Number	Short Description	Threat	Vulnerability	Measures	Impact	Probability	Risico	Proposed Approach	Rest Risico
	Machine								
MS-1.001	Dangerous voltages	Parts may become energized	Wires/cables are loose	Never work under power	High	Low	Moderate	Never work in a cabinet that is live	Low
MS-1.002	Collisions	Collisions between robot and objects or people	Insufficient safety sensors or shielding around the robot	Install light curtains or enclosure around the robot	High	Moderate	Moderate	Place screens around the workplace with light curtains for entrances	Low
MS-1.003	Crushing hazards	Crushing hazards with moving parts	Insufficient shielding of moving parts	Use of shields, safe working distance	High	Moderate	High	Place physical shielding and conduct periodic inspections	Moderate
MS-1.004	Speed	High speeds can cause parts to come loose	Incorrect setting causes excessive speed	Add speed control to a specific zone	High	Moderate	Moderate	Lower speed when interacting with humans	Moderate
MS-1.005	Software	Software errors may cause unexpected movements	Software is not fully tested for safety	Regular software updates and testing	High	Low	Moderate	Frequently perform software testing and updates	Low
MS-1.006	External influences (Moisture or dust)	Failures due to moisture or dust	Moisture can damage electronics, dust can block moving parts	Use of enclosures and maintenance planning	Moderate	Moderate	Moderate	Regular maintenance and cleaning, install in a conditioned environment	Low
MS-1.007	Hardware failure	Unexpected component failure	Components may wear out or malfunction	Preventive maintenance, diagnostic systems	High	Low	High	Regular maintenance and timely replacement of worn-out parts	Low
MS-1.008	Overloading on cobots	Cobot gets overloaded and malfunctions	Objects are too heavy or incorrect workload calculation	Set maximum load, force limits	Moderate	Low	Low	Monitor and control workload limits	Low
MS-1.009	Maintenance access	Accidents during maintenance work	No lockout during maintenance	Use of lock-out/tag-out systems	High	Moderate	Moderate	Implement lockout systems and safety procedures	Low

	Personal								
PR-2.001	Inexperience	Can be dangerous when no supervisor is present	Lack of training/guidance	Always work under the supervision of a mentor	High	High	High	Have students complete assignments to broaden their knowledge under supervision	Moderate
PR-2.002	Illness and absence	Team members can be absent for an indefinite period	Project timeline and quality may be jeopardized	Make plans with buffer time and take over tasks when necessary	Moderate	High	High	Reassign tasks as needed and account for buffer time in the planning	Moderate
PR-2.003	Communication errors	Miscommunication between team members	The final project may differ from the original plan	Write down everything discussed and reflect on it	Moderate	Moderate	Moderate	Use checklists/rubrics and take minutes of all meetings and key decisions	Low
PR-2.004	Incorrect operation	Errors during robot/cobot operation	Poor training or unclear materials	Train students under mentor supervision	High	Moderate	Moderate	Create good interfaces and assignments and perform periodic evaluations	Low

	Other								
OR-3.001	Availability of resources	Lack of access to necessary resources for completing the task	Scope change or waiting for materials can cause time pressure	List and order all necessary items in advance	Moderate	Moderate	Moderate	Inventory management and ensure fast delivery when needed	Low
OR-3.002	Change in scope	A (large) part of the project needs to be completely adjusted	Time pressure	Assess whether the change has serious consequences	Moderate	High	High	Always have changes reviewed by multiple people	Moderate
OR-3.003	Time pressure	Working faster can compromise safety and quality	Can lead to errors	Clear planning with realistic deadlines	Low	High	Moderate	Weekly meetings with updates, otherwise schedule with staff shortages	Low