2013

REPORT
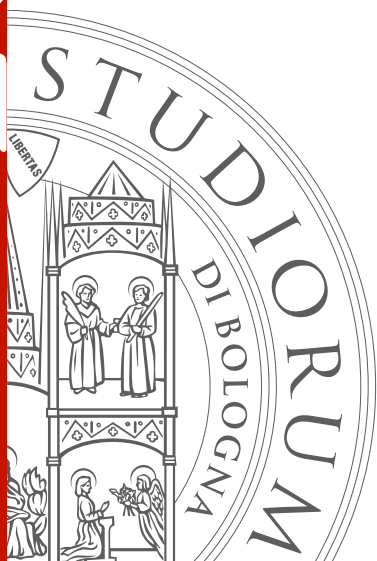
ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

School of Engineering and Architecture – Cesena Campus
LAUREA (FIRST CYCLE DEGREE/
BACHELOR - 180 ECTS) IN
ELECTRONICS ENGINEERING
FOR ENERGY AND INFORMATION
A.Y. 2013/2014
Programme Director Prof. Marco Chiani

INDICE

WHAT IS THE STUDY PROGRAMME REPORT?

What is the Study Programme Report?

The Study Programme Report provides updated information which is important for the purposes of Quality Assurance and is published annually by the University of Bologna.

The main aspects of the teaching programme are described in detail, with a view to assuring the principle of transparency and promoting self-assessment and continuous improvement processes.

The document provides a concrete overview of the features and results of the Study Programme for students, families, employers and so on.

For example, regarding the current issue of employment, it describes the learning outcomes and career opportunities; it also includes statistics on the percentage of employed graduates (D.4. Employment situation).

The document is organised into five sections and a glossary:

A. Presentation and prospects

Key information on the Study Programme, including the expected learning outcomes, career opportunities and further studies.

B. Teaching and Learning

The updated course structure diagram with the full titles and listings of the course units and the latest published lecture timetable.

C. Resources and services

The list of teaching staff and their relative curricula, the offices (secretariats), services (work placements) and infrastructures (libraries, laboratories) available to students.

D. The Study Programme in Figures

Key data shows how many students are enrolled, how many have been assigned additional learning requirements, how many drop out after the first year, how many graduate in line with the programme schedule, the opinions of attending and graduating students on the teaching programmes and information concerning graduate employment.

E. Find out more: the quality of your Study Programme

How the quality system applied to your Study Programme works. The quality system of your Study Programme is a set of processes and responsibilities adopted to guarantee the quality of all Study Programmes at the University of Bologna.

NOTES:

- Reports are available for all Study Programmes for which it is possible to enrol in the first year in academic year 2012/2013: the information and data provided is as updated as possible.

- Sections A, B and C provide data for the academic year 2012/2013.

- Section D presents data regarding the Study Programmes in the last three academic years.

- The information and data were taken from the University databases and the reports published by the Statistical Observatory of the University of Bologna and AlmaLaurea, and are updated to **15 June 2012.**

A. PRESENTATION AND PROSPECTS

This section presents the key information concerning the Study Programme, including the expected learning outcomes, career opportunities and further studies, updated to the academic year 2013/2014.

A.1. PRESENTATION

This paragraph provides information on the specific learning outcomes of the Study Programme and the curriculum.

Information and Communication Technologies, now common to many fields, play a fundamental role in economic development. Electronic data and signal acquisition and processing systems, the Internet, wireless mobile phone systems, electronic devices for energy generation and sensor networks for environmental monitoring are features of many modern applications.

The Degree Programme in Electronic Engineering for Energy and Information trains engineers with solid methodological grounding and operational skills acquired through experimental laboratory activities. Graduates are able to design, implement and manage Information Engineering systems, processes and services particularly referring to electronic systems, communication networks, and their applications for energy and environmental monitoring. With these skills, graduates in Electronic Engineering for Energy and Information refer to the professional figures classified by ISTAT in the large group 2.x.x.x.x., "Intellectual, scientific and highly specialised professions", including electronic engineers - (2.2.1.4.1) and engineer-designers of calculators and peripherals - (2.2.1.4.2). Having passed the state examination, in compliance with the applicable regulations, graduates may register with Section B, sector b) Junior Information Engineer, of the professional engineering association.

In this direction Students are guided towards the learning of problems, reference models and methods that distinguish the design of modern electronic and communication systems, electronic communication networks, signal and information processing systems and algorithms and relative standards and ICT applications for energy and environmental monitoring.

The study programme boasts a particularly inter-disciplinary format. Particular emphasis is placed on the organic focus on the fundamental principles, the use of examples in the definition of methodological approaches, the presentation of environments and instruments which together support the design of specific sectoral systems and architectures with a system-oriented vision. Specific learning skills are complemented by solid foundations in physics, mathematics and modelling, business culture and appropriate knowledge of a foreign language to B1 level. Study may include both the acquisition of the four linguistic skills (reading, writing, listening and dialogue) and compulsory attendance of lessons, in line with the criteria specified by the study programme coherently with the instructions of the Academic Bodies.

The computing and electronic equipment available for use in the university laboratories, which is being further enhanced, allow for the study of fields of application. Work placements may also be carried out in collaboration with public and private bodies and companies operating in the territory. The degree programme in Electronic Engineering for Energy and Information produces graduates with a solid methodological background and the flexibility deriving from the technical and scientific knowledge acquired during the programme which they can successfully put to use in the world of work or continue to develop by continuing studies to 2nd cycle Master's Degree level in Electronic Engineering and Telecommunications and, more generally, in Information Engineering.

A.2. ADMISSION REQUIREMENTS

This paragraph provides information on the knowledge required for admission to the Study Programme.

This information is not available in English at this time.

A.3. LEARNING OUTCOMES

This paragraph provides information on the knowledge and skills students will have acquired by the end of the Programme.

Knowledge and understanding: BASIC KNOWLEDGE
Graduates in Electronic Engineering for Energy and Information:
• know the mathematical principles and experimental sciences underlying engineering;
• understand the laws of kinematics and dynamics to analyse and assess moving systems;
• understand the principles of thermodynamics and the laws of electromagnetism;
• are familiar with the fundamental principles of chemistry, matter structure and classifications of the elements;
• know the principles of computing and types of abstract data;
• understand the methods and tools for solving optimization problems and decision-making;
• know the internal organization and operating principles of processing systems.

ELECTRONIC ENGINEERING AREA
Graduates in Electronic Engineering for Energy and Information:
• know the tools for design and use of amplifiers of small and large signals, oscillators, active filters, power converters and devices;
• understand the structure and fundamental behaviour of analogue and digital electronic devices;

• understand the operating principles and design of electronic systems (computers, apparatus, mobile phone systems, audio and video processing systems) supporting information technologies for energy and information.

TELECOMMUNICATIONS ENGINEERING AREA

Graduates in Electronic Engineering for Energy and Information:

• understand the operating and design principles of information transmission systems via cable, wireless and mobile phone;

• know the main features and protocols for telecommunications networks, Internet services and applications;

• understand the main algorithms for processing multimedia signals;

• know the main ICT applications for energy and environmental monitoring.

The knowledge and skills are acquired in lectures, practical work in the classroom and in computer laboratories as well as experimental activities. Some course units require autonomous work by students, individually or in groups, as instructed by the teaching staff.
All course units indicate the number of credits and the teaching methods.

Knowledge and understanding is assessed through written and oral exams, which may include closed-answer tests, algebraic or numerical exercises and theoretical inquiry. The type of exam in each course unit is defined in order to offer students different methods of assessment.

Applying knowledge and understanding: BASIC KNOWLEDGE

Graduates in Electronic Engineering for Energy and Information:

• can apply logical and mathematical analysis to study other scientific and technological subjects;

• can extrapolate practical information from analytical results in order to solve design problems;

ELECTRONIC ENGINEERING AREA

Graduates in Electronic Engineering for Energy and Information:

• are able to work with data acquisition systems and programmable tools;

• can use simulation tools and circuit CAD programmes;

• can use electronic instruments and CAD simulation programmes to design analogue and digital circuits.

• are able to design and manage electronic systems for electrical energy generation.

TELECOMMUNICATIONS ENGINEERING AREA

Graduates in Electronic Engineering for Energy and Information:

• are able to use analysis methods to assess the characteristics of continuous time and discrete time signals and systems.

• are able to use computer tools for numerical signal processing.

• Are able to design basic telecommunications systems and networks.

• Are able to design and run applications for the Internet and mobile phone devices

• Are able to design and manage telecommunications networks and environmental monitoring networks.

The ability to apply the above knowledge and understanding will be achieved through the critical study of texts proposed for individual study, stimulated by classroom activities, the research of case studies and applications presented by the professors, practical laboratory work, bibliographic research and field work, as well as project work assigned in the core and elective course units and in preparation of the final examination.

The tests, written and oral exams, reports, practical work and problem solving activities imply the execution of specific tasks which aim to demonstrate the student's command of tools, methods and critical autonomy.

Making judgements Graduates in Electronic Engineering for Energy and Information:

• are able to gather, filter and interpret data, mainly within the whole Information Engineering sector, and express autonomous opinions on the technical and scientific relevance of such data, aware of their possible impact on social or ethical applications;

• integrating specifications, are able to adopt the appropriate choices in order to complete projects;

• are able to assess cost and performance parameters in electronic systems, assessing the obtainable results according to the choices made

Judgement skills are developed in particular through guided practical exercises, supervised seminars and the preparation of written work assigned by the supervising professor in preparation of the final dissertation.

The acquisition of judgement skills is assessed through the evaluation of the maturity demonstrated by students during exams and during the activities assigned in preparation of the final examination.

Communication skills: Graduates in Electronic Engineering for Energy and Information:

• are able to effectively communicate the results of their activities as well as information, ideas, problems and solutions, to both specialists and non-specialists;

• are able to work in groups;

• are able to communicate with different professional figures and sector specialists and blend their competences, as a result of the multidisciplinary nature of the laboratories.

Exams to verify the command of the English language to level B1 complete the process of acquisition of communication skills.

Written and oral communication skills are developed in particular during seminars, practical exercises and learning activities generally which also require the production of reports and written documents as well as their oral presentation. Communication skills are also acquired through the preparation and presentation of the final examination.

Learning skills: Graduates in Electronic Engineering for Energy and Information:

• are able to apply the learning methods and tools developed for updating and further studying the programme contents, also in professional contexts, also in order to embark upon further studies with a high level of autonomy;

• are able to autonomously study complex subjects in different fields of information engineering and telecommunications

This knowledge is
acquired through the learning activities delivered in all subject areas in the degree programme and particularly those performed autonomously. The specific teaching methodologies used include tutorials.

These learning skills are assessed in the various exams organised throughout the programme.

A.4. CAREER OPPORTUNITIES

This paragraph provides information on the occupational profile, functions and fields of employment available to graduates of this Programme.

Professional Figure:
Junior electronic and telecommunications engineer

Career opportunities:
Career opportunities for electronic engineers for energy and information lie in companies designing and manufacturing components, appliances, electronic systems, wireless systems, telecommunications networks, Internet applications, and in sectors applying electronic technologies for the acquisition, transmission and processing of information, particularly:

• manufacturing and services industries;

• ICT companies;

• companies providing ICT systems and services for energy and environmental monitoring;

• service providers working in the production, distribution and sale of energy;

• processing industries;

• public administrations and training bodies;

• in freelance activities, providing their skills to innovation and development in all organisations faced with the need to implement restructuring plans also based on the integration of advanced ICTs.

Main functions:
The basic engineering and technical background offers graduates access to a wide range of occupations, in both industrial production and personal and business services:

1) designer: starting from the client's objectives, definition and design of the specifications of electronic components and circuits, telecommunications systems and networks, electronic systems for energy production, sensor networks for environmental monitoring;

2) production expert: starting from the design, development and organisation of the industrial production of the component or electronic system, and its integration with other systems (e.g. mechanical, energy management, transport, etc.);

3) organisation and management of telecommunications networks, energy production and distribution networks, electronic laboratories and plants using electronic apparatus, processes and products, including marketing and assistance.

These functions are coherent with the ISTAT professions listed in the large group 2.x.x.x.x, listed below.

Main competences:

- Ability to rapidly grasp meanings and objectives, combining and organising information into significant dimensions;

- Use of abstract ideas to interpret information, consider different viewpoints and reach joint conclusions;

- Ability to produce innovative ideas on unpredictable questions and situations;

- Ability to communicate design ideas and concepts orally and in writing and using CAD drawings;

- Ability to work in a team; cooperative spirit;

- Ability to select the appropriate tools for the job in hand.

A.5. OPINION OF SOCIAL PARTNERS AND POTENTIAL EMPLOYERS

This paragraph describes the outcome of the consultation with the representative employment and trade organisations.

Following the previous consultations held on 25/11/2011 with the companies represented by Confindustria Forlì-Cesena (minutes attached), on 25/09/2012 a meeting was held at the CRC Foundation of the representatives of the Cassa di Risparmio Foundation, delegates from the Municipality of Cesena and the University of Bologna, to discuss the new name of the programme, the career opportunities, learning needs and outcomes described in a preliminary draft. The coordinator presented the general framework of learning activities in all subject areas and particularly the core areas of the programme, as well as the features of the final examination leading to graduation.

The Participants agreed with the Degree Programme Coordinator on the general structure and new name of the programme, recognising its ability to meet the skills needs expressed by local businesses and the national and international job market in the green economy and environmental monitoring sector.

A.6. FURTHER STUDIES

It gives access to second cycle studies (laurea specialistica/magistrale) and master universitario di primo livello.

B. TEACHING AND LEARNING

This section describes the updated course structure diagram (for academic year 2013/2014), with the full titles and listings of the course units and the latest published lecture timetable.

B.1. COURSE STRUCTURE DIAGRAM

The link takes you to the Study Programme course structure diagrams. You can also access to each course unit content.

- Study plan: all course units in the programme

B.2. CALENDAR AND LECTURE TIMETABLE

The links take you to the teaching calendar (exam session and final examination session) and the lecture timetable (in Italian).

- Lecture timetable
- Exam sessions
- Final examination sessions

C. RESOURCES AND SERVICES

This section provides a list of teaching staff and their relative curricula and and description of the services available to students for the academic year 2013/2014.

C.1. TEACHERS

The paragraph lists the lecturers who teach in the Study Programme: from here you can access the personal web pages of each one.
Information updated to 28 May 2013 (in Italian).

Permanent teaching staff:

Albano, Paolo	Chiani, Marco	Fiegna, Claudio	Piccinini, Maurizio
Baldacci, Roberto	Cicognani, Massimo	Lotti, Nadia	Sangiorgi, Enrico
Casadei, Domenico	Costanzo, Alessandra	Mastri, Franco	Vigo, Daniele
Castaldi, Paolo	Degli Esposti, Vittorio	Mulazzani, Michele	Viroli, Mirko

Contract teaching staff:
Andretta, Massimo

C.2. STUDENT SERVICES: OFFICES

C.2.1. FUTURE STUDENTS

The link take you to the webpage which provides specific information about the offices and the services for the future students (in Italian).

- Future students

C.2.2. ENROLLED STUDENTS

The link take you to the webpage with the information on the offices and the services for the enrolled students (in Italian).

- Enrolled students

C.2.3. INTERNATIONAL STUDENTS

The link take you to the webpage with the information on the offices and the services for the international students (in Italian).

- International students

C.2.4. GRADUATES

The link take you to the webpage with the information on the offices and the services for the graduates (in Italian).

- Graduates

D. THE STUDY PROGRAMME IN FIGURES

Information on students' starting their university careers, how many students are in line with the regular programme, opinions of students and graduates on the teaching programmes and information concerning graduate employment.

This section provides the data of the last academic years for the Study Programme (SP) and a comparison with similar Study Programmes. The University of Bologna has divided its Study Programmes into four groups:

- *BIOMEDICAL group: Study Programmes of the Schools of Pharmacy, Biotechnology and Sport Science; Medicine; Agriculture and Veterinary Medicine*

- *SCIENTIFIC-TECHNOLOGICAL group: Study Programmes of the Schools of Engineering and Architecture; Sciences*

- *SOCIAL SCIENCES group: Study Programmes of the Schools of Economics, Management, and Statistics; Law, Political Sciences*

- *HUMANITIES group: Study Programmes of the Schools of Arts, Humanities, and Cultural Heritage; Foreign Languages and Literatures, Interpreting and Translation; Psychology and Education*

The section presents the results of the Study Programme for the last three academic years.

Main data shows how many students enrolled, the number of students assigned OFA, how many drop out after the first year, how many graduate in line with the programme schedule, the opinions of attending and graduating students on the teaching programmes and information concerning graduate employment.

The information and data presented in this section, updated to 28 May 2013, were taken from University databases and AlmaLaurea.

Study Programmes may be subject to degree programme system modifications from one academic year to the next, and the data provided in this section may refer to a programme with a slightly different system to the one currently running (such as programme title, course structure diagram and list of lecturers). However, indicatively the data presents the general trend of the Study Programme over the past three years.

Most of the Study Programmes running at the University of Bologna have been reformed in compliance with DM 270/04, most of them from the academic year 2008/2009. In the reports provided for these Programmes, paragraph D.5. refers to the Study Programmes as they were presented prior to the reform.

D.1. STUDENTS STARTING THEIR UNIVERSITY CAREERS

Characteristics of incoming students at the beginning of their university careers. Tables and graphs provide information on the number of registered students, focusing on the characteristics of the students, results of any entrance tests and the students assigned any additional learning requirements.

D.1.1. ENROLMENTS AND REGISTRATIONS

The **graph** shows the number of students enrolled in the 1st year compared with the average of similar Study Programmes (which belong to the same group).

In addition, the **table** shows the total number of registered students and the total number of enrolled students.

Data of the Study Programme is compared with the average of the Study Programmes of average of similar Study Programmes (which belong to the same group) for the indicated academic years.

First year enrolments

Data of the Study Programme D.M. 270/04 Electronics System Engineering for Sustainable Development (code 8612)
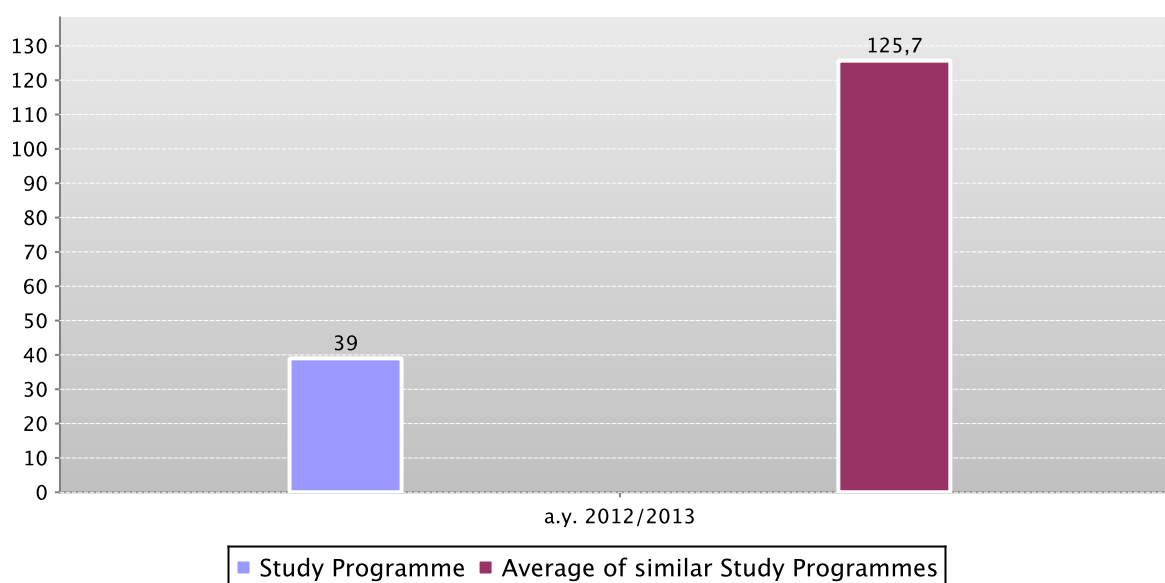
Data of the Study Programme D.M. 270/04 Electronics System Engineering for Sustainable Development (code 8612)

	Registered students	N. first year enrolments	Total N. enrolled students
	a.y. 2012/2013		
Study Programme	35	39	39
Average of similar Study Programmes	113	125,7	160,1

D.1.2. ADDITIONAL DATA ON STUDENTS' STARTING THEIR UNIVERSITY CAREERS

D.1.2.1. CANDIDATES REGISTERED FOR THE ENTRANCE EXAM

In academic year 2012/2013 access to this Study Programme was not restricted.

D.1.2.2. INCOMING STUDENTS

Geographic origin, type of high school certificate, age and gender of students.

Data shows a homogeneus group of students (cohort) which started together their academic career. Students which have passed to an other Study Programme, transferred from an other university, or registered to a 2nd degree are not included.

The **tables** show the number, geographic origin, gender, age, type and grade of high school certificate of students enrolling in the degree programme.

Data of the Study Programme is compared with the average of the Study Programmes of average of similar Study Programmes (which belong to the same group) for the indicated academic years.

Data of the Study Programme D.M. 270/04 Electronics System Engineering for Sustainable Development (code 8612)

		Registered students	Geographic origin					Gender		Average age of registered students		
			Students coming from the province of the Study Programme site	Students coming from other provinces where Unibo has a site	Students coming from other provinces of Emilia Romagna region	Students coming from other Italian regions	Students coming from abroad	M	F	19 or less	20 - 24	25 or more
Students 2012/2013	Study Programme	35	42,9%	45,7%		11,4%		91,4%	8,6%	82,9%	17,1%	
	Average of similar Study Programmes	113	30,9%	20,0%	7,9%	38,8%	2,4%	65,6%	34,4%	80,5%	17,3%	2,2%

		High school certificate					Grade of High school			
		Vocational schools	Technical Colleges	High school specializing in education and in psycho-pedagogical science	High schools specializing in classical studies, modern languages, science education	Other Italian or foreign high schools	Grade ranging from 60 to 69	Grade ranging from 70 to 79	Grade ranging from 80 to 89	Grade ranging from 90 to 100
Students 2012/2013	Study Programme		57,1%		31,4%	11,4%	17,1%	22,9%	34,3%	14,3%
	Average of similar Study Programmes	2,5%	27,3%	2,0%	62,3%	5,9%	17,5%	26,6%	26,5%	24,9%

D.1.2.3. ADDITIONAL LEARNING REQUIREMENTS

Students on the programme assigned additional learning requirements (OFA). OFA are learning requirements assigned to enrolled students who have not demonstrated the full possession of the entrance requirements. The assessment methods of students' initial preparation and the fulfilment of the OFA are described in the Study Programme Regulations, and may change each year. Students not completing the additional learning requirements are obliged to re-enrol in year 1 as repeating students.

The **table** shows the number of registered students, the number of students assigned OFA, the number who fulfilled them, the percentage of students assigned the OFA compared to the number of enrolled students and the percentage fulfilling the OFA compared to those assigned them.

Data of the Study Programme D.M. 270/04 Electronics System Engineering for Sustainable Development (code 8612)

	Registered students (a)	Students assigned OFA (b)	Students who fulfilled OFA (c)	% of students assigned OFA compared to the number of enrolled students (b/a)	% of students fulfilling the OFA compared to number of students assigned (c/b)
Students 2012/2013	35	20			

*Note: At the time of publication of this report the number of students fulfilling the OFA can be measured for a.y. 2009/2010 and a.y. 2010/2011 only.

D.2. REGULARITY OF STUDIES

Insight into the regularity with which the students pass their exams.
Graphs and tables provide information on the number of students who leave the programme after the first year and the number of regular graduates, focusing on the number of credits obtained at the end of the first year, on the exams passed and average grade achieved for each course unit.

D.2.1. STUDENTS LEAVING THE PROGRAMME BETWEEN YEARS 1 AND 2

For Study Programmes reformed in academic year 2012/2013 the only data available refers to the previous programmes.
See data of Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649), paragraph D.5.2.1.

D.2.2. REGULAR GRADUATES

Here you will find information on regular graduates, on how many students, at the end of the regular programme duration, left the programme and how many are still enrolled but not aligned to the exam schedule.

The **graph** and the **table** show the situation concerning registered students for the indicated academic year, at the end of the regular duration of the Study Programme, highlighting the percentage of regular graduates, the number of students still enrolled (not aligned to the exam schedule and repeating students), students who have left the programme (including passages, transfers and withdrawals).

The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group) for students registered in the indicated academic years.

Data of the Study Programme D.M. 270/04 Electronics and Telecommunications Engineering (code 0947)

		Registered students	Regular graduates		Passages transfers and withdrawals		Students still enrolled and not yet graduated	
			N.	%	N.	%	N.	%
Students 2008/2009	Study Programme	38	5	13,2%	12	31,6%	21	55,3%
	Average of similar Study Programmes	77,1	19,8	25,7%	30,5	39,6%	26,8	34,8%

See data of previous academic years – Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649) paragraph D.5.2.2.

D.2.3. ADDITIONAL DATA ON REGULARITY OF STUDIES

D.2.3.1. CREDITS OBTAINED BY STUDENTS IN THE 1ST YEAR

This offers an insight into how regularly students pass their exams.

The **graph** shows the distribution of the students according to the number of credits obtained at the end of the first year.

In addition, the **table** shows the number of students registered at the second year and average credits obtained during the first year.

The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group) for the indicated academic years.

Data of the Study Programme D.M. 270/04 Electronics System Engineering for Sustainable Development (code 8612)

*Note: by convention, credits are considered to be obtained by students by 31st October of the year following the year of enrolment.

D.2.3.2. EXAMS PASSED AND AVERAGE GRADE

The **table** shows number of exams passed and average grade achieved for each course unit in the calendar year 2011. Marks for the exams passed are expressed out of thirty.

The data refers to the course unit code and therefore includes the various branches of the programme divided into channels or sub-groups, divided by letter.

It considers all subjects for which a grade is assigned, and therefore excludes all those to which a pass/fail score is allocated.

Data of the Study Programme D.M. 270/04 Ingegneria elettronica e telecomunicazioni (code 0947)

	N. of exams passed	Average grade *
00196 CONTROLLI AUTOMATICI	3	
00251 ECONOMIA E ORGANIZZAZIONE AZIENDALE	7	22,3
00269 ELETTRONICA	2	
01245 TELECOMUNICAZIONI	7	23,4
02037 ELETTRONICA INDUSTRIALE	4	
02126 MISURE ELETTRONICHE	3	
03516 COMPLEMENTI DI ELETTRONICA	4	
03716 CALCOLATORI ELETTRONICI	4	
06793 ELETTROTECNICA	1	
08574 SISTEMI OPERATIVI	1	
09757 GEOMETRIA E ALGEBRA	1	
10907 ELETTRONICA DEI SISTEMI DIGITALI	4	
15201 GESTIONE DELLA QUALITA'	1	
15750 FONDAMENTI DI CHIMICA	1	
16314 ANALISI MATEMATICA B	1	
16726 FISICA GENERALE A	8	25,9
19704 FISICA GENERALE B	6	25,3
30569 ELABORAZIONE DEI SEGNALI	6	23,5
30904 FONDAMENTI DI INFORMATICA E LABORATORIO DI INFORMATICA (C.I.)	1	
30933 PROPAGAZIONE E CAMPI ELETTROMAGNETICI (C.I.)	9	25,3
32834 APPLICAZIONI E TECNICHE DI TELECOMUNICAZIONI	4	

Data of the Study Programme D.M. 270/04 Ingegneria dei sistemi elettronici per lo sviluppo sostenibile (code 8612)

* Note: no average grade is given if the number of exams passed is less than or equal to 5.

D.3. OPINIONS OF GRADUATES AND ATTENDING STUDENTS

Opinions of graduates on the Study Programme.
Tables and graphs provide information on the number of graduates who expressed positive opinions on the Study Programme, focusing on opinions expressed by attending students on course units.

D.3.1. OPINION OF GRADUATES

The **graph** shows the percentage of graduates (AlmaLaurea survey) who responded positively to the question: "**Are you generally satisfied with the Study Programme**".

In addition, the **table** shows the percentage of students who answered "Yes, to the same programme at the university" to the question "Would you register again to the university?".

The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group), and the average of Study Programmes of the same class of other Italian universities for the graduates of the indicated years.

Graduates in 2012 who responded positively to the question: "Are you generally satisfied with this Study Programme?"

Data of the Study Programme D.M. 270/04 Ingegneria elettronica e telecomunicazioni (code 0947)
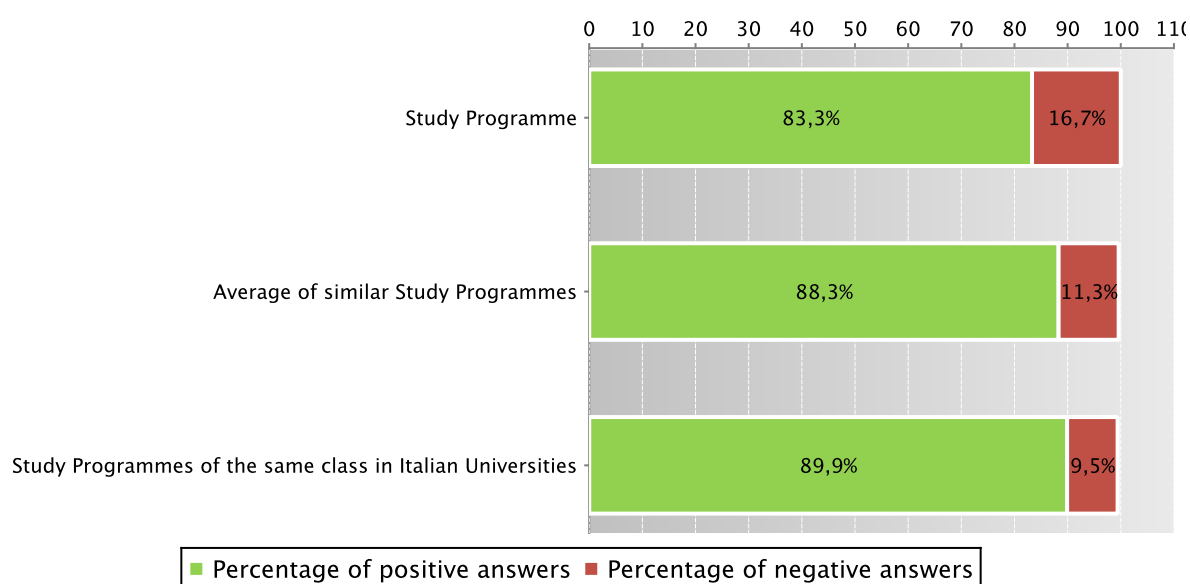
Data of the Study Programme D.M. 270/04 Ingegneria elettronica e telecomunicazioni (code 0947)

		N. graduates	Completed Questionnaires	% of positive answers to the question: "Are you generally satisfied with this Study Programme?"	% of answers "yes to the same Programme in the same University" to the question "Would you register again to the University"
2011	Study Programme	3	3		
	Average of similar Study Programmes	23,7	22,8	88,9%	73,5%
	Study Programmes of the same class in Italian Universities	529	501	90,8%	83,2%
2012	Study Programme	7	6	83,3%	83,3%
	Average of similar Study Programmes	24,4	23,9	88,3%	72,3%
	Study Programmes of the same class in Italian Universities	1539	1469	89,9%	77,8%

Symbols:

(*) The opinions of the Study Programmes with less than 5 graduates are not shown.

Further information on Graduates' Profile Report.

See data of previous academic years – Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649) paragraph D.5.3.1.

D.3.2 ADDITIONAL DATA ON OPINIONS OF STUDENTS

D.3.2.1. OPINION OF ATTENDING STUDENTS

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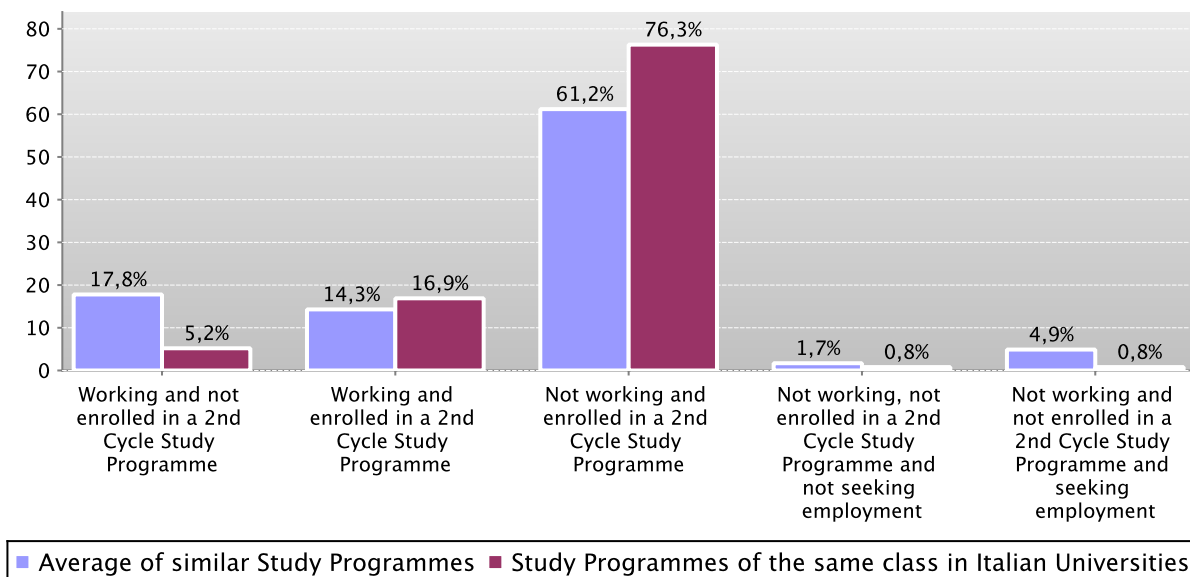# D.4. ENTRY INTO THE WORLD OF WORK

Employment situation of graduates of the Study Programme.
Tables and graphs provide information on the employment situation of graduates one year after graduating.

D.4.1. EMPLOYMENT SITUATION

Employment situation of graduates in 2011 one year after graduating

Data of the Study Programme D.M. 270/04 Electronics and Telecommunications Engineering (code 0947)

Data of the Study Programme D.M. 270/04 Electronics and Telecommunications Engineering (code 0947)

		N. graduates interviewed	Working and not enrolled in a 2nd Cycle Study Programme	Working and enrolled in a 2nd Cycle Study Programme	Not working and enrolled in a 2nd Cycle Study Programme	Not working, not enrolled in a 2nd Cycle Study Programme and not seeking employment	Not working and not enrolled in a 2nd Cycle Study Programme and seeking employment	Not working, not seeking employment, but following a university programme/traineeship (2)	Effective / very effective	Quite effective
			Employment and education situation (1)						Degree's appropriateness for the job (referred to the graduates who just work) (3)	
Graduation Year 2011	Study Programme	3								
	Average of similar Study Programmes	21,7	17,8%	14,3%	61,2%	1,7%	4,9%	55,2%	33,5%	26,0%
	Study Programmes of the same class in Italian Universities	480	5,2%	16,9%	76,3%	0,8%	0,8%	70,2%	29,1%	22,3%

See data of previous academic years – Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649) paragraph D.5.4.1.

D.5. INFORMATION ON PRE-REFORM PROGRAMMES (DM 509/99)

D.5.1. STUDENTS STARTING THEIR UNIVERSITY CAREERS

Characteristics of incoming students at the beginning of their university careers. Tables and graphs provide information on the number of registered students, focusing on the characteristics of the students, results of any entrance tests and students assigned additional learning requirements.

D.5.1.1. ENROLMENTS AND REGISTRATIONS

Data of enrolments and registrations of the last three academic years are shown in paragraph D.1.1.

D.5.1.2. ADDITIONAL DATA ON STUDENTS' STARTING THEIR UNIVERSITY CAREERS

D.5.1.2.1. CANDIDATES REGISTERED FOR THE ENTRANCE EXAM

Data of candidates registered for the entrance exam are shown in paragraph D.1.2.1.

D.5.1.2.2. INCOMING STUDENTS

Data of incoming students of the last three academic years are shown in paragraph D.1.2.2.

D.5.2. REGULARITY OF STUDIES

Insight into the regularity with which the students pass their exams.
Graphs and tables provide information on the number of students who leave the programme after the first year and the number of regular graduates, focusing on the number of credits obtained at the end of the first year, the number of exams passed and the average grade achieved for each course unit.

D.5.2.1. STUDENTS LEAVING THE PROGRAMME BETWEEN YEARS 1 AND 2

Data of students leaving the Study Programme of the last three academic years are shown in paragraph D.2.1.
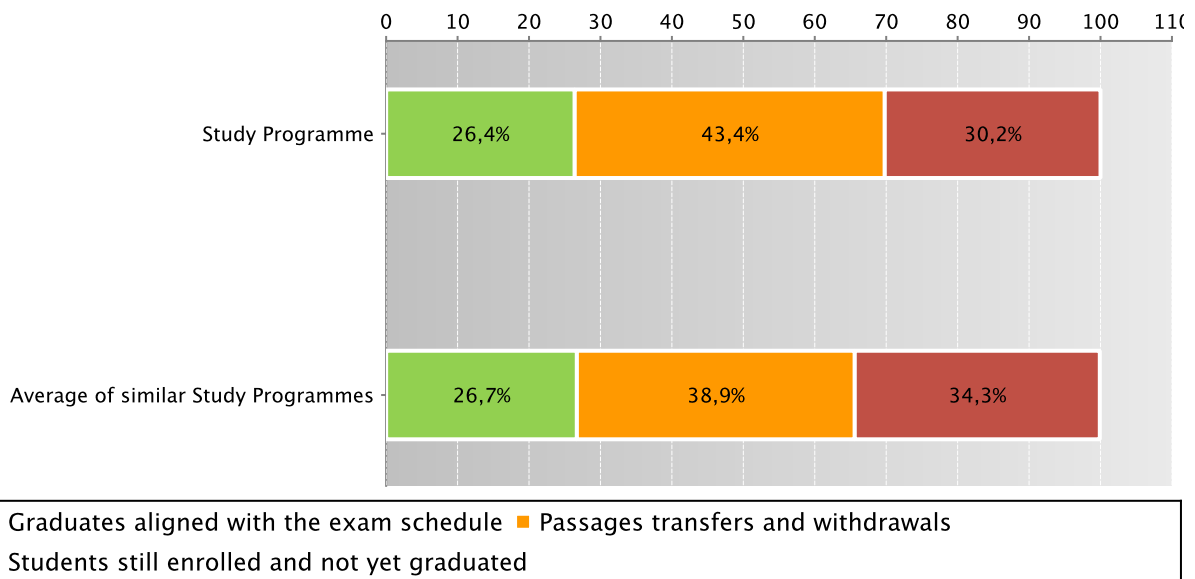
D.5.2.2. REGULAR GRADUATES

Here you will find information on regular graduates, on how many students, at the end of the regular programme duration, left the programme and how many are still enrolled but not aligned to the exam schedule.

The **graph** and the **table** show the situation concerning registered students for the indicated academic year, at the end of the regular duration of the Study Programme, highlighting the percentage of regular graduates, the number of students still enrolled (not aligned to the exam schedule and repeating students), students who have left the programme (including passages, transfers and withdrawals). The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group) for students registered in the indicated academic years.

Situation of students 2007/2008 at the end of regular duration of the study programme

Data of the Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649)

Data of the Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649)

		Registered students	Regular graduates		Passages transfers and withdrawals		Students still enrolled and not yet graduated	
			N.	%	N.	%	N.	%
Students 2007/2008	Study Programme	53	14	26,4%	23	43,4%	16	30,2%
	Average of similar Study Programmes	72,8	19,5	26,7%	28,4	38,9%	25	34,3%

Go back to D.2.2. Regular graduates

D.5.2.3. ADDITIONAL DATA ON REGULARITY OF STUDIES

D.5.2.3.1. CREDITS OBTAINED BY STUDENTS IN THE 1ST YEAR

Data of credits obtained by students in the 1st year of the last three academic years are shown in paragraph D.2.3.1.

D.5.2.3.2. EXAMS PASSED AND AVERAGE GRADE

Data of exams passed and average grade are shown in paragraph D.2.3.2.

D.5.3. OPINIONS OF ATTENDING STUDENTS AND GRADUATES

Opinions of graduates on the Study Programme.
Tables and graphs provide information on the number of graduates who expressed positive opinions on the Study Programme, focusing on opinions expressed by attending students on course units.

D.5.3.1. OPINION OF GRADUATES

The **graph** shows the percentage of graduates (AlmaLaurea survey) who responded positively to the question: "**Are you generally satisfied with the Study Programme**".

In addition, the **table** shows the percentage of students who answered "Yes, to the same programme at the university" to the question "Would you register again to the university?".

The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group), for the indicated years.

Graduates in 2010 who responded positively to the question: "Are you generally satisfied with this Study Programme?"

Data of the Study Programme D.M. 509/99 Ingegneria elettronica e delle telecomunicazioni (code 0649)
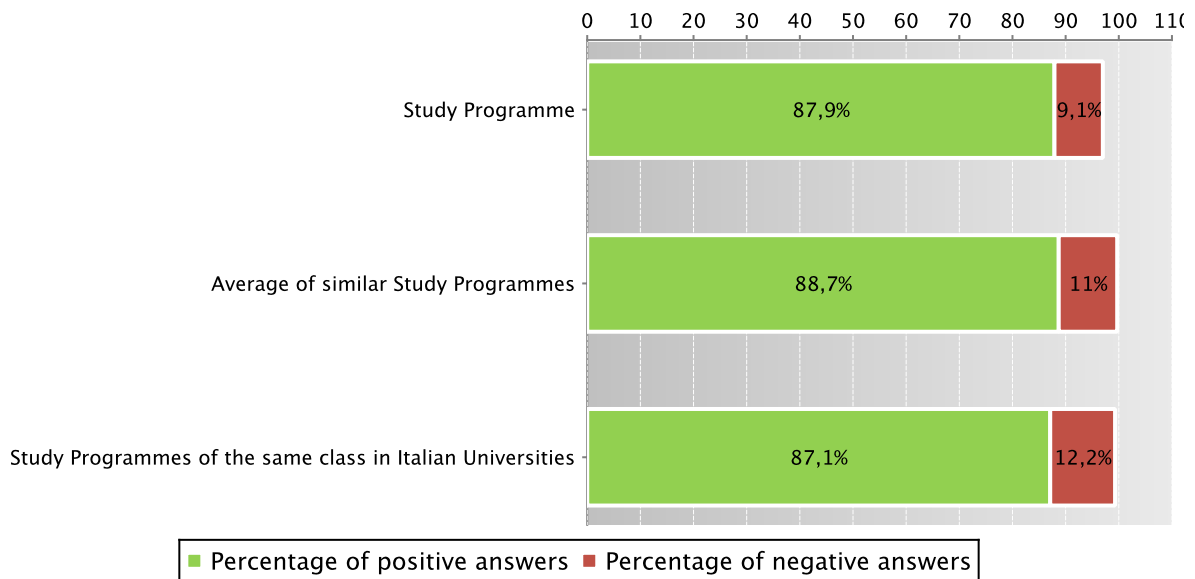
Data of the Study Programme D.M. 509/99 Ingegneria elettronica e delle telecomunicazioni (code 0649)

		N. graduates	Completed Questionnaires	% of positive answers to the question: "Are you generally satisfied with this Study Programme?"	% of answers "yes to the same Programme in the same University" to the question "Would you register again to the University"
2010	Study Programme	33	33	87,9%	81,8%
	Average of similar Study Programmes	44,6	43,4	88,7%	72,5%
	Study Programmes of the same class in Italian Universities	4058	3910	87,1%	69,6%

Symbols:

(*) The opinions of the Study Programmes with less than 5 graduates are not shown.

Further information on Graduates' Profile Report.

Go back to D.3.1. Opinion of graduates

D.5.3.2 ADDITIONAL DATA ON OPINIONS OF STUDENTS

D.5.3.2.1. OPINION OF ATTENDING STUDENTS

Data of opinion of attending students of the last three academic years are shown in paragraph D.3.2.1.

D.5.4. ENTRY INTO THE WORLD OF WORK

Employment situation of graduates of the Study Programme.
Tables and graphs provide information on the employment situation of graduates one year after graduating.

D.5.4.1. EMPLOYMENT SITUATION

The paragraph shows the employment situation of graduates one year after graduating.

The data is taken from the AlmaLaurea reports on the employment situation of graduates.

The **graph** shows who is working, who is not working but has enrolled in a Second Cycle study programme, who is not working and is not seeking employment, who is not working but is seeking employment.

In addition, the **table** shows the number of graduates interviewed, the number involved in internships and traineeships and the appropriateness of their degree to the job.

The Study Programme data is compared with the average of similar Study Programmes (which belong to the same group) and the average of Study Programmes of the same faculty of other Italian universities for the graduates of the indicated years.

Employment situation of graduates in 2010 one year after graduating

Data of the Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649)

Data of the Study Programme D.M. 509/99 Telecommunications and Electronic Engineering (code 0649)
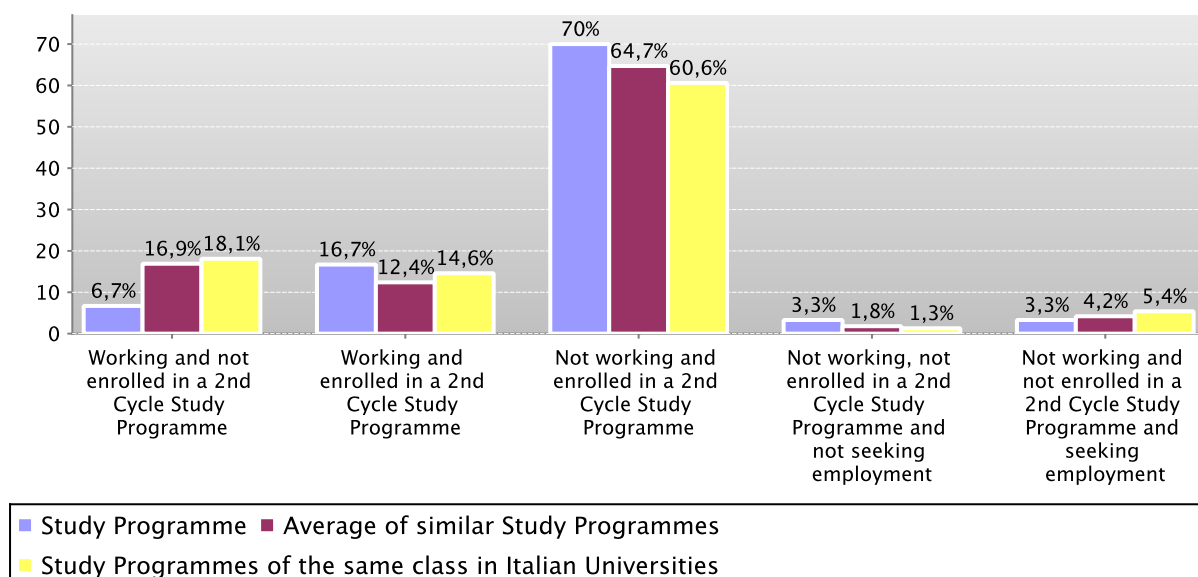
		N. graduates interviewed	Employment and education situation (1)					Not working, not seeking employment, but following a university programme/traineeship (2)	Degree's appropriateness for the job (referred to the graduates who just work) (3)	
			Working and not enrolled in a 2nd Cycle Study Programme	Working and enrolled in a 2nd Cycle Study Programme	Not working and enrolled in a 2nd Cycle Study Programme	Not working, not enrolled in a 2nd Cycle Study Programme and not seeking employment	Not working and not enrolled in a 2nd Cycle Study Programme and seeking employment		Effective / very effective	Quite effective
Graduation Year 2009	Study Programme	29	24,1%	13,8%	51,7%	3,4%	6,9%	44,8%	10,0%	50,0%
	Average of similar Study Programmes	43,1	19,0%	11,8%	62,8%	1,9%	4,5%	58,0%	34,5%	32,8%
	Study Programmes of the same class in Italian Universities	3938	15,8%	14,7%	62,7%	1,5%	5,3%	51,2%	30,3%	37,1%
Graduation Year 2010	Study Programme	30	6,7%	16,7%	70,0%	3,3%	3,3%	63,3%	57,1%	28,6%
	Average of similar Study Programmes	40,6	16,9%	12,4%	64,7%	1,8%	4,2%	59,0%	30,8%	34,6%
	Study Programmes of the same class in Italian Universities	3738	18,1%	14,6%	60,6%	1,3%	5,4%	50,2%	31,7%	39,7%

Symbols:

(*) The opinions of the Study Programmes with less than 5 graduates are not shown.

Notes on the AlmaLaurea report on the employment situation of graduates

(1) "Employment and education situation": the number of employed graduates is the sum of those working and those working who are also enrolled in a 2nd cycle degree programme. The number of those enrolled in a 2nd cycle degree programme is the sum of those who are working and studying and those who are only studying.

(2) "Number of those who do not work, who are not seeking employment but who are following a university programme/traineeship": the definition includes those who are enrolled in traineeships, PhD degrees, specialisation schools, Italian "master universitari"(first and second level). The presentation of this data complies with article 2 of D.M. 544 of 31st October 2007, as later provided for in Management Decree no. 61 of 10th June 2008 (transparency requirements).

(3) The evaluation of the appropriateness of the degree is obtained by a combination of the requirement of the relative qualification for the job held and the level of usage of the skills learned at university.

Further information on Graduates' Employment report.

E. FIND OUT MORE: THE QUALITY OF YOUR STUDY PROGRAMME

The University of Bologna has identified its objectives as the *personal, cultural and professional growth of students and the improvement of the quality of learning, also in relation to the needs of society* (Strategic Plan 2010-2013).

Students, employers and society as a whole, have the right to effective learning for individual and intellectual growth, to develop critical sense and to prepare for the world of work.

In the Statute and the Strategic Plan 2010-2013 the University of Bologna acknowledges its responsibility in guaranteeing the quality of its study programmes, and for this purpose adopts an "internal quality assurance system".

The Internal Quality Assurance system

The internal quality assurance system is a set of processes and responsibilities adopted to guarantee the quality of Study Programmes at the University of Bologna.

The guarantee of the quality of a Study Programme is the correspondence of the results achieved with the set objectives, in the following phases:

- Plan: defining the objectives
- Do: implementing the planned actions
- Check: checking that the objectives have been achieved
- Act: planning improvement action
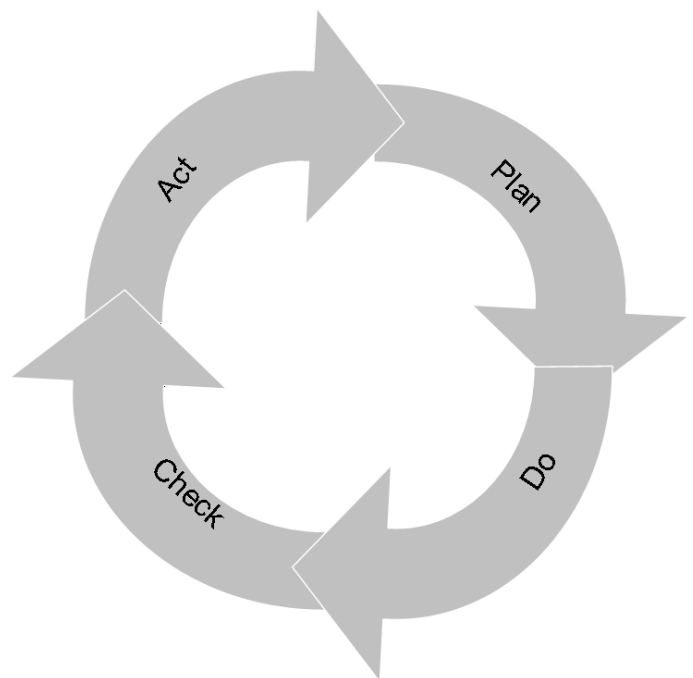
This path responds to the expectations of students, guides teaching behaviour and provides indicators for the assessment of results. Self-assessment is based on the analysis of significant data (for example, the number of students graduating in line with the exam schedule, students' opinions and the employment rates of graduates) and highlights strengths and weaknesses in order to reflect on the achieved results, critically consider one's own working methods and take steps for the continual improvement of the Programme. This path involves all educational stakeholders, including students, in order to make use of the contributions of everyone with first-hand knowledge of the Study Programme. Improvement is therefore a day to day development, concerning all aspects of teaching: from the lesson timetable to the publication of on-line programmes, from classroom management to exam methods, and the actual design of the Programme.

This is what happens in each phase:

- **Planning**: the Study Programme is the result of a proposal from the teaching structures and approved by the Academic Bodies.
- **Management**: Schools, Departments and Study Programmes manage the activities required to ensure teaching. The activities are organised as follows**:**

What we do	Who does what				
	Professors	Study Programme	Schools	Departments	General Administration
Teaching calendar, lessons programme and exam schedules			x		
Management of financial resources			x	x	
Classroom teaching	x				
Management of classrooms and laboratories			x	x	
Libraries and study rooms			x	x	
Approval of individual study plans		x			
Communication and information		x	x		Academic Affairs Division
Guidance service		x	x		Academic Affairs Division
Internships		x	x		Academic Affairs Division
Administrative services: Student Administration Office					Academic Affairs Division
Administration services: Degree programme office			x		Academic Affairs Division
Study grants and loans ad honorem					Academic Affairs Division
Student mobility: university subsidies and programmes					International Relations Division
Mobility: study grants for dissertations abroad			x		
Mobility: authorisations and recognitions		x			
Other students support services		x	x		x

- **Internal assessment:** every Study Programme periodically assesses its own results, evaluating, for example, the number of enrolled students, the number of withdrawing students, student opinions etc.; in this way, the strengths and weaknesses, as well as any implemented improvement actions, are highlighted. This phase is organised as follows:

What we do	Who does what
Definition, gathering and publication of evaluation data According to the general guidelines of the University and national and international standards, are defined the tools through which should be evaluated the results (indicators). The survey data to be evaluate are published every year on the Report of the Study Program.	Academic Bodies
Self-Assessment The Schools and Study Programmes assess the effectiveness of the previously adopted solutions, analyse the progress of their learning activities and draw up proposals for improvement.	Schools and Study Programmes
Internal audit The results of the self-assessment process are reviewed in the following phases: • Analysis: the University Quality Manager analyses the review documents, considering the ability to identify problems, propose solutions and the overall development of the internal quality assurance system. • Review: The observations on the results obtained and the good practices adopted are examined together with the persons in charge of the Schools and Study Programmes in meetings organised by scientific-disciplinary field. The persons in charge receive the observations and inputs on the areas for development and the actions to be adopted in future to improve results. • Sharing: the conclusions of the review activities are submitted to the Academic Bodies and the University Evaluation Board.	Quality Manager Vice Rector for Teaching and Education Academic Bodies

• **Improvement**: on the basis of the results of the internal audit, the Schools and Study Programmes plan improvement activities, to ensure that the Study Programmes increasingly respond to the needs of society. The cycle then starts over again, with the definition of actions to be implemented, the results of which are in turn verified, in a continuous path that guarantees the quality of education.

F. GLOSSARY TERMS

Additional Learning Requirements

Students enrolling in the first year of a first cycle or single cycle degree and who, following the results of the entrance exams established for each study programme, do not possess the knowledge required for access to the programme, are assigned additional learning requirements (OFA).

The OFA are fulfilled by passing an assessment test defined by the programme.

The non-fulfilment of the requirements by the date set by the Academic Bodies and published on the University Portal will lead to the re-enrolment in the first year of the programme.

AlmaLaurea

AlmaLaurea is an innovative in-line database service of graduates' curriculum vitae (1,620,000 CVs, from 53 Italian universities as of 05/07/2012), which offers a link between graduates, universities and businesses.

Created in 1994 on the initiative of the Statistical Observatory of the University of Bologna, managed by a consortium of Italian universities with the support of the Ministry of Education, University and Research, the purpose AlmaLaurea is to act as a point of contact between businesses and graduates, a reference within universities for anyone (students, businesses, etc...) working in the field of university studies, employment and the condition of young people at different levels.

Average of similar study programmes (belonging to the same group)

Average of the Study Programmes (which belong to the subject group)

Calculated average which refers to all study programmes of the same cycle which belong to the subject group.

There are four groups, composed as follows:

- BIOMEDICAL group: Study Programmes of the Schools of Pharmacy, Biotechnology and Sport Science; Medicine; Agriculture and Veterinary Medicine

- SCIENTIFIC-TECHNOLOGICAL group: Study Programmes of the Schools of Engineering and Architecture; Sciences

- SOCIAL SCIENCES group: Study Programmes of the Schools of Economics, Management, and Statistics; Law, Political Sciences

- HUMANITIES group: Study Programmes of the Schools of Arts, Humanities, and Cultural Heritage; Foreign Languages and Literatures, Interpreting and Translation; Psychology and Education

CFU University Learning Credits

University Learning Credits (CFU) were introduced under Italian Ministerial Decree no. 509/99 to comply with European legislation, and are a measurement of the volume of learning, including individual study, required of students; generally 1 CFU corresponds to 25 hours of a student's "overall learning effort".

Class

Degree classes group together study programmes of the same level and with the same key learning outcomes and available learning activities for a given number of credits and in sectors which are identified as indispensable. The features of the classes are set nationally, by Ministerial Decree, and are therefore common to all universities.

Cohort

Cohort refers to a group of students enrolled in the same academic year.

Enrolment status

In terms of enrolment, students may be:

- **Regularly enrolled**: students enrolled for as many or fewer years than the legal duration of the study programme, who do not fall into any of the following categories;

- **Not aligned with the exam schedule**: students who, without having graduated, have enrolled in all the years of the study programme and which, for programmes with compulsory attendance, have obtained all attendance certificates;

- **Repeating**: students re-enrolling in the same year of a programme again. Starting from academic year 2009-2010, students who have not fulfilled the assigned additional learning requirements within the deadline have to enrol in the 1st year as repeating students.

Entrance exam

 Enrolment in a study programme may be free access or restricted access.

For all programmes with restricted access, candidates are required to sit an entrance exam and there are a limited number of places available. The entrance exam is a test which is used to draw up a graded list of candidates; students may enrol in the programme according to their place in the list. The methods of managing the call for applications and the list of candidates, including the methods for filling any unclaimed places, may vary from year to year. The test may be specific to a Degree Programme or may be part of a single exam covering several programmes from the same university or from other universities (during the registration the students should indicate their first choice).

The following definitions apply:

Available places = the number of places laid down in the call for applications to the Study Programme, or determined by subsequent legal provisions; these exclude any additional places reserved according to special provisions of the programme (e.g. for international study programmes, they do not include places for foreign students selected from other universities; for all programmes with restricted access regulated nationally, these do not include the places reserved for transferring students).

Number of candidates for the exam = number of students registered for the exam indicating the study programme as their first choice;

Number of participants in the exam = number of students participating in the exam indicating the study programme as their first choice;

Number of participants in the exam for every available place = number of students participating in the exam who indicated the study programme as their first choice as a ratio of the number of places available on the programme.

First year enrolments

This includes all students enrolled in the first year, including those joining the study programme in its first year through transferrals, as well as those enrolled in the first year but not for the first time (e.g. repeating students).

New Careers

Students who start a new university career (excluding transfers) from year one in a second cycle programme.

Passages and transfers

Passage: when a student applies to move to a different study programme from the one enrolled in the previous year, within the same university.

Transfer: when a student transfers from a study programme in one university to any programme in another university.

Registered students

Students who begin a career in the Italian University System for the first time and who enrol in the first year (i.e. for whom no previous university careers are recorded) of a First Cycle (L509, L) or Single Cycle programme (LSCU, LMCU)

Statistical Observatory of the University of Bologna

The Statistical Observatory was founded in 1997 in order to "provide the university governing bodies with a reliable and timely documentary and monitoring database aiming to promote decision-making processes and planning, particularly of learning activities and other services targeting the student population" (art.1 of the Founding and Operational Regulation). Following the disabling of the Statistical Observatory, as resolved by the Board of Governors on 14 December 2010, from the second semester of academic year 2010-11 the survey and subsequently analysis of the attending students opinion is cared for the University of Bologna by Academic Affairs Division - Quality Assurance Department and Control and Finance Division - Support Planning and Evaluation Department. The overall results and the methods of collection and analysis are described in the document published online on the Statistical Observatory of the University of Bologna.

University DataWarehouse

In information service for the managers of the University of Bologna organisational departments which gathers, integrates and reorganises data from various sources and makes it available for analysis and evaluation for the purposes of planning and decision-making.

Withdrawal

Suspension of studies by students who do not register in the next academic year, or who drop out from the degree programme.