Syllabus of the UN-Data Analytics Professional Certificate UN-DAPC- Spring Semester

Contents

Learning outcomes

The UN DAPC offers a unique blended curriculum on descriptive and predictive analytics in the UN context. Over six months, participants are guided through a specialized learning built by UN data experts.

The programme has been designed to prepare UN staff to unlock their data potential through a comprehensive and interactive overview of core data science concepts from descriptive to predictive analytics. Participants will be better equipped to formulate problem statements for data-informed solutions, apply data visualization and storytelling design principles to deliver powerful messages, and build basic predictive models with appropriate methods and skills. They will have the opportunity to hone their skills in effectively communicating data analysis findings and dealing with the ethical dilemmas and risks associated with working with real-world data cases. At the end of the Programme, participants will be able to:

- Explain the different types of analytics and their applications in the UN context
- Implement a scoped data analysis to their needs for information

- Use data visualization and storytelling techniques to communicate key messages
- Identify suitable predictive analytics applications to meet the business needs at their workplaces
- Describe the key features of predictive models, understand risks and how to ensure an ethical use.

It is composed of self-paced lessons and instructor led webinars. This course's key features are practical case studies and on-the-job practice opportunities. The features ensure that participants not only gain solid knowledge and skills but also apply them.

The UN DAPC offers a number of learning modalities that give participants a unique opportunity to learn by doing through a data-use case approach.

Target audience

The course targets UN personnel (professional and general service staff) at headquarters and field locations, interested in using data more effectively at work. It will be of great benefit to those who need to present analyses or to those charged with research, analytical and reporting responsibilities. More in general, the course will benefit all UN staff interested in expanding their knowledge and ability to access, use, interpret and communicate data.

Thematic self-paced modules

A comprehensive curriculum of thematic self-paced modules delivered online through UNSSC's e-learning platform. More information on the 10 thematic modules is displayed below:

Module 1 Data fundamentals

This module lays the foundation of data science. It describes the main elements and characteristics of data and the importance of data for the United Nations. Meanwhile, it introduces descriptive statistical measures that can help us understand the quality of our data.

Module 2 Data science project

This module offers an overview of a data science project. We explore the management components of a data science project, and identify different types of approaches to data analysis. And then, we analyze different methods for data sampling and data collection to get high-quality data for analysis.

Module 3 Data exploration and analysis

This module guides us to the core steps of a data science project: data preparation and data analysis. We discuss the processes of data cleaning and the measures for data protection. Also, we cover the concepts and skills of data analysis and statistical models with EXCEL examples.

Module 4 Data for decision making

This module explains the use of data analysis results in the decision-making process. We establish the processes of turning data into wisdom, and at the same time, understand biases and noisy environments interrupt thoughtful data decisions. From here, weexplore the efforts conducted to move towards data-driven organizations.

Module 5 Data visualization- Part 1

This module reveals the basics of data visualization. Starting from the concepts and theories, we learn to communicate with data and explore the scenarios for different visualization types. By analyzing some particular examples, we identify practices that misuse data and manipulate the information, as well as skills to make accessible data visualizations.

Module 6 Data visualization- Part 2

This module extends the data visualization to the advanced level. We refine our graphs from a design standpoint to ensure the message is clear and well-emphasized. Then, we learn how to interpret more advanced graph types, as well as when to use them.

Module 7 Data storytelling

This module incorporates data into storytelling to deliver an engaging and credible message. We explore how to leverage data storytelling concepts and approaches to enable decision-making. Following the traditional narrative arc, we consider the context, the message, and the interactivity to build a powerful data story.

Module 8 Fundamentals of predictive analytics

This module introduces the key concepts and features of predictive analytics. From its mathematical logic to various methods, we learn the fundamentals of predictive analytics and the procedures for developing a predictive model. With real-life examples, we examine different kinds of predictive models for suitable scenarios in social sciences.

Module 9 The science of predictive analytics

This module describes common approaches to predictive analytics. First, we learn the components and functions of time series and learn how to develop one. Second, we analyze the methods of machine learning and its application. Third, we explore how to use ensemble learning to build a high-quality predictive model.

Module 10 Applying predictive analytics

This module demonstrates the process of machine learning model deployment and the ethical use of predictive analytics. We learn the main steps and identify key arrangements to deploy predictive models from production to operation. Also, we discuss key considerations of ethics and risks in applying predictive models, and summarize good practice.

All self-thematic modules include a resource section with relevant materials to read. Each self-paced module takes about 4 hours to complete.

Live webinars

Practical and interactive live webinar sessions with practitioners and data experts. Information about the topics, duration and dates is displayed below[1].

Live session	Time	Date
Orientation webinar	60 min	12 March
Data collection and cleaning	120 min	14 March
Data exploration and analysis	120 min	21 March
Cognitive bias and logical fallacies	120 min	28 March
Data Visualization 1	120 min	4 April
Data Visualization 2	120 min	11 April
Data Storytelling	120 min	18 April
Orientation and tools to predictive modeling	120 min	25 April
Predictive analysis of malaria prevalence	120 min	2 May
Conflict prevention through classification analysis	120 min	9 May
Analysis of time series forecasting	120 min	16 May

On the job practice and Case study

Mentoring sessions will guide the application of the knowledge and newly acquired skills. Throughout the practice, the learners will join 3 group meetings with their mentors.

On the Job Project

The On the Job Project (OJP) is expected to summarize the skills and knowledge gained through the training directly applicable to the learners' work.

The learner should choose one of the following areas of specialization:

1) Data preparation, exploration and analysis
2) Data visualization and storytelling

By 8 March the learner should choose their specialization and inform the UNSSC Team, so he/she will be assigned to a mentor.

The first meeting will take place by 22 March to discuss potential approaches for the OJP and guide the learner on the proposal.

The OJP proposal (1-2 pages) will include:

1) A title and brief description of the proposed project, in one of the three areas of specialization
2) A brief statement of expected results
3) Specification of methods and tools to use

By 12 April the learner should submit the OJP proposal to the mentor, after the first session. Then mentors will provide written feedback by 19 April.

The second meeting will be scheduled during the first week of May to give guidance and support during the research.

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[1] Dates of the webinars can be subject to changes. Participants will be informed in advance of any change related to the sessions.

By 1 June, the learner should submit a brief OJP report documenting the project experience and the results obtained.

The OJP report (3-4 pages) will include:

1) Summary of the work conducted
2) Examples of analysis or visualizations used
3) A brief statement of conclusions

By 15 June the mentor should provide brief written feedback and have a meeting with the mentees. During the meeting, mentors will clarify feedback and share best practices.

Case Study

For those learners that do not work with data, or prefer to work on a given Case Study (CS), they will be asked to choose one of the following areas of specialization:

1) Data preparation, exploration and analysis
2) Data visualization and storytelling
3) Predictive modeling

By 8 March the learner should inform the UNSSC Team about the area of interest, and he/she will be assigned to a case-study mentor.

Throughout the practice, the learners will join 3 group meetings with their mentors. The first meeting will take place by 22 March to discuss potential approaches for the case study.

The CS proposal (1-2 pages) will include:

1) A title and brief description of the proposed project, in one of the three areas of specialization
2) A brief statement of expected results
3) Specification of methods and tools to use

By 12 April the learner should submit the proposal to the mentor, after the first session. Then mentors will provide written feedback by 19 April.

The second meeting will be scheduled during the first week of May to give guidance and support during the research.

By June, the learner should submit a brief CS report documenting the experience and the results obtained.

The CS report (3-4 pages) will include:

1) Summary of the work conducted
2) Examples of analysis, visualizations or models used
3) A brief summary of conclusions

By 15 June the mentor should provide brief written feedback and have a meeting with the group. During the meeting, mentors will clarify feedback and share best practices.

Tools

The self-paced modules are mainly tool agnostic, as they focus on principles and concepts that can be used by any tool. During the webinars, the learners will discuss and practice with different tools, including:

1) Data fundamentals: Excel, OpenRefine, Trifacta Wrangler, and WinPur
2) Data visualization: Flourish, Tableau, Power BI, ChatGPT
3) Predictive modeling: BigML and Google AI

During the OJP or CS, participants will be able to practice with the tools discussed during the webinars or others, in coordination with the mentors. However, the main focus is given to the tools that are free to use. Excel will be the main tool for data cleaning and analysis. Power BI has a free version that will be available for all of our learners to carry out data exploration. Also, the free version of Flourish is good enough to carry out the work of data visualization practice in our course. Lastly, we will offer a short-term learner license of Tableau for participants in the data visualization track, which gives full access to the app.

Completion requirements

The UN DAPC will be issued upon successful completion of mandatory activities, final quiz and OJP/CS positive assessment. To receive the Certificate, the learners should have:

- Completed all lessons in the Modules
- Responded to the questions in the discussion forums
- Joined all live webinars
- Completed a final test
- Submitted the OJP/CS report
- Answered a final survey about the course

Digital certification

A digital certificate will be issued as indicator of accomplishment of the acquired learning. It will be possible to display and verify the certificate online following open badge standards.

Faculty

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