



Sapienza PhD in ICT

Doctoral program in Information and Communications Technologies at Sapienza Università di Roma, Rome, Italy

First Year Doctoral Program Form

LAST NAME	Marziani
NAME	Augusto Maria
CURRICULUM	Applied Electromagnetics
DOCTORAL CYCLE	XXXII

The Doctoral Program Form contains, year by year, the description of the PhD program of each Doctoral student. This form must be submitted to the PhD coordinator with roughly the following timing:

- o by the end of February of the first year for first year students
- o before the admission to the second year by perspective second year students
- o before the admission to the third year by perspective third year students

The Doctoral Program Proposal is approved by the PhD board shortly after submission. The Doctoral Program requirements place formalized emphasis on methodology and mastery of fundamental and applied engineering systems concepts. A Doctoral Program Proposal should be constructed in agreement with the Faculty mentor, that is the supervisor or tutor, by complying to the requirements, described in the Tables below.

ADVANCED COURSES: 12 CREDIT FORMATION UNITS (CFU)¹				
Only courses/schools providing a final verification test with pass/fail outcome certified by instructor can be included here.				
Title	Type	Duration / period	CFU²	Motivation for selection
Laboratorio multidisciplinare di elettronica	Master Degree course	48 teaching hours + 72 homework-study hours / 1 semester	6	This course will give me the practical and theoretical skills I need to overcome laboratory everyday issues. This course is tightly linked to the research activity of the PhD program especially for what concerning microwave, millimeter wave and high frequency RF measurements.
Price 2 foundation	Project Management course	19-21/06/2017 8 hours a day + exam	6	The course will give the basics for successful project management using an internationally recognized method.
Total CFU			12	

¹ Please insert lines as required/appropriate, and for each line complete each column of the Table.

² Indicate here the CFUs that can be accounted for as a result of the successful completion of the activity; for Master Degree courses, assume 1 CFU = 8 teaching hours + 12 homework/study hours, for a total of 20 hours. This rule can be slightly adjusted for other types of courses/activities (e.g., PhD courses may require slightly less hours per CFU)

SEMINARS AND LABORATORY ACTIVITIES: 6 CFU³

Activity	Type	Duration / period	CFU ⁴	Motivation for selection
SATCOM ANTENNAS	European School of Antennas course	April, 2-6/2017 Mohammed Bin Rashid Space Centre - MBRSC Dubai, United Arab Emirates	3	This course will give me the advanced knowledge of modern antenna systems for space application and ground receiving station, using both standard and innovating solutions like antenna arrays. The program will also include ground control station activities description.
ANTENNA MEASUREMENTS AT MILLIMETRE AND SUBMILLIMETRE WAVELENGTHS	European School of Antennas course	May, 8-12, 2017 31 hours (Lectures:22h – Lab: 7h – Computer exercise: 2h) Aalto University - Finland	4	This short course discusses the techniques and limitations of the various test methods, such as the planar near-field scanning and CATR as well as on-wafer measurements. Also antenna pattern correction techniques are discussed. Lectures are accompanied by laboratory demonstrations and exercises. The participants have a choice to study a related specific topic prior to the short course, write a brief report and present that to other participants during the course.
Total CFU			7	


ADDITIONAL INDEPENDENT FORMATION AND RESEARCH ACTIVITIES: 6 CFU⁵

Indicate activities that extend and complement the mandatory activities listed above

Activity	Type	Duration / period	CFU ⁶	Motivation for selection
LARGE SCALE RADIO PROPAGATION	European School of Antennas course	June 12-16, 2017 30 teaching hours UCL - Louvain-la-Neuve - Belgium	5	The general objectives of the School are: -strengthening the European excellence on antennas; -completing the individual PhD curricula of students in Electrical and Information Engineering by offering interaction with the best trainers in Europe; -increasing the link between European Universities and Industries in antenna research and development; -facilitating the interchange of ideas among early stage researchers and teachers, thus increasing the future mobility and synergy.
Corso di scrittura tecnico scientifica	Short course	January 24-25 February 7-8, 2017 Rome - Italy	4	The course deals with the fundamental of the technical-scientific writing and result presentation. It will give the instrument to better understand the scientific writing and oral presentation techniques.
Total CFU			9	

³ Please insert lines as required/appropriate, and for each line complete each column of the Table.⁴ Indicate here the CFUs that can be accounted for as a result of the successful completion of the activity; as a rule of thumb, assume 1 CFU = 20 working hours.⁵ Please insert lines as required/appropriate, and for each line complete each column of the Table.⁶ Indicate here the CFUs that can be accounted for as a result of the successful completion of the activity; as a rule of thumb, assume 1 CFU = 20 working hours.


RESEARCH ACTIVITY: 36 CFU	
Research area	Radio Propagation at μ -wave and mm-wave bands for satellite to earth and ground based communications.
Research topic	Effect of the atmosphere on radio propagation at microwave and millimeter wave focusing on effects due to scintillation. Clear air study and effect of water vapor and wind on the signal level. Aim of the research is the improvement of actual model for high frequency radiopropagation to better estimate propagation effects, and the reduction of the number of input parameters. Model will be compared with acquired data from measurement campaign data. Obtained results for satellite to earth radiopropagation will be translated for 5G ground communications trying to obtain a generic model for both ground and satellite system at mm-wave frequencies.
Framework of the proposed research topic	<p>First part of the research activity will follow these steps:</p> <ul style="list-style-type: none"> • Retrieval of necessary data and simulation of propagation models for scintillation based on RAOB data. • Implementation of the model for the calculation of C_n based on RAOB data • Comparison between results obtained from simulation and measured data • Introduction of wind data into the model • Processing of the scintillation model with the use of the principal component analysis (PCA) • Reduction of the input parameters • Correlation between PCA highlighted data and atmospheric data collected by RAOBs • Comparison with literature models and performance analysis <p>The next part of the research will deal with the modeling of propagation effects on high frequency ground communication focusing on scintillation effects on 5G communications. Models obtained in the precedent step will be improved to work on 5G mobile communication systems.</p>
Research environment	A tight collaboration will be held with the ISCOM laboratories as expected by the PhD program. Collaboration with other groups as Italian Space Agency and Fondazione Ugo Bordoni will be proposed. We will also collaborate with other members of the Alphasat TDP5 and other University research groups.

FACULTY MENTOR (TUTOR OR SUPERVISOR)	
Prof. Dr.	Frank Silvio Marzano
Supervisor signature for approval	

Signature of Doctoral student

Date

21/02/2017


(Augusto Marziani)