**Study Guide Quiz 3**

**Traffic Data**

* Know, in general, how traffic volume can vary in time and space and the factors contributing to this variation
* Understand how temporal and spatial variations in traffic volume affect the design
* Know how non-design approaches can help to deal with the inefficiencies caused by temporal variations
* Know what directional distribution is; what factors contribute to it and how it affects design
* Understand the relationship between land use type and directional distribution
* Understand, in general, how traffic is counted and by whom

**Street Capacity**

* Know the definition of AADT
* Know the basics of how the state collects data to calculate AADT
* Know why AADT is not sufficient information on which to base design decisions
* Know how a design hour is selected and the trade-off involved in choosing a design hour
* Understand how to interpret and use the AASHTO (or similar) chart for estimating design hour volume from the AADT
* Understand the concept of Level of Service and its relationship to capacity or DHSV
* Know the trade-off involved with using different LOS
* Know how to calculate the amount of lanes for a road based on DHSV and DHV
* Understand the problems associated with 'predict and provide' planning and how ‘predict and provide’ is related to estimating DHV

**Alignment Design**

**Horizontal Alignment**

* What are the elements of the horizontal alignment?

Circular Curve

* Know how to sketch a circular curve and to label the key locations.
* Know the definition of degree of curvature (D).
* Know the difference between degree of curvature and external angle (DELTA).
* Know how to derive the relationship between R and D.
* Know how to derive the relationship between L and R.

Spiral Curve

* What is the purpose of the spiral curve?
* What are the basic properties of the spiral curve?
* Know the definition of the 'k' value for the spiral curve.
* Know the relationship between the lengths (and the central angle) of the spiral and circular legs in a spiral/circular composite curve.
* Know how to use the equations for calculating length of curves and DELTAS

**Vertical Alignment**

Parabolic Curve

* Know how to sketch a parabolic curve and to label the key locations.
* Know the difference between sag and crest curve.
* Know the definition for the rate of change of curvature parameter (K).
* Know how to calculate A.
* Know the definition of the rate of change of grade (r).
* Know how to determine the grade at each point on a vertical curve.
* Know how to determine station and elevation of the turning point.
* Know how to determine elevation at all locations on a vertical curve.

**Designing 3-D Alignments**

# Know how to produce and interpret a 1/R Plot.

* Know the definition of a continuous alignment
* Know and understand the 5 guidelines for producing a continuous 3-D alignment.
* Know how the 1/R Plot can be used to assess these 5 guidelines for producing a continuous 3-D alignment.

# Urban Street Design

# Understand the changes in the philosophy of street design in terms of the priority given to different types of road users

# Know in general terms the relative amount of space occupied by different modes of travel for moving 50 people

* Know and understand the 3 essential elements for the design of urban street design
* Understand what a connected street network looks like
* Understand why walkers and bikers are considered vulnerable street users in America (but perhaps not so much in the Netherlands)
* Know the main factors that are important in designing for vulnerable road users
* Know the main features of the street, building and site design that help to create a sense of place
* Know the specific feature that helps to create a sense of an outdoor room on an urban street
* Know roughly the dimensions of the elements of the cross-section of a street including the travel lane, the parking and a bike lanes
* Know the four typical sections of the sidewalk zone

# Equations Given on Quiz

### Circular Curves

## R = 5730/D

L = (R /57.3

### Spiral Curves

### k = 100 D/ Ls

### Δs = Ls D / 200

Δ = Δc + 2 Δs

### Parabolic Curves

y = yo + g1 x + r x2/2

r = (g2 - g1 )/L

xt = - g1 / r

K = L / | G2 - G1 |