

INSTRUCTIONS:
Fill out the hazard analysis and risk assessment below.
HA-001 should be for the lane departure warning function as discussed in the lecture.
HA-002 should be for the lane keeping assistance function as discussed in the lecture.
Then come up with your own situations and hazards for the lane assistance systems. Fill in the HA-003 and HA-004 rows.
When finished, export your spreadsheet as a pdf file so that a reviewer can easily see your work.

Hazard ID	Operational Mode		Operational Scenario		Environmental Details		Situational Analysis		Other Details (Additional)		Function		Deviation		Deviation Details		Safety Impact / Consequence		Event Details		Response Event	
	Operational Mode	Operational Scenario	Operational Scenario	Operational Scenario	Environmental Details	Situational Analysis	Other Details (Additional)	Function	Deviation	Deviation Details	Safety Impact / Consequence	Event Details	Response Event									
HA-001	ON03 - Normal Driving	OS04 - Highway	EN02 - Rain (poorly road)	S002 - High speed		Normal driving on a highway during rain (poorly road) with high speed and correctly used system		Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	D026 - Actor effect is too much	The Lane Departure Warning function applies an oscillating torque with very high torque (above 10N)	E000 - Collision with other vehicle	High haptic feedback can affect driver's ability to steer as intended. The driver loses control and could collide with another vehicle in side of the road.	Driver use the function as if the car was a self-driving car and loose driving attention.	The driver do not use the function properly.								
HA-002	ON03 - Normal Driving	OS03 - Country Road	EN01 - Normal conditions	S002 - High speed		Normal driving on a country road during normal conditions with high speed and incorrectly used system		Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in lane	D003 - Function is always activated	Lane Keeping function is always activated	E000 - Collision with other vehicle	Driver use the function as if the car was a self-driving car and loose driving attention.	The driver do not use the function properly.									
HA-003	ON03 - Normal Driving	OS04 - Highway	EN01 - Normal conditions	S002 - High speed		Normal driving on a highway during normal conditions with high speed and correctly used system		Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	D002 - Function unexpectedly activated	The camera sensor stop working and the Lane Departure Warning function continue to be activated.	E000 - Collision with other vehicle	The Lane Departure Warning continue to be activated and start oscillating steering torque to the steering wheel making the driver to lose control with potential collision with other vehicle.	The driver do not use the function properly.	The driver do not use the function properly.								
HA-004	ON03 - Normal Driving	OS05 - Mountain Pass	EN01 - Normal conditions	S002 - High speed		Normal driving on a Mountain Pass during normal conditions with high speed and correctly used system		Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in lane	D007 - Actor effect too late	The LKA applies the steering torque late and thus the car goes off lane	E000 - Collision with other vehicle	The driver expects the LKA to react in time and help him driving safely as in the past. A late reaction of the LKA can surprise the driver and results in a collision.	The driver do not use the function properly.	The driver do not use the function properly.								

Emergency Lane Departure						Reclassification of ASIL and Safety Goals	
Frequency of occurrence	Parameter (for assessment)	Severity of potential harm	Rateable (for severity)	Controllability of emergency system	Parameter (for controllability)	ASIL Determination	Safety Goal
E1 - Medium probability	Driving on a highway with rain could happen between 1% and 10% of the time operating the vehicle.	E1 - Life threatening or fatal injuries	Collisions at high speed could cause fatal injuries.	C1 - Difficult to control or uncontrollable	It is difficult to stay calm and react properly when the steering wheel is moving too much.	C	The occurring steering torque from the Lane Departure Warning function shall be limited.
E2 - Low probability	The correlation between driving at a country road and missing system should not happen often. Less than 1% of the time operating the vehicle.	E2 - Life threatening or fatal injuries	Collisions at high speed could cause fatal injuries.	C1 - Difficult to control or uncontrollable	When the driver loses focus on driving, it is difficult to re-focus in the case of imminent collision.	B	The Lane Keeping Assistance function shall be time limited, and additional steering torque shall and after a given time interval so the driver cannot resume the system for autonomous driving.
E3 - Medium probability	Driving on a highway with rain could happen between 1% and 10% of the time operating the vehicle.	E3 - Life threatening or fatal injuries	Collisions at high speed could cause fatal injuries.	C2 - Difficult to control or uncontrollable	When the driver loses control of the vehicle is very difficult to realize the situation and act accordingly.	C	The Lane Departure Warning function shall be deactivated when the camera sensor stop working.
E2 - Low probability	Driving on a mountain side once a month or more often for an average driver	E2 - Life threatening or fatal injuries	Collisions at high speed could cause fatal injuries at mountain side.	C1 - Difficult to control or uncontrollable	When the driver loses control of the vehicle is very difficult to realize the situation and act accordingly.	B	The LKA function shall always react on time or inform the driver that it has a malfunction and turns itself off.