BSc Skills Learning Outcomes

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Introduction

Skills descriptions

To support the implementation of skills learning trajectories in bachelor's degree programmes a set of 16 skills are defined on the basis of the Vision for Education (2017). Each skill is defined in terms of subskills and learning objectives for each subskill. Also, for each subskill three attainment levels are given, increasing in difficulty and complexity, using Bloom's taxonomy (following the Guideline for writing and using intended learning outcomes at WUR). The learning objectives and attainment levels are all phrased in terms of 'After successful completion of this step in the learning trajectory students are expected to be able to' + action verb + object + context.

There is some variation in the set-up of the attainment levels. Sometimes each attainment level has its own focus; sometimes more than one area of attention is given for one attainment level. Also, there are attainment levels which build on each other and are cumulative in character.

For some skills more (and higher) attainment levels are available, e.g. at an advanced BSc level, or at MSc level. These have not been incorporated in this document, since they are not part of the overall WUR-BSc framework. Although the skills are all phrased in English, skills such as Presenting and Writing can be executed in either English or Dutch, in line with the WUR Code of Conduct for Foreign Languages.

Second approximation

In January 2020 a first approximation of the tables for skills learning outcomes was presented. Testing these tables in practice has led to the need of adapting some of the tables. A lot of stakeholders were involved in the adaptation process, which has led to this second approximation. As implementation is ongoing, this may warrant future adjustments to these skills learning outcomes.

Use of the document

The purpose of this document is to provide a tool that outlines the intended WUR Learning Outcomes for Skills and provides common language. It is meant to be a flexible tool that can be adapted and interpreted by programmes to suit their unique needs and perspectives. We encourage programmes to use this document as a starting point for the implementation of the Skills Learning Trajectories. Programmes can prioritize the skills accordingly to the programme's vision, nature and context. They can adapt phrasing of the learning outcomes, select and/or add subskills and add programme specific skills.

Communication

1. Academic English - Understand lectures, debates and texts and use a sufficient range of English language to give clear descriptions, express viewpoints and develop arguments, using a good range of academic vocabulary for matters connected to their field.

Go to rubric

2. Argumentation and Reasoning - Construct a logical and persuasive argument, use evidence, clear reasoning and critical thinking to communicate and persuade the audience effectively, while considering different points of view and anticipating potential objections and counterarguments.

Go to rubric

3. Presenting - Deliver a clear and structured presentation, in connection with the audience and supported by suitable (visual) tools and non-verbal communication to get the content and message across.

Go to rubric

4. Writing - Write a clear and structured text, appropriate for the specific goal and target, supported by relevant sources and supporting elements (tables, figures and appendices).

Go to rubric

Personal Development

5. Collaboration - Collaborate effectively in a (multidisciplinary) team to perform project-based work, by structuring meetings, executing different team roles and tasks and being open to multiple perspectives.

Go to rubric

6. Feedback - Proactively seek feedback and use the valuable feedback to enhance learning and results.

Go to rubric

7. Reflection - Identify, analyse and evaluate own experiences, actions, thoughts, feelings and outcomes to gain insights, to enhance learning and to develop alternative behaviour.

Go to rubric

8. Personal Leadership - Take responsibility for one's own actions, decisions, and outcomes. Set goals, make plans, and take action to achieve those goals. Be accountable for one's own learning and development and take steps to continuously improve skills and knowledge.

Go to rubric

9. Entrepreneurial Skills - Apply and integrate concepts and theories to select, test and refine ideas that create value for others and to develop, design, test and/or implement new solutions (knowledge, product or process).

Go to rubric

Research

10. Researching - Identify a potential research problem and develop and execute a research plan in which a problem definition, research questions, hypothesis, set-up and data analysis are described in relation to relevant literature.

Go to rubric

11. Information Literacy - Search, find, evaluate, select, manage, and communicate scientific information.

Go to rubric

12. Data - Apply appropriate methods and techniques to mine, collect, process, analyse, interpret and visualise relevant data, putting the results and its presentation in a wider context.

Go to rubric

Responsibility

13. Diversity and Inclusivity - Explain differences in behaviour and communication as related to cultures and values, interact with others, suspend judgment, being aware of one's position and utilise diversity in a study context.

Go to rubric

14. (Practical) Ethics and Dilemmas - Identify, assess, explain and judge ethical and societal issues and implications that may arise, and define and discuss one's position and values with well-argued choices.

Go to rubric

15. Philosophy of Science - Judge research publications by critically reflecting on problems, theories and concepts, research design, approaches, methodologies and results and recognise the limits of scientific knowledge.

Go to rubric

16. Social Embeddedness (and Impact) - Understand and investigate place, function, concerns and complexities of one's study domain within society, and the position and interaction of stakeholders to develop solutions for positive impact.

Go to rubric

Communication

1. Academic English (version December 2022)
Understand lectures, debates and texts and use a sufficient range of English language to give clear descriptions, express viewpoints and develop arguments, using a good range of academic vocabulary for matters connected to their field.

	Attainment level 1	Attainment level 2	Attainment level 3
1.1 Listening	Understand a clearly structured lecture on a familiar subject and take notes on points which strike them as important, even though they may sometimes concentrate on the words themselves and therefore miss some information.	Take detailed notes during a lecture on topics in their field of interest, recording the information so accurately and so close to the original that the notes could also be useful to other people.	Follow lectures, discussions and debates with relative ease, taking detailed notes.
1.2 Reading	Read with a large degree of independence course materials and understands specialised articles within their field. Occasionally use external sources like (online) dictionaries.	Read with a large degree of independence and understands course materials, specialised articles, technical instructions and professional publications within their field.	Understand in detail lengthy, complex texts, identifying finer points of detail including attitudes and stated as well as implied opinions.
1.3 Spoken interaction	Communicate spontaneously with good grammatical control. Occasional slips do occur but do not hinder communication. Participate actively in formal discussion.	Communicate spontaneously with good grammatical control without much sign of having to restrict what they want to say.	Communicate spontaneously with good grammatical control without much sign of having to restrict what they want to say, adopting a level of formality appropriate to the situation.
1.4 Spoken production	Produce speech that is intelligible even if a foreign accent is evident and occasional mispronunciations occur.	Produce speech that is clearly intelligible even if a foreign accent is sometimes evident and occasional mispronunciations occur.	Produce speech sustaining a clear pronunciation and intonation.
1.5 Writing	Use a sufficient range of language to be able to give clear descriptions, express viewpoints and develop arguments, using some complex sentence forms to do so if needed. Some confusion and incorrect word choice may occur without hindering communication. Spelling and punctuation are reasonably accurate but may show signs of mother tongue influence. Apply basic English grammar and syntax rules.	Use a wide range of (academic) language, employing complex sentence forms to express themselves. Spelling and punctuation are mostly accurate, apart from occasional slips of the pen. Apply mainly correct English grammar and syntax rules.	Use a good range of academic vocabulary for matters connected to their field and most general topics. Minor vocabulary and grammar errors may be present but do not impede communication. Apply correct English grammar and syntax rules.

2. Argumentation and Reasoning (version April 2023)

Construct a logical and persuasive argument, use evidence, clear reasoning and critical thinking to communicate and persuade the audience effectively, while considering different points of view and anticipating potential objections and counterarguments.

	Attainment level 1 Basic Understanding	**Attainment level 2** Application	**Attainment level 3** Advanced Analysis and application
2.1 **Preparing an argumentation**	Identify the key components of an argument (e.g. claim, evidence, warrant) and gather information to support an argument. Formulate and define objectives of argumentation for different audiences.	Construct an argument on a given topic or issue, by selecting and evaluating relevant evidence, and anticipating potential objections and counterarguments.	Construct arguments that are well-supported, nuanced, and persuasive. Identify and address multiple perspectives on an issue, make deliberate choices on the different types of arguments and how to effectively communicate arguments to a diverse audience.
2.2 **Structuring an argument**	Identify the key components of an argument structure and the organisation of arguments recognising basic transitions and supporting evidence, and recognising different argumentation structures such as deductive, inductive, or causal.	Evaluate the strengths and limitations of different argumentation structures and apply those argumentation structures to construct arguments that are logically organised.	Critically analyse and evaluate the structure of complex arguments. Construct own arguments that are logically organized and well-supported, with the use of appropriate and correct transitions. Use argumentation structures and strategies to effectively communicate and negotiate.
2.3 **Logical and clear reasoning**	Recognize when conclusions or reasonings are supported or not supported by evidence (e.g. literature, obtained date). Distinguish between valid and invalid reasoning. Identify common fallacies and other forms of false reasoning and relate their impact on an argument.	Analyse and evaluate arguments and reasonings, recognizing underlying assumptions and identify potential fallacies. Use this knowledge to strengthen and correct own reasoning without fallacies.	Critically analyse and evaluate arguments and reasonings, anticipate and respond to more subtle forms of false reasoning, objections and counterarguments that rely on fallacious reasoning. Use rhetorical strategies to effectively communicate arguments without fallacies and false reasonings to a diverse audience.

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3. Presenting (version January April 2023)

Deliver a clear and structured presentation, in connection with the audience and supported by suitable (visual) tools and non-verbal communication to get the content and message across.

	Attainment level 1	Attainment level 2	Attainment level 3
3.1 Awareness of public (connection with the audience)	Connect with the target audience and give the presentation in front of them. React to the audience (verbal signals) and answer questions.	Connect with the target audience. Adapt the presentation to the audience when they invite to do so (verbal signals).	Connect with the target audience. Adapt the presentation to the audience (verbal and non-verbal signals).
3.2 Structuring of presentation (including explanation thereof and goal setting)	Structure the presentation, using an introduction, body, conclusion.	Structure the presentation, using an introduction, body, conclusion, and match this structure to the goal and the transitions.	Structure the presentation, using a specific type of structure that matches the goal, and choose the transitions so they flow smoothly, e.g. by using key words.
3.3 Clearly present content	Clearly present the main points. Explain the content supported by notes or slides.	Clearly present the main points and secondary ideas. Explain the content clearly with support of the notes or slides.	Show that they master the content well enough to present main and secondary ideas. Explain the content in a clear and enthusiastic way and hardly look at the notes or slides.
3.4 Non-verbal communication	Use delivery techniques (posture, gestures, eye contact, use of voice) that support the verbal message and make the presentation understandable.	Use delivery techniques (posture, gestures, eye contact, use of voice) that support the verbal message and make the presentation interesting.	Consciously use delivery techniques (posture, gestures, eye contact, use of voice) to support the verbal message and make the presentation compelling.
3.5 Tools and methods for getting your message across (visual aids)	Use basic supporting materials and visual aids (media, examples, illustrations, statistics, quotations) to get the message across.	Use a variety of supporting materials and visual aids (media, explanations, examples, illustrations, statistics, analogies, quotations) to get the message across supportively.	Use a variety of supporting materials and visual aids (media, explanations, examples, illustrations, statistics, analogies, quotations) to get the message across in an appealing way.
3.6 Authenticity and confidence	Use their own presentation style, including qualities and challenges.	Use their own presentation style and use that style to raise the interest of the audience.	Show confidence and use their own presentation style to raise the interest of the audience and make a natural connection with them.

4. Writing (version January 2020)
Write a clear and structured text, appropriate for the specific goal and target, supported by relevant sources and supporting elements (tables, figures and appendices).

	Attainment level 1	Attainment level 2	Attainment level 3
4.1 Considering target audience and form and purpose of writing	Adapt the text type to a specific target audience and discipline.	Adapt the text type and content to a specific target audience and discipline, taking into account audience's perceptions and assumptions.	Adapt the text type, content and writing style to a specific target audience and discipline, taking into account audience's perceptions and assumptions.
4.2 Using a clear text structure	Use the basic structure elements of a scientific text (introduction; theory; methods; results; conclusion; discussion; references; appendices). Use structure elements in the correct order in a short scientific text i.e. right information appears at the right place.	Use the right structure elements in a correct order in a specific text type. Correctly apply sub structuring elements (section headings; sub sections and headings; paragraphs). Link introduction and conclusion guaranteeing a story line. Write a concise abstract.	Anticipate and improvise with structure elements in such a way that it benefits the readability of a specific content and text type.
4.3 Using a clear section structure	Explain the importance of a clear section structure for bringing a message across and show a first attempt to use a clear section structure, e.g. by writing coherent paragraphs.	Build a logical and clear section structure and show a first attempt to use a clear section structure.	Use a clear section structure in such a way that the section contains all key concepts in a logical order, follow a logical line of reasoning and explain the respective key message of the section. Level of detail is appropriate and comparable throughout the sections. All information occurs at the right place.
4.4 Presentation of supporting elements (tables, figures and appendices)	Use tables, figures and appendices in the text, including captions.	Use tables, figures and appendices in a text, including captions to support the ideas on the text.	Use tables, figures and appendices in a text, including captions to support the ideas on the text in a way that they complement each other. Refer correctly to tables, figures and appendices.
4.5 Communicating information from sources	Write in own words and distinguish between own text and the use of other's text when using other sources.	Write in own words and distinguish between own text and the use of other's text when using other sources. Distinguish between facts and opinions.	Write in own words and - when using other sources - combine the work of others to support their own work correctly citing and paraphrasing other sources.

Personal Development

5. Collaboration (version January 2020)
Collaborate effectively in a (multidisciplinary) team to perform project-based work, by structuring meetings, executing different team roles and tasks and being open to multiple perspectives.

	Attainment level 1 Basic group work, having meetings and contributing to group assignment	**Attainment level 2** Group work in courses	**Attainment level 3** Group work in multidisciplinary teams
5.1 **Structuring meetings and group work (setting objectives)**	Structure meetings and group work when assigned a group assignment.	Structure meetings and group work and set objectives guided by the teacher.	Structure meetings and group work and set objectives on their own.
5.2 **Executing team role and corresponding tasks (chair, secretary, member)**	Describe the team roles and corresponding tasks and explain the value and importance of each role.	Execute at least one of the group roles and corresponding tasks supported by the group members.	Execute all group roles and corresponding tasks supported by the group members.
5.3 **Contributing to the discussion content-wise**	Select input from different sources and share this information with the group.	Select input from different sources and share the relevant information with the group.	Structure this information for the group to integrate all relevant input.
5.4 **Contributing to the discussion process-wise (listening, speaking, argumenting)**	Listen (pro-)actively and ask clarifying questions when needed. Speak up and give arguments for own input.	Listen (pro-)actively and ask clarifying questions when needed. Speak up and give arguments for own input and discuss constructively when different opinions arise.	Listen (pro-)actively and ask clarifying questions when needed. Speak up and give arguments for own input, discuss constructively when different opinions arise and involve all group members in the discussion.
5.5 **Dealing with group processes**	Recognize the group dynamics and recognize their own role in that.	Explain the group dynamics and acknowledge their own role in that. Stay engaged during all peaks and troughs, with the intention to continuously contribute to the group process in an effective way.	Analyse the group dynamics and consciously choose their own role in that. Address diversity, conflict or decision-making, with the intention to resolve it.
5.6 **Being open to multiple perspectives and showing a learning attitude**	Show an open attitude towards different perspectives of group members.	Show an open attitude towards different perspectives of group members and listen actively to understand these perspectives.	Show an open attitude towards different perspectives of group members and listen actively to learn from these perspectives. Ask proactively to get an overview of all perspectives.

6. Feedback (version April 2022)
Proactively seek feedback and use the valuable feedback to enhance learning and results.

	Attainment level 1	Attainment level 2	Attainment level 3
6.1 Receiving and generating feedback	Receive and evaluate feedback constructively, seek clarification if needed.	Receive and evaluate feedback constructively, seek clarification if needed, and demonstrate understanding.	Actively seek feedback. Receive and evaluate feedback constructively, seek clarification if needed, and demonstrate understanding.
6.2 Giving feedback	Give constructive and specific feedback to others.	Give constructive, specific and well-founded feedback to others with examples.	Give constructive, specific and well-founded feedback to others with examples. Check whether feedback is clear for the receiver.
6.3 Using feedback	Use concrete feedback and suggestions to improve results.	Use concrete feedback and suggestions to improve results and enhance learning.	Critically weigh the feedback and use valuable feedback to improve results and enhance learning.

7. Reflection (version April 2023)

Identify, analyse and evaluate own experiences, actions, thoughts, feelings and outcomes to gain insights, to enhance learning and to develop alternative behaviour.

	Attainment level 1	Attainment level 2	Attainment level 3
7.1 Identifying significant situations and experiences for learning	Describe significant situations and experiences for learning.	Describe significant situations and experiences for learning and explain significance, including description of own behaviour, thoughts and feelings.	Describe significant situations and experiences for learning, explain significance, including own behaviour, thoughts and feelings and perceived effects.
7.2 Analysing	Describe actions and results, show awareness of the difference between intentions and effects.	Relate actions and results, analyse the difference between intentions and effects. Identify personal strengths and pitfalls.	Relate actions and results, analyse the difference between intentions and effects. Relate to personal strengths and pitfalls, showing insight in personal beliefs.
7.3 Developing and trying out alternative behaviour	Describe possible alternative behaviour in similar situations. Try out alternative behaviour.	Choose alternative behaviour and describe expected outcome. Try out alternative behaviour.	Make a purposeful choice for alternative behaviour, try out and adapt while doing if needed.

8. Personal Leadership (version April 2023)

Take responsibility for one's own actions, decisions, and outcomes. Set goals, make plans, and take action to achieve those goals. Be accountable for one's own learning and development and take steps to continuously improve skills and knowledge.

	Attainment level 1	Attainment level 2	Attainment level 3
8.1 Self-awareness	Express own motives, values, qualities, talents and pitfalls.	Combine own motives, values, qualities, talents and pitfalls with current context to recognize opportunities for personal development.	Align own motives, values, qualities, talents and personal development goals with desired academic, societal and career perspectives.
8.2 Self-directedness	Recognize opportunities for learning. Set personal development goals.	Recognize and use opportunities to work towards personal development goals.	Create opportunities and make strategic choices based on both own motives, values, qualities, talents, and academic, societal and career perspectives to reach personal development goals.
8.3 Self-management	Apply strategies for managing time, setting priorities, managing stress and supporting well-being.	Effectively manage time and setting priorities. Demonstrate an ability to self-regulate and manage stress, to improve performance, achieve goals, and support well-being.	Effectively manage time and set priorities even in demanding or stressful situations. Demonstrate an ability to adapt to changing circumstances and adjust goals and priorities accordingly. Show resilience.

9. Entrepreneurial Skills (version March 2023)

Apply and integrate concepts and theories to select, test and refine ideas that create value for others and to develop, design, test and/or implement new solutions (knowledge, product or process).

	Attainment level 1 Discover	**Attainment level 2** Assess	**Attainment level 3** Act
9.1 **Problem and opportunity identification, evaluation and implementation**	Identify and examine ideas/solutions to authentic problems which create value for others (e.g. stakeholders, communities) in own study domain.	Evaluate the feasibility (social, environmental, economic) of ideas and related authentic problems by interacting with specified others (e.g. actors, stakeholders, communities).	Implement, test and/or prototype ideas into reality in line with the needs and wants of the external environment (e.g. stakeholders, municipalities, users, consumers, etc.).
9.2 **Multiple value creation (balancing people, planet, profit)**	Explain in general terms how problems and related ideas/solutions have different value creation potential, this being social, environment and economic.	Analyse the social, environmental and economic value of the (authentic) problem at hand and the proposed idea/solution have by taking into account different perspectives, using creativity and a system thinking approach.	Make decisions based on a thorough analysis of the social, environmental and economic impact of your idea/solution has for different actors/stakeholders.
9.3 **Dealing with uncertainty**	Explore and describe examples (e.g. role models, guest lecturers) of entrepreneurial ambitions and challenges in own study domain.	Experiment in a guided environment with the iterative, non-linear, open nature of entrepreneurial processes in own study domain.	Building independence and resilience by experiencing the entrepreneurial process of problem and opportunity identification, evaluation and implementation in a self-directed learning environment.

Research

10. Researching (version April 2023)
Identify a potential research problem and develop and execute a research plan in which a problem definition, research questions, hypothesis, set-up and data analysis are described in relation to relevant literature.

	Attainment level 1 Remembering/understanding	**Attainment level 2** Applying/analysing	**Attainment level 3** Evaluating/creating
10.1 **Positioning research (context, knowledge gap, research question/aim and hypothesis)**	Recap the context of the research and understand how the research question/aim is related to the context of the research. Hypothesize about the possible outcomes.	Describe the context of the research and define a research question/aim which is linked to the context. Hypothesize about the outcomes of the research, based on some literature.	Describe the context of the research and identify the knowledge gap. Define a research question/aim which is linked to the context and is researchable, clear and to-the-point. Formulate a hypothesis based on literature research.
10.2 **Designing research*** **(e.g. study, experiment)**	Recognize and understand the domain-specific design of research.	Develop a domain-specific design for simple research.	Develop a domain-specific design for relatively complex research.
10.3 **Performing research**	Understand and carry out simple steps of the research under supervision, by following detailed instructions, guidelines and planning.	Understand and carry out steps of the research under limited supervision. Make small adjustments to the guidelines and planning if needed. Pay some attention to details.	Understand and carry out the research mostly independently and manages time. Adjust the guidelines if needed. Pay attention to relevant details.
10.4 **Critically analysing and evaluating the research**	Show a basic critical attitude towards the results of the research (analyse and evaluate the results).	Show a critical attitude towards the results of the research and connect to the positioning of the research (analyse and evaluate the results, reflect on research question/aim).	Critically analyse and evaluate all parts of the research (analyse and evaluate the results, reflect on research question/aim, identify weak and strong points of the research).

* Each study programme has its own type of research, so each study programme can include its own interpretation of this subskill. Some examples of types of research are experimental research, design research, technical design, case-based research, longitudinal research, and action research. Some examples of domain-specific research terminology are sampling, data collection, choice of method, protocols, variables, duplicates, control groups.

11. Information Literacy (version April 2023)
Search, find, evaluate, select, manage, and communicate scientific information.

	Attainment level 1	Attainment level 2	Attainment level 3
11.1 Orientation and preparation	Identify a need for information and describe, locate and access different sources for information with the aim to orientate on a topic. Determine the main keywords of a topic in preparation of a search.	Evaluate, document and select appropriate sources for information (e.g. bibliographic databases), with the aim to orientate on a topic and prepare for a systematic literature search. Formulate a research question for a literature search and determine the main keywords of this question in preparation of a search.	Apply levels 1 and 2 for a well-focused discipline-specific scientific project at BSc level, place own work in the relevant scientific context of the relevant scientific field.
11.2 Searching	Perform a search using basic search techniques (e.g. Booleans, field and phrase searching, wildcards) and use reference lists to find additional relevant information.	Perform a search in various databases and platforms using systematic search strategies and apply "following a thread" to effectively and efficiently find relevant information (e.g. scientific articles, data, patents) and to improve the search query.	Apply efficient and effective advanced systematic search strategies (e.g. using proximity operators, thesaurus, choice of databases and platform) to find relevant information.
11.3 Evaluation	Evaluate the search results critically and use a set of proper selection criteria to select the most appropriate information sources.	Evaluate the search results critically, relate it to the original search question, and revise the search process if needed.	Apply levels 1 and 2 plus advanced approaches to determine when to stop searching and to select the most appropriate information sources.
11.4 Management	Use basic techniques to store and organize information sources and explains how to keep track of the search process for later repetition and improvement.	Use relevant software to store and organize information sources and keep track of the search process for later repetition and improvement.	Apply levels 1 and 2, plus advanced techniques to keep track of the search process for later repetition and improvement (e.g. save search, set alert).
11.5 Communication	Cite information properly and consistently to avoid plagiarism and describe purposes for publishing in different information sources (e.g. academic journal, news article, blog post).	Apply level 1 plus describe the difference between plagiarism and copyright infringement. Describe the process of academic publishing.	Cite information properly and consistently in a defined citation style using relevant software (e.g. Endnote, Mendeley). Acquire, store, modify, use, cite and distribute different kinds of information (text, data, images, sounds, etc.) strategically, legally and ethically.

12. Data (version March 2023)
Apply appropriate methods and techniques to mine, collect, process, analyse, interpret and visualise relevant data, putting the results and its presentation in a wider context.

	Attainment level 1 remember/know	**Attainment level 2** understand and apply	**Attainment level 3** apply and evaluate
12.1 **Data acquisition and manipulation**	Recognize relevant data in your domain. Describe and identify domain-specific data quality aspects such as: validity, accuracy, completeness, consistency and uniformity.	Acquire relevant primary (fresh) and/or secondary (existing) data in your domain given a specific task. Given acquired data, identify issues regarding data quality.	Apply methods for dealing with poor data quality, such as incompleteness and inconsistency. Given a research question, design a data model.
12.2 **Data analysis**	Given a simple problem and relevant data, identify an appropriate procedure to analyse the data.	Analyse data using a relevant software tool (e.g. Atlas.ti, R, Excel, SPSS). Critically evaluate the results of an analysis and their scientific relevance under supervision.	Identify and perform appropriate data analysis when confronted with new and 'dirty' datasets (e.g. unit change, format change, missing values and other inconsistencies) that might include biases and errors. Critically evaluate the results of an analysis and their scientific relevance.
12.3 **Data visualisation**	Describe relevant basic data visualisation methods for the domain (e.g. graphs, maps, 3D models).	Given a specific aim and audience, evaluate and choose relevant data visualisation methods and tools. Indicate how specific visualisation methods may influence the interpretation (e.g. a y-axis that does not start at 0, choice of colour in map representation).	Given specific data and purpose, apply relevant visualisation. Given specific data and purpose, evaluate existing visualisation.
12.4 **Data management**	List good data management practices (e.g., safe data storage, file naming and organisation, documentation, and versioning). If working with personal or sensitive data recall good practices (e.g., ethical principles, GDPR).	Apply good data management practices including safe data storage, file naming and organisation, documentation (e.g. lab journals, metadata, notebook) and versioning. If working with personal or sensitive data apply principles of ethical research.	Explain the key concepts underlying the FAIR principles for good data management (findable, accessible, interoperable, re-usable). Describe domain specific data management challenges (e.g. large volumes of data, interoperability, data security).

Responsibility

13. Diversity and Inclusivity (version January 2020)
Explain differences in behaviour and communication as related to cultures and values, interact with others, suspend judgment, being aware of one's position and utilise diversity in a study context.

	Attainment level 1	Attainment level 2	Attainment level 3
13.1 Knowledge of diversity and inclusivity issues *(cognition)*	Have a basic knowledge of the inequality in social positions and the relevance of characteristics such as gender, race, class and culture.	Apply level 1 and understand the concepts of equality, equity and justice while recognizing that societies and cultures differ in their preference for certain modes of interaction.	Apply levels 1 and 2 and explain the diversity in behaviour as related to different cultures and value systems.
13.2 Dealing with diversity and inclusivity *(skill)*	Identify examples of inequality and explain the relevance of characteristics such as gender, race, class and culture.	Apply level 1 and identify differences in verbal and non-verbal communication across cultures and social groups and be aware of potential misunderstandings.	Apply levels 1 and 2 and interact with different others, suspend judgment and promote inclusivity in the context of one's study (e.g. group work).
13.3 Sensitivity towards diversity and inclusivity *(attitude)*	Be aware of one's position in structural inequalities at a local and global level.	Apply level 1 and acknowledge the value of diversity and respect the fundamental (human) right of being different.	Apply levels 1 and 2 and be ready to promote social equality and respect for diversity.

14. (Practical) Ethics and Dilemmas (version January 2020)
Identify, assess, explain and judge ethical and societal issues and implications that may arise, and define and discuss one's position and values with well-argued choices.

	Attainment level 1	Attainment level 2	Attainment level 3
14.1 Ethical dilemmas and practical ethics *(cognition)*	Identify ethical dimensions of one's study domain.	Apply level 1 and be familiar with relevant ethical principles and guidelines to unravel ethical dilemmas.	Apply levels 1 and 2 and apply those principles, concepts and guidelines in a specific problem context.
14.2 Ethical reflection *(skill)*	Define one's position in ethical issues and formulate arguments for and against that position.	Apply level 1 and discuss positions in ethical issues with others.	Apply levels 1 and 2 and present well-argued choices, and critically reflect on the quality of the ethical deliberation that led to these choices.
14.3 Personal ethics *(attitude)*	Acknowledge that ethical dilemmas call upon one's own values.	Apply level 1 and be able to critically reflect on one's values and explore how these may be adaptable to change.	Apply levels 1 and 2 and be ready to reconsider or adjust one's values in the light of ethical dilemmas.

15. Philosophy of Science (version January 2020)

Judge research publications by critically reflecting on problems, theories and concepts, research design, approaches, methodologies and results and recognise the limits of scientific knowledge.

	Attainment level 1	Attainment level 2	Attainment level 3
15.1 Philosophy of science (cognition)	Distinguish different views of science and of the privileged status of scientific knowledge.	Apply level 1 and understand and recognize specific (epistemological, logical, normative) concepts and tools in scientific work.	Apply levels 1 and 2 and understand fundamental scientific assumptions in one's own scientific/ technological domain.
15.2 Philosophy of science (attitude)	Explore one's own attitude towards science and technology.	Apply level 1 and investigate how uncertainty plays a role in one's scientific and/or technological domain.	Apply levels 1 and 2 and accept uncertainty and doubt as the first step of science.

16. Social Embeddedness (and Impact) (version January 2020)
Understand and investigate place, function, concerns and complexities of one's study domain within society, and the position and interaction of stakeholders to develop solutions for positive impact.

	Attainment level 1	Attainment level 2	Attainment level 3
16.1 Social embeddedness (cognition)	Understand the place and function of one's study domain within society and the development thereof in time.	Apply level 1 and identify social concerns that arise in the context of one's study domain.	Apply levels 1 and 2 and explore how one's study domain may contribute to addressing such concerns.
16.2 Dealing with social impact (skill)	Investigate the place and function of one's study domain in society.	Apply level 1 and investigate the reasons for social concerns arising in the context of one's study domain and recognize their relevance for specific groups.	Apply levels 1 and 2 and review which stakeholders are relevant to engage with when developing strategies to address such concerns.
16.3 Social sensitivity (attitude)	Acknowledge that the place and function of one's study domain is to be understood in its societal context.	Apply level 1 and accept the professional obligation to inquire the social concerns arising in the context of one's study domain.	Apply levels 1 and 2 and demonstrate sensitivity for social needs and concerns arising in the context of one's study domain and readiness to positively impact society.

BSc Skills Learning Outcomes