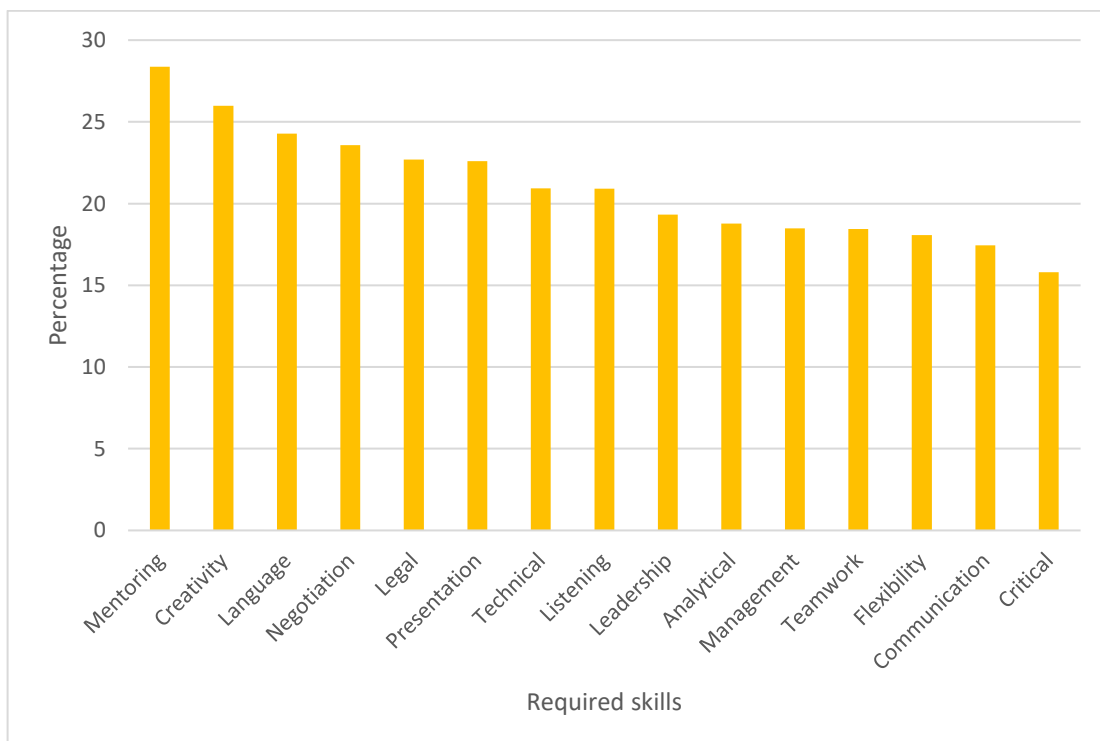
Figure 13: Required skills in e-Governance

Different to the question regarding key role, which is dominated by one particular role, the question regarding skills require different yet quite similar importance of skills. Mentoring, creativity, language, negotiation and understanding of legal aspects are seen as basic skills required in any of e-Governance key role. If we combine both two graphs in one table, we obtain the following results (table 3).

Role\Skill	Analytical	Communication	Creativity	Critical	Flexibility	Language	Leadership	Legal	Listening	Management	Mentoring	Negotiation	Presentation	Teamwork	Technical
Data Analyst	19.32	18.28	27.70	14.04	18.13	25.09	20.28	23.47	21.28	17.89	28.72	22.51	23.21	19.19	21.81
Information Security Analyst	19.61	17.13	26.28	16.16	18.11	22.46	18.98	24.13	20.19	16.74	27.24	23.13	24.54	17.43	20.56
Information Officer	17.88	15.63	25.93	16.61	18.80	24.15	21.12	26.07	20.73	19.68	29.44	26.66	23.95	18.22	20.39
It Support Administration	15.61	15.58	23.82	13.45	15.55	20.79	14.73	23.42	17.67	13.39	24.36	20.79	18.33	16.67	20.36
System Administration	18.70	15.76	24.35	14.19	17.16	22.54	17.22	22.76	21.00	16.68	28.00	22.22	23.89	16.70	20.05
System Analyst Designer	19.89	16.50	27.37	16.15	18.43	22.17	17.96	21.91	20.17	16.54	28.87	22.13	23.80	16.04	22.91
Policy Maker	19.70	17.25	27.12	16.21	18.12	24.00	18.88	23.09	20.12	18.08	29.92	23.22	22.44	18.78	21.62
IT Consultant	17.94	16.94	26.58	14.06	18.00	22.73	17.06	23.76	18.61	16.45	26.36	23.70	21.76	18.70	19.36
Legal Consultant	17.30	13.10	23.43	13.57	16.67	20.97	15.93	25.13	18.37	14.70	27.53	21.03	20.37	17.27	20.30
Policy Analyst	17.02	17.42	25.96	14.47	16.85	25.28	17.43	21.38	18.87	16.30	28.19	21.66	19.91	15.23	20.17
Politician	16.73	15.08	23.30	13.25	16.23	21.05	18.63	19.98	18.25	15.45	24.00	19.73	21.70	17.63	22.18
Software Engineer	18.73	15.88	25.91	15.70	18.00	23.09	16.85	23.24	21.09	16.85	28.70	21.36	20.94	17.18	21.70
Project Manager	18.67	18.47	26.12	15.63	17.67	26.43	21.55	24.59	19.43	18.20	30.84	23.16	22.24	18.59	21.20
Communication	16.86	16.00	26.45	14.66	19.00	23.38	13.76	22.79	21.69	14.76	28.10	25.28	22.10	18.31	17.76
Business Analyst	18.18	14.33	24.79	12.81	18.18	22.42	16.76	18.79	19.03	15.79	25.36	21.94	19.39	16.85	18.67
Process Engineer	18.94	16.09	25.11	16.98	17.38	23.13	17.57	21.98	20.00	18.43	29.81	23.57	20.94	18.74	20.91

Table 3: Cross analysis between key roles and key skills in e-Governance (shadowed the most important skills)

Table 3 is obtained by taking into account two aspects:

1. Only those who responded that a particular important role is measured—those who select moderately important for the key role aspect
2. For those respondent in number (1) then we obtained the value of each skills required

The following figure depicts what knowledge is currently lacking, and hence should be the focus of education program (figure 14).
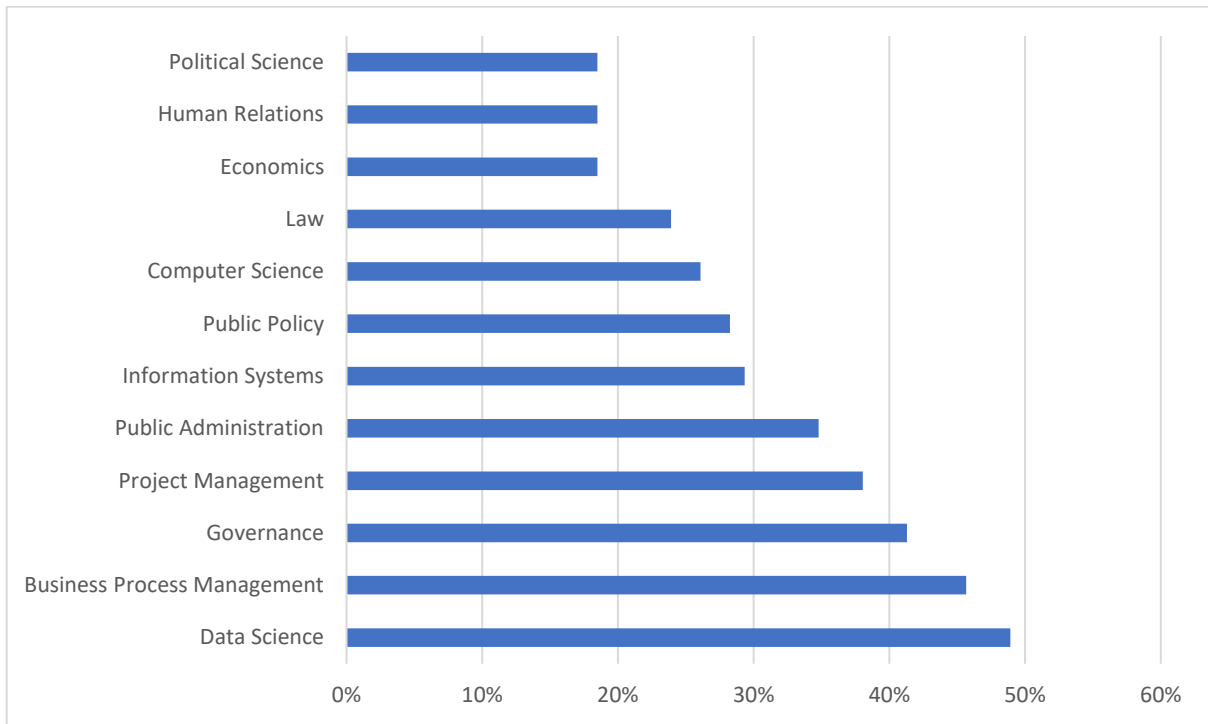
Figure 14: Lacking knowledge in e-Governance

From Figure 14 we can derive that the top five knowledge areas that lack from existing e-Governance programs are: data science, business project management, governance, project management, and public administration. The respondents have then asked about what would be the main objective of a master's program in governance. The results are illustrated in the following pie chart (figure 15).
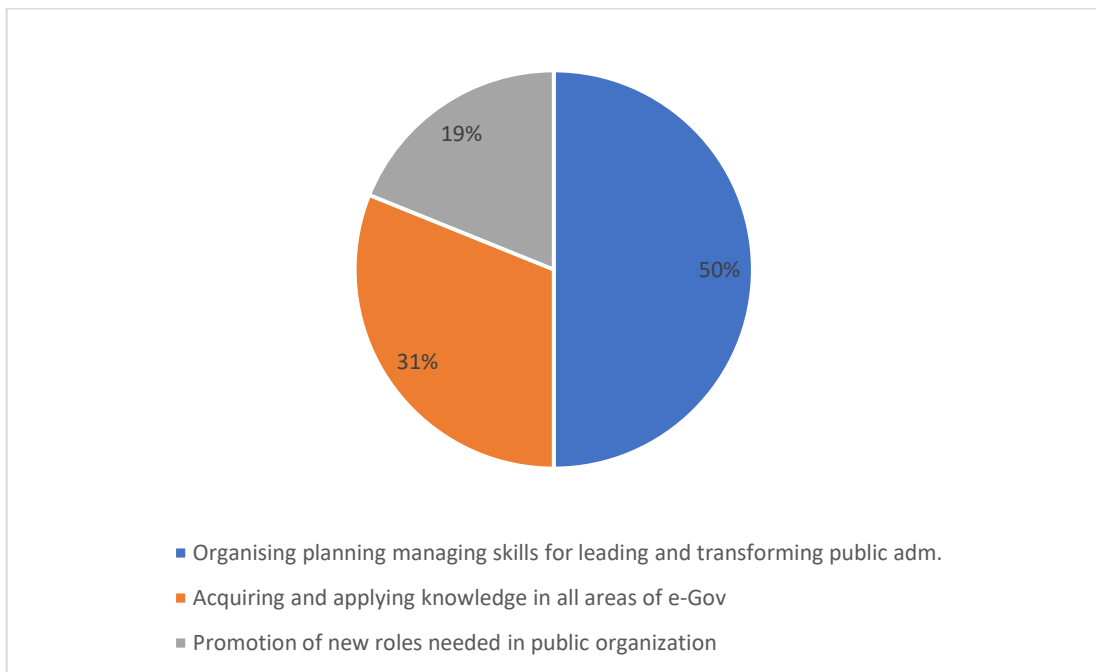
Figure 15: Main objective of a master program in e-Governance

The majority of the respondents agree that the main purpose of a master's degree program in e-Governance should be organizing and planning to lead the transformation in public administration. To do so, 60% respondent argued that the requirement for the program should be a bachelor's degree or equivalent, whereas 25% said it should be two years working experience and 13% opined a year experience as the requirement. Adding to this about, 61% of the respondents argued that there should be a course of e-government at undergraduate level, whereas 39% disagrees.

Education Level\Enrol in e-Governance degree	Yes	No
High school, graduate diploma or equivalent	3	
Bachelor's degree	2	2
Master's degree	20	24
Doctorate degree	10	30
No degree	1	
	36	56
	39%	61%

Table 4: Willingness to enrol in e-Governance program

There is a question whether the respondent is interested in enrolling in e-Governance degree. This question is somewhat tricky as some respondents should think counter-intuitively with if-analysis as they already had a degree (especially those with a PhD). Not surprisingly, 61% of respondents answered "no", whereas 39% answered "yes". If we look at the lower degree, those with master and undergraduate level, the level of interest is actually higher. The open-ended question following this question then further justifies that the majority of respondents have a positive attitude towards the initiative and that some respondents answered "If I were not having degree yet, I might be interested", meaning that this program is still promising.

Regarding the importance of courses in an e-Governance program (figure 16), there are 21 courses respondents should select based on the level of importance, with 1 being very important and 5 not important at all (thus the lesser the more important the course is).
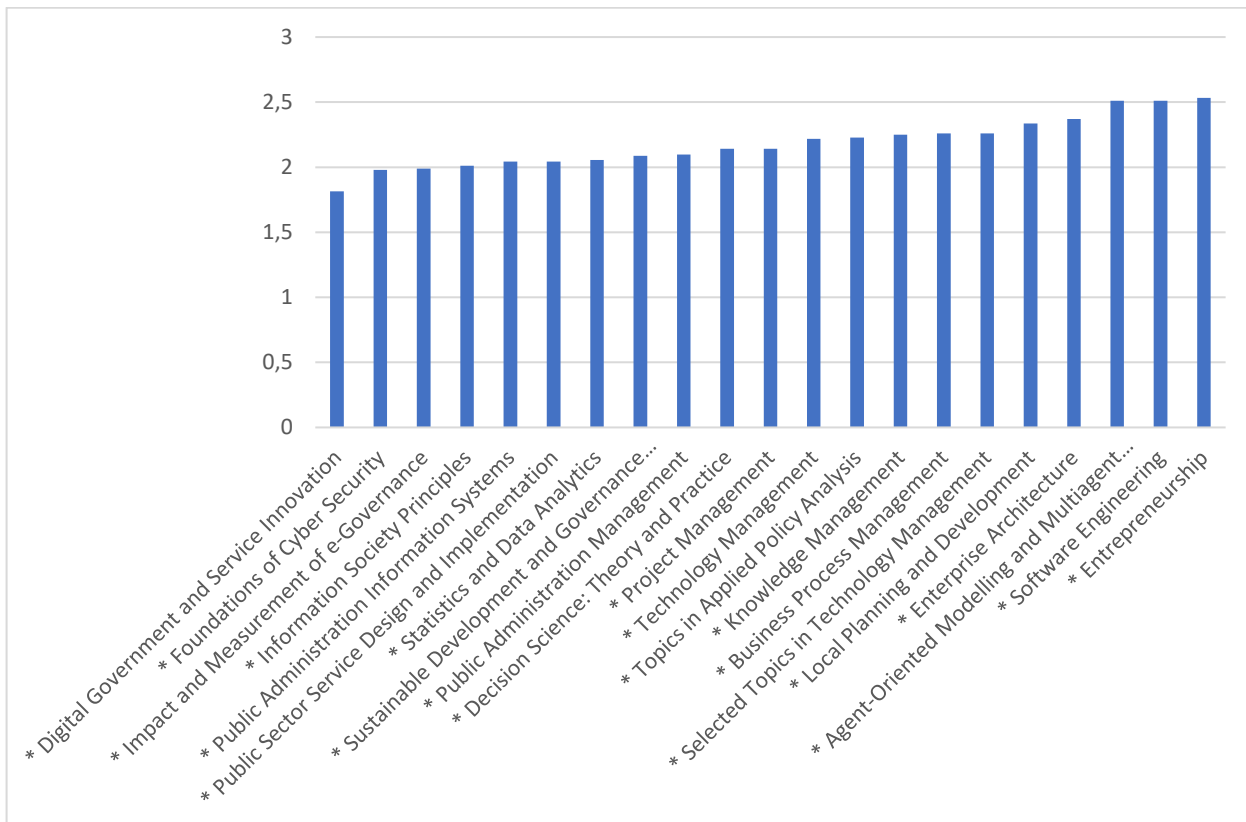
Figure 16: Significance of courses in an e-Governance program

Among top five courses perceived as the most important are Digital Government and Service Innovation, Foundation of Cyber Security, Impact and Measurement of e-Governance, Information Society Principles, and Public Administration Information Systems.

There are about 54 innovative modules respondents could select to be included as part of a broader course. Each module focuses on a single topic. The top selected modules appear in figure 17.

Figure 17: Top selected e-Governance modules

4. DATA ANALYSIS AND CONCLUSION

A two-fold analysis is conducted in this phase. On the one hand, the current situation in e-Governance education/training is illustrated using the training programs data. On the other hand, the results of work package 1 – task 1, questionnaire survey and workshops are analysed in order to derive the training ne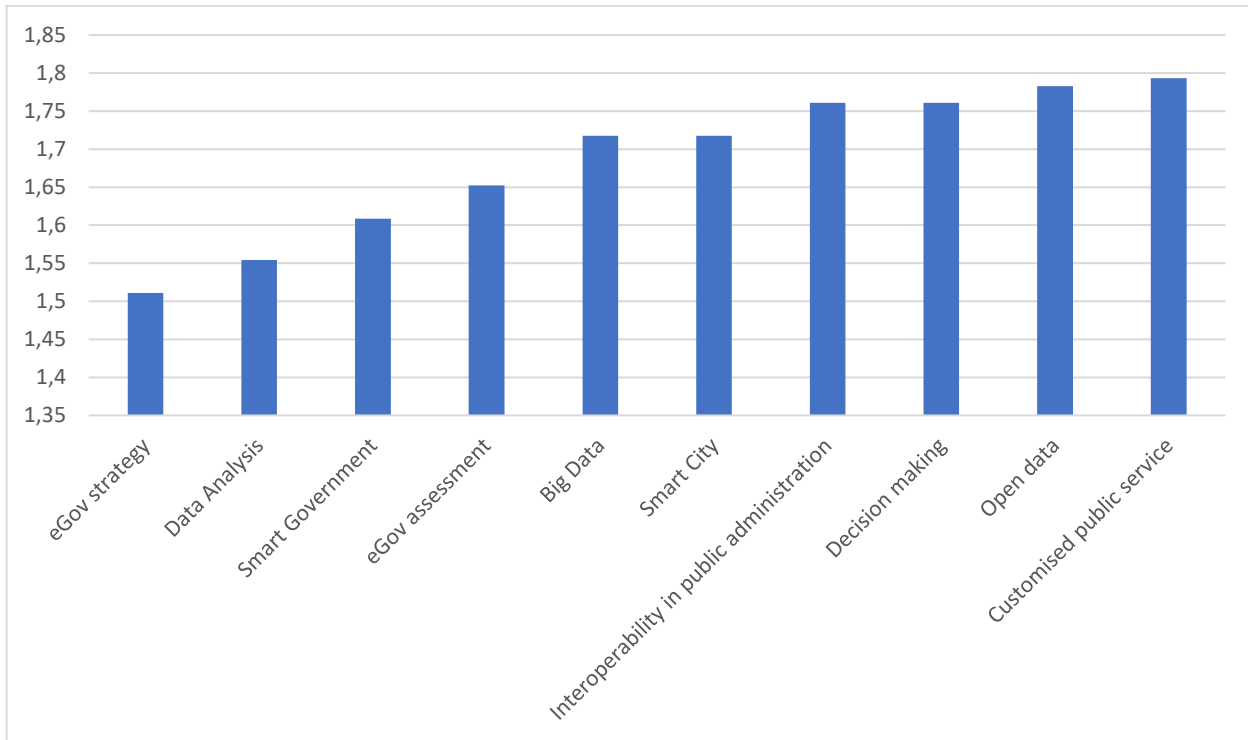eds in e-Governance. Finally, a comparison between the training needs and the current situation takes place in order to uncover the existing training gaps that should be covered in the next work packages of the project.

4.1 Mapping of existing e-Governance courses with e-Governance research areas identified in task 1

The mapping is divided in two levels; namely the Identification of the research area in course name and in the course description (full list in ANNEX G). Figure 1 presents the number of courses, of the existing e-Governance training programs, that include in their names (titles) or in their descriptions the e-Governance research topics identified in task 1 of work package 1.
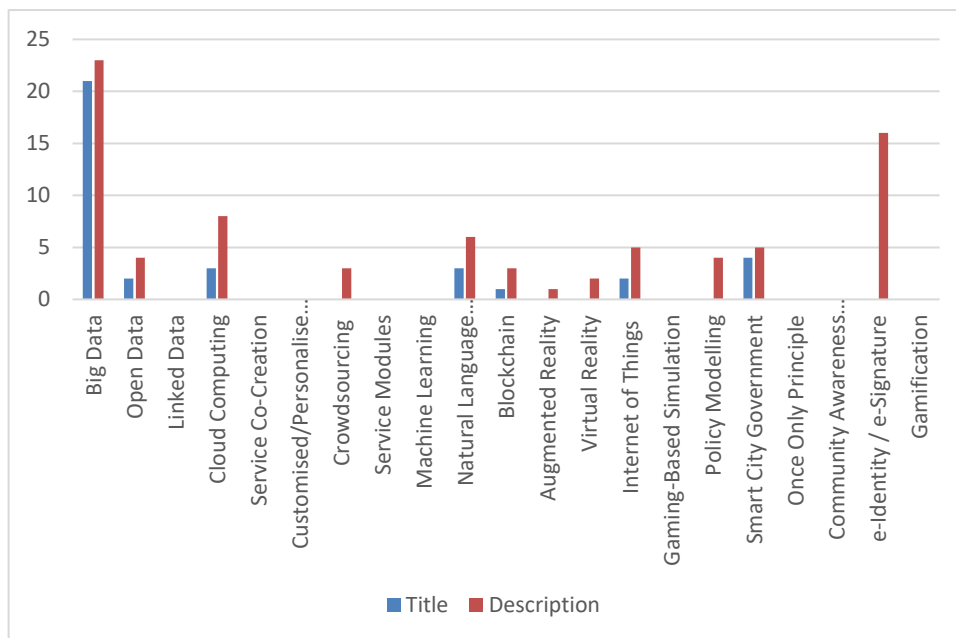
Figure 1: e-Governance research areas appeared in titles and descriptions of identified courses

It appears that the research areas, that are covered at most in the existing curricula, are Big Data, e-Identity/e-Signature, Cloud Computing, Natural Language Processing, Internet of Things, Smart City Government and Open Data. In general, the coverage, of e-Governance research topics identified in D1.1., in existing courses is very low. For example, Big Data which is the most covered research area appears at slightly more than 20 courses.

4.2 Training Needs

The top five key roles in e-Governance are policy maker, IT support administrator, data analyst, policy analyst, and project manager. The prevalence of those roles provides an indication regarding the focus of an e-Governance education program.

The knowledge areas that appear to need more attention regarding e-Governance training programs are the Data Science, Business Project Management, Governance, Project Management, and Public Administration. This provides a trend towards

enhancing delivered knowledge in Public Administration concepts, Project Management techniques and Data elaboration techniques and tools.

From table 3 (3.2.3) we can derive the following two conclusions:

1. Each key role in e-Governance requires different composite skills;
2. The five most important skills are mentoring, creativity, language, negotiation and legal irrespective of the key role in the e-Governance.

The top five courses perceived as the most important one (figure 2) are the following: Digital Government and Service Innovation, Foundations of Cyber Security, Impact and Measurement of e-Governance, Information Society Principles, and Public Administration Information Systems.

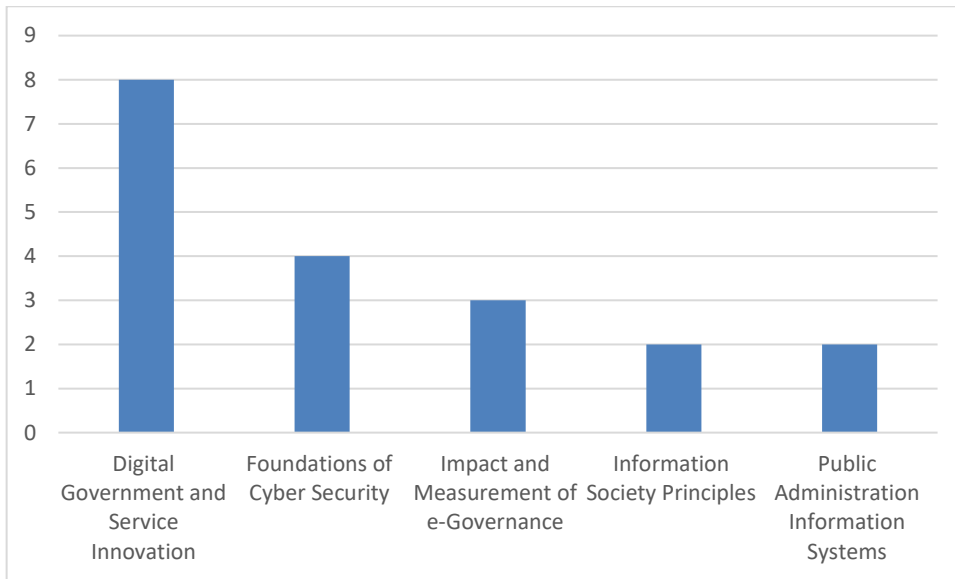**Figure 2: e-Governance courses (derived from the survey) mapped with existing courses**

The most important modules in e-Governance training (figure 3) are the following: e-Governance Strategy, Data Analytics, Smart Government, e-Governance Assessment, Big Data, Smart City, Interoperability in Public Administration, Transparency and Trust in Decision Making, Open Data and Customised Public Services.
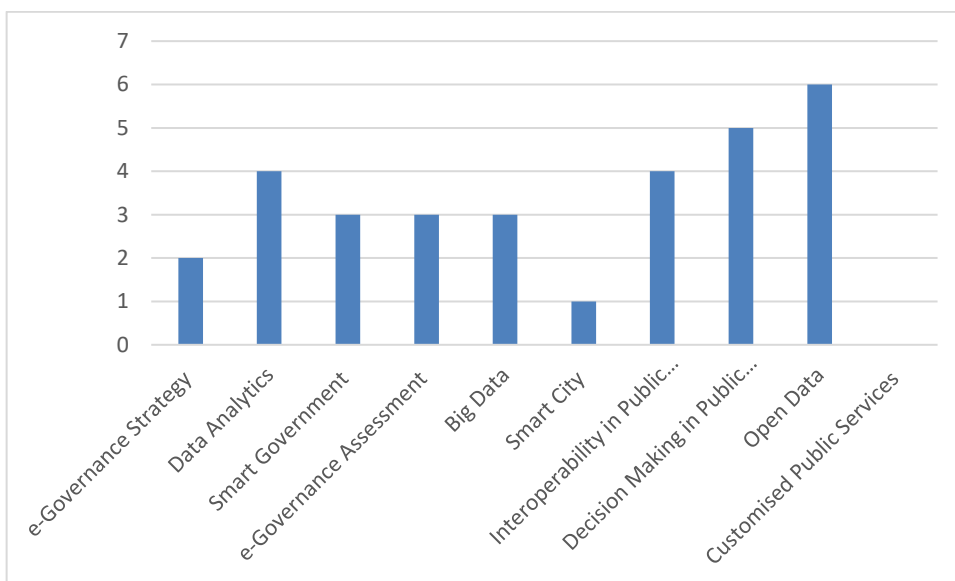
Figure 3: e-Governance modules (derived from the survey) related with existing courses

The identified most significant courses are related to the following modules (ANNEX B):

Digital Government and Service Innovation course is related to the following modules: Augmented Reality, Blockchain, Context-specific services, e-Government Strategy, Government 3.0, Government 4.0, Once Only Principle / Data Sharing, Open Data, Personalised Public Services, Proactive Services, Semantic e-Government, Service Modules, Simulation in Governance, Smart City and Social Bots.

Foundations of Cyber Security course is related to the following modules: e-Identity / e-Signature (Digital Certification), Security and Authentication in Public Administration and Social Bots

Impact and Measurement of e-Governance course is related to the following modules: e-Government Assessment, e-Government Strategy, Gender and ICT, Security and Authentication in Public Administration, Smart Governance / Government, Transparency and Trust in Decision Making

Information Society Principles course is related to the following modules: Cloud Computing, e-Identity / e-Signature (Digital Certification), Gamification, Geographical Information Systems, Internet of Things, Linked Data, Once Only Principle / Data Sharing, Open Data, Security and Authentication in Public Administration

Public Administration Information Systems course is related to the following modules: Blockchain public services, Community Awareness Platforms, Context-specific services, Electronic Participation systems, Geographical Information Systems, Security and Authentication in Public Administration

The identified most significant modules are related to the following courses (ANNEX B):

e-Governance Strategy is related to Impact and Measurement of e-Governance, Digital Government and Service Innovation and Public Administration Management.

Data Analytics is related to Statistics and Data Analytics.

Smart Government is related to Impact and Measurement of e-Governance, Public Administration Management, Public Sector Service Design and Implementation, Sustainable Development and Governance Responsibility**.**

e-Governance Assessment is related to Impact and Measurement of e-Governance

Big Data is related to Statistics and Data Analytics

Smart City is related to Digital Government and Service Innovation, Local Planning and Development, Public Sector Service Design and Implementation, Sustainable Development and Governance Responsibility

Interoperability in Public Administration is related to Software Engineering

Transparency and Trust in Decision Making is related to Decision Science: Theory and Practice, Impact and Measurement of e-Governance, Local Planning and Development, Public Administration Management, Topics in Applied Policy Analysis

Open Data is related to Business Process Management, Information Society Principles, Digital Government and Service Innovation, Software Engineering, Topics in Applied Policy Analysis

Customised Public Services is related to Business Process Management, Local Planning and Development, Public Administration Management, Public Sector Service Design and Implementation

4.3 Conclusion

Work package 2 can use this deliverable results that highlight the gaps concerning the missing knowledge from the current training curricula to provide input in work package 3. Also, based on those results, work package 2 can identify topics that suit research projects that can be conducted with the participation of students, public organisations and enterprises. It is apparent that e-Governance 3.0 research topics are not covered adequately from the current training courses. There is

plenty of room for improvement in this direction. The content of the modules, designed and implemented in work package 3, will be based on the results of this deliverable. In summary, the following insights could be reflected in modules and course design.

The identified key roles in e-Governance, policy maker, IT support administrator, data analyst, policy analyst, and project manager provide a clear indication on which aspects should the designed courses and modules, of the following work packages, cover.

Data Science, Project Management, Governance and Public Administration appear as knowledge areas that should be considered during the creation of e-Governance training curricula.

e-Governance research community highlights Digital Government and Service Innovation, Foundations of Cyber Security, Impact and Measurement of e-Governance, Information Society Principles, and Public Administration Information Systems as significant courses in an e-Governance training curriculum.

Finally, e-Governance Strategy, Data Analytics, Smart Government, e-Governance Assessment, Big Data, Smart City, Interoperability in Public Administration, Transparency and Trust in Decision Making, Open Data and Customised Public Services are the prevalent modules among those that should be included in e-Governance training programs.

5. REFERENCES

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., ... & Wittrock, M. C. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives, abridged edition. White Plains, NY: Longman.

6. ANNEX A: Questionnaire for Training Needs Assessment

The questionnaire contains the following questions:

1. What do you think are the key professions / roles in Electronic Governance?

Business Analyst

Communication Officer

Data Analyst

Information Officer

Information Security Analyst

IT Consultant

IT Support Administrator

Legal Consultant

Policy Analyst

Policy Maker

Politician

Process Engineer

Project Manager

Software Engineer

System Administrator

System Analyst / Designer

1.1. Please add any needed key professions / roles in Electronic Governance that were not included in the previous list.

2. What do you think are the needed skills in Electronic Governance? Please allocate a maximum of 100 points to every one of the following skills, based on how much important is each one (0 - not important at all; 100 - essential).

Analytical skills

Communication

Creativity

Critical thinking

Flexibility / adaptability

Foreign languages

Leadership

Legal skills

Listening

Management

Mentoring

Negotiation

Presentation

Teamwork

Technical skills

2.1. Please add any needed skills in Electronic Governance that were not included in the previous list.

3. What are the knowledge and topics that you think are important and should be covered in an Electronic Governance education program?

Business Process Management

Computer Science

Data Science

Economy

Governance

Human Relations

Information Systems

Law

Political Science

Project Management

Public Administration

Public Policy

3.1. Please add any knowledge and topics that were not included in the previous list.

4. What do you think is lacking in terms of knowledge in e-Governance that requires a special focus in the educative program? Select all that apply.

Business Process Management

Computer Sciences

Data Science

Economy

Governance

Human Relations

Information Systems

Law

Political Science

Project Management

Public Administration

Public Policy

4.1. Please add any missing knowledge that was not included in the previous list.

5. Do you know an educational program in Electronic Governance?

5.1. If you replied YES, please provide more information about it.

6. What should be the main objective of an Electronic Governance program at graduate level (e.g. Master degree)?

Organising, planning, managing skills for leading and transforming public organisations to be open, inclusive, innovative, and effective using Information and Communication Technology (ICT).

Acquiring and applying knowledge (including theories and practices) in all areas of e-Governance, as well as project and change management.

Promotion of new roles needed in public organisations, with knowledge and skills necessary to drive ICT-enabled changes in the public sector.

6.1. Please add any objective and learning outcome that was not included in the previous list.

7. What should be the admission requirements for an Electronic Governance program at graduate level (e.g. Master degree)?

A Bachelor degree (or a degree equivalent to 180 ECTS)

1 year work experience

2 years work experience

7.1. Please add any admission requirement that was not included in the previous list.

8. Which are the core (compulsory) courses that you think should be included in an Electronic Governance program at graduate level?

Agent-Oriented Modelling and Multiagent Systems

Decision Science: Theory and Practice

Enterprise Architecture

Business Process Management

Entrepreneurship

Technology Management

Foundations of Cyber Security

Impact and Measurement of e-Governance

Information Society Principles

Digital Government and Service Innovation

Statistics and Data Analytics

Knowledge Management

Local Planning and Development

Project Management

Public Administration Information Systems

Public Administration Management

Public Sector Service Design and Implementation

Selected Topics in Technology Management

Software Engineering

Sustainable Development and Governance Responsibility

Topics in Applied Policy Analysis

8.1. Please add any core courses that were not included in the previous list.

9. Which are the optional (elective) courses that you think should be included in an Electronic Governance program at graduate level?

Agent-Oriented Modelling and Multiagent Systems

Decision Science: Theory and Practice

Enterprise Architecture

Business Process Management

Entrepreneurship

Technology Management

Foundations of Cyber Security

Impact and Measurement of e-Governance

Information Society Principles

Digital Government and Service Innovation

Statistics and Data Analytics

Knowledge Management

Local Planning and Development

Project Management

Public Administration Information Systems

Public Administration Management

Public Sector Service Design and Implementation

Selected Topics in Technology Management

Software Engineering

Sustainable Development and Governance Responsibility

Topics in Applied Policy Analysis

9.1. Please add any optional courses that were not included in the previous list.

10. Do you think there should be some courses of e-Governance at the undergraduate level?

11. Which specific innovative modules (part of a larger course that focuses on a single topic) would you suggest to be included in e-Governance courses?

Augmented Reality

Big Data

Blockchain

Blockchain public services

Cloud Computing

Communication

Community Awareness Platforms

Context-specific services

Crowdsourcing

Customised public services

Data Analytics

e-Identity / e-Signature (Digital Certification)

e-Government Assessment

e-Government Strategy

Electronic Participation systems

Gamification

Gaming-Based Simulation

Gender and ICT

Geographical Information Systems

Government 3.0

Government 4.0

Interoperability in Public Administration

Internet of Things

Leadership in Public Administration and Public Policy

Legal issues

Linked Data

Machine Learning

Management of Change

Managing People in Public Administration

Media, Public Opinion and Public Policy

Natural Language Processing

Once Only Principle / Data Sharing

Ontology Engineering

Open Data

Organizational Behaviour

Personalised Public Services

Policy Modelling

Policy Process and Institutions

Private Public Partnership - Outsourcing

Proactive Services

Public Finance (Public Budgeting, Revenue, and Expenditure Analysis)

Reusable Open Source Software

Security and Authentication in Public Administration

Semantic e-Government

Sentiment Analysis

Service Co-Creation

Service Modules

Simulation in Governance

Smart City

Smart Governance / Government

Social Bots

Social Media

Social Policy Designs

Transparency and Trust in Decision Making

Virtual Reality

Visualisation

11.1. Please add any modules that were not included in the previous list.

12. Would you enrol in an e-Governance degree?

7. ANNEX B: Courses-Modules Mapping

Courses are mapped with relative modules.

Agent-Oriented Modelling and Multiagent Systems

Internet of Things

Machine Learning

Personalised Public Services

Proactive Services

Semantic e-Government

Service Modules

Simulation in Governance

Social Bots

Virtual Reality

Visualization

Decision Science: Theory and Practice

Gaming-Based Simulation

Leadership in Public Administration and Public Policy

Legal issues

Management of Change

Media, Public Opinion and Public Policy

Private Public Partnership - Outsourcing

Social Media

Transparency and Trust in Decision Making

Enterprise Architecture

Once Only Principle / Data Sharing

Service Co-Creation

Service Modules

Social Policy Designs

Business Process Management

Customized public services

Management of Change

Once Only Principle / Data Sharing

Open Data

Service Co-Creation

Service Modules

Entrepreneurship

Crowdsourcing

Management of Change

Managing People in Public Administration

Organizational Behaviour

Private Public Partnership - Outsourcing

Social Media

Technology Management

Communication

Gaming-Based Simulation

Gender and ICT

Legal issues

Management of Change

Media, Public Opinion and Public Policy

Foundations of Cyber Security

e-Identity / e-Signature (Digital Certification)

Security and Authentication in Public Administration

Social Bots

Impact and Measurement of e-Governance

e-Government Assessment

e-Government Strategy

Gender and ICT

Security and Authentication in Public Administration

Smart Governance / Government

Transparency and Trust in Decision Making

Information Society Principles

Cloud Computing

e-Identity / e-Signature (Digital Certification)

Gamification

Geographical Information Systems

Internet of Things

Linked Data

Once Only Principle / Data Sharing

Open Data

Security and Authentication in Public Administration

Digital Government and Service Innovation

Augmented Reality

Blockchain

Blockchain public services

Context-specific services

e-Government Strategy

Government 3.0

Government 4.0

Once Only Principle / Data Sharing

Open Data

Personalised Public Services

Proactive Services

Semantic e-Government

Service Modules

Simulation in Governance

Smart City

Social Bots

Statistics and Data Analytics

Big Data

Data Analytics

Knowledge Management

Once Only Principle / Data Sharing

Service Modules

Local Planning and Development

Communication

Community Awareness Platforms

Customised public services

Managing People in Public Administration

Policy Modelling

Policy Process and Institutions

Smart City

Social Policy Designs

Transparency and Trust in Decision Making

Project Management

Communication

Leadership in Public Administration and Public Policy

Management of Change

Managing People in Public Administration

Organizational Behaviour

Private Public Partnership - Outsourcing

Public Finance (Public Budgeting, Revenue, and Expenditure Analysis)

Public Administration Information Systems

Blockchain public services

Community Awareness Platforms

Context-specific services

Electronic Participation systems

Geographical Information Systems

Security and Authentication in Public Administration

Public Administration Management

Communication

Customised public services

e-Government Strategy

Gender and ICT

Leadership in Public Administration and Public Policy

Legal issues

Management of Change

Managing People in Public Administration

Media, Public Opinion and Public Policy

Organizational Behaviour

Policy Process and Institutions

Private Public Partnership - Outsourcing

Public Finance (Public Budgeting, Revenue, and Expenditure Analysis)

Smart Governance / Government

Social Media

Transparency and Trust in Decision Making

Public Sector Service Design and Implementation

Blockchain public services

Community Awareness Platforms

Context-specific services

Crowdsourcing

Customised public services

Once Only Principle / Data Sharing

Personalised Public Services

Proactive Services

Security and Authentication in Public Administration

Simulation in Governance

Smart City

Smart Governance / Government

Social Media

Selected Topics in Technology Management

Gamification

Gaming-Based Simulation

Gender and ICT

Geographical Information Systems

Management of Change

Managing People in Public Administration

Service Modules

Social Bots

Software Engineering

Gamification

Interoperability in Public Administration

Internet of Things

Linked Data

Machine Learning

Natural Language Processing

Ontology Engineering

Open Data

Reusable Open Source Software

Social Bots

Virtual Reality

Visualisation

Sustainable Development and Governance Responsibility

Communication

Community Awareness Platforms

Crowdsourcing

Media, Public Opinion and Public Policy

Policy Modelling

Policy Process and Institutions

Private Public Partnership - Outsourcing

Smart City

Smart Governance / Government

Social Policy Designs

Topics in Applied Policy Analysis

Gaming-Based Simulation

Leadership in Public Administration and Public Policy

Legal issues

Open Data

Policy Modelling

Policy Process and Institutions

Private Public Partnership - Outsourcing

Service Co-Creation

Social Media

Social Policy Designs

Transparency and Trust in Decision Making

8. ANNEX C: e-Governance Training Programs

List with e-Governance related programs.

ID	Program Name	Type	Institution	Level	Country
1	Certificate Programme in e-Governance in Africa	O	University of the Witwatersrand	Under	South Africa
2	Digital Government: ICT Governance	O	University of Pretoria	Undergraduate	South Africa
34	E-Governance and Challenges of E-Service Delivery in the Public Service	O	East and Southern African Management Institute	Short Course	Uganda
94	e-Governance Technologies and Services	M	Tallinn University of Technology	Graduate	Estonia
95	Summer School on Secure e-Governance	O	Tallinn University of Technology	Summer school	Estonia
96	ERASMUS MUNDUS MASTER OF SCIENCE IN PUBLIC SECTOR INNOVATION AND EGOVERNANCE	M	Tallinn University of Technology, KU Leuven, University of Münster	Graduate	Belgium, Germany, Estonia
97	Technology Governance and Digital Transformation	M	Tallinn University of Technology	Graduate	Estonia
110	Centre for Studies on Digital Government	O	Centre for Studies on Digital Government		Poland
114	e-Government	U	Wyższa Szkoła Handlowa w Radomiu	Undergraduate	Poland
116	Digital Society and e-Government in the European Union	O	University of Warsaw		Poland
119	Management of state information systems	M	ITMO University	Postgraduate	Russia
137	Digital Transformation - Become a Digital Leader	O	IEDC - Bled School of Management	Certificate Course	Slovenia
138	Transformation of Public Administration: A Step towards Digital-Era Governance	O	The American University of Armenia	Continuing Education	Armenia
139	Masters/PhD Degree in E-Public Administration	MSc	Academy of Public Administration (PAARA)/Mykolas Romeris University	Postgraduate	Armenia/Romania
140	MPA in Electronic Government	MSc	Academy of Public Administration under the Aegis of the President of Belarus	Postgraduate	Belarus
141	e-Government	U	The Faculty of Administration - University of Sarajevo	Undergraduate	Bosnia & Herzegovina
143	Social Media and Storytelling for the Public Administration	O	Institute for Digital Government	Professional Training	Romania
144	Social Media for institutional leaders	O	Institute for Digital Government	Professional Training	Romania

145	Science, Technology and Innovation in Public Governance MA Program	M	College of Political, Administrative and Communication Sciences	Postgraduate	Romania
146	Technologies, Systems and Applications for e-Activities - eSTART (e-Business, e-Government, e-Media, e-Health)	M	Technical University of Cluj-Napoca	Postgraduate	Romania
147	Master of Science in e-Government	M	University POLITEHNICA of Bucharest	Postgraduate	Romania
148	Diffusion and Impact of Internet Voting	O	University of Tartu	Certificate	Estonia
149	Information Technologies in E-Governance and Business Systems	M	University of Novi Sad	Postgraduate	Serbia
164	E-Governance in Developing States	M	University of the West Indies	Postgraduate	Barbados
165	Executive Training for Government Technology Leaders from Colombia	E	United Nations University	Undergraduate	Colombia
166	GEALC Network	O	Caribbean and Latin American e-Government Leaders Network	Undergraduate	GRULAC
183	Specialisation in Electronic Government	M	Universidad Nacional de Colombia	Postgraduate	Colombia
184	Masters in Public Administration and Digital Government	M	Universidad Virtual del Estado de Michoacán	Postgraduate	Mexico
185	Masters in Electronic Governance	M	Universidad de la Sierra Sur	Postgraduate	Mexico
186	Diploma in Open and Electronic Government	U	Universidad de Tecnología Nacional	Undergraduate	Argentina
187	Diploma in Digital Governance	U	eMarketing Institute	Undergraduate	Mexico
188	Smart Cities and eAdministration	O	LID Learning	Undergraduate	Mexico, Argentina, Colombia
189	Diploma in Electronic Government for the design of governmental portals and interactive spaces for communication and citizen participation	U	Monterrey Technological School of Government and Public Transformation	Undergraduate	Mexico
193	Master in Digitalization Major in E-Government and New Media	M	Florida Global University	Postgraduate	U.S.A
196	Public Administration, MPA and Management Information Systems, MS (MPA/MIS)	M	University of Nebraska Omaha	Postgraduate	U.S.A
198	Digital Government: Technology, Policy, and Public Service Innovation	O	Harvard	Postgraduate	U.S.A
199	Digital Transformation in Government	E	Harvard	Postgraduate	U.S.A
200	Digital programs & e-Government capacity building activity liberia	O	Development Aid	Postgraduate	U.S.A
201	Digital Transformation Strategy	O	Boston University	Postgraduate	U.S.A
202	Planning & Developing Governance for Digital Transformation	O	Microsoft	Postgraduate	U.S.A

203	CAS in E-Government	E	Syracuse University	Postgraduate	U.S.A
204	Certified Government Digital Services Professional (CGDSP) Certification Program	O	Public Technology Institute (pti)	Postgraduate	U.S.A
205	Executive MBA in Digital Transformation	E	McMaster University (DeGroote School of Business)	Postgraduate	Canada
206	Executive Leadership Program Cohort 19-Public Sector Governance and Leadership in a Digital World	E	Institute on Governance	Postgraduate	Canada
207	Leading Digital Transformation	O	Ionology	Postgraduate	U.S.A
214	Nordic Master Programme in Innovative Governance and Public Management	M	University of Agder	Postgraduate	Norway
215	Master of e-Government	M	Victoria University	Postgraduate	New Zealand
216	Digital Technologies and Policy MPA	M	University College London	Postgraduate	UK
230	MSc Smart Cities and Urban Analytics	M	University College London	Postgraduate	UK
232	MA Smart Urban Futures	M	Plymouth University	Postgraduate	UK
250	PhD in Governance, Knowledge and Innovation	M	Universidade de Coimbra - Faculdade de Direito	Postgraduate	Portugal
255	CAS in Digital Government	O	University of Lausanne	Undergraduate	Switzerland
257	ICT in Business and the Public Sector (MSc)	M	Leiden University	Postgraduate	Netherlands
258	e-Government Policies	E	Maastricht School of Management	Undergraduate	Netherlands
275	Open eGovernment	M	Open eGovernment	Postgraduate	Sweden
266	Master's in E-Government	M	Huazhong University of Science and Technology	Postgraduate	China
271	Diploma in e-Governance	U	"Sikkim Manipal University (SMU) - Sikkim Manipal	Postgraduate	India
273	e-Government Leadership	O	Institute of Systems Science (National University of Singapore)		Singapore
274	Audit of e-Governance	O	The International Centre for Information Systems and Audit		India
280	eGovernment seminars at the Austrian Federal Academy for Public Administration (in German)	O	The Austrian Federal Academy for Public Administration	Undergraduate	Austria
283	ERASMUS MUNDUS MASTER OF SCIENCE IN PUBLIC SECTOR INNOVATION AND EGOVERNANCE	M	KU LEUVEN	Postgraduate	Belgium
284	Public Sector innovation and e-Governance	M	University of Leuven	Postgraduate	Belgium
302	Master's degree E-Government	M	Koblenz Lendau Universitat	Postgraduate	Germany
303	Executive Program of Public administration	E	Hertie School of Governance	Postgraduate	Germany
304	Executive Seminar Digital Governance	E	Hertie School of Governance	Postgraduate	Germany

305	BSc. E-government	U	Hochschule Rhein-Waal	Undergraduate	Germany
309	Designing and implementing E-government policies - The case of the Palestinian Authority (Trento, Italy)	O	OECD	Postgraduate	Italy
312	GOVERNANCE, MANAGEMENT, E-GOVERNMENT DELLE PUBBLICHE AMMINISTRAZIONI	M	Unitelma Sapienza	Postgraduate	Italy
313	Bachelor's Degree in Digital Management	U	University of Venice	Undergraduate	Italy
317	Master professional in technology for e-Government	M	University of Trento	Postgraduate	Italy

9.   ANNEX D: Admission Requirements

Admission requirements for post-graduate training programs classified in categories.

1.   Academic requirements

- School-leaving certificate

- National   Senior   Certificate / with specific grade

- Undergraduate qualification

- Bachelor's degree

- Bachelor's Degree with Public Administration or equivalent as a major subject

- Honours Degree in Public Governance, Public Administration or Public Management and Development

- A good first university degree

- A holders of a Bachelor degree of at least Upper Second Class (Honours)

- Bachelor's degree or equivalent in IT, Law Social Sciences, Economics or other related fields;

- Bachelor degree in social sciences, political sciences, public administration, information systems, information science, informatics, engineering, business, law, or an equivalent degree in the mentioned areas.

- A Bachelor degree or a degree equal to 180 ECTS.

- Bachelor degree in Computer Science, Computer Engineering, Information Technology, Systems Engineering, Informatics, or other related fields

- Degree in a quantitative discipline.

- A Bachelor degree or a degree equal to 180 ECTS.

2.   Work experience

- Relevant work experience

- Sound working knowledge of business processes in their area of public service specialisation

- Appropriate administrative and managerial work exposure of three years, preferably in the public sector

- Minimum of five years working experience, at least three years of which should be in a senior position within the private, public or NGO sector.

- 4 years of relevant post-qualification work experience

- Be a middle-level African professional or manager employed by a government or state enterprise located in Eastern or Southern Africa.

- Must have been a Director for at least two years

- Must have been a Senior Manager for not less than 5 years

- A minimum of 2 (two) years' practical, relevant occupational experience in Administration.

- Demonstrated managerial experience and effectiveness

- Have a track record of administrative or managerial experience in basic web design and communications management

3.   Knowledge

- User knowledge and practice of IT or content management
- Students should have a background in economics, public administration, politics, African Studies, law, gender studies, philosophy, the social sciences or related disciplines.

4. Research interest

- Research proposal of approximately eight pages
- Motivation letter
- Curriculum Vitae
- Academic Records
- Motivation Letter: The Motivation Letter or Statement of Purpose should express the applicant's reasons for applying to the MSc program (1-2 pages).
- Video testimony: Applicants are asked to prepare a 2-3 minute video, in which they answer specific questions
- Professional and / or research experience in administrative sciences, political and social sciences, computer sciences or related areas.

5. Assessment

- Applicants may be required to undergo a competency assessment
- Five credit passes in the GCE ordinary level examination
- Mathematics and English Language at the 'O' level (or French or Portuguese for non-English speakers)
- Preference will be given to students with A level passes in numerate/analytical subjects such as Accounting, Economics, Management of Business, Mathematics, Sciences, and Geography
- Competence in basic Mathematics not below GCE 'O' level
- English level 4
- Mathematical Literacy level 4
- Mathematics level 3
- Interview by an admissions panel.
- English language skills according to CELF-B2 level and higher
- Successful completion of a selection procedure including personal interview with the applicant in English
- Online interview
- English language proficiency - the level not lower than B2 (following the Common European Framework of Reference for Languages (CEFR).
- IELTS (International English Language Testing Service)- Academic Module: Overall minimum score of 6.5 (with no section below 5.5).
- TOEFL (Test of English as a Foreign Language) Paper Based: Overall minimum score of 575 (with minimum score 4.5 in the written test) Internet based : Overall minimum score of 90 (with minimum score 20 in the written test)
- University of Cambridge and Oxford: Certificate in Advanced English or Diploma of English Studies
- GMAT or GRE General Test or CEU Mathematics test:
- CAE (Certificate of Advanced English) pass
- CPE (Certificate of Proficiency in English) pass

6. Other (Recommendation, age etc.)

- Preference will be given to candidates recommended by those Governments or state enterprises which make an explicit commitment to provide the successful graduates with the requisite institutional environment (including appropriate incentive systems) that would enable them to make good use of their newly acquired skills and competences in the collective pursuit of sustainable development and poverty reduction on the Continent

- Letters of Recommendation

- Mature applicants must be 25 years and above before they can apply.

- Potential for significant growth

- Ability to contribute to the study team and class participation

- Ability to do graduate work

- Maturity and motivation

- Interest and commitment by the public and / or social sector.

- Critical analytical thinking, argumentative and self-taught capacity.

- Proactive attitude towards new knowledge in government and information technologies.

- Full-time availability

- Ethical and social commitment in the problems of government.

- Have exposure to social media and app applications

10. ANNEX E: Course clusters of e-Governance related programs

e-Governance related training programs courses clustered in categories.

e-Governance

1 Certificate Programme in e-Governance in Africa

2 Digital Government: ICT Governance

34 E-governance, e-government, e-democracy initiatives and e-government functions;

34 Phases of e-government and stages of e-government development;

34 Applications of ICT used in public administration and governance.

94 Information Society Principles: towards e-Governance

94 e-Governance and e-Democracy

94 E-Governance Technologies and Services Master's Project

94 Special seminar on e-Governance Technologies

94 Digital Transformations of Government

94 Impact and Measurement of e-Governance

95 Introduction to e-Estonia.

95 Defining the scope for e-services with the AOM approach

96 Selected Chapters: e-Government

96 Technology and Society

96 E-Governance

96 e-Governance and Democracy Instruments

96 Recent Issues in e-Governance

141 E-Government (E-Administration)

145 E-Government and Sustainable Development

146 e-Government for institutions

146 e-Government for citizens

146 e-Government for business

147 E-Government

147 Decision-making in e-Government

148 Diffusion and Impact of Internet Voting

164 e-Governance for development

164 Analysis and management of e-governance systems

164 eDemocracy and access to e-Government

165 Introduction to Electronic Governance

165 Electronic Governance and Organizational Change

165 Electronic Governance Infrastructure and Services

183 Introduction to Electronic Government

215 E-Government, Public Sector Reform and Good Governance

230 Smart Cities: Context, Policy and Government

271 e-Governance System Integration

271 Development Model for e-Governance

271 e-Governance Project Study Tour

271 e-Governance Concepts

271 IT & Regulatory Framework for e-Governance

274 Audit of e-Governance

275 Open e-Government and e-Democracy

275 IS Governance for e-Government: Requirement, Use, Evaluation

275 Security and Privacy in e-Government: Systems, IT, Laws and Ethics

283 E-Government

302 Administrative computer science / E-Government

312 E-Government

317 Laboratory on e-Government

Public Policy

34 Policy and management issues specific to e-governance;

141 Public Policy

141 Public Manifestations

146 Sustainability and innovation in society

185 Public Policies and ICT

186 Public Innovation and Resistance to Change

186 Digital Public Policies

187 Importance and Impact of Social Channels on Public Policy

196 Policy Design & Implementation

196 Health Care Policy

196 Information Security Policy and Ethics

203 Information Policy

203 Science, Technology, and Public Policy

203 Advanced Policy Analysis

214 Implementation and Evaluation of Public Policies

216 Introduction to Science, Technology, Engineering and Public Policy

216 Analytical Methods for Policy

216 Digital Technology and Policy

216 Science, Technology and Engineering Advice in Practice

216 Communicating Science for Policy

216 Negotiation, Mediation and Diplomacy

230 Urban Systems Theory

250 Governance, Institutions and Public Policies

250 Science and Innovation Policies

250 Science, Technology and Knowledge in Society

250 Seminar on Governance, Institutions and Public Policies

250 Thesis in Political Economy of Knowledge and Institutions

271 Public Policy Technology and Law

283 Governance and Policy making

303 Actors, Institutions, Policies

Governance

34 Governance and managerial operations performed through the use of ICT

96 Peer Production and the Theory of the Commons

145 ICT Innovation in Governance

165 Government Information Leadership

165 Government Knowledge Management

165 Government Information Sharing

165 Government Enterprise Architecture

185 Democracy and Governance

186 Open Government

188 Open Government: transparency, social responsibility and open data

193 Government and Digital Age

214 Introduction to Innovative Governance and Public Administration

216 Evidence, Institutions and Power

216 Risk Assessment and Governance

257 Lean Six Sigma

271 Social inclusion for Development

271 Functions and Structure of Govt. Organization

271 Government Process Re-engineering

271 Business Models, GFR rules PPP

274 Audit of Government Receipts

274 Audit of State Owned Enterprises

303 Understanding Organisations / Organisational Forms

Project Management

94 Software Project Management

96 Project Management

141 Project Management

141 Management of IT Projects in Administration

145 Project Management and Evaluation

146 Project management

147 E-Government Project Management

164 Project management

183 Project management applied to Electronic Government

193 Digital Media II: Project Management

196 Project Risk Management

203 Managing Information Systems Projects

204 Project Management

258 project management

271 Risk Management in e-Governance Projects

271 Consulting for e-Governance Projects

271 Project Conceptualization Management & Analysis

Software Engineering

94 Software Process and Quality

94 Enterprise Architecture and BPM

94 Introduction to Development in Cloud

94 Foundations of Cyber Security

94 Cyber Security Management

95 Building interoperability and digital data exchange

96 Principles of Database Management

96 Enterprise Architecture Management

145 Data Warehouse and Business Intelligence

146 Database management

146 Data modeling and analyzing for management decisions

146 Remote analyzing and processing of medical images

146 Storage and communication standards for medical information

186 Open Data

193 Mobile Apps: Application Development

196 Management of Software Development

196 Database Management

203 User-Based Design

203 Human Interaction with Computers

203 Data Administration Concepts and Database Management

203 Advanced Database Administration Concepts and Database Management

230 Spatial Data Capture, Storage and Analysis

230 Urban Simulation

230 Introduction to Programming

271 Data Analysis

271 Secure Software Development Practices, Quality Standards

275 Knowledge Management

275 Open and Big Data Management

313 Introduction to coding and data management

317 Conceptual Modeling, Ontology Design, and Semantic Interoperability

Information Systems

94 Business Information Systems

94 Information Management and Digital Archiving

94 Information Systems Programming

94 Agent-Oriented Modelling and Multiagent Systems

94 Virtual Environments Usability

95 Information management & digital archiving

95 Virtual environments' usability

96 Business Information Systems

96 Information Management in the Public Sector

96 Information Management: Theories

119 Information Systems Architecture

119 Information security in state and municipal government

119 Social Informatics

141 Information Systems in Administration

141 Business Information Systems

141 Collaborative Systems in Administration

145 GIS for Policy Mapping

146 Electronic services

146 Internet technologies

146 Using networks and communication protocols

146 e-Activities Platforms

146 Projecting the systems for e-Activities

146 System Security for e-Activities

146 Web 2.0/3.0 technologies

146 Knowledge management and semantic web

146 e-Commerce

146 Digital technologies for marketing

146 Digital media

146 Design for e-Media

204 Metrics and big data

204 Reporting systems, techniques

205 Strategic Information Systems

205 Emerging Topics in Digital Transformation

230 Geographic Information Systems and Science

232 Design Lab I

232 Urban Dataplay

232 Design Lab P

257 Security

258 Integration

258 Interoperability

258 Involvement of citizens and businesses through the usage of social media and mobile computing

271 IT Service Management Systems

271 Emerging Technologies

271 Knowledge and Content Management

271 Geo Spatial Technologies

271 Information and Cyber Security

271 Information and Communications Systems for Organizational Performance

271 Data Base Management Systems

274 Auditing in IT Environment

275 Supplementary course in Computer and Systems Science

275 Enterprise Computing and ERP Systems

275 Citizen Centric Service Design and IT Architecture

283 Information systems

302 Information systems

302 Digital communication, IT-security, collaboration

313 Lab of information systems and analytics

313 Planning and management control systems

313 Lab of web technologies

313 Lab of human-centered design

317 Information Management and Integration

317 Application integration and Business Process Management

317 Security and privacy

Business Administration

94 International Entrepreneurship

94 Entrepreneurship Project

94 Advanced Business Process Modeling and Automation

95 Defining business processes

95 Business processes automatization & optimization

95 Transformation and change management

95 Start-up world & Prototyping ideas

141 Economics of Enterprise

146 Entrepreneurship and digital innovations for business

147 Methodology for Consultancy on Informatics Services

188 Develop an innovative ecosystem

188 Design Thinking as an innovation tool

188 Efficient professionals

205 Digitally-driven Entrepreneurship

232 Futures Entrepreneurship

271 The Open Group Architecture Framework (TOGAF)

271 Business Intelligence & Decision Making

274 Performance Audit

274 Environment Audit

275 Business Process and Case Management

275 Digital business strategies and change management

275 Decision Making and Business Intelligence

313 E-business, entrepreneurship and digital transformation

313 Business analytics

313 Data analytics

Management

94 Entrepreneurship and Technology Management

96 Entrepreneurship and Technology Management

119 Management of programs and projects of the Information Society development

141 Fundamentals of Management

141 Human Resources Management

141 Contemporary Management

141 Leadership and Teamwork

141 Sociology of Management

145 Strategic Planning

145 Face and Marketing

145 NGO Management

145 Conflict Management

145 Impact Assessment

145 Performance Measurement Systems

145 Financial Management

164 Managing organization change in the new economy

187 Performance Measurement Online

193 Strategic Program Techniques

193 Global Marketing: Levering Digital Technology

193 Media Innovation and Impact

193 Market Research in Digital Media

193 New Media and Democracy

196 Public Management & Leadership

196 Organization Theory & Behavior

196 Analysis & Decision Making

196 Planning & Evaluation

196 Seminar in Advanced Management Analysis

201 Digital Transformation Strategy

203 Enterprise Risk Management

204 Management, leadership, and governance, policies and procedures

204 Compliance and Contract management (CJIS, PCI, HIPAA, FOIA, e-Discovery, Accessibility, Records Act, etc.)

204 Security and Crisis Management

204 Emotional Intelligence

205 Personal Leadership Effectiveness

205 Strategic Marketing

205 Strategic Marketing Analytics

205 Organizational Behaviour for Decision Making

205 Strategic HR Analytics

205 Innovation Leadership and Design Thinking

205 Strategic Management for Decision Making

205 Strategic Valuation for Digital Organizations

207 Leading Digital Transformation

214 Organisational Changes and Change Management

214 Regional industrial development

214 Evaluation & Learning/Leading development and change in knowledge-intensive organisations

215 Managing Service Transformation

215 Managing ICT-enabled Forms of Public Engagement

215 Comparative Public Management

215 Information Systems Management

215 Managing IT-related Change

258 Risk management

271 Change Management and Capacity Building

271 Approach Methodology for Evaluation and Impact Assessment

303 Power & Influence: Leadership in Action

303 Leadership and Management

Public Administration

186 Social Networks and The Public Sector

187 Innovations and Challenges of the Internet in Public Management

187 Attention and Service to the Citizen in Public Management

196 Foundations of Public Service

203 Problems in Public Administration

203 Public Administration and Democracy

214 Institutions, Innovation and Economic Renewal

214 Leadership in Public Organisations

258 Transparency and accountability

271 DPR, Government Procurement, RFP Formulation, Contract Management and Monitoring

303 Governance and Decision-making in and between Public Institutions

312 Governance in Public Administrations

312 Public management

Legal Issues

95 Legal aspects of e-governance, cyber security & secure governance

141 Constitutional Law

141 Administrative Law

141 Legal Organisation of Public Administration

141 Fundamentals of Civil Law

141 Labour Law and Social Security

141 E-Regulation

145 Human Rights

164 Legal and ethical issues in e-governance

183 Electronic Government and regulation

203 Public Administration and Law

283 Jurisprudence

302 Jurisprudence

313 Fundamentals of IT law

313 Business and Digital Law

Scientific Research

96 Research Seminar: Part I

96 Integrated Research Seminar

119 Strategy and methods of scientific research

119 Methods for the study of usability of information resources

119 Computer technologies in scientific research: preparation of scientific publications

141 Student Practice

145 Research Methods for Process Analysis

145 Applied Research

147 Research Activities

164 Investigative methods for eGovernance

185 Epistemology

185 Research in Social Sciences

185 Research Protocol

185 Thesis Writing Workshop

214 Introduction to academic writing and research methodology

214 Research on Public Management and Organizations

230 Quantitative Methods

250 Research Seminar in Economics and Sociology

275 Scientific Communication and Research

275 Research Methodology for Computer and Systems Sciences

302 Research training and soft skills in E-Government

Economy

141 Basics of Economy

141 Public Finance

141 Economics of the Public Sector

145 Public Budgets

185 Economy and Government

187 Financing Programs for Digital Development

188 Understand globally the digital economy.

196 Public & Nonprofit Budgeting

196 Seminar in Public Financial Administration

196 Public Budgeting

196 Health Care Finance

203 Public Budgeting

205 Accounting/Finance for Decision-Making

250 Contemporary Political Economy

250 Seminar in Methodology of Economics and Sociology

271 Finance Concepts : Public Finance & Project Finance

303 Economics, Finances, and Methods

303 Fiscal Rules and Budgeting

303 Public Sector Budgeting and Accounting

313 Introduction to economics

313 Financing High Growth Firms

313 Financial statement analysis

Statistics

141 Statistics in Administration

145 Statistics

205 Statistics for Analytics

313 Probability and statistics

European Institutions

141 European Integration and EU Institutions

141 European Administrative Law

141 E-Government in the EU and E-Democracy

145 EU Funds Management

303 European Union Governance

Other

141 Physical Education

145 Ethics

146 Publicity

313 Mathematics for decision sciences

94 English for Science and Research

11. ANNEX F: Courses of e-Governance related programs

Courses of e-Governance related training programs

1 Certificate Programme in e-Governance in Africa University of the Witwatersrand   Under   South Africa

Certificate Programme in e-Governance in Africa

2 Digital Government: ICT Governance   University of Pretoria   Undergraduate   South Africa

Digital Government: ICT Governance

34 E-Governance and Challenges of E-Service Delivery in the Public Service   East and Southern African Management Institude   Short Course   Ugada

E-governance, e-government, e-democracy initiatives and e-government functions;

Phases of e-government and stages of e-government development;

Policy and management issues specific to e-governance;

Governance and managerial operations performed through the use of ICT;

Applications of ICT used in public administration and governance.

94 e-Governance Technologies and Services   Tallinn University of Technology   Graduate   Estonia

Information Society Principles: towards e-Governance

e-Governance and e-Democracy

Software Project Management

Software Process and Quality

Enterprise Architecture and BPM

E-Governance Technologies and Services Master's Project

Business Information Systems

Special seminar on e-Governance Technologies

International Entrepreneurship

Entrepreneurship and Technology Management

Digital Transformations of Government

Introduction to Development in Cloud

Entrepreneurship Project

Public Sector Service Design and Implementation

Foundations of Cyber Security

Information Management and Digital Archiving

Cyber Security Management

Information Systems Programming

Agent-Oriented Modelling and Multiagent Systems

Practice

Virtual Environments Usability

Creating Innovation Capacities in Government

English for Science and Research

Impact and Measurement of e-Governance

Advanced Business Process Modeling and Automation

95 Summer School on Secure e-Governance   Tallinn University of Technology   Summer school   Estonia

Introduction to e-Estonia.

Legal aspects of e-governance, cyber security & secure governance

Information management & digital archiving

Building interoperability and digital data exchange

Defining business processes

Business processes automatization & optimization

Defining the scope for e-services with the AOM approach

Transformation and change management

Virtual environments' usability

Start-up world & Prototyping ideas

96 ERASMUS MUNDUS MASTER OF SCIENCE IN PUBLIC SECTOR INNOVATION AND EGOVERNANCE   Tallinn University of Technology, KU Leuven, University of Münster Graduate   Belgium, Germany, Estonia

Business Information Systems

Principles of Database Management

Public Administration and Public Sector Innovation: Capita Selecta

Research Seminar: Part I

Information Management in the Public Sector

Enterprise Architecture Management

Information Management: Theories

Project Management

Selected Chapters: eGovernment

Integrated Research Seminar

Entrepreneurship and Technology Management

Technology and Society

E-Governance

Peer Production and the Theory of the Commons

eGovernance and Democracy Instruments

Recent Issues in eGovernance

110 Centre for Studies on Digital Government   Centre for Studies on Digital Government   Poland

114 e-Government   Wyższa Szkoła Handlowa w Radomiu   Undergraduate   Poland

119 Management of state information systems   ITMO University Postgraduate   Russia

Management of programs and projects of the Information Society development

State and Municipal Administration

Strategy and methods of scientific research

Information Systems Architecture

Information security in state and municipal government

Methods for the study of usability of information resources

Social Informatics

Computer technologies in scientific research: preparation of scientific publications

138 Transformation of Public Administration: A Step towards Digital-Era Governance The   American   University   of Armenia   Continuing Education   Armenia

Transformation of Public Administration: A Step towards Digital-Era Governance

139 Masters/PhD Degree in E-Public Administration   Academy   of   Public   Administration   (PAARA)/Mykolas Romeris University   Postgraduate   Armenia/Romania

140 MPA in Electronic Government   Academy of Public Administration under the Aegis of the President of Belarus   Postgraduate   Belarus

141 e-Government   The Faculty of Administration - University of Sarajevo   Undergraduate Bosnia   & Herzegovina

Theory of the state and rights

Theory of Adminstration

Basics of Economy

Constitutional Law

Organisation of the Public Sector

Fundamentals of Management

Public Policy

Physical Education

Sociology of Administration

Public Manifestations

Sustainable Development and Public Administration

Administrative Law

Human Resources Management

Economics of Enterprise

Public Finance

Legal Organisation of Public Administration

Fundamentals of Civil Law

Statistics in Administration

Informatization of Business Processes in Administration

Project Management

Management of Investments in the Public Sector

Administrative Procedure and Administrative Dispute

Administrative Internal Affairs

Labour Law and Social Security

Local Self Government

Economics of the Public Sector

European Integration and EU Institutions

The Right of Public Registers

Contemporary Management

European Administrative Law

Leadership and Teamwork

Sociology of Management

E-Government (E-Administration)

Management of IT Projects in Administration

E-Government in the EU and E-Democracy

E-Regulation

Information Systems in Administration

Student Practice

Final Work

Business Information Systems

Collaborative Systems in Administration

143 Social Media and Storytelling for the Public Administration   Institute for Digital Government   Professional Training Romania

144 Social Media for institutional leaders   Institute for Digital Government   Professional Training   Romania

145 Science, Technology and Innovation in Public Governance MA Program   College of Political, Administrative and Communication Sciences Postgraduate   Romania

ICT Innovation in Governance

Strategic Planning

Research Methods for Process Analysis

Building Performance in Public Services: Emergency Response System

Face and Marketing

NGO Management

E-Government and Sustainable Development

GIS for Policy Mapping

Statistics

EU Funds Management

Applied Activities in Central and Local Government

Urban Development

Public-Private Partnership

Data Warehouse and Business Intelligence

Public Budgets

Human Rights

Building Performance in Public Services: Education

Conflict Management

Project Management and Evaluation

Impact Assessment

Performance Measurement Systems

Financial Management

Applied Research

Ethics

Public Governance for a Better Quality of Life

Public Procurement

146 Technologies, Systems and Applications for e-Activities - eSTART (e-Business, e-Government, e-Media, e-Health)   Technical University of Cluj-Napoca   Postgraduate   Romania

Electronic services

Internet technologies

Project management

Database management

Using networks and communication protocols

e-Activities Platforms

Projecting the systems for e-Activities

System Security for e-Activities

Web 2.0/3.0 technologies

Knowledge management and semantic web

Entrepreneurship and digital innovations for business

e-Commerce

Digital technologies for marketing

Data modeling and analyzing for management decisions

e-Government for institutions

Sustainability and innovation in society

e-Government for citizens

e-Government for business

Digital media

Design for e-Media

Digital content management systems

Publicity

e-Health applications

Remote analyzing and processing of medical images

Storage and communication standards for medical information

Management of medical information systems

147 Master of Science in e-Government   University POLITEHNICA of Bucharest   Postgraduate   Romania

E-Government

Cloud Computing

Adaptive and Collaborative Systems

Elective Course 1

Research Activities

E-Services Users' Psychology

E-Government Project Management

Methodology for Consultancy on Informatics Services

Elective Course 2

Research Activities

Information Security

Decision-making in e-Government

Policy Enforcement in Distributed Systems

Elective Course 3

Research Activities

MSc Thesis Preparation

Research Activities

148 Diffusion and Impact of Internet Voting   **University of Tartu**   **Certificate**   **Estonia**

Diffusion and Impact of Internet Voting

149 Information Technologies in E-Governance and Business Systems   **University of Novi Sad**   **Postgraduate**
      Serbia

164 E-Governance in Developing States   **University of the West Indies**   **Postgraduate**   **Barbados**

Investigative methods for e-Governance

e-Governance for development

Legal and ethical issues in e-governance

Project management

Managing organization change in the new economy

Analysis and management of e-governance systems

Strategic aspects of information technologies

eDemocracy and access to e-government

Practicum

Dissertation

165 Executive Training for Government Technology Leaders from Colombia   **United   Nations   University**
      Undergraduate   Colombia

Introduction to Electronic Governance

Government Information Leadership

Government Knowledge Management

Government Information Sharing

Electronic Governance and Organizational Change

Electronic Governance Infrastructure and Services

Government Enterprise Architecture

Information Technology Governance

166 GEALC Network   **Caribbean and Latin American eGovernment Leaders Network**   **Undergraduate   GRULAC**

183 Specialisation in Electronic Government   **Universidad Nacional de Colombia**   **Postgraduate**
    Colombia

Introduction to Electronic Government

Information Technologies and Electronic Government

Project management applied to Electronic Government

The quality of service in Electronic Government

Workshop applied to Electronic Government

Electronic Government and regulation

Prospective of Electronic Government

184 Masters in Public Administration and Digital Government   **Universidad Virtual del Estado de Michoacán**   **Postgraduate**   **Mexico**

185 Masters in Electronic Governance   **Universidad de la Sierra Sur**   **Postgraduate**   **Mexico**

Public Administration

Information and Knowledge Society

Electronic Government

Epistemology

Economy and Government

Introduction to Technological Prospective

Implementation and Management of Electronic Government

Research in Social Sciences

Democracy, Governance and Governance

Development of Applications for Electronic Government

Public Policies and ICT

Research Protocol

Thesis Writing Workshop

Development of Governmental Websites

Geographic Information Systems

Electronic Government Interoperability

Security in the Use of ICT

186 Diploma in Open and Electronic Government   **Universidad de Tecnología Nacional**   **Undergraduate**
    Argentina

The Successive Reforms of The State

Open Government.

Public Innovation and Resistance to Change

Public Policies and Barriers To O-Gov.

Transparency and Public Information

Open Data

Citizen Participation

Collaboration.

Basis for Electronic Government

Digital Public Policies

Social Networks and The Public Sector

Strategies and Advanced Applications Of E-Gov.

187 Diploma in Digital Governance   eMarketing Institute   Undergraduate   Mexico

Innovations and Challenges of the Internet in Public Management

Introduction to Digital Government

Transforming Information into Knowledge and Actions

Attention and Service to the Citizen in Public Management

Importance and Impact of Social Channels on Public Policy

How to Build a Citizen Portal

Local Positioning of Public Services in Search Engines

Performance Measurement Online

Propaedeutic course (optional): What is Internet?

Financing Programs for Digital Development

How to Prepare a Digital Agenda

188 Smart Cities and eAdministration   LID Learning   Undergraduate   Mexico, Argentina, Colombia

Understand globally the digital economy.

The Smart Cities

Success stories of Smart Cities

The e-Administration

Internet of all things (IoE)

Cloud computing and big data

Cognitive Computing

Industry 4.0

Develop an innovative ecosystem

Design Thinking as an innovation tool

Efficient professionals

Design the citizen experience: new digital needs

Digital migration of Public Administration services

Open Government: transparency, social responsibility and open data

189 Diploma in Electronic Government for the design of governmental portals and interactive spaces for communication and citizen participation Monterrey Technological School of Government and Public Transformation Undergraduate Mexico

Frame of reference: electronic government and government portals

Planning a government portal

Information technology for government portals

Methodologies for the design of governmental portals

Communication between government and citizen through portals

Information architecture and navigation in a government site

Citizen language and the design of information

Visual design and government identity on the Internet

Citizen participation in government portals

Evaluation and continuous improvement of the electronic government strategy

193 Master in Digitalization Major in E-Government and New Media Florida Global University Postgraduate U.S.A

Strategic Program Techniques

Digital Media and Society

Digital Media I: Design Principles and Practice

Global Marketing: Levering Digital Technology

Media Innovation and Impact

Digital Media II: Project Management

Mobile Apps: Application Development

Market Research in Digital Media

Government and Digital Age

Strategic Planning for Electronic Governance

New Media and Democracy

e-Government and ICT

196 Public Administration, MPA and Management Information Systems, MS (MPA/MIS) University of Nebraska Omaha Postgraduate U.S.A

Public Management & Leadership

Foundations of Public Service

Organization Theory & Behavior

Analysis & Decision Making

Policy Design & Implementation

Public & Nonprofit Budgeting

Planning & Evaluation

Management of Software Development

Advanced Systems Analysis & Design

Data Communications

Managing the Distributed Computing Environment

Database Management

Managing the IS Function

Seminar in Advanced Management Analysis

IT Project Fundamentals

Project Risk Management

 Seminar in Public Financial Administration

Public Budgeting

IT Audit and Control

 Information Security Policy and Ethics

Health Care Finance

Health Care Policy

Information Security Policy and Ethics

Clinical Systems Architecture and Function

198 Digital Government: Technology, Policy, and Public Service Innovation   Harvard Postgraduate   U.S.A

Digital Government: Technology, Policy, and Public Service Innovation

199 Digital Transformation in Government Harvard Postgraduate   U.S.A

Digital Transformation in Government: Innovating Public Policy & Service

**200 Digital programs & e-government capacity building activity Liberia   Development Aid   Postgraduate
U.S.A**

Digital programs & e-government capacity building activity Liberia

201 Digital Transformation Strategy   Boston University Postgraduate   U.S.A

Digital Transformation Strategy

202 Planning & Developing Governance for Digital Transformation   Microsoft   Postgraduate   U.S.A

Planning & Developing Governance for Digital Transformation

203 CAS in E-Government Syracuse University   Postgraduate   U.S.A

e-Government

Mid-career Training Group

Information Policy

Introduction to Information Security

Enterprise Risk Management

Security in Networked Environments

Enterprise Technologies

User-Based Design

Managing Information Systems Projects

Human Interaction with Computers

Data Administration Concepts and Database Management

Enterprise Architecture: Concepts and Practice

Information Security Policy

Advanced Database Administration Concepts and Database Management

Problems in Public Administration

Public Budgeting

Public Administration and Law

Public Administration and Democracy

Science, Technology, and Public Policy

Advanced Policy Analysis

204 Certified Government Digital Services Professional (CGDSP) Certification Program Public Technology Institute (pti) Postgraduate U.S.A

Citizen participation (pictures, video, recorded meetings, live meeting participation, polling, etc.)

Web management

App Management

Multi-channel systems

Digital service delivery

Metrics and big data

Reporting systems, techniques

Management, leadership, and governance, policies and procedures

Compliance and Contract management (CJIS, PCI, HIPAA, FOIA, e-Discovery, Accessibility, Records Act, etc.)

Security and Crisis Management

Project Management

Emotional Intelligence

205 Executive MBA in Digital Transformation   McMaster   University   (DeGroote   School   of   Business)   Postgraduate   Canada

Accounting/Finance for Decision-Making

Statistics for Analytics

Strategic Information Systems

Personal Leadership Effectiveness

Strategic Marketing

Digitally-driven Entrepreneurship

Strategic Marketing Analytics

Organizational Behaviour for Decision Making

Strategic HR Analytics

Innovation Leadership and Design Thinking

Strategic Management for Decision Making

Strategic Valuation for Digital Organizations

Emerging Topics in Digital Transformation

Capstone Project

206 Executive Leadership Program Cohort 19-Public Sector Governance and Leadership in a Digital World   Institute on Governance   Postgraduate   Canada

Executive Leadership Program Cohort

207 Leading Digital Transformation   Ionology   Postgraduate   U.S.A

Leading Digital Transformation

214 Nordic Master Programme in Innovative Governance and Public Management   University   of   Agder   Postgraduate   Norway

Introduction to Innovative Governance and Public Administration

Introduction to academic writing and research methodology

Implementation and Evaluation of Public Policies

Institutions, Innovation and Economic Renewal

Research on Public Management and Organizations

Free choice-studies

Leadership in Public Organisations

Organisational Changes and Change Management

Regional industrial development

Innovations for the Emerging City, Openlab Multidisciplinary Project Course

Evaluation & Learning/Leading development and change in knowledge-intensive organisations

Master's Thesis and Seminar

215 Master of e-Government   Victoria University   Postgraduate   New Zealand

Managing Service Transformation

E-Government, Public Sector Reform and Good Governance

Managing ICT-enabled Forms of Public Engagement

Comparative Public Management

Information Systems Management

Managing IT-related Change

216 Digital Technologies and Policy MPA   University College London   Postgraduate   UK

Introduction to Science, Technology, Engineering and Public Policy

Analytical Methods for Policy

Digital Technology and Policy

Evidence, Institutions and Power

Science, Technology and Engineering Advice in Practice

Risk Assessment and Governance

Communicating Science for Policy

Negotiation, Mediation and Diplomacy

230 MSc Smart Cities and Urban Analytics University College London   Postgraduate   UK

Geographic Information Systems and Science

Quantitative Methods

Smart Cities: Context, Policy and Government

Urban Systems Theory

Spatial Data Capture, Storage and Analysis

Urban Simulation

Introduction to Programming

Dissertation/report

232 MA Smart Urban Futures   **Plymouth University**   **Postgraduate**   **UK**

Design Lab I

Urban Dataplay

Design Lab P

Futures Entrepreneurship

Research Project/Dissertation

250 PhD in Governance, Knowledge and Innovation   **Universidade de Coimbra - Faculdade de Direito Postgraduate**   **Portugal**

Governance, Institutions and Public Policies

Science and Innovation Policies

Science, Technology and Knowledge in Society

Contemporary Political Economy

Seminar on Governance, Institutions and Public Policies

Seminar on Science, Technology and Knowledge in Society

Research Seminar in Economics and Sociology

Seminar in Methodology of Economics and Sociology

Thesis in Political Economy of Knowledge and Institutions

255 CAS in Digital Government   **University of Lausanne**   **Undergraduate**   **Switzerland**

257 ICT in Business and the Public Sector (MSc)   **Leiden University**   **Postgraduate**   **Netherlands**

Security

Lean Six Sigma

MSc Research Project

258 e-Government Policies   **Maastricht School of Management**   **Undergraduate**   **Netherlands**

Integration

Interoperability

Transparency and accountability

Risk management

Project management

Involvement of citizens and businesses through the usage of social media and mobile computing

266 Master's in E-Government   Huazhong University of Science and Technology   Postgraduate   China   (not   in website)

271 Diploma in e-Governance   "Sikkim Manipal University (SMU) - Sikkim Manipal   Postgraduate   India

IT Service Management Systems

Social inclusion for Development

e-Governance System Integration

Risk Management in e-Governance Projects

Knowledge and Content Management

Development Model for e-Governance

Consulting for e-Governance Projects

Data Analysis

Emerging Technologies

e-Governance Project Study Tour

Dissertation and Major Project

Geo Spatial Technologies

The Open Group Architecture Framework (TOGAF)

Business Intelligence & Decision Making

Information and Cyber Security

Functions and Structure of Govt. Organization

Public Policy Technology and Law

Information and Communications Systems for Organizational Performance

Data Base Management Systems

Project Conceptualization Management & Analysis

Finance Concepts : Public Finance & Project Finance

Secure Software Development Practices, Quality Standards

e-Governance Concepts

Government Process Re-engineering

Business Models, GFR rules PPP

DPR, Government Procurement, RFP Formulation, Contract Management and Monitoring

IT & Regulatory Framework for e-Governance

Change Management and Capacity Building

Approach Methodology for Evaluation and Impact Assessment

273 e-Government Leadership   Institute of Systems Science (National University of Singapore)
       Singapore

274 Audit of e-governance   The International Centre for Information Systems and Audit   India

Audit of Government Receipts

Auditing in IT Environment

Audit of State Owned Enterprises

Performance Audit

Audit of e-governance

Environment Audit

275 Open eGovernment   Open eGovernment   Postgraduate   Sweden

Supplementary course in Computer and Systems Science

Enterprise Computing and ERP Systems

Knowledge Management

Open e-Government and e-Democracy

Scientific Communication and Research

IS Governance for e-Government: Requirement, Use, Evaluation

Decision Making and Business Intelligence

Research Methodology for Computer and Systems Sciences

Security and Privacy in e-Government: Systems, IT, Laws and Ethics

Open and Big Data Management

Business Process and Case Management

Citizen Centric Service Design and IT Architecture

Digital business strategies and change management

280 eGovernment seminars at the Austrian Federal Academy for Public Administration (in German)   The   Austrian Federal Academy for Public Administration   Undergraduate   Austria

E-Government: Open Government Data

E-Government: Überblick und neue Entwicklungen

E-Government: Verfahren und Zustellung digital

E-Government: Grundbuch, Firmenbuch, Ediktsdatei

E-Government: Zentrales Melderegister (ZMR): Schulung für abfrageberechtigte Behörden

E-Government: Gebäude- und Wohnungsregister (GWR)

E-Government – Rechtsinformationssystem (RIS)

EU-Datenbanken im Internet

EU-Datenbanken – Recherche im Bereich Recht

E-Government – E-Recht

E-Government: Das Bürgerportal HELP.gv.at

E-Government: Das Unternehmensserviceportal USP.gv.at

Barrierefreie Informationssysteme – Grundlagen

Barrierefreie Inhalte – Leicht verständlich schreiben, damit der Inhalt ankommt

Barrierefrei präsentieren mit MS Powerpoint und PDF

Barrierefrei publizieren mit MS Word und PDF

Barrierefrei publizieren mit Adobe InDesign und PDF

Barrierefreies Webdesign – Techniken und Best Practices

Toolbox E-Government – Analyse und Konzeption bedarfsgerechter Entwicklungsmaßnahmen

283 ERASMUS MUNDUS MASTER OF SCIENCE IN PUBLIC SECTOR INNOVATION AND EGOVERNANCE   KU   LEUVEN   Postgraduate   Belgium

Information systems

E-Government

Governance and Policy making

Information systems

Jurisprudence

Work, research and Seminar

Mater thesis in e-government

284 Public Sector innovation and e-governance   University of Leuven   Postgraduate   Belgium (same in 96)

302 Master's degree E-Government   Koblenz Lendau Universitat   Postgraduate   Germany

Administrative computer science / E-Government

 Information systems

 Digital communication, IT-security, collaboration

 Jurisprudence

 Research training and soft skills in E-Governement

 Master's thesis in E-Government

303 Executive Porgram of Public administration   Hertie School of Governance   Postgraduate   Germany

 Actors, Institutions, Policies

Governance and Decision-making in and between Public Institutions

Understanding Organisations / Organisational Forms

European Union Governance

Strategic and Performance Management

Human Resource Management

Fiscal Rules and Budgeting

Public Sector Budgeting and Accounting

Power & Influence: Leadership in Action

Leadership and Management

Economics, Finances, and Methods

Intersectoral Management

304 Executive Seminar Digital Governance Hertie School of Governance   Postgraduate   Germany

Digital Governance

305 BSc. E-government   Hochschule Rhein-Waal   Undergraduate   Germany (in german)

309 Designing and implementing E-government policies - The case of the Palestinian Authority (Trento, Italy)   OECD   Postgraduate   Italy

Capacity building seminar: Designing and implementing E-government policies - The case of the Palestinian Authority

312 GOVERNANCE, MANAGEMENT, E-GOVERNMENT DELLE PUBBLICHE AMMINISTRAZIONI   Unitelma   Sapienza   Postgraduate   Italy

Governance in Public Administrations

Public management

E-Government

313 Bachelor's Degree in Digital Management   University of Venice   Undergraduate   Italy

Introduction to Digital Management 1 and 2

Mathematics for decision sciences 1 and 2

Fundamentals of it law

Introduction to economics 1 and 2

Introduction to coding and data management 1 and 2

Probability and statistics

Lab of information systems and analytics

E-business, entrepreneurship and digital transformation 1 e 2

Planning and management control systems

Organising in a digital world

Financing High Growth Firms

Business and Digital Law 1 and 2

Strategic and digital marketing

Digital public management and social innovation

Lab of web technologies

Lab of human-centered design

Financial statement analysis

Business analytics

Data analytics

317 Master professional in technology for e-government   University of Trento   Postgraduate   Italy

Information Management and Integration

Application integration and Business Process Management

Conceptual Modeling, Ontology Design, and Semantic Interoperability

Security and privacy

Principles of Public Management

Case studies

Laboratory on e-Government

12. ANNEX G: Research areas appearances in courses of e- Governance related programs

In this annex the number of appearances of D.1.1 research areas, in names and descriptions of all training programs, are counted.

Big Data

Name 21

Big Data and Public Policy

Ethics of Big Data

Smart Energy, Big Data and Innovation Strategies

Big Data Computing

Advanced Data Analysis & Big Data for Business Intelligence

Big Data Systems Development and Implementation

Big Data Collection, Storage&Processing in Heterogeneous Distributed Computer Networks

Big Data Based Marketing Analytics

Big Data Based Risk Analytics

Process mining and Big Data Driving Process Management

Big Data Analytics for Industrial Internet

Cloud computing and big data

Metrics and big data

Big Data Fundamentals

European Business Intelligence and Big Data Summer Schoo

Managing Big Data

Open and Big Data Management

Big Data

Big Data Processes

Critical Big Data Management

Big Data Management

Description 23

e-Governance and e-Democracy

Defining the scope for e-services with the AOM approach

Big Data and Public Policy

Ethics of Big Data

Just Data

Smart Energy, Big Data and Innovation Strategies

Business Intelligence in SPSS

Strategic Marketing Analytics

Big Data Fundamentals

Large-Scale Analytics

Business Process Analytics

eHealth: Policy, Strategy and Systems

Social Computing, Data and Information Service

E-Government

Spatial Data Capture, Storage and Analysis

Urban Simulation

Design Lab I

Urban Dataplay

Design Lab P

Open and Big Data Management

Information Management in the Public Sector

Integrated Research Seminar

Open and Big Data Management

Open Data

Name 2

Open Data

Open Government: transparency, social responsibility and open data

Description 4

Big Data and Public Policy

Data Governance: Privacy, Openness and Transparency

Innovative Digital Public Service

Information Management in the Public Sector

Linked Data

Name 0

Description 0

Cloud Computing

Name 3

Cloud computing

Cloud Computing

Cloud computing and big data

Description 8

Introduction to IT and eGov Technologies

Introduction to Development in Cloud

Data Infrastructure in Production

Digital economy's ecosystem

IT and Operations Management

Big Data Fundamentals

Information Systems

Information Management in the Public Sector

Service Co-Creation

Name 0

Description 0

Customised/Personalised Public Services

Name 0

Description 0

Crowdsourcing

Name 0

Description 3

E-Government

Handling Disruption: Humanitarian Emergencies Management and Development

E-Government

Service Modules

Name 0

Description 0

Machine Learning

Name 0

Description 0

Natural Language Processing

Name 3

Natural Language Processing and Cognitive Modelling

Introduction to natural language processing

Information retrieval and natural language processing

Description 6

Deep Learning in R

Applied Analytics Frameworks and Methods

Introduction to natural language processing

Language engineering

Information retrieval and natural language processing

Content and Usage Analytics

Blockchain

Name 1

Blockchain Economics

Description 3

Digital Government: Technology, Policy, and Public Service Innovation

Distributed ledger technology. Blockchain's disruptive potential.

Contemporary Topics in Advanced Technology Management

Peer Production and the Theory of the Commons

Augmented Reality

Name 0

Description 1

Urban Dataplay

Virtual Reality

Name 0

Description 2

Multimedia Systems and Technologies

Smart Cities: Context, Policy and Government

Internet of Things

Name 2

Internet of all things (IoE)

Internet of Things

Description 5

Digital economy's ecosystem

Design Lab I

Urban Dataplay

Design Lab P

Mobile Internet Security

Gaming-Based Simulation

Name 0

Description 0

Policy Modelling

Name 0

Description 4

Welfare State Models

Decision Analysis, Modeling, and Quantitative Methods

Public Sector Reform and Management

e-Government II: Open and Collaborative Government

Smart City Government

Name 4

Smart Cities

The Smart Cities

Success stories of Smart Cities

Smart Cities: Context, Policy and Government

Description 5

Smart Energy, Big Data and Innovation Strategies

Smart Cities: Context, Policy and Government

Spatial Data Capture, Storage and Analysis

Urban Simulation

e-Government II: Open and Collaborative Government

Once Only Principle

Name 0

Description 0

Community Awareness Platforms

Name 0

Description 0

e-Identity / e-Signature

Name 0

Description 16

Computer Networks and Communications

E-Business

Legal aspects of e-governance, cyber security & secure governance

Cryptology

Information Systems Security and Privacy Enhancing Technologies

Applied Cryptography

Legal Aspects of Security

Ethics of Big Data

Electronic services

Logic for information professionals

Heritage institutions

General Theory of Heritage

Fundamentals of Digital Image and Text Processing

Data Governance: Privacy, Openness and Transparency

Security Management

Privacy Enhancing Technologies

Gamification

Name 0

Description 0