Visual Tools to Empower Citizens

1st Edition
Code: 200058
Category: Master
Credits: 60.00
Language: English
Start date: 14/10/2020
Last session face-to-face session: 26/06/2021
End date: 26/06/2021

Day and Time: From January to March: Wednesdays, Thursdays and Fridays from 4 pm to 7 pm. From March to June hackathons will take place in online format on specific days (see the calendar) 100% of the classes will be held by videoconference.
Location: Parc Científic i Tecnològic de la Universitat de Girona or in streaming through the videoconferencing platform Zoom.
Places available: 20

Prices and discounts

Price: 4.175 €

300,00 euros Persons unemployed at the time of enrolment.
3.875€ (835 € Pre-registration + 3.040 € Enrollment)

300 euros Students and alumni of the University of Girona.
3.875€ (835 € Pre-registration + 3.040 € Enrollment)

300 euros for Students and alumni of the FUdGIF Masters, postgraduate and specialisation courses
3.875€ (835 € Pre-registration + 3.040 € Enrollment)

300,00 euros University of Girona and FUdGIF personnel.
3.875€ (835 € Pre-registration + 3.040 € Enrollment)

5% discount Students and alumni of the FUdGIF Masters, postgraduate and specialisation courses.
3.966,25€ (835 € Pre-registration + 3.131,25 € Enrollment)

300, 00 euros Persons with disabilities (of 33% or above).
3.875€ (835 € Pre-registration + 3.040 € Enrollment)

5% off discount Members of large or single-parent famílies.
3.966,25€ (835 € Pre-registration + 3.131,25 € Enrollment)

10% off for companies enrolling 2 employees for the same course (with the company billing).
3.757,50€ (835 € Pre-registration + 2.922,50 € Enrollment)

15% off for companies enrolling 3 or more employees for the same course (with the company billing.
3.548,75€ (835 € Pre-registration + 2.713,75 € Enrollment)

10% discount for employees from companies that have done tailor-made training courses with the FUdGIF.
3.757,50€ (835 € Pre-registration + 2.922,50 € Enrollment)

Informative Sessions

	Date	Time	Place
Informative session 1	24/07/2020	17:00	ONLINE by videoconference with Zoom by clicking here
Informative session 2	08/09/2020	17:00	ONLINE by videoconference with Zoom by clicking here
Informative session 3	02/10/2020	18:00	ONLINE by videoconference with Zoom by clicking here

Reasons for doing the course

Informative session

Next informative session will take place on **Friday, October 2 at 6pm by Zoom** in the following link:

https://zoom.us/j/99060708060

Reasons to take the course

There is a growing demand (an urgent need, it could be argued) for a hybrid profile that merges design and computing. Qualified professionals are needed who are capable of designing visualisation solutions for the public sector: from transparency tools aimed at citizens to intelligent systems for data-driven understanding, exploration and decision-making.

Professionals are required who can work within public administrations, but also in media or companies that wish to make data accessible to a specific audience or to a sector of their customers.

The specialised training described here is not offered anywhere else. International studies contain part of the content offered through this Master's Degree but in those studies the aforementioned content is not geared towards practice or towards the professional opportunities that currently exist.

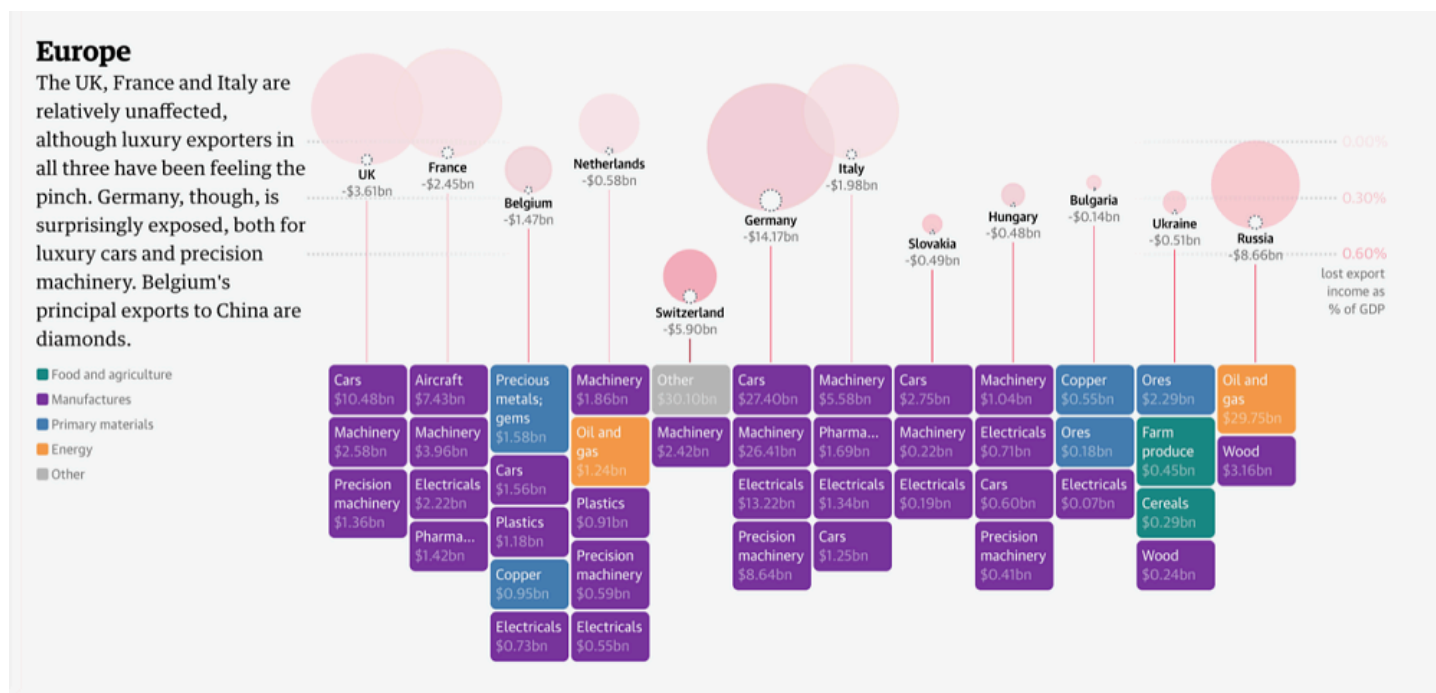Make data accessible.

External practices

With the public and private partner entities listed above, along with others that may join us before the start of the Master's Degree.

Presentation

Presentation

In November 2019, the Publications Office of the European Union organised the first EU DataViz conference, under the motto "Serving citizens from better data visualisations". The event brought together more than 500 people (mostly from the public sector) to discuss how to meet the needs of communities. Transparency laws passed in recent years in Europe require governments to open repositories of public information. However, if the general public does not understand the explanations of open data, public actions are of little use. This idea was reflected at the EU DataViz, both in the talks and in informal conversations. Public entities have a duty of care to citizens; they must create interfaces that explain and enable the discovery of data.

This Master's Degree aims to make strides in improving the visual literacy of data, as a citizen empowerment tool designed to measure and evaluate evidence-based public policies. At the same time, it aims to guide public administration bodies, research institutes and the media in good visualisation and transparency practices.

Europe

The UK, France and Italy are relatively unaffected, although luxury exporters in all three have been feeling the pinch. Germany, though, is surprisingly exposed, both for luxury cars and precision machinery. Belgium's principal exports to China are diamonds.

Food and agriculture
Manufactures
Primary materials
Energy
Other

UK -$3.61bn
France -$2.45bn
Belgium -$1.47bn
Netherlands -$0.58bn
Germany -$14.17bn
Switzerland -$5.90bn
Italy -$1.98bn
Slovakia -$0.49bn
Hungary -$0.48bn
Bulgaria -$0.14bn
Ukraine -$0.51bn
Russia -$8.66bn

0.00%
0.30%
0.60%
lost export income as % of GDP

Cars $10.48bn
Machinery $2.58bn
Precision machinery $1.36bn

Aircraft $7.43bn
Machinery $3.96bn
Electricals $2.22bn
Pharma... $1.42bn

Precious metals; gems $1.58bn
Cars $1.56bn
Plastics $1.18bn
Copper $0.95bn
Electricals $0.73bn

Machinery $1.86bn
Oil and gas $1.24bn
Plastics $0.91bn
Precision machinery $0.59bn
Electricals $0.55bn

Other $30.10bn
Machinery $2.42bn

Cars $27.40bn
Machinery $26.41bn
Electricals $13.22bn
Precision machinery $8.64bn

Machinery $5.58bn
Pharma... $1.69bn
Electricals $1.34bn
Cars $1.25bn

Cars $2.75bn
Machinery $0.22bn
Electricals $0.19bn

Machinery $1.04bn
Electricals $0.71bn
Cars $0.60bn
Precision machinery $0.41bn

Copper $0.55bn
Ores $0.18bn
Electricals $0.07bn

Ores $2.29bn
Farm produce $0.45bn
Cereals $0.29bn
Wood $0.24bn

Oil and gas $29.75bn
Wood $3.16bn

Aims

To train professionals to design and develop visual tools and public data exploration systems that increase transparency.

These include tools similar to those of the Govtrack.us project: Tracking the United States Congress, which in 2005 made available vast amounts of legislative data in a structured, open and visual format for researchers, journalists and public interest initiatives. This initiative served to develop dozens of open government projects up until 2017, when the US Congress began to publish open and structured data itself.

Although our focus will be on the public sector, the skills required to conceive and develop the projects will be transferable to other areas, ranging from interactive journalism to companies.

Professional outings

The radical change from visual and interactive journalism to the mainstream Anglo-American and European media (in which we have extensive experience) occurred the moment computer professionals entered the newsroom. Until then, journalists and "technical" staff were two worlds apart. They had virtually no contact with each other.

Although we are fully aware that the language of each specialisation involves technical differences, we are convinced that demand will grow in the coming years. Both profiles - design and programming - are essential for a visualisation team. The proof of this is that the most successful agencies and departments strike a balance of both.

Some of the most noteworthy professional opportunities are as follows:

- DataViz developers for public administration bodies
- Designers of interactive visualisations for public research institutes
- Data scientists and visualisation developers for data analytics companies
- DataViz designers or developers of interactive media systems or fact-checking agency systems.
- DataViz designers or developers of interactive systems for companies in any sector.

Who the course is for

Graduates in Computer Engineering, Biomedical Engineering, Biotechnology, Videogame Design and Development, Multimedia Studies, Bioinformatics, Science and Data Engineering, Geoinformation and Geomatics Engineering, Audio-Visual Systems Engineering or Data Engineering, among others.

The Master's Degree is also open to active professionals in the journalism or corporate communication sector (journalism, advertising, marketing), as well as to those from other branches of the Humanities, along with Social and Cultural spheres.

When it comes to selecting students, special emphasis is placed on female profiles of all the proposed disciplines, in order to ensure a much-needed perspective that is lacking in the professional market.

Admission requirements

Candidates must hold a university degree or equivalent (bachelor's degree, engineering, architecture, diploma, technical engineering or technical architecture).

In the case of a foreign university degree, the student must accredit a comparable educational level in the aforementioned degrees and must accredit eligibility to access postgraduate studies in their country of issuance.

If the candidate holds a degree in Communication, Humanities or the Social area, they must accredit the prior completion of an intensive course in computer programming and/or statistics.

Syllabus

Data visualisation programming

One of the key capabilities of this subject is knowing how to implement visual interfaces for data exploration or communication at scale. A variety of technologies are featured, aimed at data visualisation production. In addition to showing a wide range of emerging tools, we will work with the libraries, frameworks and programming languages that have become a standard for visualisation, such as d3.js, Vega, R and Python.

Statistical programming

The course will provide students with practical knowledge of data analytics and statistical techniques: R and SQL; machine learning models and data mining techniques (data mining) for the creation of predictive systems, recommenders and classification systems. An overview of probability, discrete and continuous random variables, distributions, correlations, regression, and other statistical techniques will also be provided.

Cartography and visualisation

A considerable amount of public data emanates from the geographies inherent to the administrative territory itself. This course introduces the many uses of mapping to explore and reveal spatial patterns. It will cover everything from map design to data management and representation, geostatistical techniques, and emerging web technologies that have revolutionised geographic information systems.

Data visualization design and creative technologies

Data visualisation is a language, and like all languages it has precise code, but it also has flexibility for creativity. In this subject, we will study how to convert quantitative variables into visual attributes, graph grammar, composition, information aesthetics, interaction design and information design. It is a pencil and paper subject involving case study analysis and debate, designed to complement data visualisation programming.

Ethics and Democratic Culture

This course aims to provide a context on how Artificial Intelligence and data misuse are impacting society, including unfair bias, surveillance and breach of privacy. It seeks to analyze different scenarios identifying risks for people, as well as to rethink improvements to develop possible solutions. The focus will always be on how we could be more ethical, legal and secure when working with data and technology.

Open data engineering and systems architecture

One of the necessary skills for creating scalable data exploration tools is how we store and process datasets. In this subject, we will address the foundations for building the architecture of traditional and modern data systems for big data. The basic concepts of cloud computing will also be discussed, with emphasis on solving specific needs for data analysis and science.

Workshops I, II and III

Each workshop will consist of the elaboration of a project, carried out with one of the collaborating entities (public or private) of the Master's Degree.

All the workshops are independent, which means that a project cannot be started in Workshop I and be continued in Workshops II and III. The skills necessary to develop the projects must be complementary. Therefore, they will only have to fulfil one or two parts of the visualisation process.

Starting with a brief introduction and a prototype, students will work online and in groups. In an intensive face-to-face session (hackathon mode), the final result of each project will be presented and evaluated.

Final project (TFM)

The TFM must comply with the entire visualisation process: from the search and collection of data to database management, transformation, analysis, evaluation and visualisation.

Due to its longer duration, the face-to-face part will consist of two intensive sessions (hackathons) in order to present and evaluate the completed work.

An example of a TFM would be the following: 'US-led airstrikes against Islamic State in Syria and Iraq' report. The newspaper kept the database updated for a year. The software was written to detect new releases posted on the operations website of the United States Department of Defense, extracting the locations and dates of the bombings from the text of these reports. The software also alerted a group of reporters, who checked and approved the extracted data. Once the information was verified, the data was automatically passed to the dataset, which updated an interactive display of the extracted data.

Qualification

Master's Degree in Visual Tools to Empower Citizens by the University of Girona*

* It does not include the issuance rate of the title.

Teaching and Assessment

The subjects will combine different methodologies: flipped classroom, online materials proposed by the invited speakers (professionals of recognised prestige from the media or public administration bodies), case-study presentations, etc.

The students will be organised in rotating teams of three people, in order to replicate the collaborative work typically found in companies or institutions.

The practice part of the Master's Degree (the most significant part of the methodology) takes the form of a laboratory where students will have to design and develop real projects for public administration bodies, research institutes, interactive media teams (news apps), and/or public agencies (national and international).

Online communication and participation between teachers and students will be conducted through communication channels such as Slack or Moodle.

Evaluation system

The method of continuous and collaborative assessment (staff, colleagues, teacher and mentor) will be used. The collaborative

dynamics in the classes and the contributions in the online and face-to-face sessions will also be observed.

The overall attitude and activity set of the student will also be evaluated.

Scholarships

Mobility scholarships can be applied for by students living outside Girona.

Financing

Scholarships

Mobility scholarships can be applied for by students living outside Girona.

Bank financing

Enrolled students can pay in installments.*

The Fundació has agreements in place offering preferential terms for their students with the following entities:

– [Sabadell Consumer](#)
– [CaixaBank](#)
– [Banco Santander](#)

* Only applicable to persons resident in Spain and upon acceptance by the bank.

Teaching table

Management

Karma Peiró
Transparency, accountability, ethics, and democratic culture

Karma Peiró is a journalist specialising in Information and Communication Technologies (ICT) since 1995. She has worked for the main Catalan public and private media outlets, such as La Vanguardia, TV3 or Catalunya Ràdio. She has also served as the director of the leading online newspaper in Catalan, Nació Digital. Her areas of interest include ethics, artificial intelligence, transparency and data activism.

Xaquín Veira González
Data visualization design and creative technologies

Xaquín G.V. is a visual journalist and data visualisation expert. He has worked for El Mundo, The New York Times, National Geographic and The Guardian, where he led the Visuals team. His areas of interest include visual literacy, emotional data communication, and automation of visual narratives.

Coordination

Anton Bardera Reig
Data visualisation programming

Anton Bardera holds a degree in Telecommunications Engineering from the Polytechnic University of Catalonia (2002) and a PhD from the University of Girona (2008). He is currently an associate lecturer in the Department of Computer Science, Applied Mathematics and Statistics at the University of Girona. His main fields of research are image processing, visualisation, information theory, and biomedical applications. He has co-authored two books, several articles in indexed journals and papers at international

conferences.

Teaching staff

Ricardo Baeza-Yates
Guest speaker

PhD in Computer Science. He is director of Graduate Data Science Programs (part-time) at Northeastern University (Silicon Valley) and Full professor in computer science at Universitat Pompeu Fabra. Adjunct professor at the CS department of the University of Waterloo, Canada. He is a member of the AI Advisory Council of Spain. ACM and IEEE fellow.

Anton Bardera Reig
Data visualisation programming

Anton Bardera holds a degree in Telecommunications Engineering from the Polytechnic University of Catalonia (2002) and a PhD from the University of Girona (2008). He is currently an associate lecturer in the Department of Computer Science, Applied Mathematics and Statistics at the University of Girona. His main fields of research are image processing, visualisation, information theory, and biomedical applications. He has co-authored two books, several articles in indexed journals and papers at international conferences.

Helena Bengtsson
Guest speaker

Helena Bengtsson is the data editor for Sveriges Television, Sweden's national broadcaster. She previously worked with The Guardian's data team (an entirely female team), where she led data analysis for both the Panama Papers and Paradise Papers investigations.

Apple Chan-Fardel
Guest speaker

Apple Chan-Fardel is an engineer specialising in data visualisation, the creation of user interfaces (design and experience) and machine learning. Between 2015 and 2017, she worked as a data visualisation developer at The Guardian in London. Her projects included being at the forefront of developing the internal visualisation tool.

Marc Comas Cufi
Statistical programming

Marc Comas holds a degree in mathematics from the Autonomous University of Barcelona and a PhD in statistics and compositional data analysis from the University of Girona (UdG). He currently works as a statistician within the research group of Epidemiology and Vascular Health Research of Girona. He is also an associate lecturer in statistics at the UdG.

Carla Garcia
Cartography and visualisation

Carla Garcia is Geographer and has a master's degree in analysis and management of the global environmental change. Her PhD focused on the Catalan coastal systems: their historical evolution and their status. She works at SIGTE (Geographical Information Systems Lab from University of Girona) since 2019 and she is professor in GIS at the Department of Geography of the same university since 2016.

Karina Gibert
Statistical programming

Karina Gibert is Full Professor at the Universitat Politècnica de Catalunya-BarcelonaTech (UPC). Bachelor in Informatics Engineering with specialities in computational statistics and Artificial Intelligence. Ph.D. in Computer Science. Postgraduate in

Higher Eductation Teaching. Member of the governmental working team Catalonia.AI. ViceDean for Big Data, Data Science and Artificial Intelligence of the Official Professional Chamber of Informatics Engineering of Catalonia and Vicepresident for Equity and Ethics (COEINF).

Matt Osborn
Open data engineering and systems architecture

Matt is a software engineer with a background in a range of disciplines, including extensive experience in data processing & analysis, data visualization, and interactive web design. He has worked on various web-based dataviz projects and spent some time at The Guardian where he worked on two UK general election live result trackers.

Karma Peiró
Transparency, accountability, ethics, and democratic culture

Karma Peiró is a journalist specialising in Information and Communication Technologies (ICT) since 1995. She has worked for the main Catalan public and private media outlets, such as La Vanguardia, TV3 or Catalunya Ràdio. She has also served as the director of the leading online newspaper in Catalan, Nació Digital. Her areas of interest include ethics, artificial intelligence, transparency and data activism.

Josep Sitjar
Cartography and visualisation

Josep Sitjar is Geographer and has a master's degree in environmental change. Specialized in GIS and web development, he works at SIGTE? (Geographical Information Systems Lab from University of GIrona) since 2007. He has been involved on several projects related to geospatial information, and is teacher of 'Remote Sensing' and 'Web Mapping' subjects at UNIGIS. Josep is also one of the organizers of 'Jornadas de SIG Libre', the Spanish FOSS4G.

Monica Ulmanu
Guest speaker

Monica Ulmanu is a graphic editor for The Washington Post. She joined the Post in 2018 from the Visual team of The Guardian, where she worked as an editor of special projects. She previously worked at Thomson Reuters, The Boston Globe and The New York Times.

Xaquín Veira González
Data visualization design and creative technologies

Xaquín G.V. is a visual journalist and data visualisation expert. He has worked for El Mundo, The New York Times, National Geographic and The Guardian, where he led the Visuals team. His areas of interest include visual literacy, emotional data communication, and automation of visual narratives.

Carlo Zapponi
Guest speaker

Carlo Zapponi creates data visualisations for the Cisco analytics team. Before that, he worked at The Guardian, Microsoft/Nokia and Frog Design. In his spare time, he co-authored Visualize News and Soccer. He is passionate about everything that mixes creativity, data and people. The management reserves the right to make changes to the teaching team if any of the teachers are unable to teach their subject for whatever reason, guaranteeing the same level of quality and professional status.

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*Management reserves the right to modify the teaching staff, if necessary, to ensure the levels of quality and professional category.

Promoting entities

Fundació UdG: Innovació i Formació

Fundació ViT

Visual Tools to Empower Citizens

Start course: 14/10/2020

Last session face-to-face session: 26/06/2021

End course: 26/06/2021

Date closing assessment report: 17/07/2021

Informative Sessions

	Date	Time	Place
Informative session 1	24/07/2020	17:00	ONLINE by videoconference with Zoom by clicking here
Informative session 2	08/09/2020	17:00	ONLINE by videoconference with Zoom by clicking here
Informative session 3	02/10/2020	18:00	ONLINE by videoconference with Zoom by clicking here

Calendar

Date	Place	Start of morning	End of morning	Start of afternoon	End of afternoon
14/10/2020	Open data engineering and systems architecture (Videoconference by ZOOM)			17:00	20:00
15/10/2020	Dataviz programming (Videoconference by ZOOM)			17:00	20:00
16/10/2020	Statistical programming (Videoconference by ZOOM)			17:00	20:00
21/10/2020	Open data engineering and systems architecture (Videoconference by ZOOM)			17:00	20:00
22/10/2020	Dataviz programming (Videoconference by ZOOM)			17:00	20:00
23/10/2020	Statistical programming (Videoconference by ZOOM)			17:00	20:00
28/10/2020	Open data engineering and systems architecture (Videoconference by ZOOM)			17:00	20:00
29/10/2020	Dataviz programming (Videoconference by ZOOM)			17:00	20:00
30/10/2020	Statistical programming (Videoconference by ZOOM)			17:00	20:00
4/11/2020	Open data			17:00	20:00

	engineering and systems architecture (Videoconference by ZOOM)			
5/11/2020	Dataviz programming (Videoconference by ZOOM)		17:00	20:00
6/11/2020	Statistical programming (Videoconference by ZOOM)		17:00	20:00
11/11/2020	Open data engineering and systems architecture (Videoconference by ZOOM)		17:00	20:00
12/11/2020	Dataviz programming (Videoconference by ZOOM)		17:00	20:00
13/11/2020	Statistical programming (Videoconference by ZOOM)		17:00	20:00
18/11/2020	Open data engineering and systems architecture (Videoconference by ZOOM)		17:00	20:00
19/11/2020	Dataviz programming (Videoconference by ZOOM)		17:00	20:00
20/11/2020	Statistical programming (Videoconference by ZOOM)		17:00	20:00
25/11/2020	Open data engineering and systems architecture (Videoconference by ZOOM)		17:00	20:00
26/11/2020	Dataviz programming (Videoconference by ZOOM)		17:00	20:00
27/11/2020	Statistical programming (Videoconference by ZOOM)		17:00	20:00
2/12/2020	Open data engineering and systems architecture (Videoconference by ZOOM)		17:00	20:00
3/12/2020	Dataviz programming (Videoconference by ZOOM)		17:00	20:00
4/12/2020	Statistical programming (Videoconference by ZOOM)		17:00	20:00
9/12/2020	Open data		17:00	20:00

	engineering and systems architecture (Videoconference by ZOOM)		
10/12/2020	Dataviz programming (Videoconference by ZOOM)	17:00	20:00
11/12/2020	Statistical programming (Videoconference by ZOOM)	17:00	20:00
16/12/2020	Open data engineering and systems architecture (Videoconference by ZOOM)	17:00	20:00
17/12/2020	Dataviz programming (Videoconference by ZOOM)	17:00	20:00
18/12/2020	Statistical programming (Videoconference by ZOOM)	17:00	20:00
8/1/2021	Videoconference by ZOOM	16:00	19:00
13/1/2021	Videoconference by ZOOM	16:00	19:00
14/1/2021	Videoconference by ZOOM	16:00	19:00
15/1/2021	Videoconference by ZOOM	16:00	19:00
20/1/2021	Videoconference by ZOOM	16:00	19:00
21/1/2021	Videoconference by ZOOM	16:00	19:00
22/1/2021	Videoconference by ZOOM	16:00	19:00
27/1/2021	Videoconference by ZOOM	16:00	19:00
28/1/2021	Videoconference by ZOOM	16:00	19:00
29/1/2021	Videoconference by ZOOM	16:00	19:00
3/2/2021	Videoconference by ZOOM	16:00	19:00
4/2/2021	Videoconference by ZOOM	16:00	19:00
5/2/2021	Videoconference by ZOOM	16:00	19:00
10/2/2021	Videoconference by ZOOM	16:00	19:00
11/2/2021	Videoconference by ZOOM	16:00	19:00
12/2/2021	Videoconference by ZOOM	16:00	19:00
17/2/2021	Videoconference by ZOOM	16:00	19:00
18/2/2021	Videoconference by ZOOM	16:00	19:00
19/2/2021	Videoconference by	16:00	19:00

Date	Description				
	ZOOM				
24/2/2021	Videoconference by ZOOM			16:00	19:00
25/2/2021	Videoconference by ZOOM			16:00	19:00
26/2/2021	Videoconference by ZOOM			16:00	19:00
3/3/2021	Videoconference by ZOOM			16:00	19:00
4/3/2021	Videoconference by ZOOM			16:00	19:00
5/3/2021	Videoconference by ZOOM			16:00	19:00
10/3/2021	Videoconference by ZOOM			16:00	19:00
11/3/2021	Videoconference by ZOOM			16:00	19:00
12/3/2021	Videoconference by ZOOM			16:00	19:00
17/3/2021	Videoconference by ZOOM			16:00	19:00
18/3/2021	Videoconference by ZOOM			16:00	19:00
19/3/2021	Videoconference by ZOOM			16:00	19:00
27/3/2021	Hackaton. Videoconference by ZOOM	9:30	12:30	13:30	19:30
17/4/2021	Hackaton. Videoconference by ZOOM	9:30	12:30	13:30	19:30
8/5/2021	Hackaton. Videoconference by ZOOM	9:30	13:30	14:30	19:30
29/5/2021	Final Project Presentations by videoconference with Zoom	9:30	12:30	13:30	19:30
30/5/2021	Final Project Presentations by videoconference with Zoom	10:00	13:00		
26/6/2021	Final Project Presentations by videoconference with Zoom	9:30	13:30	14:30	19:30