11th International
WORKSHOP

Applied Problems in Theory of Probabilities and Mathematical Statistics into Telecommunications (APTP+MS'2017) (Summer Session)

The Workshop aims to discuss contemporary issues of applied probability theory, stochastic processes, mathematical statistics, stochastic analysis, queuing theory in their application to the performance analysis and quality of service in modern communication 5G networks. Nowadays one can see the wireless solutions have moved beyond their traditional areas of application and today we can talk about a space where users can interact with various technologies services. As a consequence, the methods of the applied probability theory and mathematical statistics for the effective estimation of the wireless networks performance parameters have received much attention in recent years and have become a key aspect of application development. Further research in this area can create opportunities for the development of theoretical foundations, new mathematical models and methods for the performance analysis of future wireless networks.

ORGANIZING AND PROGRAMME COMMITTEE
Giuseppe Araniti (Italy); Konstantin Samouylov (Russia); Sergey Shorgin (Russia)

ORGANIZERS
University Mediterranea of Reggio Calabria – DIIES Dep. (Italy)
Peoples' Friendship University of Russia (RUDN University) (Russia)
Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences (Russia)

10-11
October 2017

University Mediterranea of Reggio Calabria
REGGIO DI CALABRIA, ITALY

UFFICIOMARKETINGMEDITERRANEA

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University Mediterranea of Reggio Calabria – DIIES Department (Italy)

Peoples' Friendship University of Russia (RUDN University) (Russia)

Federal Research Center "Computer Science and Control" of the Russian Academy of Sciences (Russia)

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Program Overview

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10:20 - 10:40	**Future of the Internet of Things Beyond 5G** Aleksandr Ometov (Tampere University of Technology, Finland)	**Vulnerabilities of a Network Management System** Alexander Grusho, Elena Timonina, Sergey Shorgin (Institute of Informatics Problems FRC CSC RAS, Russia)
10:40-11:00	**Discrete Time Bulk Service Queue for Analyzing Admission Control in Vehicle-to-Vehicle Networks** Vitalii Beschastnyi (RUDN University, Russia); Valeriy Naumov (Service Innovations Research Institute, Finland)	**Performance Analysis of LSA Framework as Queuing System with Finite Resources** Evgenii Mokrov (RUDN University, Russia); Valeriy Naumov (Service Innovations Research Institute, Finland); Konstantin Samouylov (RUDN University, Russia)
11:00-11:20	**Access Success Probability Analysis for MTC Communication over 3GPP RACH** Ekaterina Medvedeva, Oksana Semenova, Anastasiia Vlaskina, Elvira Zaripova, Irina Gudkova (RUDN University, Russia)	**Reliability Calculation of a Redundant Heterogeneous System with General Repair Time Distribution** Dmitry Kozyrev, Victoriya Kimenchezhi, Hector Houankpo (RUDN University, Russia)

Time	Tuesday, 10.10.2017	Wednesday, 11.10.2017
11:20-11:40	**Optimizing Dynamic Resource Allocation in NB-IoT Systems** Viacheslav Begishev (RUDN University, Russia); Andrey Samuylov, Dmitri Moltchanov (RUDN University, Russia; Tampere University of Technology)	**Analyzing Delay of Data Transfer Using Multicast and Device-to-Device Connections in Wireless Networks** Anastasiia Vlaskina, Oksana Semenova, Irina Gudkova (RUDN University, Russia)
11:40-12:00	**Model of Radio Admission Control Scheme with Service Bit Rate Degradation within LSA Framework** Anastasiia Golskaia, Ekaterina Markova (RUDN University, Russia)	**eTOM End-to-End Business Process Modelling with a BCMP Queueing Network** Konstantin Samouylov, Anna Gaidamaka, Viktoriia Khalina, Natalia Popovskaya (RUDN University, Russia)
12:00-12:20	**Reneging Queuing Analysis and 5G Mobile Network Services Pricing** Sergei Vasilyev, Galina Tsareva (RUDN University, Russia)	**On Comparative Analysis of Radio Admission Control Schemes for Licensed Shared Access Framework** Dmitrii Poluektov, Ekaterina Markova, Daria Ostrikova (RUDN University, Russia)
12:20-12:40	**Social Matching Meets Big Social Data Science** Ekaterina Olshannikova (Tampere University of Technology, Finland)	**Simulation of Circuit Board Soldering** Veniamin Chupritskiy, Dmitry Divakov, Leonid Sevastianov (RUDN University, Russia)

Venue Information

The International Workshop on Applied Problems in Theory of Probabilities and Mathematical Statistics into Telecommunications (APTP+MS'2017) (Summer Session) will be held at the Università degli Studi Mediterranea di Reggio Calabria – Ingegneria, Reggio Calabria, Italy. More information about the University can be found here.
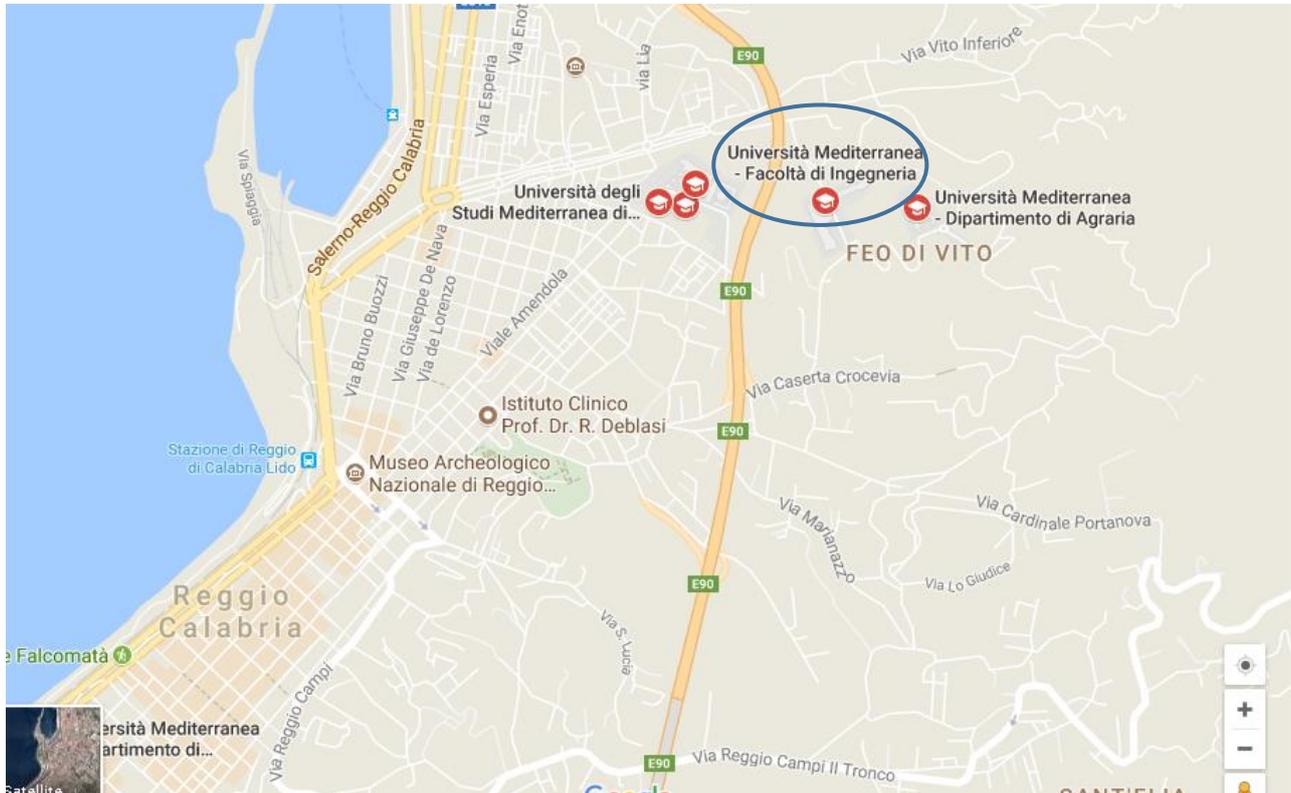
Coordinates can be found here.

Address of the International Workshop

Aula Consiglio – Ingegneria
Università degli Studi Mediterranea di Reggio Calabria
Via Graziella
89124 Feo di Vito
Reggio Calabria (RC)
Italy

WiFi Information

Eduroam is also available.

Reggio City WIFI
The Lungomare (promenade) "Falcomatà", the most representative place in the city, center of cultural life and an intense summer tourist season, is covered by "Reggio Calabria Wireless" hot spots, and in other areas of the city center, as shown in the "Maps" section of the website.
More information can be found here: http://www.reggiowireless.com/index_en.htm

Directions

How to get from the Airport to the City Centre

1. Bus
Public buses go at regular intervals between the airport and the city centre.
- The bus line no 27 goes daily every hour from 7.00 to 19.00 between the airport and the city centre. Journey time approx. 20 min.
- The bus line no 28 goes daily every hour from 7.30 to 19.30 between the airport and the city centre. Journey time approx. 20 min.

Costs: single ticket € 1.50
Tickets are available at the newsstand in the airport terminal.

2. Taxi
A taxi stand can be found in front of the airport terminal. Transfer time from the airport to the city centre is approx. 15 minutes.
According to the Giunta Comunale resolution nr. 83 of 19 June 2015, taxi costs should be:

From-To	Fixed Costs (without supplements)
Airport – Train Central Station	Euro 12,00
Airport – Museo Nazionale	Euro 16,00
Airport – Port Reggio Calabria	Euro 18,00

How to get from the airport to the Workshop Venue
Take the bus line no 27 direction "Facoltà Agraria" and get out at the stop **"S. Brunello"** (then walk to the Workshop venue). See "From the stop "S. Brunello" to the Workshop venue (on foot)".

How to get from the City Centre to the Workshop Venue
There are three possible ways to get to the Workshop venue from the city center:

1. Take the bus line no 27 direction "Facoltà Agraria" and get out at the stop **"S. Brunello"** (then walk to the Workshop venue). See "From the stop "S. Brunello" to the Workshop venue (on foot)".

Bus stops of Line 27: Aeroporto - Via Ravagnese Inferiore - Ponte S. Agata - Via Gebbione – Viale Calabria - Argine Calopinace - Piazza Garibaldi - Via S. Francesco da Paola - Via del Torrione - Via Romeo - Museo - Viale Amendola - Via Mons. De Lorenzo - Via XXV Luglio - Viale Zerbi (Porto) - Viale Boccioni - Terminal Ponte Libertà - **S. Brunello** - Facoltà Agraria

Timetable of Line 27: see Timetables Public Transport

2. Take the bus line no 5 or 10 direction "Vito Superiore" and get out at the stop **"S. Brunello"** (then walk to the Workshop venue). See "From the stop "S. Brunello" to the Workshop venue (on foot)".

Bus stops of Line 5 or 10: Riparo Vecchio - S. Sperato - Modena - Via del Seminario - Viale Europa - Via Pio XI - Via Sbarre C.li - Ponte S. Pietro - Argine Dx Calopinace - Piazza Garibaldi (Stazione FS) – Via S. Francesco da Paola - Via del Torrione - via Domenico Romeo (INPS) - Museo - Viale Amendola – Via Ibico - Argine Annunziata - **S. Brunello** - Vito Superiore - Vito Superiore

Timetable of Line 5 or 10: see Timetables Public Transport

3. You can reach the Workshop venue from the city center also by foot. In this case, the destination is Via Graziella, 89124 Reggio Calabria. For example, from the Museum bus stop it takes about 30 minutes (about 1,8 Kilometres)
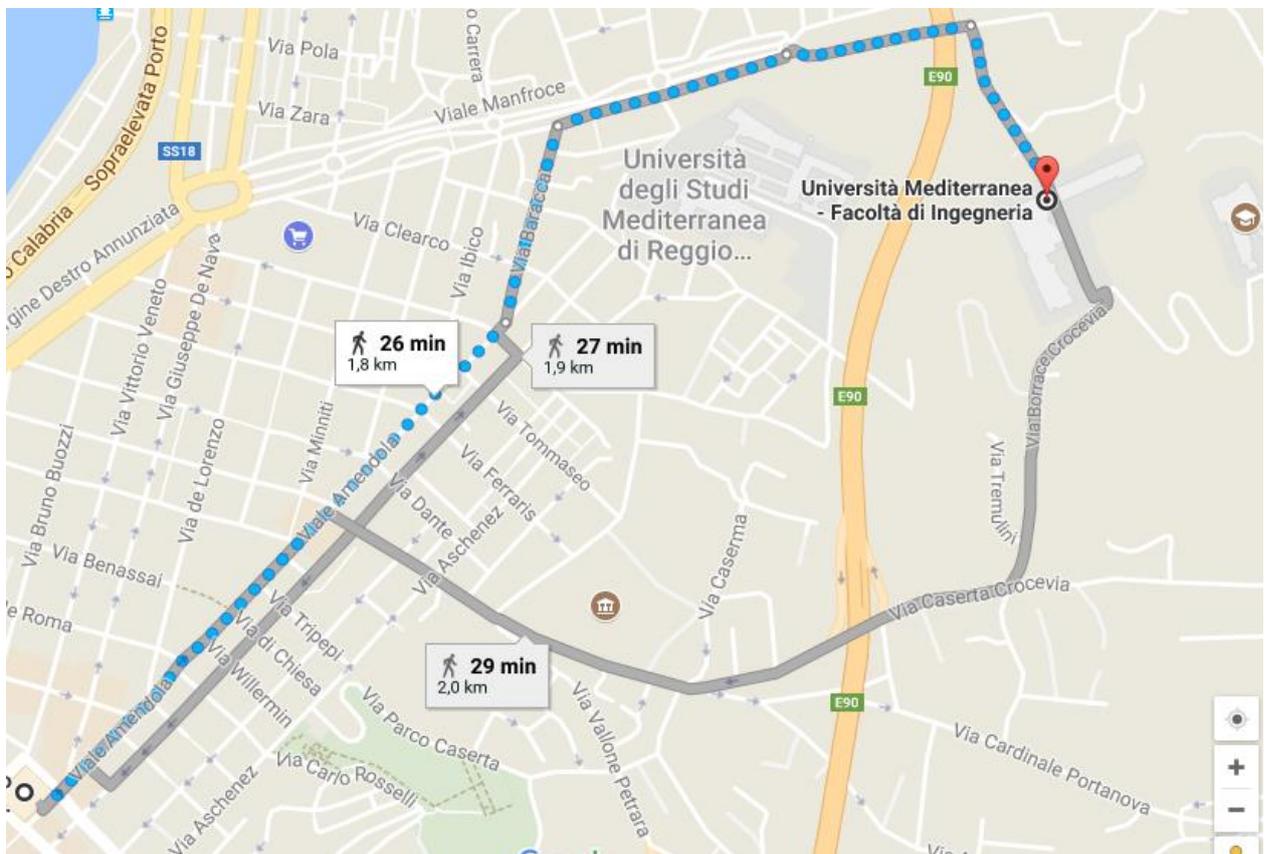
Walking distance from the city center to the Workshop venue

Use this stop: Via Domenico Romeo.
The **line 5 + 10 + 27** stop at the university.
Stop: S. Brunello
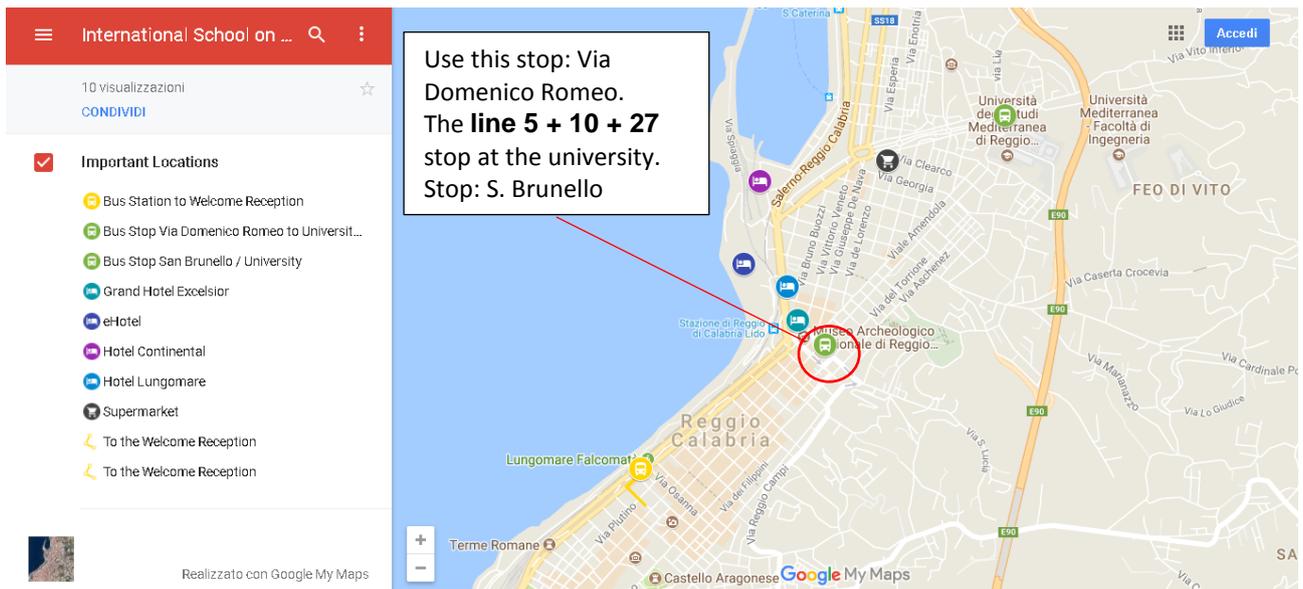
Note: Bus Line 27 will approximately leave from the bus stop „Via Domenico Romeo" between 08.15 – 08.25 → please be there at 8.10!
The bus lines 5 + 10 should depart in the same time frame (usually a few minutes after line 27).

Get out here!

Check out the International Workshop on 5G Google Maps to get all details.

From the stop "S. Brunello" to the Workshop Venue (on foot)

Here you can see an overview how to get from the bus stop "**S. Brunello**" to the Workshop venue.

Bus Stop "S. Brunello"

On the right of the bus stop "**S. Brunello**", you can see the parking lot of the University and the four towers of the University. Walk through the parking lot, walk upstairs and follow the pedestrian path. At the top of the stairs take the pedestrian walk on the left and follow the signs "INTERNATIONAL WORKSHOP 2017".
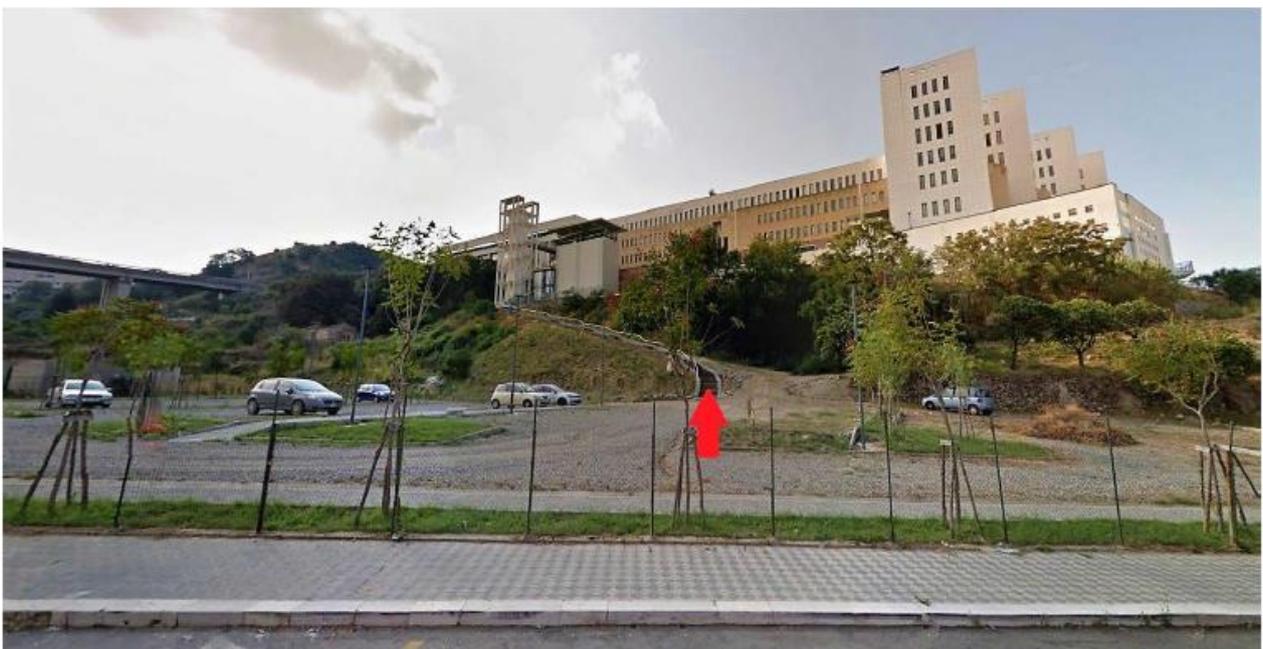
Stairs to the International Workshop venue

How to get from the Workshop Venue to the City Center

There are three possible ways to get from the venue to the city center:

1. Take the bus line no 27 from the bus stop **"S. Brunello"**. This stop is a few meters away from the bus stop where you get-off when you arrive at S.Brunello; it is on the right side of the downhill road, a few meters ahead of the cars parked in the picture above. The bus stops of the city center are from "Via De Nava" to "Stazione FS C.le".

Bus stops of Line 27: Facoltà Agraria - **S. Brunello** - Viale Libertà - Ponte Libertà - Via De Nava - Via XXV Luglio - Viale Zerbi (Porto) - Via Roma - **Via De Nava - Museo - Largo Colombo - Corso Matteotti - Stazione FS C.le** - Argine Calopinace - Viale Calabria - Via Gebbione - Ponte S. Agata - Via Ravagnese Inferiore – Aeroporto

Timetable of Line 27: see Timetables Public Transport

2. Take the bus line no 5 or 10 from the bus stop "**S. Brunello**". This stop is a few meters away from the bus stop where you get-off when you arrive at S.Brunello; it is on the right side of the downhill road, a few meters ahead of the cars parked in the picture above. The bus stops of the city center are from "Via De Nava" to "Stazione FS C.le".

Bus stops of Line 5 or 10: Vito Superiore - Vito Superiore - **S. Brunello** - Argine Annunziata - Via Pensilvania - Viale Amendola - Via XXV Luglio - **Via De Nava - Museo - Corso Matteotti - Stazione FS C.le** - Argine Sx Calopinace - Ponte S. Pietro - Argine Calopinace - Viale Europa - Via del Seminario - Modena - S. Sperato - Riparo Vecchio

Timetable of Line 5 or 10: see Timetables Public Transport

3. You can reach the city center from the Workshop venue also on foot: for example, reaching the Museo takes about 30 minutes (about 1,8 Kilometres).

Public Transport in Reggio Calabria

In Reggio Calabria the public bus service (ATAM) is operating. To reach the Workshop venue, take either the bus n. 27 or the bus n. 5 or 10 (stop S. Brunello), line starting from "Aeroporto".

Timetable of Line 27: (Stop at University: S. Brunello)

Linee 27 Aeroporto-Università															
Aeroporto (Parcheggio)	07:00	08:00	08:15	09:00	09:45	10:00	11:00	12:00	12:15	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Viale Calabria	07:10	08:10	08:25	09:10	09:55	10:10	11:10	12:10	12:25	13:10	14:10	15:10	16:10	17:10	18:10	19:10
Piazza Garibaldi	07:17	08:17	08:32	09:17	10:02	10:17	11:17	12:17	12:32	13:17	14:17	15:17	16:17	17:17	18:17	19:17
Viale Zerbi (incrocio Boccioni)	07:27	08:27	08:42	09:27	–	10:27	11:27	12:27	12:42	13:27	14:27	15:27	16:27	17:27	18:27	19:27
Terminal Ponte Libertà	07:29	08:29	08:44	09:29	–	10:29	11:29	12:29	12:44	13:29	14:29	15:29	16:29	17:29	18:29	19:29
S. Brunello	07:32	08:32	08:47	09:32	–	10:32	11:32	12:32	12:47	13:32	14:32	15:32	16:32	17:32	18:32	19:32
Facoltà Ingegneria	07:34	08:34	08:49	09:34	–	10:34	11:34	12:34	12:49	13:34	14:34	15:34	16:34	17:34	18:34	19:34
Facoltà Agraria	07:41	08:41	08:56	09:41	–	10:41	11:41	12:41	12:56	13:41	14:41	15:41	16:41	17:41	18:41	19:41
Facoltà Agraria	07:45	08:45	09:00	09:45	10:45	11:45	12:45	13:00	13:45	14:45	15:45	16:45	17:45	18:45	19:45	
S. Brunello	07:50	08:50	09:05	09:50	10:50	11:50	12:50	13:05	13:50	14:50	15:50	16:50	17:50	18:50	19:50	
Ponte Libertà	07:52	08:52	09:07	09:52	10:52	11:52	12:52	13:10	13:52	14:52	15:52	16:52	17:52	18:52	19:52	
Viale Zerbi (incrocio XXV Luglio)	07:54	08:54	09:09	09:54	10:54	11:54	12:54	–	13:54	14:54	15:54	16:54	17:54	18:54	19:54	
Museo	07:57	08:57	09:12	09:57	10:57	11:57	12:57	–	13:57	14:57	15:57	16:57	17:57	18:57	19:57	
Stazione FS C.le	08:02	09:02	09:17	10:02	11:02	12:02	13:02	–	14:02	15:02	16:02	17:02	18:02	19:02	20:02	
Viale Calabria (incr. Botteghelle)	08:06	09:06	09:21	10:06	11:06	12:06	13:06	–	14:06	15:06	16:06	17:06	18:06	19:06	–	
Aeroporto (Parcheggio)	08:16	09:16	09:31	10:16	11:16	12:16	13:16	–	14:16	15:16	16:16	17:16	18:16	19:16	–	

Bus stops at the city center from Via de Nava to Stazione FS C.le:

Facoltà Agraria - S. Brunello - Viale Libertà - Ponte Libertà - **Via De Nava - Via XXV Luglio - Viale Zerbi (Porto) - Via Roma - Via De Nava - Museo - Largo Colombo - Corso Matteotti - Stazione FS C.le** - Argine Calopinace - Viale Calabria - Via Gebbione - Ponte S. Agata - Via Ravagnese Inferiore - Aeroporto

Timetable of Line 5-10: (Stop at University: S. Brunello)

Linee 5-10 Riparo-S. Brunello/Vito																		
Riparo Vecchio	–	06:15	–	06:55	07:20	–	08:15	08:35	09:15	09:55	10:15	10:55	11:35	11:55	12:55	13:40		
Piazza Garibaldi	05:40	06:30	07:00	07:15	07:40	08:15	08:35	08:55	09:35	10:15	10:35	11:15	11:55	12:15	13:15	14:00		
S. Brunello	05:53	06:45	07:14	07:28	07:55	08:30	08:50	09:10	09:50	10:30	10:50	11:30	12:08	12:30	13:30	14:15		
Vito Superiore	06:00	–	07:25	–	08:05	08:40	–	–	–	10:40	–	11:40	–	12:40	13:40	14:25		
Riparo Vecchio	14:55	15:15	16:15	–	16:55	17:55	18:15	18:35	–	19:30	19:45							
Piazza Garibaldi	15:15	15:35	16:35	16:55	17:15	18:15	18:35	18:55	19:30	19:50	20:05							
S. Brunello	15:30	15:50	16:50	17:10	17:30	18:30	18:50	19:10	19:45	–	20:20							
Vito Superiore	–	16:00	–	17:20	–	–	–	–	19:55	–	–							
Vito Superiore	–	06:05	–	–	07:25	08:15	08:40	–	–	–	10:40	–	11:50	–	12:55	13:40		
S. Brunello	–	06:15	06:45	07:30	07:35	08:25	08:50	09:05	09:25	10:05	10:50	11:05	12:00	12:12	13:05	13:50		
Piazza Garibaldi	06:01	06:29	07:00	07:43	07:48	08:40	09:05	09:20	09:40	10:20	11:05	11:20	12:05	12:22	13:20	14:05		
Riparo Vecchio	06:15	06:49	07:20	08:03	08:10	09:00	–	09:40	10:00	10:40	11:25	11:40	12:35	–	13:40	14:25		
Vito Superiore	14:30	–	16:00	–	17:20	–	–	–	–	20:00								
S. Brunello	14:40	15:35	16:10	17:05	17:30	17:45	18:45	19:05	19:25	20:10	20:35							
Piazza Garibaldi	14:55	15:50	16:25	17:20	17:45	18:00	19:00	19:20	19:40	20:25	20:50							
Riparo Vecchio	15:15	16:10	16:45	17:40	18:05	18:20	19:20	19:40	20:00	20:45	21:10							

Bus stops at the city center from Via de Nava to Stazione FS C.le:

ito Superiore (Linea 5) - Vito Superiore - S. Brunello - Argine Annunziata - Via Pensilvania - Viale Amendola - Via XXV Luglio - **Via De Nava - Museo - Corso Matteotti - Stazione FS C.le** - Argine Sx Calopinace - Ponte S. Pietro - Argine Calopinace - Viale Europa - Via del Seminario - Modena - S. Sperato - Riparo Vecchio

Useful Information

Tourist Information
Associazione Proloco Città di Reggio Calabria
Via Venezia 1 89128 Reggio Calabria RC Italy +39 329 323 4407

Emergency Numbers	
Fire service	115
Police	112
Ambulance/ rescue	118
European emergency	112

Drinking Water

Officially, it is safe to drink the tap water in Italy. Generally, however, people do not drink tap water.

Opening Hours of Shops in Reggio

Shop opening hours may depend indicatively. Pharmacies are open from 8:00 -13:00 with a break until 16:00 and closing at 19:30. Small convince food shops are open from 8:00-13:00 with a break until 16:00/16:30 and then open again until 20:00.
There is a supermarket not far from the Workshop venue called *IperCoop* with the following opening hours: 8:30 to 21:00 with no breaks. IperCoop Address: Via De Nava, 1, 89123 Reggio Calabria RC
Other shops are typically open from 9:00-13:00 with a break until 16/16:30 and closing at 20:00.

Tipping:

Tipping in restaurants in Italy is not obligatory. However, if you are happy with the service you can leave a 10% tip of the bill or simply round up to a convenient number. Be aware that in some restaurants supplements through the *servizio* (service charge) on your restaurant bill and/or the *coperto* (cover charge), sometimes both may be applied. In that case, a service fee is being charged and an additional tip is not necessary.

About Reggio Calabria

Reggio di Calabria (Italian pronunciation: [ˈreddʒo di kaˈlaːbrja], also [ˈrɛddʒo]; Sicilian-Calabrian dialect: *Rìggiu*, Italic-Greekof Bovesia: *Righi*, Ancient Greek: Ῥήγιον, *Rhḗgion*, Latin: *Rhēgium*), commonly known as **Reggio Calabria** or simply **Reggio** in Southern Italy, is the largest city and the most populated *comune* of Calabria, Southern Italy. It is the capital of the Metropolitan City of Reggio Calabria and the seat of the Regional Council of Calabria.

Reggio is located on the "toe" of the Italian Peninsula and is separated from the island of Sicily by the Strait of Messina. It is situated on the slopes of the Aspromonte, a long, craggy mountain range that runs up through the centre of the region. The third economic centre of mainland Southern Italy, the city proper has a population of more than 200,000 inhabitants spread over 236 square kilometres (91 sq mi), while the fast-growing urban area numbers 260,000 inhabitants. About 560,000 people live in the metropolitan area, recognised in 2015 by Italian Republic as a metropolitan city.

As a major functional pole in the region, it has strong historical, cultural and economic ties with the city of Messina, which lies across the strait in Sicily, forming a metro city of less than 1 million people.

Reggio is the oldest city in the region, and despite its ancient foundation – *Ρηγιον* was an important and flourishing colony of Magna Graecia – it has a modern urban system, set up after the catastrophic earthquake on 28 December 1908, which destroyed most of the city. The region has been subject to earthquakes.

It is a major economic centre for regional services and transport on the southern shores of the Mediterranean. Reggio, with Naples and Taranto, is home to one of the most important archaeological museums, the prestigious National Archaeological Museum of Magna Græcia, dedicated to Ancient Greece (which houses the Bronzes of Riace, rare example of Greek bronze sculpture, which became one of the symbols of the city). Reggio is the seat, since 1907, of the Archeological Superintendence of Bruttium and Lucania.

The city centre, consisting primarily of Liberty buildings, has a linear development along the coast with parallel streets, and the promenade is dotted with rare magnolias and exotic palms. Reggio has commonly used popular nicknames: The "city of Bronzes", after the Bronzes of Riace that are testimonials of its Greek origins; the "city of bergamot", which is exclusively cultivated in the region; and the "city of Fatamorgana", an optical phenomenon visible in Italy only from the Reggio seaside.

More details can be found here.