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	OS04 - Highway	EN06 - Rain (slippery road)	SD02 - High speed	Lane Departure	IU01 - Correctly used	Normal Driving on a Highway in Rain (slippery road) at High Speed at Lane Departure.	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).	E3 - Medium probability	Occurs once a month or more often for an average driver	S3 - Life-threatening or fatal injuries	On country roads speed of vehicle is expected to be high.	C3 - Difficult to control or uncontrollable	If the lane departure warning function causes the steering wheel to vibrate excessively with wild swings of the steering wheel, most drivers would have difficulty controlling the vehicle.	C	The oscillating steering torque from the LDW function shall be limited.
HA-002	OM03 - Normal driving	OS03 - Country Road	EN01 - Normal conditions	SD02 - High speed	Ego Lane	IU01 - Correctly used	Normal Driving on a Country Road in Normal Conditions at High Speed at Ego Lane.	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 controls the steering torque with high frequency.	EV00 - Collision with other vehicle	The driver was misusing the function by taking both hands off the wheel and incorrectly treating the car as a fully autonomous vehicle.	The LKA function is always on.	E2 - Low probability	The driver is on a country road and misusing the system. That combination probably does not happen often.	S3 - Life-threatening or fatal injuries	On country roads speed of vehicle is expected to be high.	C3 - Difficult to control or uncontrollable	hands aren't 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	OS01 - Any Road	EN07 - Snow (slippery road)	SD02 - High speed	Lane Departure	IU01 - Correctly used	Normal Driving on a Any Road in Snow at High Speed at Lane Departure.	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV01 - Function not activated	The LDW function does not add vibration torque.	EV00 - Collision with other vehicle	Although the line departed while traveling on the snow road, the driver did not notice the deviation because the torque does not vibrate.	The LDW function deviated from the line, but does not vibrate the torque.	E1 - Very low probability	The majority of drivers will not run on snowy roads where lanes are not visible.	S3 - Life-threatening or fatal injuries	On country roads speed of vehicle is expected to be high.	C2 - Normally controllable	If you look around, there is a possibility that you may notice the LDW function without communicating.	QM	The LDW function shall be able to judge whether the lane departs from the lane other than the lane.
HA-004	OM03 - Normal driving	OS01 - Any Road	EN01 - Normal conditions	SD02 - High speed	Ego Lane	IU01 - Correctly used	Normal Driving on a Any Road in Normal Conditions at High Speed at Ego Lane.	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV02 - Function unexpectedly activated	The LKA function takes extra torque.	EV-05 - Front collision with ahead traffic	The driver tries to overtake the car in front. Because torque is applied, driver can not move to another lane as I want.	The LKA function takes extra torque.	E3 - Medium probability	We assume that the opportunity to overtake a forward vehicle occurs more than once a month.	S3 - Life-threatening or fatal injuries	On country roads speed of vehicle is expected to be high.	C2 - Normally controllable	If the driver reduces the vehicle speed, there is a high possibility of avoiding a frontal collision.	B	When overtaking a vehicle ahead in the driving lane, The LKA function shall not move the torque.