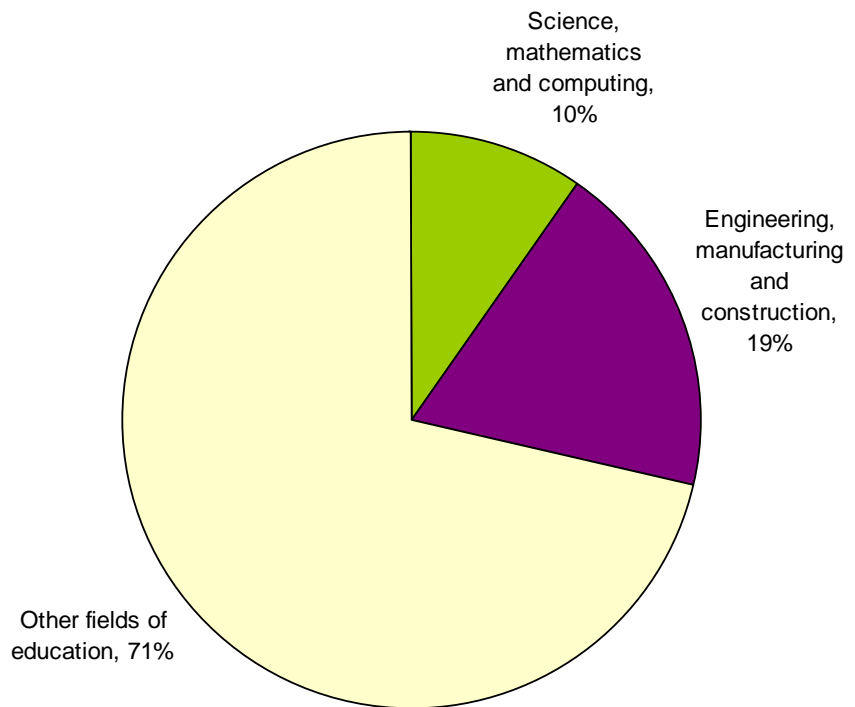


# Science graduates are younger and better employed

Figure 1: Share of tertiary graduates between 25 and 64 years old, with a degree in S&E in the EU, in 2005



ES : 2004 data.  
CZ : 2003 data.

Source : Eurostat HRST data base derived from EU LFS

## MAIN FINDINGS

- In 2005, 29% of the EU's 55 million tertiary graduates between 25 and 64 years old had a degree in Science, mathematics and computing or in Engineering, manufacturing and construction.
- European graduates have preferred studying Engineering fields to Science fields. In Germany, for example, 28% of all graduates aged between 25 and 64 had a degree in Engineering and only 7% had a degree in Science.
- Women are often under-represented among Science graduates and, in particular, among Engineering graduates. In 2005, the share of females, amongst all EU graduates in respectively field, was 37% and 15%.
- The population of graduates with a degree from Engineering fields tends to be older than those with a degree from Science fields. The oldest populations of Engineering graduates in the EU are found in Latvia, Hungary, Poland and Estonia.
- While nearly 75% of employed EU graduates with a degree in Science were working as Professionals or Technicians in 2005, less than 60 % of those with a degree in Engineering were found in those two occupational groups.

## Statistics in focus

### SCIENCE AND TECHNOLOGY

18/2006

Author

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## Of the EU's 55 million tertiary graduates of working age, around 29% had a degree in S&E

Table 2: Tertiary graduates aged 25-64, in thousands, by field of education and their percentage share of the total stock of tertiary educated as well as the proportion of female graduates, in the EU and selected countries, in 2005

	Science, mathematics and computing			Engineering, manufacturing and construction			Other fields of education		
	In thousands	as % of all tertiary graduates	% females	In thousands	as % of all tertiary graduates	% females	In thousands	as % of all tertiary graduates	% females
EU-25	5 331	9.7	37.5	10 444	18.9	14.4	39 440	71.4	60.3
EU-15	4 690	9.7	36.3	9 080	18.7	13.4	34 738	71.6	59.5
BE	194	11.2	37.1	233	13.4	13.3	1 310	75.4	60.5
CZ	51	7.4	35.3	186	27.0	17.7	451	65.6	55.7
DK	46	4.7	23.9	167	17.1	22.2	767	78.3	61.4
DE	728	6.8	28.6	3 047	28.4	12.5	6 960	64.8	54.5
EE	11 u	4.6 u	72.7 u	70	29.5	35.7	156	65.8	75.6
EL	107	8.9	33.6	189	15.6	22.8	912	75.5	55.0
ES	570	9.1	40.0	1 232	19.6	10.3	4 477	71.3	61.8
FR	815	10.6	35.5	1 212	15.7	16.0	5 694	73.7	63.7
IE	110	17.9	43.6	75	12.2	9.3	429	70.0	62.2
IT	426	11.0	53.8	526	13.6	20.2	2 905	75.3	58.1
CY	9	8.1	55.6	16	14.4	18.8	85	76.6	56.5
LV	18	6.8	50.0	59	22.4	37.3	186	70.7	69.9
LT	28	5.9	53.6 u	132	27.7	27.3	316	66.4	70.6
LU	7	10.4	28.6	10	14.9	20.0	50	74.6	52.0
HU	48	5.1	29.2	188	19.9	20.7	708	75.1	65.5
MT	2 u	7.7 u	: u	3 u	11.5 u	: u	22	84.6	45.5
NL	160	6.2	25.0	273	10.6	9.5	2 150	83.2	51.3
AT	42	5.2	31.0	216	26.8	10.6	549	68.0	55.9
PL	431	13.0	48.3	558	16.8	16.5	2 338	70.3	67.1
PT	96	13.1	53.1	116	15.8	25.0	523	71.2	68.1
SI	12	5.3	41.7 u	45	19.8	20.0 u	170	74.9	67.6
SK	31	7.6	45.2	107	26.2	25.2	270	66.2	58.9
FI	49	5.0	49.0	222	22.7	14.4	709	72.3	70.5
SE	90	6.4	38.9	213	15.2	22.5	1 098	78.3	65.0
UK	1 250	14.2	33.3	1 349	15.3	9.8	6 205	70.5	60.5
IS	4	9.3	25.0	5	11.6	: u	34	79.1	61.8
NO	40	5.0	30.0	49	6.1	12.2	717	88.8	56.6
EEA	5 375	9.6	37.4	10 498	18.7	14.4	40 191	71.7	60.2
CH	85	9.5	18.8	205	22.9	9.3	605	67.6	46.6
BG	35	3.9	60.0	225	24.8	38.7	648	71.4	68.5
RO	195	15.2	55.9	350	27.2	32.6	742	57.7	54.0
TR	:	:	:	:	:	:	:	:	:

ES: 2004 data and CZ: 2003 data.

EU-25, EU-15 and EEA: Eurostat estimates including CZ and ES.

Source: Eurostat HRST data base derived from EU LFS

In 2005, 29% of the EU's 55 million tertiary graduates between 25 and 64 years old had a degree in *Science, mathematics and computing* or *Engineering, manufacturing and construction* (Figure 1). The bulk of this population - namely 10.4 million, or 18.9% of all tertiary graduates - had an educational background in *Engineering*, and 5.3 million, or 9.7% of all tertiary graduates, had an educational background in *Science*.

In Table 2, this population is further broken down by country and gender. In absolute numbers, Germany had the largest population of *Science and Engineering (S&E)* tertiary graduates, followed by the United Kingdom and France. With nearly 3.8 million S&E tertiary graduates, Germany was also, together with Romania, the Czech Republic and Estonia, among the countries with the highest share of S&E tertiary graduates in the total population of graduates aged 25-64 years. The respective shares were 35%, 42%, 34% and 34%.

Looking more in detail at the differences between the two S&E fields, more tertiary graduates had followed studies in *Engineering, manufacturing and*

*construction* than studies in *Science, mathematics and computing* (with the exception of Ireland). The largest difference between the two fields was found in Bulgaria and Estonia, where in 2005 the number of graduates with a tertiary degree from *Engineering* fields outnumbered the number of graduates with a tertiary degree from *Science* by more than 6 times.

*Science* studies have been more popular in Ireland, as nearly 18% of all tertiary graduates between 25 and 64 had a degree in this field in 2005. Other countries well above the EU average of 9.7% *Science* graduates were Romania, the United Kingdom, Portugal and Poland.

Women were often under-represented among *Science* and, in particular, among *Engineering* graduates. In the EU in 2005, less than 15% of the graduates with a degree in *Engineering* and around 37% of the graduates with a degree in *Science* were women. In some countries, however, females were in the majority among graduates with an educational background in *Science*. This was the case in Estonia, Bulgaria, Romania, Cyprus, Italy, Lithuania, Portugal and Latvia.

## Comparing the differences between inflows and stocks of S&E tertiary graduates

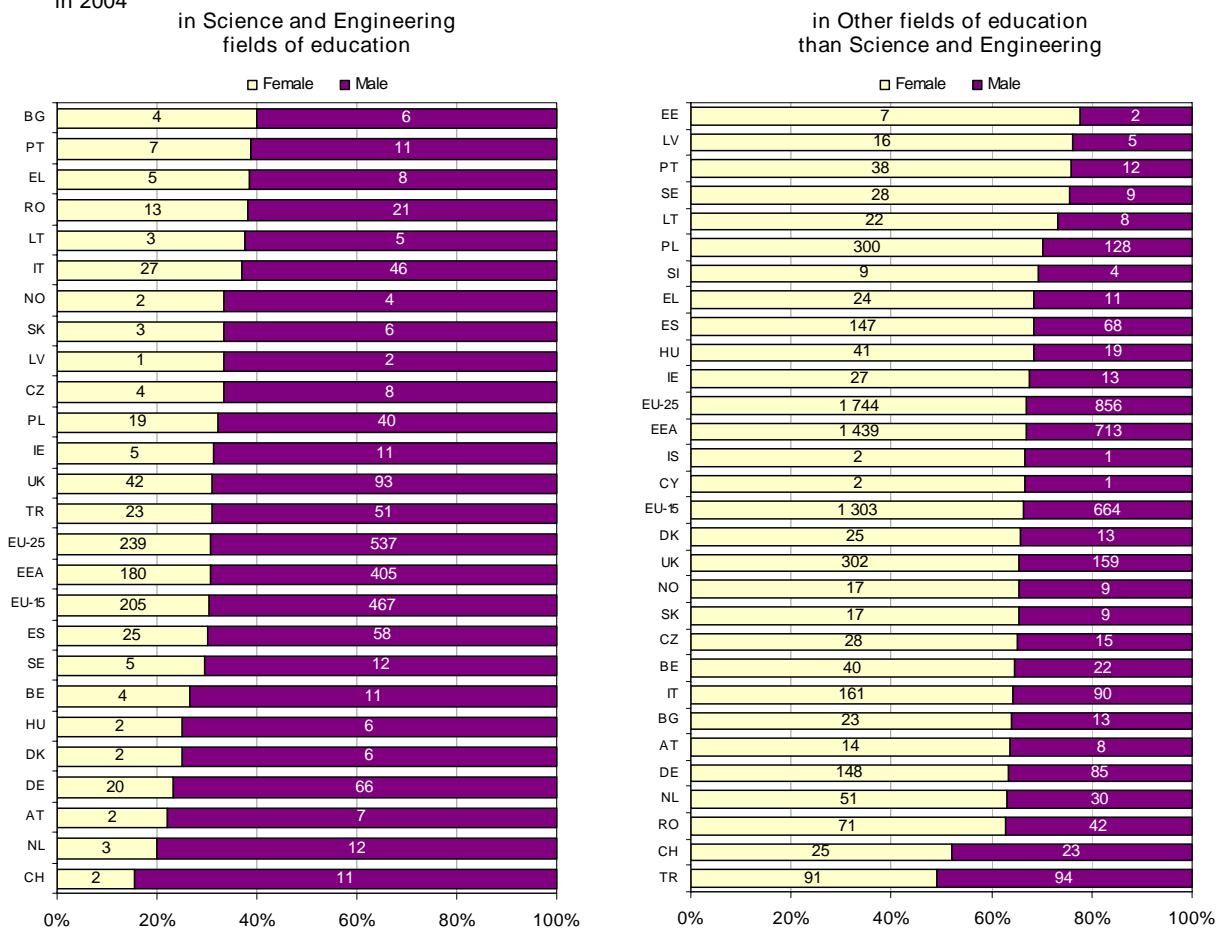
In 2004, the total number of new EU graduations from tertiary education can be estimated at 3.4 million. Of these, 776 000, or 23 %, were from the S&E fields. The share of S&E tertiary graduates in 2005 in the total population of graduates (25-64 years) was significantly higher, at 29% (see Table 2).

A comparison of these figures could indicate that in the EU as a whole the S&E fields have been less popular in recent times than they used to be. However, this trend is not present in all countries. In Sweden, for example, new graduations from S&E in 2004 accounted for 31% (Figure 3). This share is clearly above the 22% of S&E tertiary graduates in the total population of Swedish graduates aged 25-

64 in 2005 (Table 2). A similar trend could also be observed for Norway and Greece.

Women made up 31% of new graduates from S&E in the EU in 2004 (Figure 3), compared to only 22% women in of the stock of S&E graduates in 2005 (Table 2). Although the female share of recent S&E graduations seems to be rather high, parity between women and men in new graduations from S&E is not found in any of the countries shown in Figure 3. Bulgaria reached 40% of new female tertiary graduates in S&E, making it the country with the highest proportion in 2004. This contrasts with the share of new women graduates from *Other fields of education*, which in 2004 was above 50% in all countries shown, except Turkey.

Figure 3: New graduations from S&E and other fields, by gender, in thousands and in percentage, in the EU and selected countries, in 2004



FR, LU, FI and MT: Data not available.

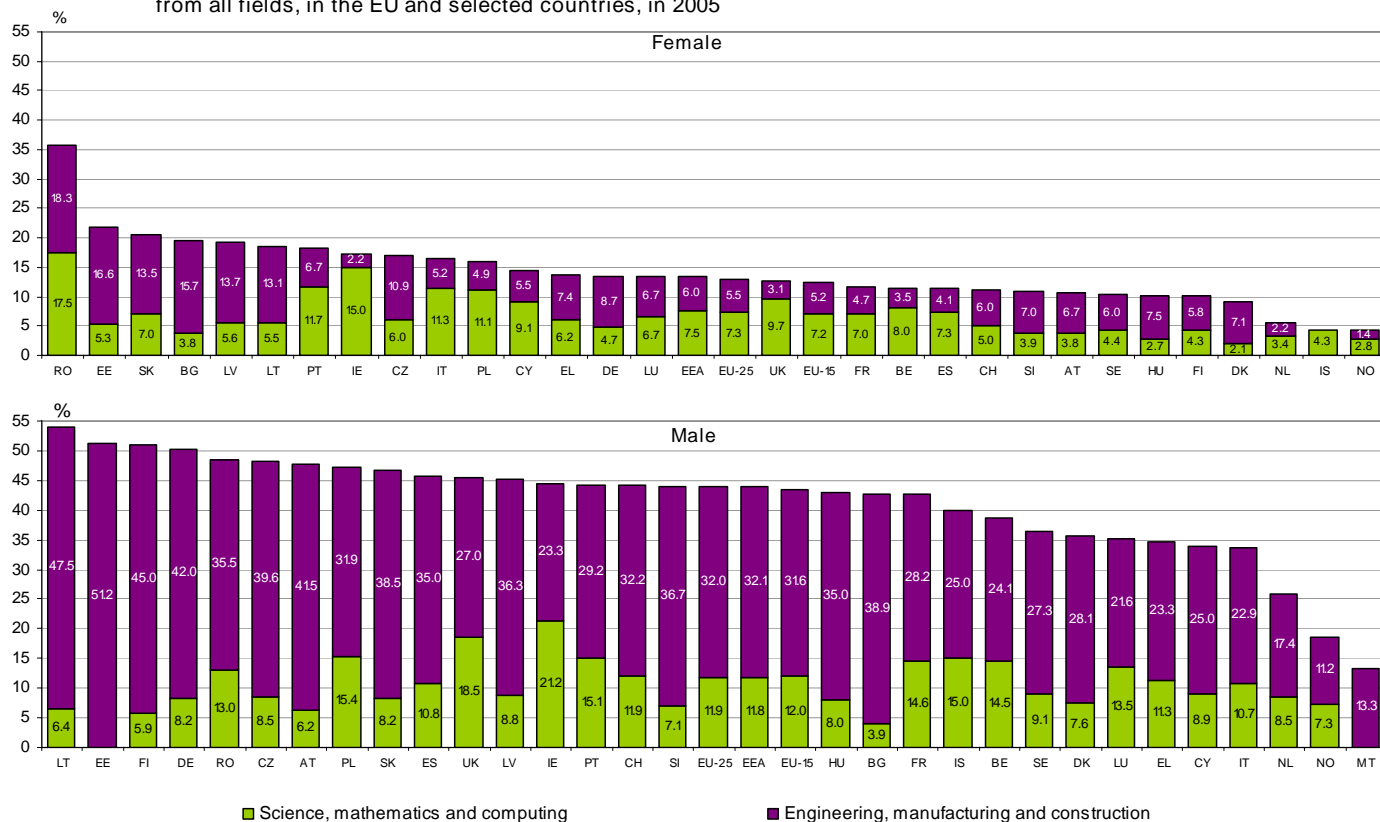
Source : Eurostat HRST data base derived from education statistics

In Science and Engineering: Data not available for CY, EE, IS and SI.

EU-25, EU-15 and EEA: Eurostat estimates, excluding FR, LU, FI and MT.

## Female EU graduates preferred *Science* to *Engineering*

Figure 4: Stock of female and male S&E tertiary graduates 25-64 years old, in thousands and as a share of tertiary graduates from all fields, in the EU and selected countries, in 2005



ES : 2004 data.

CZ : 2003 data.

TR: Data not available.

Unreliable data: MT for females; IS for females in Engineering; EE and MT for males in Science.

EU-25, EU-15 and EEA : Eurostat estimates including ES 2004 and CZ 2003.

Source : Eurostat HRST data base derived from EU LFS

Figure 4 clearly shows that male tertiary graduates were more likely than female graduates to have an educational background in S&E. In 2005, Lithuania had the highest share of male tertiary graduates in the age group 25-64 with a degree in S&E (54%). Malta and Norway are at the other end of the scale, with less than 20% of their male graduates in the same age group having a tertiary degree in S&E in 2005.

Science education seems to have been particularly popular among male tertiary graduates in Ireland. In 2005, 21% of Irish male graduates aged 25-64 had a degree from this field. The United Kingdom was next with 19% of male S&E graduates. Engineering, on the other hand, was the most popular choice for male tertiary students in Estonia, where 51% of the male graduates aged 25-64 had a degree in this field.

An exceptionally high share of S&E graduates among female graduates was found in Romania. 35% of the Romanian female graduates aged 25-64 had a

tertiary degree in S&E in 2005. Estonia, Slovakia, Bulgaria, Latvia and Lithuania followed, although their shares of female graduates in S&E were lower. In 2005, the shares of female graduates aged 25-64 years, with a degree in S&E were between 22% and 19% in all five countries. S&E studies were the least attractive option for females in Norway. In 2005, only 4% of Norwegian female tertiary graduates in the age group 25-64 had a degree in S&E.

The choice between Science and Engineering as a preferred field of study also depends on gender. In 11 of the 29 countries for which data are available, a higher share of women had a tertiary degree in Science than in Engineering. For male graduates, this was not the case in any of the countries shown. Ireland was the country that came closest to parity with 21% male tertiary graduates with a degree in Science against 23% with a degree in Engineering.

## Europe's *Science* graduates tend to be younger than its *Engineering* graduates

Figure 5 shows that those with a tertiary degree in *Science* tend to be younger than those with a tertiary degree in *Engineering*. Of the EU's 5.3 million graduates with a degree in *Science*, 32% were between 45 and 64 years old. Of the EU's 10.4 million *Engineering* graduates of working age, 41% were over 45 years old.

The oldest populations of *Engineering* graduates were found in Latvia, Hungary, Poland, Norway and Estonia, which had more than 50% in the 45-64 age bracket. Sweden, Spain, Ireland and Portugal had the youngest population of *Engineering* graduates. More than 40% of this population was aged under 35 in those four countries; Sweden – with 47% - had the highest proportion.

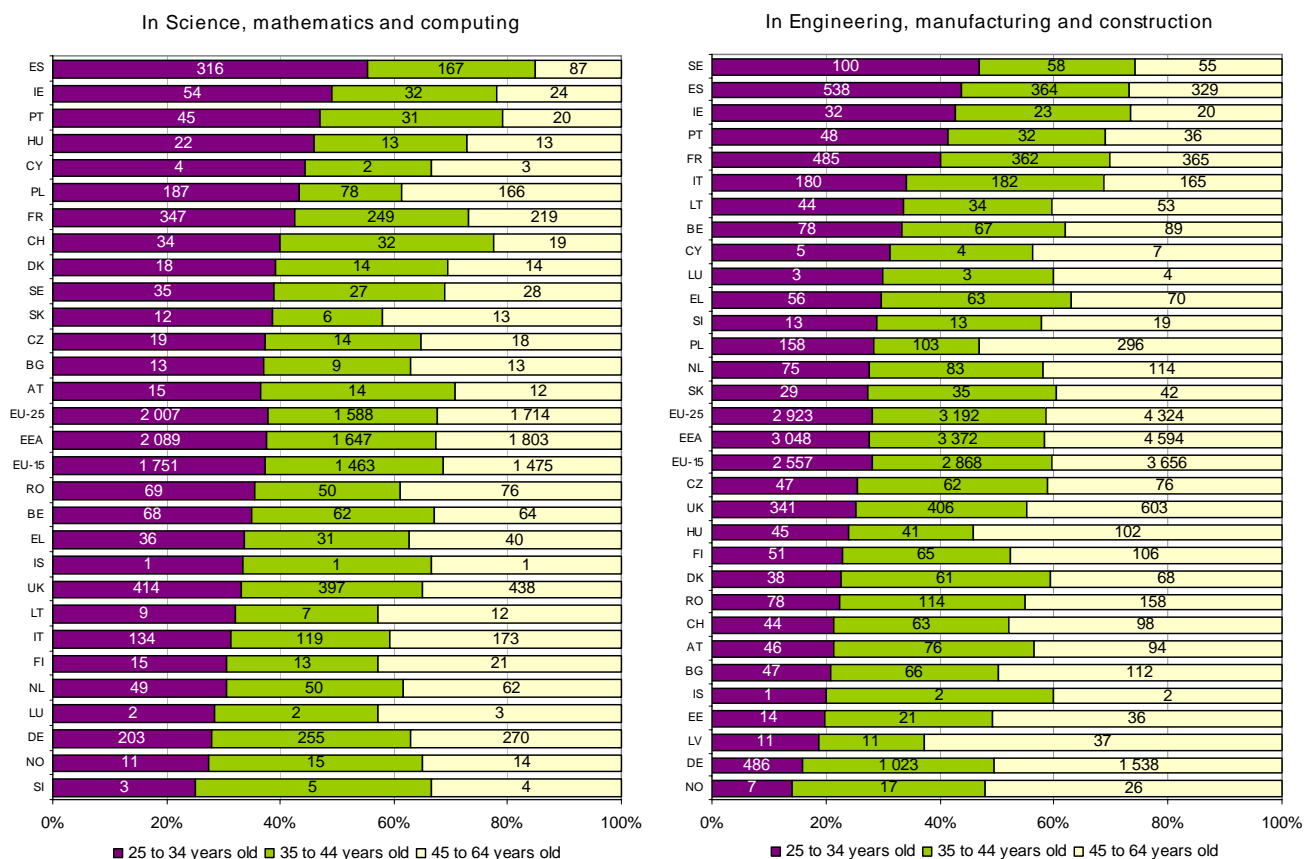
The youngest population of *Science* graduates was found in Spain. More than 55% of the tertiary graduates with a degree in *Science* in Spain were younger than 35 years. Ireland and Portugal also

show relatively young populations of *Science* graduates. In these two countries slightly less than 50% of the *Science* graduates fell into the 25-34 age bracket. Hungary, already mentioned as having a relatively old population of *Engineering* graduates, had the fourth youngest tertiary graduate population with a degree in *Science*.

Lithuania, Luxembourg, Finland, Slovakia and Italy had the oldest population of *Science* graduates of working age. However, with slightly over 40% aged 45-64, none of these countries could be said to have a particularly old population of *Science* graduates.

For both *Science* and *Engineering* graduates, Poland had a relatively large share of its working population in the upper and lower age groups. Accordingly, the 35-44 age group is relatively small. In 2005, this age group corresponded to a share of around 18% for both *Science* and *Engineering* tertiary graduates of working age.

Figure 5: Age distribution of S&E tertiary graduates aged 25-64 years old, in thousands and in percentage, in the EU and selected countries, in 2005



ES: 2004 data and CZ: 2003 data.

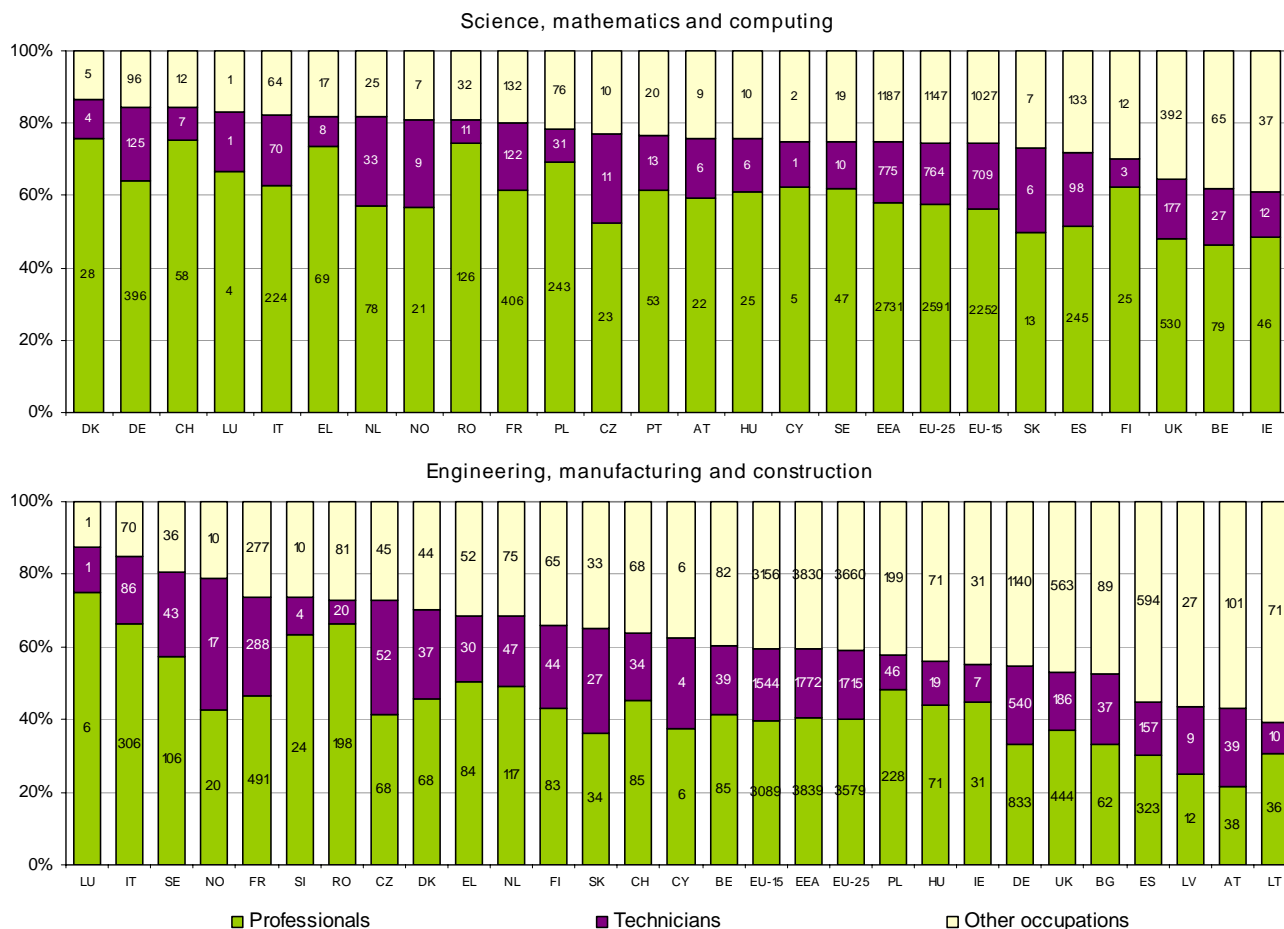
Data not available: TR ; MT in Science and Engineering ; EE and LV in Science.

EU-25, EU-15 and EEA: Eurostat estimates including CZ 2003 and ES 2004.

Source : Eurostat HRST data base derived from EU LFS

## Science graduates are found in qualified jobs more often than *Engineering* graduates

Figure 6: Science and Engineering tertiary graduates 25-64 years old, by type of occupation, in thousands and in percentage, in the EU and selected countries, in 2005



EU-25, EU-15 and EEA : Eurostat estimates including ES 2004 and CZ 2003.

Source : Eurostat HRST data base derived from EU LFS

TR: Data not available.

ES: 2004 data and CZ: 2003 data.

Unreliable data: EE in Science; MT in Science and Engineering; SI, IS, LT, BG and LV for Technicians in Science; PT and IS for Technicians in Engineering.

In 2005, 13.5 million S&E graduates in the 25-64 age group were employed in the EU. Of these, 64% were working as either *Professionals* or *Technicians and associated professionals*, occupations for which tertiary level education is normally required.

Figure 6 shows this population separated into two graphs, one for *Science* graduates and one for *Engineering* graduates. In the EU, nearly 75% of the employed graduates with a tertiary educational background in *Science* were working as either *Professionals* or *Technicians*. By contrast, less

than 60% of the employed *Engineering* graduates in the EU were occupied in either of those two occupational groups.

There are differences between countries, however, and these seem to be especially marked among the population of *Engineering* graduates. Indeed, in 2005, the share of *Engineering* graduates aged 25-64, employed as *Professionals* or *Technicians* ranged from 39% in Lithuania to 87% in Luxembourg. For the employed *Science* graduates in the same age group, the share of employment in these two occupational groups varied between 61% as in Ireland and 86% as in Denmark.



### 1. New HRST indicators

This Statistics in Focus publication is based on a set of new indicators in the Human Resources in Science and Technology (HRST) domain that has been developed following recommendations in two working papers presented by Eurostat in 2005 and 2006.

Previously, the only breakdowns by fields of study in the HRST domain were limited to the annual real inflow (graduation) or potential inflow (participation) from tertiary education into the stock of HRST. Until now, no measure of the educational background of the stocks of HRST has been available.

The population behind the new indicators are all people that have successfully completed their tertiary education (ISCED '97 version levels 5a, 5b or 6) – HRSTE. This HRST sub-group, HRST by education, is measured using characteristics of educational achievement, mainly following the guidelines of the *Canberra Manual*.

The focus in this publication is mainly on graduates from the *Science and Engineering (S&E)* fields, even if all other fields are sometimes included as a single aggregate.

### 2. Level of Education

Programmes at the third level of education are classified according to the International Standard Classification of Education (ISCED'97) into the following levels:

- ISCED level 6

Second stage of tertiary education, leading to an advanced research qualification

- ISCED level 5a

Programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skill levels

- ISCED level 5b

Programmes that are generally more practical/technical/occupationally specific than ISCED level 5a programmes

### 3. Fields of Education

The variable “field of highest level of education or training successfully completed”, part of the EU LFS regular collection since 2003, is coded according to the manual on Fields of Education and Training (Eurostat, 1999), in line with the International Standard Classification of Education (ISCED, 1997).

In this publication, the fields of education are combined into the following three categories:

- Science, mathematics and computing (EF4)
- Engineering, manufacturing and construction (EF5)
- Other fields of education (EF0-EF3, EF6-EF9)

### 4. Occupation

The classification of occupations is based on the *International Standard Classification of Occupations — ISCO*.

The following occupational breakdown is used in this publication:

- Professionals (ISCO'88 code 2)

Occupations whose main tasks require a high level of professional knowledge and experience in the fields of physical and life sciences, or social sciences and humanities.

- Technicians and associate professionals (ISCO'88 code 3)

Occupations whose main tasks require technical knowledge and experience in one or more fields of physical and life sciences, or social sciences and humanities.

- Other occupations (ISCO'88 codes 0, 1, 4-9)

All other occupations.

### 5. Data sources

Two different data sources are used in this publication.

Stocks of graduates are derived from the European Union Labour Force Survey (EU LFS). Data on recent inflows (Figure 3) are derived from Eurostat's Education database. Comparability between these two data sources is not always assured.

The most recent data were extracted in June 2006.

#### Quality of the data

The guidelines on the sample size reliability of the data, established by the EU LFS, are applied to the HRST database. Therefore, breakdowns for which quality levels are considered insufficient are flagged either as not available or unreliable.






### 6. Statistical abbreviations and Symbols

:	not available	s	Eurostat estimate
b	break in series	u	Unreliable value

## Further information:

Data: [EUROSTAT Website/Home page/Science and technology/Data](#)

### Science and technology

-  **Human Resources in Science & Technology**
  -  Stocks of HRST at the national and regional levels; unemployment for HRST and non-HRST
    -  Annual data on HRST and sub-groups of HRST at the national level
  -  **Flows of HRST at the national level: Education inflows and job-to-job mobility**
    -  Annual data on real and potential inflows of HRST into the HRST stocks at the national level, by gender and field of study

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This document was produced jointly with Céline Lagrost.