INSTRUCTIONS:
Fill out the hazard analysis and risk assessmer
HA-001 should be for the lane departure warnir
HA-002 should be for the lane keeping assistar
Then come up with your own situations and ha
When finished, export your spreadsheet as a p

Hazard ID	
	Operational Mode
HA-001	OM03 - Normal Driving
HA-002	OM03 - Normal Driving
HA-003	OM03 - Normal Driving
HA-004	OM03 - Normal Driving

ıt below.
ıg function as discussed in the lecture.
ıce function as discussed in the lecture.
ızards for the lane assistance system. Fill in the HA-003 and HA-004 rows.
df file so that a reviewer can easily see your work.

Operational Scenario	Environmental Details	Situation Details
OS04 - Highway	EN06 - Rain (slippery road)	SD02 - High speed
OS03 - Country Road	EN01 - Normal conditions	SD02 - High speed
OS04 - Highway	EN03 - Fog(Degraded View)	SD02 - High speed
OS03 - Country Road	EN08 - Glace(Slippery road)	SD02 - High speed

Situational Analysis

Other Details (optional)	Item Usage (function)
-	IU01 - Correctly used
The system is being used as an autonomous system instead of assistance	IU02 - Incorrectly used
	IU01 - Correctly used
	IU01 - Correctly used

Situation Description
Normal Driving on a highway during rain (slippery road) with high speed and correctly used system.
Normal driving on country roads during normal conditions with high speed (the driver is misusing the lane keeping assistance function as an autonomous function)
Normal driving on a highway during normal conditions with high speed and correctly used system.
Normal driving on a country road during normal conditions with high speed and correctly used system.

Function
Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback
Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane
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Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane

Deviation
DV04 - Actor effect is too much
DV03 - Function always activated
DV09 - Actor action after
DV16 - Sensor detection before

Deviation Details
The LDW function applies an oscillating torque with very high torque (above limit).
The LKA function applies the steering torque is always active
The Lane Departure Warning function applies very late due to the fog
The camera ECU detects lane lines befor they are actually encountered

Hazard Identification

Hazardous Event (resulting effect)
EV00 - Collision with other vehicle
EV00 - Collision with other vehicle
EV00 - Collition with other vehicle.
EV00 - Collition with other vehicle.

Event Details
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 driver misusing the lane keeping assistance function as an autonomous function could collide with another vehicle or with road infrastructure
The Lane Departure Warning didn't work as intended to work due to sequence error
The Lane Keeping Assistance camera ECU detected lines before actual lines

Hazardous Event Description
The LDW function applies too high an oscillating torque to the steering wheel (above limit).
The LKA function applies the steering torque is always active, allow driver to misuse the functionality
The LDW didn’t warn in time giving less time to react to accident
The sequence in which lane lines are dectected is incorrect leading to unpredictable behaviour

Exposure (of situation)	Rationale (for exposure)
E3 - Medium probability	Driving on rainy road is not very common
E2 - Low probability	Such misuse is relatively rare
E2 - Low probability	Foggy weather is not common
E3 - Very Low probability	Glaced roads are only found in extremely cold weather

Hazardous Event Classificat

Severity (of potential harm)	Rationale (for severity)
S3 - Life-threatening or fatal injuries	As the speed of the vehicle is high so is the severity
S3 - Life-threatening or fatal injuries	As the speed of the vehicle is high
S3 - Life-threatening or fatal injuries	Collitions at high speed could cause fatal injuries.
S3 - Life-threatening or fatal injuries	Collitions at high speed are often fatal

ion
Controllability (of hazardous event)
C3 - Difficult to control or uncontrollable
C3 - Difficult to control or uncontrollable
C3 - Difficult to control or uncontrollable
C3 - Difficult to control or uncontrollable

Rationale (for controllability)
As the lane departure warning system, might cause the steering wheel to vibrate excessively with wild swing of steering wheel most drivers would have difficulty controlling the vehicle
Since the driver is not paying proper attention it will be hard to control
Foggy weather makes it hard to control
Glaced roads are infamous for being hard to drive on

ASILD
C
B
B
A

Determination of ASIL and Safety Goals
Safety Goal
The oscillating steering torque from the lane departure warning function shall be limited
The driver must pay attention while driving. Internal cameras should be installed to monitor driver activity and alert when not paying attention
Latency in dectection should be monitored and a warning displayed to the driver
A redudant system should be placed to cross check the dectedted lanes