

U-Multirank 2022

Specification of programmes and degrees included

This text specifies the range of programmes that can be included in U-Multirank and defines the subjects of the 2022 edition. Both are based on the [UNESCO ISCED](#) classification of fields of education and training as closely as possible.

I. Degree Programmes

U-Multirank includes all programmes that are equivalent to ISCED classification 6 and 7:

- Bachelor and equivalent (ISCED 6)
- Master and equivalent (ISECED 7)

Hence included are also:

- First degrees equivalent to a Bachelor (up to 4 years duration)
- Undivided long first degrees equivalent to a Master (5 + years)

Not included are:

- Short degrees equivalent to ISCED 5 (e.g. Foundation degrees or associate degrees)
- Graduate certificates/ diplomas
- PhD programmes (ISCED 8)

For reasons of comparability, we do not include:

- Programmes of teacher education

II. Specification of Subjects

Our definitions and delineations of the field refer to the UNESCO *ISCED-F 2013 Classification of Fields of Education and Training* as far as possible. For your information, the classification of fields is attached as Annex I. The full document can be found [here](#).

The 2022 subject rankings will focus on engineering and natural science fields. In 2022 the 2019 U-Multirank subjects will be updated. In addition, one new subject, bioengineering, will be added. The 2022 data collection includes:

1. Biology (update)
2. Bioengineering (new)
3. Chemistry (update)
4. Chemical Engineering (update)
5. Civil Engineering (update)
6. Computer Science (update)
7. Electrical Engineering (update)
8. Environmental Engineering (update)
9. Materials Engineering (update)
10. Mathematics (update)
11. Mechanical Engineering (update)
12. Physics (update)
13. Production/Industrial Engineering (update)

General remark on interdisciplinary programmes

Interdisciplinary or broad programmes and qualifications are those which combine two or more fields of education and training with no single field dominating. Many interdisciplinary programmes and qualifications cover several narrow or even broad fields (in terms of ISCED-F 2013).

In our understanding, the *'leading subject rule'* is applied to determine the field to which the interdisciplinary study programme should be assigned.

To give an example: If a programme consists of 60% biology, 20% bioengineering and 20% biotechnology, it should be classified as biology as this is the dominant subject.

If there is no leading subject (e.g. 50% electrical engineering and 50% mechanical engineering), the decision to assign the programmes to the appropriate subject is left to the institution.

In the data collection process, you can specify if fields are interdisciplinary.

1. Biology

Our definition of biology corresponds to the narrow field “051 Biological and related sciences” of the ISCED_F 2013 classification.

Included are both general biology programmes and specialised programmes, such as

- Botany
- Cell biology
- Entomology
- Genetics
- Mycology
- Neurobiology
- Zoology
- Biochemistry programmes
- Biotechnology, detailed field 0512 in ISCED_F 2013

Not to be included are:

- Bioengineering programmes (see number 3)
- Programmes classified as narrow field “052 Environment”
- Medical programmes with a specialisation in biomedicine (they were included in the 2021 medicine ranking)

2. Bioengineering

Bioengineering is the application of engineering and natural science principles regarding tissues, cells and molecules. It is located in the fields of engineering and natural sciences, biology and medicine. This field is a sub-field of “0711 Chemical engineering and processes”.

Not to be included are:

- Biotechnology programmes (see number 2)

3. Chemistry

Our definition of the field corresponds to detailed field “0531 Chemistry” of ISCED-F 2013 classification

Included are both general Chemistry programmes and specialised programmes such as:

- Inorganic chemistry
- Organic chemistry
- Physical chemistry

Not to be included are:

- Chemical engineering programmes (which are classified as detailed field 0711 Chemical engineering and processes in ISCED_F 2013); see number 5.
- Biochemistry: is included in Biology (see 2).

4. Chemical Engineering

Our definition of the subject includes the detailed field “0711 Chemical engineering and processes”.

To be included: Chemical engineering (plants, products);

- Chemical engineering (plants, products);
- Chemical process engineering
- Programmes in Bio-Engineering

Not to be included:

- Science degrees in chemistry, ISCED detailed field “0531 Chemistry” (see 4).

5. Civil Engineering

Our definition of the field refers to detailed field “0732 Building and civil engineering”.

Included are both general programmes and specialised sub-fields, such as

- Water/hydraulic engineering
- Transport engineering

Not included are the ISCED detailed fields

- “0731 Architecture and town planning”
- “0521 Environmental sciences”

6. Computer Science & Engineering

Our definition of computer science and engineering corresponds to the narrow field “061 Information and Communication Technologies (ICTs)” of the ISCED 2013 classification.

Included are all detailed fields listed there as well as computer science programmes (incl. applied programmes).

To be included:

- Computer Science
- Applied computer science
- Informatics
- Software / software engineering
- Hardware/ hardware engineering (detailed field 0714 ‘Electronics and automation’)
- Computer systems

Not to be included:

- Programmes included under electrical engineering (see 8).

7. Electrical Engineering

Our definition of the subject includes the detailed field “0714 Electronics and automation” (except of subjects “computer engineering” and “computer repairing”) of the ISCED classification.

- To be included:
- Electrical and electronic engineering
- Robotics and automatic control
- Automation and control systems
- Communication engineering and systems
- Telecommunication

Not to be included: programmes assigned to computer science and engineering (see 7).

8. Environmental Engineering

Environmental engineering is not exactly defined in the ISCED-2013 classification. Our definition includes the narrow field “0712 Environmental protection technology”.

Our definition of the subject includes general programmes “Environmental engineering” as well as specialised programmes such as e.g.

- Water resources and management
- Renewable Energy
- Sustainable Energy
- Climate Engineering

Not included are:

- Programmes included under civil engineering (see 6.)

9. Materials Engineering

Our definition of Materials engineering corresponds to the narrow field “0722 Materials” of the ISCED classification.

Included are both general programmes in material sciences and engineering and programmes specialising on particular materials, such as e.g.

- Ceramics and glasses
- Polymers
- Composite materials
- Nano materials
- Bio materials

Not to be included:

Programmes on metal work already included under mechanical engineering (“0715 Mechanics and metal trades”).

10. Mathematics

Our definition of the field corresponds to the narrow field “054 Mathematics and statistics” of ISCED-F 2013.

Included both general mathematics and applied and specialised mathematics, including

- Algebra
- Geometry
- Numerical analysis
- Operational research
- *Statistics*: both general statistics and applied and specialised statistics
- For specialised mathematics (e.g. technical mathematics) and statistics (e.g. Bio-statistics) mathematics/statistics should dominate over other fields involved, which means more than 50% of classes/courses should be in mathematics/statistics.

11. Mechanical Engineering

In some engineering fields the ISCED classification, which aims to apply to all of education from lower secondary to higher education, does not fit very well to higher education engineering programmes.

Mechanical engineering is the broadest of the engineering disciplines. This subject focuses on two major topics: thermal systems and mechanical systems. From ISCED-2013 particularly the narrow fields “0715 Mechanics and metal trades” and “0716 Motor vehicles, ships and aircraft” are included here.

Included are e.g.:

- “General” mechanical engineering
- Energy engineering
- Applied mechanics
- Thermodynamics
- Automotive engineering
- Aerospace engineering;

Not to be included:

- Programmes included under materials engineering (see 10).

12. Physics

Our definition of the field corresponds to detailed field “0533 Physics” of ISCED-F 2013 classification. Included are both general physics programmes and specialised programmes as:

- Astronomy
- Astrophysics
- Chemical physics
- Medical physics
- Optics
- Space science

Not to be included:

- Opticians’ practice: belongs to the detailed field 0914 ‘Medical diagnostic and treatment technology’

13. Production/Industrial Engineering

Here ISCED does not offer a useful definition. Institutions can include units and programmes explicitly labeled and focused on this subject.

- Industrial engineering
- Production / product development
- Manufacturing
- Logistics engineering

Please note: Programmes have to be assigned either to industrial engineering/production or one of the other engineering fields!