Aviation HBO Competences and Levels…version 22-23

1. Analysis

The analysis of an engineering or operational Aviation question or issue comprises the identification of the problem or customer need, the consideration and balancing of possible design strategies or proposed solutions, and the explicit charting out of the requirements, objectives and parameters.

In this process, a whole **range of methods are used, including desk research, mathematical analyses, process analyses, computer models and simulations, and experiments**. Parameters relating to economics, engineering, logistics, safety, security, environment, society, sustainability, etc. are also considered.

	Level 1	Level 2	Level 3
Indicator ↓	The student analyses a problem presented by the supervisor, under supervision. The student demonstrates this by...	The student analyses a fairly complex problem, simulated or (partially) framed, if necessary, under supervision. The student demonstrates this by...	The student autonomously analyses (or supervisions the analyses of team members of) a complex issue presented by a client or business community. The student demonstrates this by...
A	selecting **relevant sources** in respect to the question or issue: using internal documents and (scientific) literature.	selecting all relevant aspects in respect to the question or issue: taking into account the internal strategic, tactical and operational level.	selecting all relevant aspects in respect to the question or issue: taking into account the internal strategic, tactical and operational level, as well as the mutual influences between the parties in the Aviation chain;
B	identify the **possible influences** on technical, operational, business, regulatory, safety and environmental aspects.	specifying the possible influences on technical, operational, business, regulatory, safety and environmental aspects.	specifying the possible influences on technical, operational, business, regulatory, safety and environmental aspects in qualitative or quantitative terms;
C	**formulating the problem definition, (research) question** and dividing it into sub-questions or objectives.	formulating a clear definition of the problem, objectives and assignment, based on the wishes of the client.	formulating a clear problem outline, objective and assignment by cutting through to the underlying question, and reformulating and demarcating it as such so that the client can identify with it;
D	**drawing up a list of requirements** in consultation with the supervisor for which the solution must satisfy, taking into account the most **relevant legislation** for Aviation.	documenting a clear program of requirements in such a way that it meets the clients' needs, taking into account the most relevant legislation for Aviation.	documenting a clear and complete program of requirements (technical and non-technical); specifically taking into account the complete and current legislative framework for Aviation;
E	**using models and simulations** created by others in order to gain insight in performance and/or interdependencies.	modelling or simulating a product, process or service with instructions to gain insight in performance and/or interdependencies.	independently modelling or simulating a product, process or service to gain insight in performance and/or interdependencies.

2. Design

The design of a solution to be realised may be for a **technological innovation, or a new or improved process or method**, whereby the Aviation specialist has a sense of the impact of this solution on the operational process, safety, security, environment, reliability, sustainability and business.

The Aviation specialist makes use of a structured methodological approach. The solution to be realised is based on the program of requirements and forms a complete and correct fulfilment of all requirements imposed.

	Level 1	Level 2	Level 3
	The student demonstrates this by...	The student demonstrates this by...	The student demonstrates this by...
A	**elaborate concept solutions** based on the requirements imposed, taking into account the specified laws and regulations.	elaborating and selecting a concept solution on the basis of the requirements imposed, taking into account the specified laws and regulations.	elaborating and selecting a concept solution on the basis of the requirements imposed, thereby specifically guaranteeing regulatory compliance;
B	**producing designs** according to the generated solutions, including visualisations with diagrams and / or drawings.	producing designs according to the selected solution, including visualisations with diagrams and /or drawings.	producing more detailed designs according to the selected concept solution, including visualisations with (industry standard) schematics and/or (technical) drawings;
C	**Arguing** which aspects should be taken into account when checking the **feasibility** of the solution;	taking into account the technical and operational feasibility of the solution; checking the direct impact of the solution on (parts of) technical systems and / or operational processes;	taking into account the technical and operational feasibility and testability of the solution; checking the impact of the solution on other (parts of) technical systems and/or operational processes;
D	**verifying solutions** according to the schedule of requirements**; analysing the quality** through peer and/or lecturer judgment;	verifying the solution according to the schedule of requirements; analysing the quality of the solution through simulation, practical testing, or expert judgement;	verifying the solution according to the schedule of requirements; analysing the quality of the solution in practice through simulation, practical testing, or expert judgement;
E	**prepare the documentation** for the product, service or process according to the given format.	prepare the documentation for the product, service or process according to the programme specific standards.	drawing up the documentation for the product, service or process in accordance to company and legislative standards.

3. Realisation

For the realisation and **delivery of a product, service or process** that meets the requirements set, the Aviation specialist must develop practical skills to solve aviation issues through research and experiments. These skills include knowledge of material use and limitations, computer simulation models, aviation engineering processes, machines, literature and relevant and reliable sources.

The Aviation specialist is also capable of recognising the (often non-technical) impact of his activities, with respect to ethics, the social environment and sustainability.

	Level 1	Level 2
	The student demonstrates this by...	The student demonstrates this by...
A	making **appropriate use of** prescribed standards and materials, acquired processes and imposed norms.	making suitable use of materials, processes, norms and standards; and assembling components into a complete product, service or process;
B	**verifying** the product, service or process with regard to the requirements imposed;	verifying and validating the product, service or process with respect to the requirements imposed;
C	**informing all internal stakeholders** about relevant changes in a timely and effective manner;	informing all internal and external stakeholders about relevant changes in a timely and effective manner;
D	taking into account **sustainable regular operations** and the most **critical safety risk as a consequence** of the realisation.	using 'sustainable operational readiness' as part of the mental framework: taking into account any possible operational disruptions, and safety risks as a consequence of the realisation;
E	**documenting** the realisation process; timeline, project plan and/or implementation plan.	documenting the realisation process; updating relevant handbooks, manuals, workplace instructions.

4. Control

The Aviation specialist **ensures that a product, service or process operates ideally** in its application, context or working environment, considering aspects of compliance to law and regulations, safety, security, sustainability, technical and economic lifetime.

	Level 1	Level 2
	The student demonstrates this by...	The student demonstrates this by...
A	**introducing, testing and integrating and commissioning** a new product, service or process under supervision to optimize current operational performance;	autonomously introducing, testing, integrating and commissioning a new product, service or process to optimize current operational performance;
B	Conducting **risk assessment** of operational processes and defining related mitigating measures.	ensuring continuity of operation by anticipating (expected) changes in legislation, mitigation of and recovery from operational disruptions, and creation of an adequate (operational) planning;
C	**verify the performances** of a product, service or process to meet the quality and safety criteria laid down in given guidelines.	demonstrating the ability to assess the performance of a product, service or process according to quality and safety criteria;
D	**providing feedback** in response to a given set of circumstances and/or performance of a product, service or process;	providing feedback in response to changing circumstances and/or performance of a product, service or process;
E	*participate in **open communication** in order to ensure that potential errors quickly come to the forefront and can be corrected;*	contributing to a just culture; facilitating open communication in order to ensure that potential errors quickly come to the forefront and can be corrected; eliminating any safety and security risks.

5. Management

The Aviation specialist **manages organisational and operational processes and the related staff** with a view towards achieving the the objectives of the business unit or project, of which the specialist is in charge, taking into account the external environment.

	Level 1	Level 2
	The student demonstrates this by...	The student demonstrates this by...
A	**organising a** (sub)**project**: drawing up project plans and documentation, quantifying risks and organising resources (human and material);	organising a (sub)project: quantifying time and money, assessing and quantifying risks, drawing up project plans and documentation and organising resources (human and material);
B	**monitoring and re-adjusting** activities in terms of time, quality, information and organisation;	monitoring and re-adjusting activities in terms of time, money, quality, information and organisation;
C	**task and process-oriented communication** to all direct stakeholders to take common and conflicting interests into consideration;	task and process-oriented communication to all internal and external stakeholders using a complete overview of the Aviation chain to take common and conflicting interests into consideration;
D	**communication and cooperation** leading or functioning in a team with others in a multicultural environment, and fulfilling the requirements imposed by participation in a simulated [1]working environment.	communication and cooperation with others in a multicultural, international and/or multidisciplinary environment, and fulfilling the requirements imposed by participation in a working environment.

[1] With a simulated working environment, a school environment is implied.

6. Advice

The Aviation specialist offers **underpinned advice on the design, improvement or application of products, processes and methods based on a thorough understanding of the restrictions, relationships and dependencies** in the Aviation business. Distinctive for the Aviation specialist is the ability to think ahead and proactively focus on operational readiness and sustainability aspects.

	Level 1	Level 2
	The student demonstrates this by...	The student demonstrates this by...
A	asking questions to **clarify the client's needs** in the context of the assignment and incorporate feedback from the supervisor (in the client's role).	understanding the needs of the (internal or external) customer, clarifying the needs of the client in context of the Aviation chain;
B	**translating,** under supervision, the customer requirements into technically & economically viable solutions suitable for the Aviation context in compliance with regulations.	translating the customer requirements into technically & economically viable solutions suitable for the Aviation context in compliance with regulations and in consultation with relevant parties;
C	**Supporting,** under supervision, his/her/their **advice** with solid arguments, and convincing lecturers (in the role of clients) of these arguments;	Substantiating his/her advice with solid arguments, and independently convincing the client of these arguments; taking into account the related requirements and constraints.
D	adequately **asking and giving feedback** to maintain relationships with group members.	Adequately asking and giving feedback to maintain relationships with internal and external stakeholders.

7. Research

The Aviation specialist has a critical stance and an **investigative attitude.** He uses the appropriate methods and techniques for gathering and assessing information, in doing **applied research**. This research is aimed at adding value ~~for~~ to the aviation industry.

Examples of such methodology are literature review and study, the analysis and modelling of the problem, designing and executing experiments, and interpreting data and computer simulations, which requires consulting data sets, standards and safety norms.

	Level 1	Level 2
	The student demonstrates this by...	The student demonstrates this by...
A	drawing up the **research question** and formulate the **objectives** and sub questions based on a given problem description.	Independently or autonomously [2] drawing up the research question and objectives for a specific study on the basis of the underlying question, problem or opportunity;
B	**selecting** (scientific) **literature**, (inter)national standards, rules and regulations, and other information sources for acquiring further knowledge of the question from provided sources.	independently selecting and reviewing (scientific) literature, (inter)national standards, rules and regulations, and other information sources for acquiring further in-depth knowledge of the question, thereby demonstrating the ability to validate the reliability of the various information sources;
C	Following recommended **research method(s);** planning and executing research activities;	selecting appropriate research method(s); planning and executing research activities;
D	summarising, structuring and **interpreting the results**	summarising, structuring and interpreting the results and drawing conclusions in relation to the study question;
E	**reporting and presenting** these results	reporting and presenting these results according to the standards applicable in the professional field;
F	**reflecting** on the selected approach	critically reflecting on the selected approach and issuing recommendations for potential further study.

[2] Independently stands for doing something individually, not in groups when autonomously stands for doing something based on own knowledge without any task support

8. Professionalisation

The Aviation specialist is acquiring and maintaining the skills needed to be able to effectively implement his/her knowledge, skills and attitudes. These skills may be relevant in a broader setting. Among other things, this encompasses having an **international orientation and a perspective on new developments, social norms and ethical dilemmas**.

This includes following and interpreting current and future developments in the field, actively pursuing life-long learning. This competence is implemented in combination with the other competences to ensure well-developed research abilities and a reflective and critical attitude.

	Level 1	Level 2	Level 3
	The student demonstrates this by...	The student demonstrates this by...	The student demonstrates this by...
A	learning to **reflect on (personal) learning outcomes**	choosing a personal learning outcome and strategy independently, and using the result to reflect on the learning outcome;	defining and executing a personal learning outcome and strategy independently, and using the result to reflect on the learning outcome;
B	learning about **various approaches** in a range of professional situations;	adopting a flexible approach in a range of professional situations	adopting a flexible approach in a range of professional situations; being open to working in a multidisciplinary context;
C	analysing professional and **ethical dilemmas**	analysing professional and ethical dilemmas taking into account the (inter)national Aviation framework of accepted standards and values;	making sound considerations and decisions when faced with professional and ethical dilemmas taking into account the (inter)national legislative framework of accepted standards and values;
D	**receiving feedback** on own behaviour and content;	offering and receiving feedback with respect to both behaviour and content;	asking for, offering and receiving constructive feedback with respect to both behaviour and content; reflecting on learning purposes and overall connections
E	**reflect on his/her own actions**, thoughts and outcomes;	deeply reflecting on his/her own actions, thoughts, feedback and outcomes resulting in an action plan;	deeply reflecting on his/her own actions, thoughts, feedback and outcomes providing evidence on actions taken;
F	using a range of communication forms and tools in order to **effectively communicate in English** (or Dutch if applicable); language use and structure	using a range of communication forms and tools in order to effectively communicate in English (or Dutch if applicable); using sound argumentation in the research and professional products presented	using a range of communication forms and tools in order to effectively communicate in English (or Dutch if applicable); attuned to professional jargon and knowledge
G	being interested, aware and able to discuss on current changes based upon **developments and events in the Aviation Sector**	being able to react on current changes based upon developments and events in the Aviation Sector	being able to react on current changes based upon developments and events in the Aviation Sector and with any future changes in the industry as well.