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							
	Operational Mode	Operational Scenario	Environmental Details	Situation Details	Other Details (optional)	Item Usage (function)	Situation Description	Function
HA-001	OM03 - Normal Driving	OS04 - Highway	EN06 - Rain (slippery road)	SD02 - High speed		IU01 - Correctly used	Normal driving on a highway during rain (slippery) 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
HA-002	OM03 - Normal Driving	OS03 - Country Road	EN01 - Normal conditions	SD02 - High speed		IU02 - 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
HA-003	OM03 - Normal Driving	OS04 - Highway	EN03 - Fog (degraded view)	SD02 - High speed		IU01 - 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
HA-004	OM03 - Normal Driving	OS05 - Mountain Pass	EN01 - Normal conditions	SD02 - High speed		IU01 - Correctly used	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 ego lane

Hazard Identification						
Deviation	**Deviation Details**	**Hazardous Event (resulting effect)**	**Event Details**	**Hazardous Event Description**	**Exposure (of situation)**	**Rationale (for exposure)**
DV04 - Actor effect is too much	LDW vibration torque is too strong	EV00 - Collision with other vehicle	High haptic feedback can affect the driver's ability to steer as intended. The driver could lose control of the vehicle and collide with another vehicle or road infrastructure.	The LDW function applies too high an oscillating torque to the steering wheel (above limit)	E3 - Medium probability	Driving on wet highway roads happens relatively often (about once a month)
DV03 - Function always activated	LKA always on	EV00 - Collision with other vehicle	Driver is misusing the lane keeping assistance function as a fully autonomous function and takes both hands off the wheel. The driver could lose control of the vehicle and collide with another vehicle or road infrastructure.	The LKA function is always activated and the driver is improperly using the LKA function as an autonomous feature.	E2 - Low probability	Driving on country roads is infrequent for the majority of drivers
DV19 - Sensor detection is wrong	Lane Assist has incorrect estimate of position in lane	EV00 - Collision with other vehicle	Camera Susbsystem has problems detecting lane lines in fog conditions and the system may incorrectly activate and/or may not know where it is in the lane.	Fog conditions degrade the ability to correctly identify lane lines and the position of the car relative to the lines.	E3 - Medium probability	Driving in degraded visibility conditions occurs about once a month for many drivers
DV04 - Actor effect is too much	LKA too much for curves/windy roads	EV04 - Car comes off the road	On winding mountain roads, or even on sharp curves, a small amount of torque provided by the Lane Assist item may cause the vehicle to leave the road.	Even a small amount of unanticipated torque on windy roads may cause the car to tip over.	E2 - Low probability	Driving on windy mountain roads and/or roads with sharp curves is infrequenct for most drivers

Hazardous Event Classification				Determination of ASIL and Safety Goals	
Severity (of potential harm)	**Rationale (for severity)**	**Controllability (of hazardous event)**	**Rationale (for controllability)**	**ASIL Determination**	**Safety Goal**
S3 - Life-threatening or fatal injuries	Collisions at high speeds could result in life-threatening or fatal injuries	C3 - Difficult to control or uncontrollable	Wild swings of the steering wheel would be hard to control	C	The oscillating steering torque from the LDW function shall be limited.
S3 - Life-threatening or fatal injuries	Collisions at high speeds could result in life-threatening or fatal injuries	C3 - Difficult to control or uncontrollable	If driver has both hands off the wheel, the vehicle would be very hard to control at high speeds	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
S3 - Life-threatening or fatal injuries	Collisions at high speeds could result in life-threatening or fatal injuries	C3 - Difficult to control or uncontrollable	If vehicle is unsure of position in lane and tries to correct, it will be difficult to control it at high speeds.	C	The lane assist function shall be disabled in degraded visibility conditions.
S3 - Life-threatening or fatal injuries	Car leaving the road could result in life-threatening or fatal injuries	C3 - Difficult to control or uncontrollable	On a sharp curve, vehicle would be very hard to control.	B	The lane assist function shall be disabled on sharp bends in the road.