ROMOR Project Special Mobility Strand

2017-2018 Erasmus+ Student Mobility for Studies/Traineeship to the University of Parma

UNIVERSITÀ DI PARMA

Application Announcement

Project number: 573700-EPP-1-2016-1-PS-EPPKA2-CBHE-JP

Contents

Dear students,

For 2017-2018 Academic year, the ROMOR Erasmus+ Project offers the opportunity of Student Mobility for Traineeship/Study to the University of Parma. Under the scope of this project, students from four partner Palestinian universities can obtain financial support for their traineeship/study mobility. Applications for the 2017-2018 Academic Year have been initiated. Here is the calendar for application procedures:

Application Period	5rd of June 2017 – 20th of June 2017
Announcement of the Results	13th of July 2017
Signature of Mobility Agreements	30th of July 2017
Mobility Period	4 months
Mobility Start	1st September 2017 – 31st December 2017 1st March 2018 – 30th June 2018

1 Main Objective of ROMOR Project

The overall aim of ROMOR project is to sustainably enhance the practice of research output management in the Palestinian Higher Education Institutions through enabling Open Access Institutional Universities (OAIRs) as well as the advocacy in support of Open Access to research outputs. The Special Mobility Strand is an additional component of the Project that aims to enhance the practice of digital curation and preservation (DCP) in local institutions in Palestine to ensure long-term availability and accessibility of their digital holdings. Particularly it aims at fostering research for development and adoption of improved preservation procedures, and technologies in order to improve the quality, reliability, organization, management, and accessibility of digital data of importance to the institutions in Palestine. This capacity can be built through the provision of educational opportunities and interdisciplinary research as well as encouraging exchange of students and staff in ICT-related programs between the Project partner Palestinian higher education institutions and partner European higher education institutions.

Student exchange will support a deeper integration and form the basis for joint theses supervision as well as helping students from Palestine to establish contacts with researchers at partner European higher education institutions.

2 Fields of Study/Traineeship

For 2017-2018 Academic year, the ROMOR Erasmus+ Project offers opportunities for Student Mobility for Study/Traineeship **to** the **University of Parma** in Italy for applications **from** four partner **Palestinian Higher Education Institutions**:

- The Islamic university of Gaza
- Birzeit University
- Alquds Open University
- Palestine Technical University- Kadoorie

A list of courses matching ROMOR objectives are offered by the University of Parma and are shown in Table 1. Selected students can create their own program of these courses in English (or Italian) adapted to their academic background and interests, achieving from 18 to 30 ECTS in one semester. The students are allowed to attend the studies and the traineeship, given the evidence of having the specific requirements, having the right academic background and language proficiency. More details on the contents of the offered courses are given in Appendix A.

Table 1: The list of courses offered by the University of Parma.

Sending Institution	Hosting Institution	Title	ECTS	Semester	Study cycle
• Islamic University of Gaza • Birzeit University • Al-Quds Open University • Palestine Technical University-Kadoori	University of Parma, Italy	Network security	6 or 9	Spring	Master
		Machine learning for pattern recognition	6	Spring	Master
		Internet of things	6	Spring	Master
		Artificial intelligence	6 or 9	Fall 2018 (in English) Fall 2017 (in Italian)	Master
		Access to Digital Library	15	Fall	Master
		Digital document	15	Fall	Master
		User&Usage	15	Fall	Master
		Paradigmi e linguaggi did programmazione (Italian) Programming languages and paradigms	6	Spring	Master
		Project work Data mining on Scopus laboratory	12 (6)	Available both in Fall and Spring	Bachelor
		Social media analysis laboratory	6	Available both in Fall and Spring	Bachelor
		Social networks for research outputs laboratory	6	Available both in Fall and Spring	Bachelor
		Italian Language course	4	Available both in Fall and Spring	

The students who apply have to consider the conditions below. For this reason, we advise the students to read carefully the requirements for application. The applications with a missing document and the applications that are completed outside the application period are not acceptable.

3 Application Requirements

- The students who are going to apply for Erasmus+ Student Mobility must be registered students at the sending institution in a bachelor or a master education.
- Student mobility flows in accordance with the provisions set out in the Erasmus+ Program Guide and the Guidelines for the Special Mobility Strand.
- At University of Parma, courses are taught in Italian and English. Therefore, students who are interested in benefiting from the Mobility opportunity have to certify their language proficiency as per the rules and acceptance of the sending and hosting university.
- Master's degree courses **are at advanced level and students have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle**. ROMOR Mobility Strand Students at 3-4 years of higher education can **be exceptionally** admitted if their academic background is evaluated and accepted by the coordinating institutions.
- Bachelor students have demonstrated knowledge and understanding in a field of study that builds upon general secondary education. ROMOR Mobility Strand Students should know how to program, know the fundamentals of networks data concepts and representation of the information.

4 Application Process and Documents

Students have to apply online here:

http://romor.iugaza.edu.ps/romor/index.php/parmasms

Students are required to enclose with their application, in PDF format, the following documents:

- Signed and stamped transcript of academic records.
- Signed and stamped certificate of registration at the sending university mentioning the level and date of registration.
- Language proficiency document.
- CV (You need to prepare your CV on the format available on the web page: https://europass.cedefop.europa.eu/en/documents/curriculum-vitae).
- A motivation letter written in English and, for academic exchange students, the programs of the courses to be attended at the hosting university.
- 2 passport photographs
- Passport copy

Originals of documents shall be claimed from the selected students during the orientation meeting. The Selection Committee will contact the candidates for an interview in order to verify the information provided within the application and the English proficiency declared.

5 Selection

- The selection criteria for the Exchange Student are as follows:
    1. Majors in ICT-related study field
    2. Cumulative Grade Point Average (CGPA)
    3. Motivation letter
    4. English language proficiency
    5. Interview in English for short candidates list
- The selection of candidates' Erasmus student mobility for study must achieve:
    - after the interview with each candidate and based on data from the student file, determining Total Score
    - proposes ranking of the candidates in descending order of Total Score
    - determines the ranking of the candidates admitted (A), reserves (Z) or rejected (W)
- The rejected candidates send their appeals to the External Relations Office in the sending institution within 24 hours.
- The ranking will be published on the sending institutions websites, and on ROMOR project website at the following link:

  http://romor.iugaza.edu.ps/romor/index.php/romor-sms
- The list of selected students will be submitted to the sending and hosting institutions for an evaluation of the applications. The hosting institution will make the final admission

decision regarding all incoming Exchange Students, via letter of invitation or acceptance letter.

- Selected students must enroll at the hosting institution following its proper rules and procedures. If one candidate withdraws, he/she need to submit a written request. The vacant place may be occupied by only one of the reserves for the respective selection.

6 Acceptance

- In order to register for University of Parma courses, both institutional coordinators should give their consent.
- The External Relation Office in sending institution will submit Exchange Students completed folders to the hosting institution following to receive an invitation/ acceptance from the hosting institution and information pack (if applicable).
- After the announcement of the selection results, Exchange Students will complete the documentation required by the hosting institution (e.g. Student Application Form, the accommodation, the request to attend some language courses, etc.). Also, Exchange Students will sign the Individual Grant Agreement, fill the Learning Agreement with their faculty/department in the sending institutions, and apply of travel (to the sending institution administration).
- Registration to the courses in the University of Parma will be possible in the beginning of each semester (please check information about the registration in the preliminary list of the courses in Appendix A)
    - Registration to the courses in I semester (Fall) will be possible at the end of September.
    - Registration to the courses in II semester (Spring) will be possible at the end of January.

7 Grant Support

- The grant allocated to the students through the Erasmus+ Program is based on a fixed rate in euros for travel and living costs. The grant does not directly include accommodation, transportation, visa and additional expenditure of the student during their study mobility. These should be arranged and paid for directly by the student with the grant allocation and with the help of the hosting institution.
- Students will receive the Erasmus Grant in two installments. The first installment (70%) will be transferred to the student bank account shortly after receiving both the "Confirmation of Arrival" form and the Erasmus Grant Agreement as specified in the Guidelines for the Special Mobility Strand. The second installment (30%) of the grant will be issued at the end of the program, following receipt of the "Confirmation of Departure" form and the completion of the Participant Report (EU Survey) by the student.
- Students shall be prompted to fill in the report as of 30 days before the end of the mobility.

- If the student has to return back to the sending institution before the planned end date of the traineeship due to justified reasons outside of his/her control (such as obligation, familial reasons, health problems and natural disaster), the student does not have to reimburse the grant allocated to him/her for the period of mobility abroad actually completed. However, the student must reimburse the grant for the days he/she does not actually stay abroad.
- If the student returns back to the sending institution before the planned end period for his/her traineeship, (without justification), the amount of grant allocated to the student must be reimbursed.
- If the student does not fulfil their responsibilities after the mobility (such as not completing their courses or not taking exams) the students must reimburse the grant paid to them.
- The fixed rate amount of grant to be allocated is indicated below:

Sending Country	Hosting Country	Travel Costs (Euro)	Subsistence Costs (Euro) for 4 Months Period
Palestine	Italy	360	3400

8 Other Provisions

- Before departure, selected students must submit a Learning Agreement to the Faculties/departments at the sending institutions for approval.
- Upon arrival at the hosting Institution, exchange students must ask the International Office the issue of an arrival certificate. At the end of the mobility period, students must ask for a departure certificate (stating the duration of the mobility), the Transcript of Records and any other relevant documentation to present once back to the sending Institution.
- Once back at the sending institution, exchange students must submit to the International Relations Office the following documents:
    - The above mentioned original certificates issued by the hosting institution, stating the dates of beginning and end of the mobility period;
    - Original hard copies of flight tickets (and boarding passes), passport copies indicating date of arrival.
- In addition, exchange students must submit to their faculties/departments at the sending institution a declaration of their tutor or supervisor, stating the activities carried out abroad, as well as any other document released by the hosting University (such as Attendance Certificate or Transcript of Records.
- Any academic credit earned at the hosting institution, where applicable, will be transferred back to the sending institution after the completion of the mobility. Exchange Students must consult their faculties/departments at the sending instructions for the

registration of exams held abroad, submitting the relevant documentation, as well as a brief report of the activities carried out.

- If are concluded satisfactorily, periods of study which are part of the curriculum will be automatically and entirely recognized by the partner Palestinian sending universities using the ECTS credit transfer system.
- The EU HEIs follow the criterion of 60 ECTS for a year of full-time studies (1500 Student Learning Hours - 1 ECTS = 25 student learning hours). One semester studies is 30 ECTS (750 Student Learning Hours). Credits are obtained only after passing the related test.
- The PS HEIs follow the US Credit Hours system (1 ECTS = 0.60 Credit Hours, 30 ECTS= 18 Credit Hours). Grades / marks obtained in the subjects taken during the internship will be achieved through rules Conversion clear, transparent and focused on competence and not on name disciplines based on a correlation between the grading systems of the partner Palestinian universities and the University of Parma, according to the scale of equivalence of the marks, from the inter-institutional agreement.
- With regards to the health care, Exchange Students are individually responsible for their insurance coverage.

9 Contact

- The ROMOR Project website:

  http://romor.iugaza.edu.ps
- More information about ROMOR Special Mobility Strand component can be found here:

  http://romor.iugaza.edu.ps/romor/index.php/romor-sms
- Student Mobility for Study 2017/2018 at the university of Parma (students guidelines) will be available soon

ROMOR representatives in sending and in hosting institutions:

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10 Appendix A: Detailed content of offered courses

10.1 Internet of Things

(6 ECTS, 42 minimum class hours, 4 hours/week, teaching period: March 1, 2018 - June 8, 2018)

Learning objectives:

The goals of the course, in terms of knowledge and comprehension, are the following:
- to give students a basic knowledge of the main operational principles of IoT systems, with particular attention to the communication protocols;
- to give students an application knowledge based on the use of an IoT testbed in the lab.

Contents:

The course is divided in two parts. The first part (theory) is dedicated to the introduction to the Internet of Things (IoT), with a description of the mostly used communication protocols (from physical layer to application layer). The second part (practice) is dedicated to an IoT lab: the students are introduced to the main IoT operating systems and to development tools at application layer. The lab part ends with the assignment of a project, which consists of the design and development of an IoT application (using proper IoT nodes which will be given to students) and of the consequent preparation of a short report. The grade of the project assignment is then averaged with the grade of a written exam (typically four questions) on the topics covered in the first part of the course.

Prerequisites:

Having attended basic and/or advanced courses on telecommunication networks is useful.

10.2 Network Security

Two modalities available for this course: 6 ECTS or 9 ECTS

(6 ECTS, 42 minimum class hours, 4 hours/week, teaching period: March 1, 2018 - June 8, 2018)

(9 ECTS, 63 minimum class hours, 6 hours/week, teaching period: March 1, 2018 - June 8, 2018)

The 9 ECTS offering includes extended laboratory activity.

Learning objectives:

The course aims to provide the student with the knowledge of the main security mechanisms and protocols used for securing communications and for protecting computer networks; in particular the knowledge and understanding of:

- applied cryptography;
- main algorithms and protocols for authentication and for securing data exchanges;
- main communication security protocols;
- possible network vulnerabilities and main network protection mechanisms.

The abilities in applying the above-mentioned knowledge are in particular in the:

- analysis of authentication and data protection schemes based on symmetric and/or asymmetric cryptography;
- design of mechanisms for authentication and secure data exchange;

- configuration and use of standard security protocols and algorithms (e.g. IPSec and TLS protocols; AES, DES, 3DES, RSA cryptography algorithms; digital signature and certificates X.509 and PGP; etc.);
- use of tools for network monitoring and vulnerabilities scanning;
- configuration of systems (e.g. firewalls) for network protection.

Contents:

1) Basics of cryptography and authentication mechanisms
- Basics of symmetric (classic) cryptography and examples of algorithms (DES, 3DES, AES)
- Basics of asymmetric cryptography and examples of algorithms (RSA, Diffie-Hellman, DSA); advantages and disadvantages
- Hash and MAC functions (MD5, SHA, HMAC)
- Authentication algorithms, based on both symmetric and asymmetric cryptography
- Key exchange, agreement, and distribution
- Digital signature, digital certificates, certification authority, Public Key Infrastructure, standard X.509, PGP (Pretty Good Privacy)

2) Security protocols
- Protocols for authentication and key exchange (Kerberos, AAA, RADIUS)
- Protocols for secure communications at IP layer (IPSec/AH/ESP), and virtual private networks (VPNs)
- Protocols for secure communications at transport (SSL/TLS) and application layer

3) Network vulnerabilities and countermeasures
- Vulnerabilities of TCP/IP protocols, attacks and countermeasures (sniffing, network and port scanning, spoofing, flooding, buffer overflow, etc.)
- Firewall (packet filtering, ALG, NAT, DMZ), examples of network configurations
- Protocols for FW and NAT traversal (STUN e TURN)
- Intrusion Detection System (IDS)
- Anonymity networks

Prerequisites:

Familiarity with TCP/IP stack and networking.

10.3 Machine Learning for Pattern Recognition

(6 ECTS, 42 minimum class hours, 4 hours/week, teaching period: March 1, 2018 - June 8, 2018)

Learning objectives:

The objective of the course is to provide the student with the ability to understand and apply the basic rules of machine learning and, in particular:
- to apply the most common statistical tests in classification among different categories
- to synthesize the structure of the optimal classifier and analyze its error performance
- to apply the most common feature extraction methods from input data
- to apply the most common statistical estimators in machine learning
- to apply the most common clustering algorithms in unsupervised learning

The abilities in applying the above-mentioned knowledge are in particular in the:
- design and performance analysis of classifiers in machine learning
- selection of the most appropriate features to discriminate input categories
- selection of the most appropriate clustering algorithms in the design of unsupervised classifiers

Contents:

PART 1: Fundamentals

- Basic probability refresher. Bayesian binary and M-ary classification. MAP and Minimax classifiers. Performance and ROC. Gaussian case and linear discriminant rules.
- Bayesian estimation (regression). Maximum likelihood, MMSE, MMAE estimators.
- Linear suboptimal estimators.
- Supervised learning. Generative versus discriminative approaches. Plug-in learning.
- Bayesian learning. Minimum empirical risk learning. Nonparametric probability density estimation.
- Linear data reduction for feature extraction.

PART 2: Advanced topics and applications

- Support Vector Machines. Classifier evaluation techniques.
- Unsupervised classification and clustering.
  - K-means and Isodata algorithms
  - Self-Organizing Maps
  - Learning Vector Quantization
  - Kohonen networks

Prerequisites:

Entry-level courses in linear algebra and probability theory, such as those usually offered in undergraduate / bachelor courses, are necessary pre-requisites for this course.

10.4 Artificial Intelligence (delivery in English language postponed to Fall 2018)

(Fall 2017 offering: in Italian language, 9 ECTS, 63 minimum class hours, 6 hours/week, teaching period: October 1, 2017 - December 22, 2017)
(Fall 2018 offering: in English language, 6 ECTS, 42 minimum class hours, 4 hours/week, teaching period: October 1, 2018 - December 22, 2018. 6 ECTS course does not include “machine learning” and “soft computing” sections -- see course contents below)

Learning objectives:

The course aims to introduce students to the techniques and technologies designed to reproduce on the computer smart behaviors, typical of living beings, with particular attention to the knowledge engineering and machine learning techniques.

Knowledge and understanding:

Specifically the course aims to illustrate

- the main techniques of knowledge representation used in Artificial Intelligence,
- the methodologies to formulate well-defined problems and solutions
- the management of (certain or uncertain) knowledge through logic and reasoning
- some of the most important of Machine Learning methods
- some aspects of the Semantic Web

Applying knowledge and understanding
The main goal of course is to provide students with the ability to

- formulate a problem that can be solved by a logic agent
- describe and represent knowledge through the use of logic
- analyze the knowledge used in a domain and choose the method that is considered more appropriate for its management
- solve a real world problem using machine learning methods

- design a Semantic Web application

Making judgments

To carry out the final project the student will need to analyze the state of the art in the literature to motivate the choices that are made in the development of the task.

Communication skills

Lab exercises and the project can be carried out in small groups, promoting the exchange of views. In addition, the drafting of the report requires a good logical and clarity in reporting data and results.
Learning skills
The student's ability to look at things from different perspectives is stimulated by the integration of theory lessons and laboratory activities.

Contents:

1 Introduction
- 1.1 Definitions and basic approaches

2 Solving Problems by Searching
- 2.1 Well-defined problems and solutions
- 2.2 Blind Search Techniques
- 2.3 Partially Informed Search Techniques
- 2.4 Informed (Heuristic) Search Strategies
- 2.4 Adversarial Search
- 2.5 Games
- 2.6 Optimal decisions in multiplayer games
- 2.7 Imperfect Real-Time Decisions

3 Knowledge representation
- 3.1 Logical Agents
- 3.2 First-Order Logic
- 3.2.1 Inference in first-order logic
- 3.3 Knowledge engineering in first order logic
- 3.4 Description logic
- 3.5 Inference in description logic
- 3.6 Ontological Engineering
- 3.7 Uncertain Knowledge and Reasoning
- 3.8 Bayesian networks
- 3.9 Fuzzy logic

4. Outline of Classical Planning

5. Semantic Web
- 5.1 The basic elements of Semantic Web.
- 5.2 Taxonomies and Ontologies
- 5.3 Examples of applications

6 Machine Learning
- 6.1 Automatic learning and biological learning
- 6.2 Automatic learning in AI

7 Soft Computing
- 7.1 Introduction to the Soft Computing Techniques
- 7.2 Neural Networks
- 7.3 Evolutionary Computation
- 7.3.1 Genetic Algorithms
- 7.3.2 Genetic Programming

7.4 Swarm Intelligence
7.5 Hybrid Systems
7.6 Examples of applications

10.5 Access to Digital Library

(15 ECTS, by distance, Study School in presence September 18-22, 2017)
The course aims:

- to provide students with knowledge and understanding on contemporary digital technology issues and practice
- to provide students with knowledge on digital library models and their implementation;
- to provide a conceptual framework for digital libraries, illustrating the contingency upon people, content and technologies.

The course includes the following main units:
Basic concepts underlying a Digital Library Reference Model: A simple Reference Architecture, components of digital library, interoperability issues, & examples of implementation (Federation, GRID).
Information access: Data model for digital libraries, text retrieval, similarity-based multimedia object retrieval, querying, & relevance feedback. : Metadata and their standards (MARC, Dublin Core), communication standards (Z39.50, OAI-PMH), conceptual models and their representation (FRBR, RDF).
Information discovery: conceptual models and their representation (FRBR, RDF), OAI model, OAI-PMH, OAI-ORE, NISO OpenURL, Syndication feeds, Portals, SOA, & Web 2.0. Information representation and retrieval: representation of text, images, video, audio, text retrieval, content based image and video retrieval.
User interfaces: Personalization, multilingualism, visualization tools, virtual collections, & collaborative tools.
Additional services: security, authentication, authorization, intellectual property rights and DRM, selected reservation issues, access to scientific repositories for e-Science and e-Learning.
Optional traineeship in digital libraries.

10.6 Digital Knowledge Organization

(15 ECTS, by distance; Study School in presence September 18-22, 2017)

The course aims:

- to create opportunities for the development of knowledge and understanding on different metadata formats for describing digital documents;
- to create preconditions for the development of the analytical framework needed to understand secure interoperability between metadata formats.

The course contains the following units:

- Introduction: knowledge organization, metadata, digital revolution, history of non-book bound information systems, digital media, digital document, and digital library.
- Indexing: principles of indexing, owner based indexing; collection based indexing, user-based indexing.
- Ontologies: bibliographic languages, document languages and work languages, subject languages, ontologies.

- Metadata and interoperability: types of metadata (descriptive, structural, administrative), Dublin Core and MARC, levels of interoperability (schema, record, repository levels).
- Semantic web: technologies for developing the semantic web, XML, RDF, RDF Schema (RDFS), OWL (Web Ontology Language)
- Linked data: ontology modelling revisited, interoperability recapitulated, the data silo problem, linked data.
- Libraries and linked data: bibliographic description in the linked data landscape, subject languages, document and work languages.
- Traineeship in digital libraries.

10.7 User and Usage

(15 ECTS, by distance; Study School in presence September 18-22, 2017; Tutoring and lab supervision 4 hours/week: from October 1, 2017 to December 22, 2017)

The course will provide students with:

- knowledge and understanding of theories, models and best practices for developing digital libraries;
- a methodological framework to consider user needs, expectations and perceptions needed to develop critical ability to plan digital library programs.

The course contains the following main units:

- A user-centred digital library.
- Target groups and communities of practice regarding the digital library users.
- Measuring performance and value of digital libraries.
- Allocation of resources, collection management and information mediation in digital libraries. Marketing digital library services, economical and legal aspects of access.
- Library services and user training. Developing the digital competencies of users.
- Traineeship in digital libraries.

10.8 Programming Languages and Paradigms (English/ Italian)

(6 ECTS, course offered in Italian language; instructor willing to held part of the lectures in English language upon request of foreign students. 42 minimum class hours, 4 hours/week, teaching period: March 1, 2018 - June 8, 2018)

Learning objectives:

The course aims at providing students with the ability to understand the principles of programming languages and the modern programming techniques, according to the main different paradigms:

- Basics of language theories and compilers

- Object-oriented programming
- Generic programming
- Functional programming

The abilities to apply the listed knowledge elements regard mainly multi-paradigm development, fit for the context of distributed, heterogeneous and parallel systems:

- Handle correctly data and code in text form
- Acknowledge and use features shared by various languages
- Use static analysis to obtain robust and performance code
- Use polymorphism and meta-programming to raise the level of abstraction
- Use functional programming for integrity and parallel computation

Contents:

- Introduction to formal languages (12 hours in classroom and 4 in lab)
  Chomsky classification
  Regular expressions
  Context free grammars
  Syntactic analysis and parser generators
  Syntax trees and code generation
- Object-oriented programming (4 hours in classroom and 2 in lab)
  Introduction
  Object-oriented programming in C++14
  Comparison with other languages: Java, Python, Go
- Generic programming (4 hours in classroom and 2 in lab)
  Introduction
  C++ templates and STL
- Functional programming paradigm (8 hours in classroom and 4 in lab)
  Introduction
  Presentation of LISP
  Programming in Haskell
  Functional features of C++14
  Parallel programming in C++14
- Dynamic languages and metaprogramming (4 hours in classroom and 2 in lab)
  Introduction
  Dynamic features of C++14
  Dynamic and scripting languages
  Metaprogramming in Python

Prerequisites:

Students are expected to possess good basic abilities in structured and object-oriented programming.

10.9 Laboratory Internship

Various laboratory activities can be performed during the program, corresponding to 6 ECTS of internship. Optionally, these activities can also be joined with laboratory projects for other courses (corresponding to 6 or 9 additional ECTS). Internships are available both in Fall and in Spring semesters.

Some internship activities more closely related to the ROMOR themes include:

- Data mining on Scopus. Scopus is a well-known repository of metadata about scientific research articles. Data can be gathered from this repository to create a social graph of scientific authors, starting from citations among their articles. Moreover, using data mining techniques, some relevant research topics can be inferred for each author, from the textual analysis of the abstracts of his articles. Authors can be clustered on the basis of the more relevant terms extracted from abstracts. A different type of clustering is based instead on community detection algorithms. More insightful knowledge can also emerge from the analysis of these data, along a timespan of some decades.

- Sentiment analysis on social media. Within social media, many and various communities are originated by users with common interests, or with similar ways to feel part of the community. This activity is based on a combined approach between Social Network Analysis and Sentiment Analysis. The work also regards more detailed emotion detection, possibly based on machine learning and hierarchical automatic classification, which has a wide range of applications among which the assessment of users' moods in a community is perhaps the most relevant.

- Community detection and geolocalization in social networks. One of the most important problems in the field of social network analysis, and one of the most discussed ones, is community detection, aimed at clustering the nodes on the basis of their social relationships. Community detection is relevant in various fields, including: recommendation systems, link prediction and suggestion, epidemic spreading and information diffusion, sybil detection. Moreover, this kind of analysis has even greater value if combined with geographical data, associated in various ways with published messages, and sentiment analysis, for associating a prevailing sentiment with communities of users and geographical areas.

- Patterns of user behaviours on social media. Social networking systems are being largely adopted inside organizations. Also traditional information systems, such as CRMs and ERPs, are being modified in order to include social aspects. Analysis of users' behaviours can be useful to cope with common organization problems, including: launching distributed teams, retaining people with vital knowledge for the organization, improving access to knowledge and spreading ideas and innovation. However, these goals are often frustrated by difficulties, including anti-social behaviours of participants, lack of incentives, organizational costs and risks. On the other hand, effective use of social media can lead to the rapid widespread of news, ideas, and innovation. This project is founded on the basic aspects of social network analysis and some theories of participation in social networks, inspecting in particular the role of social capital.
- Open systems for social networking. This project is meant for creating the building blocks of an open social networking platform, also useful in the area of scientific research and open data. Useful existing standard formats and protocols include: Portable Contacts, FOAF, Atom, RSS, OStatus, OAuth. More recently, OpenSocial is being standardized by the W3C as a set of common APIs, defined in the form of RESTful Web services, that allow developers to access core functions and information at social networks: (i) information about a user's profile, (ii) information about the social graph connecting users, and (iii) activities occurring in the network, including status updates, publishing of new content and media, commenting and tagging.

10.10 Italian Language course

(4 ECTS, Fall and Spring, 30 hours of face-to-face lessons and an online part consisting in guided self-access lessons)

- The Italian Language Courses take place in both semesters and are organized in two modules, each one corresponding to a different level:
- First Module: Intensive course, beginning in September (1st semester) and February (2nd semester) – taking students from an A2+ to a B1 level
- Second Module: Extensive course, beginning at the end of October (1st semester) and of March (2nd semester) – from a B1 to a B2 level
- Every course is provided in a blended modality: 30 hours of face-to-face lessons and an online part consisting in guided self-access lessons on teaching materials aimed at developing competences in Italian for study purposes.
- Students attending a course and passing the final test are awarded 4 ECTS (CFU) credits; in addition they can acquire other 4 ECTS by attending another course of a higher level and passing its final test (e.g. if a student attends the 1st course and reaches a B1 level, he/she can then attend the 2nd course to attain a B2 level).