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	Day time + Distraction	IU01 - Correctly used	Normal Driving on Highway during Rain (slippery road) with High speed (Day time + Distraction) 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)	E3 - Medium probability	The situation involved driving on wet roads and according to functional safety standard driving on wet roads is E3	S3 - Life-threatening or fatal injuries	Because the driver is traveling at high speed, severity would be S3.	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 roads	EN01 - Normal conditions	SD02 - High speed	Day time + Over speed limit	IU01 - Correctly used	Normal driving on country roads 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	DV03 - Function always activated	The lane keeping assistance function is always activated	EV00 - Collision with other vehicle.	There is potential for a vehicle collision	The lane keeping assistance function should add extra steering torque for a limited amount of time and then stop providing extra torque.	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	Because the driver is traveling at high speed, severity would be S3.	C3 - Difficult to control or uncontrollable	The mafunction was that the lane keeping assistance was always on and had no time limit, so drivers could take both hands off the wheel. Because hands aren't on the wheel at high speeds, a vehicle accident would not be controllable.	B	The lane keeping assistance 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	EN03 - Fog (degraded view)	SD02 - High speed	Day time + Distraction	IU01 - Correctly used	Normal Driving on Highway during Normal conditions with High speed (Day time + Distraction)	Lane Departure Warning (LDW) function shall apply an oscillating steering torque to provide the driver with haptic feedback	DV19 - Sensor detection is wrong	Line detection stop working	EV06 - Front collision with oncoming traffic	Vehicle crosses the center line and crashes into oncoming traffic	Loss of the oscillating torque to lane departure warning function	E3 - Medium probability	In a right curve lane, fog prevents line detection from working and vehicle crashes into oncoming traffic	S3 - Life-threatening or fatal injuries	On highway speed of vehicle is expected to be high and vehicle collides front	C3 - Difficult to control or uncontrollable	Reaction time will be very short	C	The oscillating torque to lane departure warning function will be limited
HA-004	OM03 - Normal driving	OS04 - Highway	EN01 - Normal conditions	SD02 - High speed	Day time + Over speed limit	IU01 - Correctly used	Normal Driving on Highway during Normal conditions with High speed (Day time + Over speed limit)	Lane Keeping Assistance (LKA) function shall apply the steering torque when active in order to stay in ego lane	DV015 - Sensor detection too late	Sensor stop working correctly	EV02 - Side collision with other traffic	Vehicle crashes into other traffic	Total loss of lane keeping assistance	E1 - Very low probability	Dust prevents sensors from working properly	S1 - Light and moderate injuries	Other traffic aware of detailling and avoid collison	C0 - Controllable in general	Driver normally is able to take over the control easily	QM	Total loss of lane keeping assistance shall be prevented