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						E3						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	N06-rain(slippery road)	SD02-high speed		IU01-correctly used system	Normal driving on highway during rain (slippery 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	Actor affect is too much	LDW function applies very high(above average) oscillating torque	Collision with other vehicle	Driver could lost control and collide with other vehicle or road infrastructure	High haptic feedback can affect driver's ability to steer the car as intended. Driver could lost control and collide with other vehicle or road infrastructure	E3	Driving on wet road is quite often so exposure would be E3	S3	Because the driver is driving at high speed, severity would be S3	C3	High oscillating torque would make it difficult to control the car so controllability would be C3	C	The oscillating steering torque from LDW function shall be limited
HA-002	OM03-Normal Driving	OS03-country road	EN01-Normal conditions	SD02-high speed	the driver is misusing the lane keeping assistance function as an autonomous function	IU02-Incorrect Use	Normal driving on a country road during normal conditions with high speedand the driver is misuing the lane keeping assistance function as an autonomous function	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	function always activated	Lane keeping assistance function is always activated	Collison with other vehicle	Driver misuse the lane keeping assistance function as an autonomous function which can cause a collision with other vehicle	Always activated LKA function misausage as an autonomous driving function can reduce the driver's attention. Car could collide with other vehicle.	E2	The driver is on a country road and misusing the system. This combination does not hapen a lot so exposure would be E2	S3	Because the driver is driving at high speed, severity would be S3	C3	Because hands are not on the wheel at high speed, it would be difficult to control the car. Controllability would be C3.	B	The LKA function shall be time limited and the additional steering torque shall end after a given time interval so that driver cannot misuse the system for autonomous driving.
HA-003	OM03-Normal Driving	OS01-Any road	EN09-N/A	SD06-high braking		IU01-correctly used system	Normal driving on any road applying brakes and correctly used system	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	function unexpectedly activated	LKA function is still active though it's not needed.	Vehicle spins and get out of control.	LKA system applies the torque while driver is applying hard brake, which spins the vehicle and driver lose the control.	Driver could lost control and collide with other vehicle or road infrastructure	E3	This situation can happen once a month	S2	Because the driver is applying had brakes vehicle is at low speed but vehicle also spins, severity would be S2	C2	Because of the low speed after hard brakes usually the vehicle is controllable.	A	Lane keeping assistance should be deactivated when driver applies the bakes.
HA-004	OM03-Normal Driving	OS03-country road	EN01-Normal conditions	SD02-high speed		IU01-correctly used system	Normal driving on a country road during normal weather 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	function unexpectedly activated	Camera sensor stopped working but LKA function is still active.	Collision with other vehicle	LKA system stays active and executes random torque on the steering wheel leads to driver loosing control with potential collision with other vehicle.	LKA system continue to work incorrectly when the camera sensor is not working.	E3	Normal driving on a country road during normal weather conditions with high speed happens often so exposure is E3	S3	Because the driver is driving at high speed, severity would be S3	C3	Random(incorrect) torque would make it difficult to control the car so controllability would be C3	C	Lane keeping assistance should be deactivated when camera sensor stops working.