



**Tempus SMGR No: 517340 – TEMPUS - 1-2011-1- IT  
Documentation for Quality Assurance of  
Study Programmes (DoQuP)**

**Training Seminar**

on

**Software for on-line management of identified  
information and data for quality assurance of  
study programmes in Partner Countries**

**Conferenza dei Rettori delle Università Italiane (CRUI)  
Piazza Rondanini 48 – Roma  
*13-15 November 2013***

**Example of Documentation for Quality Assurance  
consistent with the DoQuP Model**

## **General Entry**

### **Official Name of the Study Programme**

**Laurea in Fisica (Bachelor in Physics)**

### **Qualification (ex Degree profile)**

Dottore in Fisica (Doctor in Physics)

### **Cycle /Level**

Qualifications Framework for the European Higher Education Area (QF for EHEA): 1<sup>st</sup> cycle;  
European Qualifications Framework for Lifelong Learning (EQF for LLL): level 6;  
National Qualification Framework: 1<sup>st</sup> cycle

### **Type of Degree & Length**

Single degree (180 ECTS-credits)

### **Institution(s)**

University of Genoa, Italy

### **Accreditation Organisation**

National Agency for the Evaluation of the University System and Research (ANVUR)

### **Period of reference**

Accredited for 3 years for cohorts commencing in academic year 2012/13

### **Purpose**

To provide education in Physics, envisaging various employment capabilities and careers. To prepare students with particular interest in specialized areas of Physics for further studies.

### **Discipline(s) / Subject area(s)**

Physics; Mathematics; Informatics; Others (50: 30: 5: 15).

### **General / Specialist Focus**

General education in experimental and theoretical physics.

### **Orientation**

Based on previous research and exposed to current research but introducing specializations envisaging specific employment/career opportunities: Physics (topics in Theoretical and Applied Physics), Biophysics, Medical Physics, Informatics.

### **Teaching & Learning Approaches**

Lectures, laboratory classes, seminars, small group work, individual study based on text books and lecture notes, individual consultations with academic staff, preparing graduation-exam dissertation.

### **Assessment Methods**

Written exams, oral exams, laboratory reports, oral presentations, continuing assessments, final comprehensive exam, assessment of graduation-exam dissertation.

### **Distinctive Features**

The programme is taught also in English.

## **Standard A - Needs and Objectives**

*The study programme should identify the educational needs of the labour market of reference, establish educational objectives coherent with the mission of the institution the study programme belongs to and the educational needs of the labour market of reference, and learning outcomes coherent with the established educational objectives.*

### **Quality Requirement A1 - Educational needs of the labour market**

*The study programme should identify the educational needs of the labour market of reference. The*

*educational needs should be identified in terms of professional profiles and/or functions/roles/activities expected for the graduates and associated required competences.*

### **Organisations representative of labour market consulted and Methods and schedule of the consultation**

For the identification of the general educational needs of the labour market in terms of required competences the SP has made reference to the Tuning document “Reference Points for the Design and Delivery of Degree Programmes in Physics”

([http://www.unideusto.org/tuningeu/images/stories/Publications/PHYSICS\\_FOR\\_WEBSITE.pdf](http://www.unideusto.org/tuningeu/images/stories/Publications/PHYSICS_FOR_WEBSITE.pdf)).

Furthermore the SP has appointed a University/Labour Market Committee, *composed by representatives from University and from the labour market of reference*, which meets at least once per year, with the main aim to adapt the general educational needs shared at international level with the expectations of the labour market of reference.

The representatives of the labour market of reference involved in the Committee are:

- representatives of the main industries located in the territory of reference (Liguria region), such as Ansaldo Energy, ...;
- representatives of the Chamber of Commerce of the Ligurian provinces;
- representatives of the Industry Association of the Ligurian provinces
- representatives of the Regional Association of Physicists.

Other informal, not scheduled ways of consultation are the relationships established with the industries where students carry out stages or develop their thesis work.

Another informal way of information on the needs and expectation of the labour market are the questionnaires filled by the graduates after 3 years from their placement in the labour market.

### **Identified educational needs of the labour market**

The identified educational needs and expectations of the labour market of reference are shown in the minutes of the last meeting of the Committee University/Labour Market held on 28 October 2012, available at

<http://www.physics.unige.it/bachelorinphysics/communiversitylabourmarket/minutesmeeting28.10.2012>

In synthesis the graduates of the Bachelor in Physics are requested to have:

- a deep knowledge and understanding of the fundamental physics principles and of appropriate mathematical methods;
- ability to apply their knowledge and understanding in the analysis of both natural and technological physical phenomena;
- ability to solve a wide range of problems by identifying their fundamental aspects and using both theoretical and experimental methods;
- experimental and computational skills;
- learning ability to enter new fields by using mathematics and physics knowledge;
- team-work and time management;
- communication skills also with non-experts and using ICT;
- ethical commitment

### **Quality Requirement A2 - Educational objectives**

*The study programme should define educational objectives in terms of professional profiles of the graduates and/or functions/roles/activities students are to be prepared for and associated key competences to be developed and obtained by the students during the learning process consistent with the mission of the institution which the study programme belongs to and the educational needs of the labour market of reference.*

#### **Educational objectives**

#### **Professional profile**

Physicist.

Functions/Roles/Activities students are to be prepared for

Research assistant in universities and research centres.

Laboratory technician in universities, research centres, industries.

Technical positions in microelectronics, telecommunication, opto-electronics, materials industries and societies.

Technical positions in informatics and software societies.

Technical positions in banks and insurance companies.

Key competences to be developed and obtained by the students during the learning process

*SUBJECT SPECIFIC*

- Deep knowledge and understanding: ability to analyze physical phenomena (both natural and technological) in terms of fundamental physics principles and knowledge and by means of appropriate mathematical methods.
- Estimation skills: ability to make order-of-magnitude estimates and find approximate solutions with explicit statements of assumptions and the use of special and limiting cases.
- Mathematical skills: ability to understand and master the use of the mathematical and numerical methods most commonly used in physics.
- Experimental skills: Ability to perform experiments independently, as well as to describe, analyze and critically evaluate experimental data.
- Problem solving: ability to solve a wide range of problems by identifying their fundamental aspects and using both theoretical and experimental methods as derived from physics curriculum.
- Computational skills: ability to use appropriate software such as programming languages and packages in physics and mathematical investigations.
- Physics culture: ability to provide explanations of a wide range of natural processes and objects (both natural and technological) ranging in scale from the universe as a whole (including its evolution from its origins to the present) to subatomic particles and processes; this ability to be grounded in a deep knowledge and understanding of a wide range of physics topics and theories.
- Learning ability: ability, through independent study, to enter new fields by using mathematics and physics knowledge.

*GENERIC*

- Analysis and synthesis: capacity for analysis and synthesis using logical arguments and proven facts.
- Flexible mind: acquisition of a flexible mind, open to apply basic physical knowledge and competences in a wide range of job opportunities and in everyday life.
- Team-work: capability to perform guided teamwork in a lab setting and related special skills demonstrating capacity for handling the rigor of the discipline and for time management (including meeting deadlines).
- Communication skills: ability to communicate effectively and to present complex information in a concise manner orally and in writing and using ICT and appropriate technical language.
- Popularization skills: ability to communicate with non-experts, including some teaching skills.
- Ethical commitment: ethical commitment from the point of view of both professional integrity and awareness of possible physics social impact.

Main areas in which graduates can find employment and level of responsibility they are qualified to take

Positions in companies/small enterprises and institutions (research, quality assurance, commerce) from technological and informatics sector, bio-medical and pharmaceutical sector, environmental

sector. Positions in financial institutions. Teaching positions.

Second cycle programmes in which the first cycle graduates can prosecute their studies

Master programmes in Physics (theoretical, applied physics), interdisciplinary programs related to Physics (Biophysics, Medical Physics, Geophysics), Master programmes in engineering / technological physics or Informatics.

### **Quality Requirement A3 - Learning outcomes**

*The study programme should define learning outcomes in terms of what students are expected to know, understand and/or be able to demonstrate after completion of the educational process consistent with the national qualification framework, if any, and with the established educational objectives.*

#### **Learning outcomes**

The learning outcomes expected in the students at the end of the educational process have been established as follows.

- Ability to demonstrate knowledge and understanding of physics fundamentals in: classical mechanics, vibrations and waves, optics and spectroscopy, thermodynamics, electromagnetism, quantum physics. The level of this knowledge of core physics is a basic one, i.e. the level needed for working with established areas of applications but not as high as is needed for research at the frontiers of knowledge.
- Ability to demonstrate knowledge and understanding of mathematics relevant for physics at a basic level, i.e. differential and integral calculus, algebra, analytic functions of real and complex variables, vectors and matrices, vector calculus, ordinary and partial differential equations, statistics, Fourier methods and – furthermore – capability of using such tools in physics applications.
- Ability to demonstrate experimental skills in physics (i.e. knowledge of experimental methods and how to perform physics experiments) under supervision, in order to test hypotheses and to investigate phenomena and their physical laws (i.e. being able to ask for the right questions; familiar with most common instrumentations; designing, assembling, conducting experiments; collecting and analyzing data, including careful error analysis and critical evaluation of experimental results).
- Ability to demonstrate knowledge and understanding at a basic level of elements of theoretical physics (analytical mechanics, classical electromagnetism, relativity, etc.; quantum theory; statistical mechanics) to appreciate the role of models and theories in the development of physics and to shape a flexible mind.
- Ability to demonstrate knowledge and understanding at a basic level of modern physics (atomic and molecular, nuclear and sub-nuclear, solid state, astrophysics) with some exposure to research frontiers.
- Ability to apply knowledge and understanding at an operational level of elements of applied physics and related subjects (chemistry, electronics et related) to foster awareness of interrelations among hard sciences.
- Basic knowledge and understanding of special fields chosen by the student: theoretical physics, photonics, polymers, condensed matter physics, biophysics, medical physics, informatics in order to prepare for future specialization and/or interdisciplinary approaches.
- Ability to perform computer calculations related to physics problems by using appropriate software and at least one programming language, learning how to analyse and display results.
- Acquisition of good working habits concerning both working alone (e.g. diploma thesis) and in teams (e.g. lab reports, including team-leading), achieving results within a specified time-frame, with an emphasis on awareness about professional integrity and on how to avoid plagiarism.
- Demonstrated proficiency in using English language, including subject area terminology, for literature search.

## Results of the comparison with the learning outcomes of other study programmes of the same typology

The exits of the comparison with the learning outcomes of the Bachelor in Physics of the European Network of Physics Institutions (ENPI) are registered in the report “Characteristics of European Bachelors in Physics”, edited by ENPI and updated every three years.

The last edition of the report is of 2012 and is available at <http://www.ENPI.eu/bachelorinphysics/2012>.

## Standard B - Educational process

*The study programme should assure students educational activities able to accomplish the established learning outcomes through contents, methods and times adequately designed and planned, take under control their development, assure a correct assessment of students' learning through suitable assessment methods and criteria, and establish appropriate criteria for students' studies progression.*

### Quality Requirement B1 - Admission qualifications and requirements

*The study programme or the competent authority should define qualifications and requirements for the admission to the study programme adequate for a profitable participation of the students to the established educational activities, in particular of the first course year.*

#### Qualifications and requirements for the admission to the SP, Assessment of the mastery of the admission requirements and Criteria of admission

All the students who have overcome the school-leaving examination can be admitted to the Bachelor in Physics independently from the school of provenance.

The requirements, the assessment tests and the criteria for the admission at the SPs are established at national level by the Ministry of Education, University and Research (MIUR). They are available at the Ministry web site (<http://www.miur.it/universityadmissionrequirements/2013-14>) and are also shown at <http://www.schoolofMPNscience.unige.it/bacheloradmissionrequirements>.

The requirements for the admission at the Bachelor in Physics regard: general culture, verbal comprehension, logic, mathematics, physics.

There is not established a minimum level of the mastery of the admission requirements. Students who participate at the admission tests, which are carried out on the date established by the Ministry in all the national Universities which offer SPs in Physics, are inserted in a national ranking on the base of the grade obtained in the admission test and can choose the University where enrolling until the completion of the available places.

The assessment of the mastery of the admission requirements is carried out through tests at multiple answers, established by MIUR.

### Quality Requirement B2 - Design and planning of the educational process

*The study programme should design a curriculum and characteristics of the didactic units consistent with the established learning outcomes. The study programme should also establish appropriate criteria for students' progression in their studies.*

*Furthermore the study programme should plan the development of the educational process in such a way that students are able to achieve the learning outcomes in the expected time, according to a gradual process and activities coherent and coordinated with each other.*

#### Required Documentation

##### Curriculum

The curriculum of the bachelor in Physics for the academic year 2013-14 is shown at <http://www.physics.unige.it/bachelorinphysics/curriculum2013-14>.

For each didactic unit of the curriculum the following information are shown:

- year and semester of delivery;
- ECTS credits;
- lecturer(s.)

The curriculum is proposed by the Council of the Bachelor in Physics and approved by the Council of the Physics Department.

## Bachelor in Physics

### Curriculum Academic Year 2013-14

| Year/<br>Semester | Didactic Unit | ECTS<br>credits | Lecturer(s) |
|-------------------|---------------|-----------------|-------------|
| ...               | ...           | ...             | ...         |

### Characteristics of the didactic units

The characteristics of the didactic units are shown at

<http://www.physics.unige.it/bachelorinphysics/curriculum2013-14/characteristicdidacticunits>.

For each didactic unit the following information are shown:

- name;
- number of ECTS credits;
- course year and teaching period of carrying out;
- lecturer(s);
- learning outcomes specific of the didactic unit and consistent with the established learning outcomes of the SP;
- contents and schedule;
- instructional forms of education (face to face education, paper-based distance education, ICT-based distance education), also in terms of hours/credits for each form, and typologies of educational activities or teaching techniques (e.g.: lectures, practical classes, project classes, laboratory sessions, projects, etc.), also in terms of number of hours/credits for each technique;
- assessment methods (e.g.: written examinations, oral examinations, etc.) and assessment criteria (descriptions of what the learner is expected to do and to what level, in order to demonstrate that a learning outcome has been achieved and to what extent); criteria for measuring students' learning or assessment metrics (e.g.: attribution of a final grade, fitness declaration, etc.) and criteria of attribution of the final grade, if any;
- preparatory didactic units, if any;
- didactic material of reference (e.g.: textbooks, lecture texts, etc.).

The definition of the characteristics of the didactic units is coordinated by Didactic Commission of the SP, particularly in order to avoid gaps or superimpositions in the definition of the specific learning outcomes and contents and to assure the suitability of the assessment methods to a correct assessment of the students' learning.

### Characteristics of the graduation exam

The characteristics of the graduation exam are shown at

<http://www.physics.unige.it/bachelorinphysics/curriculum2013-14/graduationexam>.

The following information are specified:

- workload, in terms of ECTS credits;
- requirements to be fulfilled by the final work;
- criteria for the attribution of the graduation grade.

### Suitability of the curriculum to the achievement of the expected learning outcomes

The suitability of the curriculum to the achievement of the expected learning outcomes is shown

in the following table, where for each learning outcome the didactic units which contribute to its accomplishment are indicated.

| Learning outcomes   | Didactic units which contribute to the accomplishment of the learning outcome   |
|---|---|
| Ability to demonstrate knowledge and understanding of physics fundamentals in: classical mechanics, vibrations and waves, optics and spectroscopy, thermodynamics, electromagnetism, quantum physics. The level of this knowledge of core physics is a basic one, i.e. the level needed for working with established areas of applications but not as high as is needed for research at the frontiers of knowledge. | Physics 1 ( <i>classical mechanics, vibrations and waves, optics and spectroscopy</i> )<br>Physics 2 ( <i>thermodynamics, electromagnetism, quantum physics</i> ) |
| ...   | ...   |

### Criteria for students' studies progression

Students' progression in their studies is regulated by the following criteria.

#### ***Frequency of the didactic activities***

Frequency of the didactic activities is compulsory.

To be admitted at the exam of each didactic unit students must have attended at least the 80% of the hours of didactic activities carried out in the didactic unit.

Working students are waved only from the attendance to lectures.

#### ***Admission at the successive course year***

To be admitted at the 2<sup>nd</sup> course year students must have accumulated at least 30 ECTS credits.

To be admitted at the 3<sup>rd</sup> course year students must have accumulated at least 90 ECTS credits.

#### ***Training periods outside University***

For carrying out training periods outside University students must have accumulated at least 150 ECTS credits.

#### ***International mobility***

For carrying out periods of international mobility students must have accumulated at least 120 ECTS credits

#### ***Admission at the graduation exam***

To be admitted at the graduation exam students must have accumulated all the ECTS credits established in the curriculum, except the credits attributed to the graduation exam.

#### ***Part time students***

Students who in an academic year acquire a number of credit less than 45 are considered 'part time student'.

The rules for progression in their studies of part time students are reported at

<http://www.physics.unige.it/studentguide2013-14/partimestudents>.

#### ***Students who cannot attend the didactic activities for a long period for causes independent from their will***

Admission at the exams of students who cannot attend the didactic activities for a long period for causes independent from their will is regulated time by time by the Didactic Commission of the Bachelor.

### Calendar and timetable of didactic units and exams



The calendar and timetable of the didactic units for the academic year 2013/14 are available at <http://www.physics.unige.it/bachelorinphysics/didacticunits/calendar2013-14>.

The calendar of the exams and the compositions of the exam commissions for the academic year 2013/14 are available at <http://www.physics.unige.it/bachelorinphysics/exams/calendar2013-14>.

The calendar of the graduation exam included and the composition of the exam commissions for the academic year 2013/14 are available at <http://www.physics.unige.it/bachelorinphysics/graduationexams/calendar2013-14>.

### **Quality Requirement B3 - Realization of the educational process**

*The study programme should implement the educational process coherently with the designed and planned development.*

*The study programme should also control the development of the educational process, in order to check its correspondence with the designed and planned development, and the adequacy of the assessment tests to the learning outcomes and the correctness of the evaluation of the students' learning.*

#### **Required Documentation**

#### **Correspondence of the development of the educational process with the designed and planned development**

The SP takes under control the correspondence of the development of the educational process with the designed and planned development through:

- the control of the lecture registers, which are on-line and have to be filled in real time by the lecturers, by the President of the Council of the Bachelor;
- the survey of the students' opinions on the didactic units.

At the end of each semester the President refers at the Council the results of the control of the lecture registers. The President's report is attached to the minutes of the Council meeting. In the two semester of the last academic year (2012-13) there has been full correspondence of the development of the educational process with the designed and planned development.

The results of the monitoring of the students' opinion relative to all the didactic units of the curriculum for the last academic year (2012-13) are shown at <http://www.physics.unige.it/bachelorinphysics/student'sopinionondidacticunits/results2010-13>, while the results relative to the single didactic unit are made available only at the persons in charge of the Bachelor and at the lecturer.

The Bachelor takes into account the survey of the students' opinions on the didactic units in occasion of the revision process, in order to identify all the opportunities of improvement and adopt suitable actions.

#### **Adequacy of the assessment tests to the learning outcomes and correctness of the evaluation of the students' learning**

At the moment the SP does not take under control the adequacy of the assessment tests to the learning outcomes and the correctness of the evaluation of the students' learning.

The question will be examined in occasion of the next revision process.

### **Standard C - Resources**

*The study programme should have at disposal teaching staff, facilities, financial resources, student support services and partnerships with businesses, research institutions and other Higher Education Institutions adequate for the accomplishment of the learning outcomes and able to make students' studies progression easier.*

#### **Quality Requirement C1 - Teaching staff**

*The study programme should have at disposal teaching staff, including teaching support staff, adequate for the achievement of the established learning outcomes.*

### Teaching staff

The SP lecturers are listed at <http://www.physics.unige.it/bachelorinphysics/teachingstaff/2013-14>.

The information shown for each lecturer are:

- academic or professional qualification;
- list of the didactic units he/she is in charge of, subdivided into didactic units of the Bachelor in Physics and didactic units of other SPs;
- for each didactic unit, if he/she is the holder or the title on the basis of which it is covered (e.g.: additional duty, contract, etc.).

It is also available the hyperlink at the CV of each lecturer, with the description of his/her scientific and/or professional interests, activities and results.

### Bachelor in Physics, A.Y. 2013-14

#### Teaching Staff

| Lecturer           | Qualification* | Didactic units of the SP** | Didactic units of other SP** |
|--------------------|----------------|----------------------------|------------------------------|
| Adamkulova Chinara | FP             | Mathematics 1 (ID)         | Mathematics 1 (AD)           |
| ...                |                |                            |                              |
| Musaio Angelo      | PR             | Experimental Physics (C)   |                              |
| ...                |                |                            |                              |

\* FP: Full Professor; AP: Associate professor; ...; PR: Professional.

\*\* ID: Institutional Duty; AD: Additional Duty; ...; C: Contract.

### Criteria of selection of the lecturers

*Description*

*Opportunities offered to the teaching staff for improving their teaching skills and reaching acceptable standards*

*Description*

### Teaching support staff

The SP teaching support staff is listed at

<http://www.physics.unige.it/bachelorinphysics/teachingsupportstaff2013-14>.

The information provided for each course unit which utilizes support teachers are:

- support teacher(s);
- his/her qualification;
- total number of hours of didactic workload;
- task.

### Bachelor in Physics, A.Y. 2013-14

#### Teaching Support Staff

| Course Unit          | Support Teacher | Qualification | N. of hours of didactic workload | Task               |
|----------------------|-----------------|---------------|----------------------------------|--------------------|
| Mathematics 1        | Zich Michele    | PhD Student   | 40                               | Practical Training |
| ...                  |                 |               |                                  |                    |
| Experimental Physics | Holzer David    | Professional  | 12                               | Lab Assistance     |
| ...                  |                 |               |                                  |                    |

### ***Criteria of selection of the support teachers***

The support teachers are selected according to the following criteria.

#### *Description*

### **Quality Requirement C2 - Facilities**

*The study programme should have at disposal facilities, with the associated equipments, quantitatively and qualitatively adequate for the development of the established educational activities and able to allow the application of the established didactic methods.*

#### **Classrooms**

The classrooms of the Physics Department are listed at <http://www.physics.unige.it/classrooms>.

For each classroom at least the following information are shown:

- number of seats;
- supply of audiovisual equipments;
- availability of web connection;
- surveillance and assistance staff available.

The Bachelor in Physics utilizes the following classrooms: PD1, PD4, PD7, PD12.

#### **Rooms for individual study**

The rooms for individual study available at the Physics Department and utilized by the students of the Bachelor in Physics are two, ISR1 and ISR2.

- ISR 1
  - number of seats: 40
  - opening time: 8.00-20.00 from Monday to Friday;
  - access: free;
  - no surveillance staff available.
- ISR 2
  - number of seats: 20
  - opening time: 8.00-20.00 from Monday to Friday;
  - access: free;
  - no surveillance staff available.

#### **Laboratories**

The didactic laboratories of the Physics Department are listed at

<http://www.physics.unige.it/didacticlaboratories>.

For each didactic laboratory at least the following information are shown:

- equipments or personal computers and software of interest for the didactic activities of the SP available;
- number of work places and number of students for work place;
- technical staff available.

The Bachelor in Physics utilizes the following laboratories:

- Metrology Laboratory;
- Experimental Physics Laboratory;
- ... .

#### **Libraries**

The students of the Bachelor in Physics utilize the library of the Physics Department.

The information on the library's:

- availability of updated bibliographical material of interest for the didactic activities of the SP;
  - availability of web connections;
  - services offered (consultation of books and journals, book rent, bibliographical researches, access to data bases);
  - opening time and access rules;
  - librarian staff available;
- are available at <http://www.physics.unige.it/library>.

### Other resources and special initiatives

List the other resources at disposal of and the special initiatives undertaken by the SP.

### Quality Requirement C3 (optional) - Financial resources

The study programme should have at disposal financial resources adequate for the development of the educational process according to the designed and planned activities.

#### Needs of financial resources

The needs of financial resources are established for all the SPs of the Department (1 Bachelor and 3 Masters).

The needs for the academic year 2013-14 are shown in the following table.

#### Physics Department

##### Needs of financial resources for the didactic activities – A.Y. 2013-14

| Expense Voices  | €   |
|---|-----|
| Remuneration of the contract teachers                   | ... |
| Remuneration of the support teachers                    | ... |
| Updating of the equipments of the didactic laboratories | ... |
| Maintenance of the didactic laboratories                | ... |
| Didactic material to be distributed to students         | ... |
| ...   | ... |

A more detailed description of the needs of financial resources for all the SPs of the Department is reported in the minutes of the meeting of the Council of the Physics Department held on 25 October 2013 (available on-line only to authorized people).

#### Availability of financial resources

The availability of financial resources for the needs of all the SPs of the Department (1 Bachelor and 3 Masters) for the academic year 2013-14 is shown in the following table.

#### Physics Department

##### Availability of financial resources for the didactic activities - A.Y. 2013-14

| Financer Body                            | €   | Available for  |
|--|-----|--|
| Central Administration of the University | ... | Remuneration of the contract teachers<br>Remuneration of the support teachers  |
| Students' contributes                    | ... | Updating of the equipments of the didactic laboratories<br>Maintenance of the didactic laboratories<br>Didactic material to be distributed to students |
| UBI Bank                                 | ... | Updating of the equipments of the didactic laboratories  |
| ...                                      | ... |  |

A more detailed description of the availability of financial resources for the needs of all the SPs of the Department is reported in the minutes of the meeting of the Council of the Physics

Department held on 25 October 2013 (available on-line only to authorized people).

### **Quality Requirement C4 - Student support services**

*The study programme should have at disposal student support (orienteeing, tutoring and assistance) services relevant to the educational process and able to make students' learning and studies progression easier.*

#### **Support Services**

Students have at their disposal the following support services:

- the **student administrative office**, organised and managed by the Central Administration of the University, has as main responsibilities the students' enrolment and the management of the students' career.

Information on the:

- office organisation and management;
- available staff;
- activities in charge of the office;
- activities and results of the last academic year;

are available at <http://www.unige.it/studentoffice/schoolofMPNsciences>.

- The **orienteeing service for students in entrance**, organised and managed by the School of MPN Sciences, whose main responsibilities are to favour a correct knowledge of the educational objectives and of the characteristics of the SPs of the School and to orient students in order to favour an aware choice of the SP.

Information on the:

- service organisation and management;
- available staff;
- activities in charge of the office;
- activities and results of the last academic year;

are available at <http://www.schoolofMPNscience.unige.it/orienteeringinentranceservice>.

- The **tutoring service**, organised and managed by the Physics Department, whose main responsibilities are to favour an effective insertion in the educational process of the SP and an effective studies progression of the students.

Information on the:

- service organisation and management;
- available staff;
- activities in charge of the office;
- activities and results of the last academic year;

are available at <http://www.physics.unige.it/studentoffice/tutoringservice>.

- The **service for the development of training periods outside University**, organised and managed by the School of MPN Sciences, whose main responsibilities are the organisation and the management of training periods outside University.

Information on the:

- service organisation and management;
- available staff;
- activities in charge of the office;
- activities and results of the last academic year;

are available at <http://www.schoolofMPNscience.unige.it/trainingperiodsservice>.

- The **service for the students' international mobility**, organised and managed by the School of MPN Sciences, whose main responsibilities are the organisation and the management of the mobility of students in exit and in entrance.

Information on the:

- service organisation and management;
  - available staff;
  - activities in charge of the office;
  - activities and results of the last academic year;
- are available at <http://www.schoolofMPNscience.unige.it/studentsmobilityservice>.

- The **job placement service**, , organised and managed by the School of MPN Sciences, whose main responsibility is to favour the placement of the graduates in the labour market.

Information on the:

- service organisation and management;
- available staff;
- activities in charge of the office;
- activities and results of the last academic year;

are available at <http://www.schoolofMPNscience.unige.it/jobplacementservice>.

### **Quality Requirement C5 - Partnerships**

*The study programme should have at disposal partnerships with national and international businesses, research institutions and other Higher Education Institutions quantitatively and qualitatively adequate for the carrying out of students' external education and mobility.*

#### **Partnerships for the carrying out of training periods outside University**

The list of the active partnerships for the carrying out of training periods outside University and for each partnership the number of students of the Bachelor in Physics who have carried out training periods in the body in consideration in the last three academic (solar) years are shown at <http://www.schoolofMPNscience.unige.it/bachelorinphysics/partnershipstrainingperiods>.

Add a comment. In particular **to comment** the evolution of the number of students who carry out training periods outside University in the academic years considered.

**Bachelor in Physics**

**Partnerships for the carrying out of training periods outside University**

**Annex C5.1**

#### **Partnerships for the carrying out of international mobility periods**

The list of the active partnerships for the carrying out of international mobility periods and the number of students of the Bachelor in Physics, in exit and in entrance, who have carried out periods of international mobility in the Institution in consideration in the last three academic (solar) years are shown at

<http://www.schoolofMPNscience.unige.it/bachelorinphysics/partnershipsmobilityperiods>.

Add a comment. In particular **to comment** the evolution of the number of students who carry out mobility periods University in the academic years considered.

**Bachelor in Physics**

**Partnerships for the carrying out of international mobility periods**

**Annex C5.2**

### **Standard D - Monitoring and Results**

*The study programme should monitor the results of the educational process at least with respect to entrance students, students' learning, students' studies progression, students' opinion on the educational process, graduates' placement, in order to check the adequacy and effectiveness of*

*the educational service provided.*

### **Quality Requirement D1 - Entrance students**

*The study programme should monitor the entrance students in order to check its attractiveness.*

#### **Results of the monitoring of the assessment of the mastery of the admission requirements**

The results of the monitoring of the assessment of the mastery of the admission requirements by the entrance students enrolled in the first course year of the last three cohorts (from A.Y. 2010-11 to A.Y.2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/assessmentmasteryadmissionrequirements2010-13>.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

##### **Results of the tests for the assessment of the mastery of the admission requirements**

##### **Annex D1, Table D1.1\_B**

#### **Results of the monitoring of the enrolments at the first course year**

The results of the monitoring of the enrolments at the first course year for the last three cohorts (from A.Y. 2010-11 to A.Y.2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/enrolmentsfirstcourseyear2010-13>.

The following data are shown:

- number of the entrance students;
- geographical provenance;
- secondary school of provenance;
- grade of the school-leaving examination.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

##### **Students enrolled at the first course year**

##### **Annex D1, Table D1.2\_B**

### **Quality Requirement D2 - Students' learning**

The study programme should monitor the students' learning in order to check the effectiveness of the didactic units.

#### **Results of the monitoring of the students' learning**

The results of the monitoring of the students' learning in the last three academic years (from A.Y. 2010-11 to A.Y.2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/students'learning2010-13>.

For each course unit the following data are shown:

- number of students who have to take the examination in the academic year under consideration;
- number of students who have passed the examination in the academic year under consideration;
- medium value of the grades attributed to all the students who have passed the examination;
- grade variance.

Add a comment. In particular **to comment** the evolution of the results in the academic years considered and **to compare** the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.

#### **Bachelor in Physics**

#### **Results of the tests for the assessment of the students' learning**

#### **Annex D2, Table D2.1**

#### **Results of further monitoring**

Describe the other methods of control of the assessment tests eventually carried out by the SP and indicate the web site where they are available.

Add a comment.

#### **Quality Requirement D3 - Students' studies progression**

The study programme should monitor the students' studies progression (in particular: drop-outs, number of credits acquired at the end of each course year, time to graduation) in order to check the effectiveness of the educational process.

#### **Results of the monitoring of the enrolments at the different course years**

The results of the monitoring of the enrolments at the different course years in the last three academic years (from A.Y. 2010-11 to A.Y.2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/enrolmentsatdifferentcourseyear2010-13>.

The results regard the number of students who pass from one course year to the successive one.

Add a comment. In particular **to comment** the evolution of the results in the academic years considered and **to compare** the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.

#### **Bachelor in Physics**

#### **Enrolments at the different course years**

#### **Annex D3, Table D3.1\_B**

#### **Results of the monitoring of the dropouts**

The results of the monitoring of the dropouts in the last three academic years (from A.Y. 2010-11 to A.Y.2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/enrolmentsatdifferentcourseyear2010-13>.

The results regard the number of dropouts.

Add a comment. In particular **to comment** the evolution of the results in the academic years considered and **to compare** the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.

#### **Bachelor in Physics**

#### **Dropouts**

#### **Annex D3, Table D3.2\_B**

#### **Results of the monitoring of the credits acquired by the students who pass from one course year to the successive one**

The results of the monitoring of the credits acquired by the students who pass from one course year to the successive one in the last three academic years (from A.Y. 2010-11 to A.Y.2012-13)



are shown at <http://www.physics.unige.it/bachelorinphysics/creditsacquired2010-13>.  
The results regard the median and the mean value, with the associated variance, of the number of ECTS credits with which students pass from one course year to the successive one.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

**Credits acquired by the students passing from one course year to the successive one**  
**Annex D3, Table D3.3\_B**

#### **Results of the monitoring of the graduation time**

The results of the monitoring of the graduation time in the last three academic years (from A.Y. 2010-11 to A.Y.2012-13) are shown at <http://www.physics.unige.it/bachelorinphysics/graduationtime2010-13>.

The results regard the number of graduates within the official length of the programme.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

#### **Graduates**

**Annex D3, Table D3.4\_B**

### **Quality Requirement D4 - Students' opinion on the educational process**

*The study programme should monitor the students' opinion on the educational process in order to check the perceived adequacy and effectiveness.*

#### **Monitoring and results of the students' opinion on the didactic units**

The monitoring of the students' opinion on the didactic units is carried out on-line. The monitoring starts at the end of the lesson period for the didactic unit considered and finishes at the end of the first exam session after the end of the lesson.

The monitoring instrument is the questionnaire available at and at

<http://www.schoolofMPNscience.unige.it/student'sopinionondididacticunits/questionnaire>.

The results of the monitoring relative to all the didactic units of the curriculum for the last three cohorts (from A.Y. 2010-11 to A.Y. 2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/student'sopinionondididacticunits/results2010-13>, while the results relative to the single didactic unit are made available only at the persons in charge of the Bachelor and at the lecturer.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

#### **Students' opinion on the didactic units**

**A.Y. ...**

*To present the results relative to each question considered in the questionnaire. It is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Monitoring and results of the students' opinion on the training periods outside University**

The monitoring of the students' opinion on the training periods outside University is carried out on-line. Students who carry out training periods outside University are asked to fill the questionnaire available at

<http://www.schoolofMPNscience.unige.it/student'sopinioneontrainingperiodsoutsideuniversity/questionnaire> within a month after the completion of the training period.

The results of the monitoring relative to training periods carried out in the last three academic years (from A.Y. 2010-11 to A.Y. 2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/student'sopinioneontrainingperiodsoutsideuniversity/results2010-13>.

*Add a comment. In particular **to comment** the evolution of the results in the academic years considered and **to compare** the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

##### **Students' opinion on the training periods outside University**

**A.Y. ...**

*To present the results relative to each question considered in the questionnaire. It is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Monitoring and results of the students' opinion on the periods of international mobility**

The monitoring of the students' opinion on the periods of international mobility is carried out on-line. Students who carry out periods of international mobility are asked to fill the questionnaire available at

<http://www.schoolofMPNscience.unige.it/student'sopinioneonperiodsinternationalmobility/questionnaire> within a month after the completion of the mobility.

The results of the monitoring relative to periods of international mobility carried out in the last three academic years (from A.Y. 2010-11 to A.Y. 2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/student'sopinioneonperiodsinternationalmobility/results2010-13>.

*Add a comment. In particular **to comment** the evolution of the results in the academic years considered and **to compare** the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

#### **Bachelor in Physics**

##### **Students' opinion on the periods of international mobility**

**A.Y. ...**

*To present the results relative to each question considered in the questionnaire. It is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Monitoring and results of the opinion of the final year students on the educational process and on the student support services**

The monitoring of the opinion of the final year students on the educational process and on the student support services is carried out on-line. Final year students are asked to fill the questionnaire available at

<http://www.schoolofMPNscience.unige.it/opinionfinalyearstudents/questionnaire> in occasion of

their enrolment at the graduation exam.

The results of the monitoring relative to training periods carried out in the last three academic years (from A.Y. 2010-11 to A.Y. 2012-13) are shown at

<http://www.physics.unige.it/bachelorinphysics/opinionfinalyearstudents/results2010-13>.

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

### **Bachelor in Physics**

#### **Opinion of the final year students on the educational process and on the student support services**

**A.Y. ...**

*To present the results relative to each question considered in the questionnaire. It is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Quality Requirement D5 - Graduates' placement**

*The study programme should monitor the graduates' placement in order to check the qualification spendability, the correspondence of the study programme educational objectives to and the adequacy of the study programme learning outcomes for the educational needs of the labour market.*

#### **Monitoring and results of the graduates' job placement**

The monitoring of the graduates' job placement is carried out on-line every three years for all the students graduated in the academic years preceding the year of the survey (2008-09, 2009-10, 2010-11 for the survey carried out in 2012). Graduates placed on the labour market are asked to fill the questionnaire available at

<http://www.schoolofMPNscience.unige.it/graduates'jobplacement/questionnaire>.

The results of the monitoring relative to the last survey carried out in 2012 are shown at

<http://www.physics.unige.it/bachelorinphysics/graduates'jobplacement/results2012>.

The following information are shown, subdivided for academic year of graduation:

- percentage of employed graduates, ;
- only for second cycle graduates, the percentage of graduates who have prosecuted their studies in PhD;
- the placement time in the labour market;
- the effectiveness of the degree in the working activity (where for 'effectiveness' it is intended both the formal and substantial necessity of the degree in the working activity and the use of the acquired competences).

*Add a comment. In particular to comment the evolution of the results in the academic years considered and to compare the results of the SP with those obtained by other SPs of the structure the SP belongs to and/or the results obtained by other SPs of the same typology of other Universities, if any.*

### **Bachelor in Physics**

#### **Job placement of the graduates in the A.Y. ...**

*To present the results relative to each question considered in the questionnaire. It is preferable to represent the results using histograms or cake-diagrams than tables.*

#### **Monitoring and results of the prosecution of the studies in the second cycle programmes**

The monitoring of is carried out every year by the Student Administrative Office of the University.

The results for the last three academic years (from A.Y. 2010-11 to A.Y. 2012-13) are shown at <http://www.unige.it/studentadministrativeoffice/prosecutionofstudiesinsecondcycleprogrammes/bachelorinphysics/results2010-13>

Add a comment. In particular **to comment** the evolution of the results in the academic years considered.

### **Bachelor in Physics**

#### **Prosecution of the studies in the second cycle programmes**

*It is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Monitoring and results of the employed graduates' opinions on the education received**

The monitoring of the employed graduates' opinions on the education received is carried out on-line every three years for all the students graduated in the academic years preceding the year of the survey (2008-09, 2009-10, 2010-11 for the survey carried out in 2012).

Graduates placed on the labour market are asked to fill the questionnaire available at <http://www.schoolofMPNscience.unige.it/graduates'jobplacement/questionnaire>.

The results of the monitoring relative to the last survey carried out in 2012 are shown at <http://www.physics.unige.it/bachelorinphysics/graduates'jobplacement/results2012>.

The following information are shown:

- ...

### **Bachelor in Physics**

#### **Employed graduates' opinions on the education received**

**AA.YY. ...**

*To present the results relative to each question considered in the questionnaire. When possible, it is preferable to represent the results using histograms or cake-diagrams than tables.*

### **Monitoring and results of the employers' opinion on the graduates' education (optional)**

At the moment the Bachelor in Physics does not monitor the employers' opinion on the graduates' education.

## **Standard E - Management system for quality**

*The study programme should adopt an adequate and effective management system, able to promote and assure the study programme quality and the improvement of the effectiveness of the processes for the study programme management and of the associated results, and should assure its continual adequacy and effectiveness.*

*Furthermore the SP should guarantee the publicity of the information on the study programme.*

### **Quality Requirement E1 - Management system**

*The study programme should define and adopt an adequate and effective management system, through the identification of the processes for a management for quality of the study programme and the definition of an adequate organisational structure.*

*The study programme should also commit explicitly to the development of a culture which recognises the importance of quality and quality assurance.*

### **Required Documentation**

#### **Processes for the SP management and organisational structure**

The processes for the SP management and the responsibilities for their management are shown at <http://www.physics.unige.it/bachelorinphysics/managementsystem>.

Add a comment on the adequacy and effectiveness of the management system.

## Bachelor in Physics

### Management system

#### Annex E1.1

##### Positions of responsibilities

The list the positions of responsibilities for the SP management, with the following information for each position:

- appointment;
- composition (only in case of Commissions, Committees, Working Groups, ...).

is available at <http://www.physics.unige.it/bachelorinphysics/managementsystem>.

## Bachelor in Physics

### Positions of responsibility

#### Annex E1.2

##### ~~Commitment to the development of a quality culture~~

~~Describe the SP policy and associated procedures for the assurance and the strategy for the continuous enhancement of the SP quality.~~

~~Provide only information registered in official documents.~~

To add a standard on **Policy and processes for quality assurance**

##### **Quality Requirement E2 - Revision**

*The study programme should periodically revise needs and objectives, educational process, resources, results and management system, in order to guarantee their constant adequacy and effectiveness and promote the improvement of the effectiveness of the processes for the study programme management and of the associated results.*

##### Expected Activities and Behaviours

*The revision is a periodic and scheduled process, finalised to the improvement of the SP.*

*To this end the SP should first of all define the management modalities of the revision (in any case the revision should involve the teaching staff, the enrolled students and the interested parties of the labour market), its periodicity, the period of the academic year in which it should be carried out and the information and data to be taken into account, which however should include:*

- *changes in the national laws and norms and/or in the statute and by-laws of the structure which the SP belongs to;*
- *resolutions of the structure which the SP belongs to and/or of its own bodies;*
- *outcomes of the relationships with the interested parties;*
- *needs and availability of resources;*
- *results of the monitoring activities;*
- *results of the self-assessment and external assessment activities.*

*All these information should be reported in an official document.*

*The revision must start with a self-assessment finalised to the identification of the strong and weak points of the SP, through at least the comparison of the SP's results with those obtained in the preceding years and the results obtained by other SPs of the same typology, if any, and to the identification of the causes of the weak points (e.g: causes of the dropouts, motivations of delays*

*in graduation, etc.).*

*The self-assessment may bring to the identification of needs of revision or redefinition of the educational objectives and process and of the internal quality assurance system and of opportunities of improvement of the management and/or of the results of single processes.*

*Then, for each identified need of revision and for each opportunity of improvement, the SP should identify and adopt opportune improvement actions.*

*The results of the revision should be reported in a Revision Report.*

### **Management of the revision process**

The revision of the Bachelor in Physics is carried out every year on January, when all the results of the precedent academic year are available and before the definition of the didactic offer for the successive academic year.

The revision is carried out by the Design and Revision Committee, composed by the President of the Council of the Bachelor, three members of the teaching staff, one representative of the administrative staff and two representatives of the students, appointed by the Bachelor Council, and a representative of the labour market of reference, appointed by the University/Labour Market Committee.

The information and data taken into account include:

- changes in the national laws and norms and/or in the statute and by-laws of the structure which the SP belongs to;
- resolutions of the structure which the SP belongs to and/or of its own bodies;
- outcomes of the relationships with the interested parties;
- needs and availability of resources;
- results of the monitoring activities;
- results of the self-assessment and external assessment activities.

### **Results of the revision process**

The report of the revision carried out in 2013 is available at

<http://www.physics.unige.it/bachelorinphysics/revisionreport2013>.

### **Quality Requirement E3 - Publicity of information**

The study programme should make public full, up to date, easily acquired information, both quantitative and qualitative, on programme objectives, educational process, resources, results and management system.

### **Publicity of the documentation for the QA of the SP**

The on-line documentation for quality assurance of the Bachelor in Physics is available at <http://www.physics.unige.it/bachelorinphysics/onlinedocumentationforQA>.

Information and data on the following sections:

- Standard A;
  - Standard B: Quality Requirements B1, B2;
  - Standard C: Quality Requirements C1, C2, C4, C5;
  - Standard D: Quality Requirements D1;
- are public and available to all the interested parties.

Information and data on the following sections:

- Standard B: Quality Requirement B3;
- Standard C: Quality Requirement C3;
- Standard D;

are reserved and available only to authorized people.