

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 system. 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	Situational Analysis						Hazard Identification				Hazardous Event Classification						Determination of ASIL and Safety Goals				
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage (function)	Situation Description	Function	Deviation	Deviation Details	Hazardous Event (resulting effect)	Event Details	Hazardous Event Description	Exposure (of situation)	Rationale (for exposure)	Severity (of potential harm)	Rationale (for severity)	Controllability (of hazardous event)	Rationale (for controllability)	ASIL Determination	Safety Goal
HA-001	OM03 - Normal Driving	OS02 - Country Road	EN01 - Normal Conditions	SD03 - High Speed		IJ01 - Correctly Used	Normal driving on country roads 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.	DV04 - Actor effect is too much	The LDW function applies an oscillating torque with very high torque (above limit)	EV00 - Collision with other vehicle	High haptic feedback can affect driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle or with road infrastructure.	The LDW function applies too high an oscillating torque to the steering wheel (above limit)	E4 - High probability	Once the oscillating torque is too high, it always too high.	S3 - Life-threatening or fatal injuries	Driving at high speed and losing control is fatal.	C2 - Normal controllable	The driver's hands are still on the wheel, but he or she should beat the torque of LDW function to control of the car.	C	The LDW function's oscillating torque shall be smaller than a limit that will not disturb driver's manipulation. It would be better if the oscillation torque can be adjusted by him or herself before driving.
HA-002	OM03 - Normal Driving	OS02 - Country Road	EN01 - Normal Conditions	SD03 - High Speed		IJ02 - Incorrectly Used	Normal driving on country roads 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 ego lane	DV03 - Function always activated	The LKA function is activated beyond the acceptable duration	EV00 - Collision with other vehicle	The driver was misusing the function be taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle.	The LKA function always adds extra steering torque.	E2 - Low probability	The driver is on a country road and misusing the system. The combination probably does not happen often.	S3 - Life-threatening or fatal injuries	Driving at high speed and losing control is fatal.	C3 - Difficult to control or uncontrollable	Because hands are not on the wheel at high speeds, a vehicle accident would not be controllable.	B	The LKA function shall be time limited and the additional steering torque shall end after a given time interval so that the driver cannot misuse the system for autonomous driving.
HA-003	OM03 - Normal Driving	OS04 - Highway	EN01 - Normal Conditions	SD03 - High Speed		IJ01 - Correctly Used	Normal driving on a highway 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 ego lane.	DV02 - Function unexpectedly activated	The camera sensor stop working and the LKA function continue working	EV00 - Collision with other vehicle	The LKA continue working at a random torque to the vehicle making the driver to loose control.	The LKA function starts acting randomly when the camera sensor is not working.	E3 - Medium probability	The camera sensor or its ECU has a medium probability to have some problem in special conditions.	S3 - Life-threatening or fatal injuries	Driving at high speed and losing control is fatal.	C3 - Difficult to control or uncontrollable	When the driver looses control, the vehicle is very difficult to realize the situation and act properly.	C	The LKA function shall be turned off when the camera sensor stop working.
HA-004	OM03 - Normal Driving	OS04 - Highway	EN06 - Normal Conditions	SD03 - High Speed		IJ01 - Correctly Used	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.	DV02 - Function unexpectedly activated	The camera sensor stop working and the LDW function continue working	EV00 - Collision with other vehicle	The LDW continue working at a random torque to the vehicle making the driver to loose control.	The LDW function starts acting randomly when the camera sensor is not working.	E3 - Medium probability	The camera sensor or its ECU has a medium probability to have some problem in special conditions.	S3 - Life-threatening or fatal injuries	Driving at high speed and losing control is fatal.	C3 - Difficult to control or uncontrollable	When the driver looses control, the vehicle is very difficult to realize the situation and act properly.	C	The LDW function shall be turned off when the camera sensor stop working.