International Bureau
Weltpoststrasse 4
P.O. Box 312
3000 BERNE 15
SWITZERLAND

T +41 31 350 31 11
F +41 31 350 31 10
www.upu.int

Contact: Ms Patricia Vivas
T +41 31 350 35 83
patricia.vivas@upu.int

To: Union member countries

        Regulators

        Designated operators

For information to:

        Restricted unions

Berne, 4 August 2022

Reference: 4880(DOP.EPSI.PSAA)1070
Subject: Training on the integration of geographic information systems into postal addressing – Pre-registration of participants

Dear Sir/Madam,

Addresses constitute a basic piece of information that links a postal item to a recipient for the purpose of postal deliveries; as such, they are a primary requirement for the supply chain. Sender and recipient address information is an essential component of electronic advance data (EAD) transmitted in advance of international postal shipments. The increasing use and enhancement of geospatial technologies, such as geographic information systems (GIS), have made the process of creating and maintaining addresses more effective and cost-efficient. Since addressing data is inherently spatial, it can be easily collected, organized, mapped, visualized and analyzed in a GIS environment.

With this in mind, at its recent session in Berne, the Postal Operations Council approved the terms of reference for a training package on the integration of GIS into postal addressing. The objective of the training will be to provide the necessary basic knowledge to work in the spatial data environment, including both spatial data infrastructures and GIS and their most common operations. A description of the training package can be found in Annex 1 to this letter. It should be noted that the table of contents presented in Annex 1 has been designed for the Spanish training package and may slightly vary for other language versions.

The training will last approximately 27 weeks, and is expected to take place in early 2023. The Moodle platform will be used for the training, which will be provided 100% online. The first course will be delivered in Spanish, followed by English and French. The cost of the entire course per student will be 500 CHF. If you would need to benefit from financial support in order to participate, please let us know.

Countries wishing to participate in the training can register up to four participants using the form in Annex 2. It is recommended that the participants registered for the training be part of the team in charge of national addressing at the government, regulator and/or designated operator level.

The completed questionnaire should be submitted online or returned **no later than 30 September 2022**.

We hope that as many as possible of the 192 UPU member countries will wish to take part in this training, and therefore urge you to respond to this questionnaire. If you require any further information, please do not hesitate to contact Ms Patricia Vivas (patricia.vivas@upu,int), our Addressing and Physical Services Expert.

Yours faithfully,
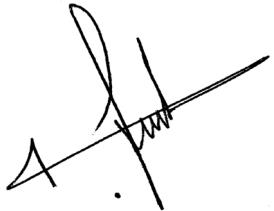
Abdel Ilah Bousseta
Director of Postal Operations

Syllabus for the training package on the integration of geographic information systems into postal addressing

About the training

The course will introduce the basic concepts of geographic information and identify the different geodetic reference systems, along with the tools provided by geographic information systems (GIS). These tools range from capture and storage to final analysis of the information, which requires knowledge of the structure and type of geographic information. The course will continue with study of the process of publishing data on the Internet in a standardized and interoperable way, following the principles of spatial data infrastructures (SDIs) through visualization and download services. The course will also provide knowledge on how to describe geographic data *a priori* through product specifications and *a posteriori* through metadata, highlighting the type of licence and its relationship with open data catalogues. Practical examples of postal address structures – identifying it as a geographic object, its attributes and its relationships with other geographic objects – and how postal addresses should be documented, described and finally published and exploited through geocoding web services, will also be integrated. In addition, exercises and case studies will form part of the course, based on the following free software tools: QGIS, GeoServer, GeoNetwork, PostGis and Notepad ++.

Each of the modules will include:

– Interactive theoretical material: each module will present the theoretical content in PDF or video format. In some cases, the theoretical contents will be shown in a dynamic and pedagogical way.

– Questionnaires: for each module, a questionnaire will be available to evaluate the theoretical knowledge. Responses will be corrected automatically by the system and results stored directly on the platform.

– Guided practices: the practical aspects of the course range from participating in discussions through the forum to submitting the answers to the module exercises. The practices will be sent to the tutor for correction.

Throughout the course, the student will have the support of a tutor in each of the modules. They will be contactable via e-mail through the course platform to resolve any course-related issues. In addition, the tutors will follow up on the training and will mark and grade the activities programmed for each of the students.

Table of contents

Course I – GIS fundamentals

Module A – Geographic information concepts

Unit 1 – Terms and definitions

1.1   Spatial data and geographic data

1.2   Data sets and series

1.3   Geographic objects and catalogue of geographic objects (ISO standard)

1.4   Data product specifications (ISO standard)

Unit 2 – Fundamental concepts of coordinate reference systems

2.1   Geodetic reference systems

2.2   Cartographic projections

2.3   Coordinate reference systems

2.4   Geographic or geodetic coordinates

2.5   Representation of spatial data – EPSG codes

List of exercises:

–   Catalogue of geographic objects

–   Product specifications

Self-assessment quiz: 10 questions

Duration: 2 weeks

Module B – Fundamentals of geographic information systems (GIS)

Unit 1 – Definitions and components of GIS

1.1   Definitions of GIS

1.2   Components of GIS

1.3   Phases of a GIS project

Unit 2 – Vector and raster models

2.1   Geographic data and its representation

2.2   Vector and raster models

2.3   Comparison between vector and raster models

2.4   Digital terrain models (DTMs)

Unit 3 – Vector spatial model

3.1   Geometric and topological primitives

3.2   Complete topology: relationships between topological primitives

3.3   Spatial operators

Unit 4 – Structure of geographic data

4.1   Data structure in the vector model

4.2   Data structures in the raster model

List of exercises:

–   Introduction to the QGIS interface

–   Topology and topological primitives

–   Data structure

Two self-assessment quizzes: 10 questions

Duration: 3 weeks

Module C – Phases of a GIS process

Unit 1 – Data modelling

1.1   Examples of data specification construction

1.2   Unified Modelling Language (UML): application scheme

Unit 2 – Geographic information capture

2.1   Methods of capturing geographic information

2.2   Topographic sources, data import and download centres

Unit 3 – Data quality

3.1   Definition and differences between accuracy and precision

3.2   Errors (types and sources, and uncertainty)

3.3   Geographic data quality

Unit 4 – Geographic information processing

4.1   Introduction

4.2   Integration: format homogenization, coordinate systems and quality, data harmonization

4.3   Editing

Unit 5 – Storage and management of geographic information

5.1   Storage and compression of geographic information

List of exercises:

–   Understanding, querying and creating a UML model

–   Loading data into QGIS

–   Editing data with QGIS

–   Data storage with QGIS

–   Exploiting data and basic tools with QGIS

Self-assessment quiz: 20 questions

Duration: 4 weeks

Course II – Advance GIS and spatial data infrastructures

Module D – Exploitation and updating of geographic information: GIS applications

Unit 1 – Exploitation of GIS

1.1   Definition

1.2   Data exploitation functions in a vector GIS

1.3   Data exploitation functions in a raster GIS

1.4   Thematic analysis functions

1.5   Example of updating geographic information

Unit 2 – Representation of geographic information on a map

2.1   Map elements

2.2   Map composition

2.3   Graphic semiology

Unit 3 – Fields of application of GIS

3.1   Introduction

3.2   GIS applications: transportation, land use, environmental impact studies, market analysis

3.3   Summary of GIS applications

3.4   Examples of real GIS applications

List of exercises:
–   Data exploitation and basic tools with QGIS
–   Data exploitation: selection tools with QGIS
–   Data exploitation: processing tools with QGIS
–   Map design with QGIS

Self-assessment quiz: 20 questions

Duration: 3 weeks

Module E – Concepts for the publication of geographic information

Unit 1 – Spatial Data Infrastructure (SDI)

1.1   SDI concept and components

1.2   Open data and reuse

1.3   Interoperability

1.4   ISO/TC 211 Geographic Information and the Open Geospatial Consortium (OGC)

1.5   SDI legal framework (Europe and Latin America)

1.6   Other examples: European Commission, Argentina, Brazil, Chile, Colombia, Ecuador, Peru, Spain and Uruguay

Unit 2 – Open data and licensing

2.1   Open data and reuse

2.2   Types of licences

2.3   Guidelines for the publication of spatial data

Unit 3 – Language and architecture for geoservices

3.1   Extensible Markup Language (XML), syntax, parts and validity

3.2   XML in SDI

3.3   Geographic Markup Language (GML).and the ISO 19131 application schema

List of exercises:

–   Open data identification and open data catalogues

–   XML document and schema with Notepad ++

–   Identification of XML data schemas (GML)

Self-assessment quiz: 10 questions

Duration: 2.5 weeks

Module F – Geographic information storage

Unit 1 – Databases

1.1   Introduction

1.2   Characteristics and relational databases

Unit 2 – PostgreSQL and the PostGIS extension

2.1   Design and administration: pgAdmin interface

2.2   Database structure

2.3   Data manipulation (insert, select, update, delete)

2.4   Simple queries (clauses and operators) and combined queries (inner join, left join, right join, full join)

2.5   SQL functions

List of exercises: SQL functions

Self-assessment quiz: 10 questions

Duration: 1.5 weeks

Module G: Geoservices for GI publication

Unit 1 – Visualization service (Web Map Service, WMS)

1.1   Introduction

1.2   Request rules

1.3   WMS operations: GetCapabilities, GetMap, GetFeatureInfo

Unit 2 – Web Map Tile Service (WMTS)

2.1   Introduction

2.2   WMTS structure and differences with the WS

2.3   WMTS operations: GetCapabilities, GetTile, GetFeatureInfo

Unit 3 – Download services

3.1   Direct download services and predefined download services

3.2   Structure of a Web Feature Service (WFS): simple, basic and complete

3.3   ATOM Feed Service

3.4   Web Coverage Service (WCS)

3.5   Introduction to OGC API features

List of exercises:

–   Querying and visualization of data through a WMS (GeoServer)

–   Querying and visualization of data through a WMTS (GeoServer)

–   Querying and downloading data through a WFS (GeoServer)

Self-assessment quiz: 20 questions

Duration: 3 weeks

Module H – Description of geographic information

Unit 1 – Definition and use of metadata

1.1   Definitions and context

1.2   Introduction to metadata (definition, use and advantages)

1.3   Metadata files, XML

1.4   Methodology for creating resource descriptions

1.5   Publication of metadata

Unit 2 – International metadata standards

2.1   ISO 19115-1:2014 – Part 1: Fundamentals

2.2   ISO 19115-2:2019 – Part 2: Extension for images and mesh data

2.3   ISO/TS 19115-3:2016 – Part 3: XML schema implementation for fundamental concepts

2.4   Latin American Metadata Profile (LAMP) version 2.0

2.5   European standards and technical guidelines

Unit 3 – The metadata catalogue

3.1   The catalogue in SDI

3.2   Open data declaration

3.3   Open data catalogues and portal

3.4   Geographic information catalogue references

Unit 4 – The catalogue service

4.1   The Catalogue Service Web (catalogue client, catalogue service CSW)

4.2   GeoNetwork

List of exercises:

–   Analysis of metadata elements

–   Creating a metadata file of a data set

–   Practice with GeoNetwork

–   Metadata queries via a location service, CSW

Self-assessment quiz: 20 questions

Duration: 3 weeks

Module I – Geocoding of spatial data

Unit 1 – Geocoding

1.1   Definition

1.2   Direct and inverse geocoding

1.3   Data types: place names, points of interest and postal addresses

Unit 2 – Data model examples

2.1   European Commission address data specifications. Regulation (EU) No. 1089/2010

2.2   Application schema: spatial objects, attributes and relationships

2.3   Data model of the Standards Commission of the Spanish Geographic High Council

2.4   CartoCity

Unit 3 – Geocoding service and clients

3.1   Characteristics of a geocoding service: examples

3.2   Postal address downloading service (WFS)

3.3   Routeing, network analysis, minimum path

List of exercises:

–   Queries to the European Commission data model

–   Direct and inverse queries to the geolocation service

Self-assessment quiz: 10 questions

Duration: 2 weeks

Course III – Creation of geographic address models

Module J – Geographic address models

Unit 1 – Conceptual and historical framework

1.1 Terms and definitions

1.2 Importance, uses and historical evolution

1.3 Administrative and postal records

1.4 Social integration and human rights

Unit 2 – Data models

2.1 Address assignment scheme

2.2 Conceptual model

2.3 Canonical forms and labelling

2.4 Postal specificities

2.5 Interchange formats

2.6 Metadata

Unit 3 – Management models

3.1 Governance

3.2 Processes

3.3 Services (with emphasis on public and postal services)

3.4 Technological architecture

3.5 Regulations and documentation

Unit 4 – Quality control of geographic information

4.1 Quality model

4.2 Completeness

4.3 Consistency

4.4 Accuracy

4.5 Usability

Unit 5 – Current overview

5.1 Global initiatives for direction and positioning

5.2 National and local experiences in Latin America

5.3 Current panorama: challenges and opportunities of addressing systems

Module K: Practical applications of postal-oriented products and services

Unit 1 – Products derived from geographic addresses using GIS

1.1 Web services (address search, postcode search and street suggestions)

1.2 Geocoder (Tsubasa)

1.3 Geopostal and its main information layers

1.4   Public software catalogue

1.5   Control panel (Galatea) and indicator management

1.6   Postal area management

1.7   Postman management

1.8   Complex spatial analysis: from the most classical to the most useful ones

Duration: 3 weeks

ISO/TC 211 international standards for geographic information

The following is a list of the ISO/TC 211 international standards of the 19100 family that are taught and used as a reference in the course, either partially or in their entirety.

–   Data model standards

- ISO 19107:2019 Geographic information – Spatial scheme

- ISO 19109:2015 Geographic information – Rules for application schemas

- ISO 19137:2007 Geographic information – Essential spatial schema profile

–   Standards for the management of geographic information

- ISO 19110:2016 Geographic information – Methodology for the cataloguing of geographic objects

- ISO 19111:2019 Geographic information – Coordinate reference systems

- ISO 19112:2019 Geographic information – Spatial reference systems by geographic identifiers

- ISO 19115-1:2014 Geographic information – Part 1: Fundamentals

- ISO 19115-2:2019 Geographic information – Part 2: Extension for imagery and gridded data

- ISO/TS 19115-3:2016 Geographic information – Part 3: Implementation of XML schemas for fundamental concepts

- ISO 19131:2007 Geographic Information – Data product specifications

- ISO 19168-1: 2020 Geographic information – Geospatial API for geographic objects – Part 1: Core

–   Infrastructure standards*:* ISO/TS 19103:2005 Geographic information – Conceptual schema language

–   Geographic information services standards

- ISO 19128:2005 Geographic information – Map web server interface

- ISO 19133:2008 Geographic information – Location-based services: Tracking and navigation

- ISO 19142:2010 Geographic information – Geographic object web service

–   Geographic information coding standards

- –   ISO 19118:2011 Geographic information – Codification

- ISO 19136-1:2010 Geographic information – Geographic Markup Language (GML) – Part 1: Fundamentals

- ISO 19160-4:2022 Geographic information – Addresses – Part 4: Components of international postal address language models

Survey on the need for a training package on the integration of geographic information systems into postal addressing – preregistration of participants

Purpose of the survey: to gather information on training needs related to the integration of geographic information systems (GIS) and spatial data infrastructure (SDI) in the development and management of postal addressing.

The objective of this survey is to establish a plan for delivering the training in the different linguistic regions. To do so, the International Bureau wishes to identify the potential number and type of experts interested in participating in the training, as well as their linguistic regions.

Only one response per member country is allowed. In cases where there are training needs in different departments responsible for addressing within the same member country, the answers should be coordinated internally and/or grouped together by the concerned country as appropriate. To this end, the survey has been divided into two parts: part 1 is designed to coordinate country answers, while part 2 will be used to preregister participants. You are kindly requested to complete the online version of the questionnaire, which can be found at:

– In English:

Part 1 – Country information: https://www.surveymonkey.com/r/BKS8P6H

Part 2 – Preregistration of participants: https://www.surveymonkey.com/r/GZB3PF6

– In French:

Part 1 – Country information: https://fr.surveymonkey.com/r/3TY5CSC

Part 2 – Preregistration of participants: https://fr.surveymonkey.com/r/H9GLM79

– In Spanish:

Part 1 – Country information: https://es.surveymonkey.com/r/PXXY5J5

Part 2 – Preregistration of participants: https://es.surveymonkey.com/r/PNQSNVM

If you are unable to complete the questionnaire online, you will find a Word-format version on the UPU website at www.upu.int/en/Postal-Solutions/Capacity-Building/Addressing-Assistance-to-Countries under "Training materials". The Word version of the questionnaire should be returned to patricia.vivas@upu.int.

Please note that the completed questionnaire should be submitted or returned **no later than 30 September 2022**.

If neither of the above options is possible, please complete the paper copy below and return it to:

Patricia Vivas
Postal Operations Directorate
Universal Postal Union
Weltpoststrasse 4
3015 BERNE
SWITZERLAND

Target audience

The training is aimed at representatives of ministries, regulators and postal operators who are called upon to work with address data. Countries wishing to participate in the training can register up to four participants. It is recommended that the participants registered for the training sessions be from the team in charge of national addressing at the government, regulator and/or designated operator level.

Stl/Pro

Technical requirements

The exercises and case studies will be carried out with the following free software tools: QGIS, GeoServer, GeoNetwork, PostGIS and Notepad++. Although the sessions will not be live, a good Internet connection is required to take part in the training. A computer with administrator rights is also needed.

Part 1 – Training package on integration of geographic information systems into postal addressing – Country information

1.   Contact details of person responsible for coordinating the answers from the member country:

Country		
Full name	❏ Mr	❏ Ms
Position/title		
Tel.	E-mail	

2   Please select the desired language for the training

   ❏   English

   ❏   French

   ❏   Spanish

3   Financial support needed

   ❏   Yes

   ❏   No

Part 2 – Training package on integration of geographic information systems into postal addressing – preregistration of participants

Questionnaire: About the participant

This section will be used as a preregistration form for the training on integration of GIS into address management. The form may be duplicated to register more than one participant for the training sessions. Please note that it is recommended that at least one representative from the government/regulator and one from the Post be registered, in order to achieve the objective of integration of GIS into regular address management.

Please fill in the form in block capitals.

1   Contact information for the person attending the training:

Full name		
	❏ Mr	❏ Ms
Position/title		
Tel.	E-mail	

2   I work for the (Please tick the correct box)

   ❏   Government

   ❏   Regulator

❑   Postal operator

		Yes	No
3	Do you have any prior knowledge of:		
	– Geographic information systems (GIS)	❑	❑
	– Spatial data infrastructures (SDI)	❑	❑
	– Extensible Markup Language (XML)	❑	❑
	– Relational database management systems and structure query language (SQL)	❑	❑
	– Web Map Services (WMS)	❑	❑
	– Metadata	❑	❑
	– Catalogue Service Web (CSW)	❑	❑
	– Geocoding and geocoding services	❑	❑
	– Phyton	❑	❑
	– ISO/TC 211 International Standards for Geographical Information	❑	❑
	– The INSPIRE Directive	❑	❑

4   Please provide information about your professional background in relation to the following fields:

GIS	
SDI	
IT	
Address data	
Postal operations	

5   Please select the desired language for the training

❑   English

❑   French

❑   Spanish

6   If you have any general comments or any issues, please include them here: