Be able to calculate:

- the critical shear stress given particle characteristics and using the Shields diagram
- the entrainment rate, given flow and particle characteristics
- the bedload transport rate in coarse-grained system using Parker et al. (1982)
- the concentration profile using a Rousean approximation
- the total load from Bagnold's stream power relation
- the total transport of sediment using a sediment rating curve
- the sediment concentration at an equilibrium bed given particle and flow characteristics (i.e., same as the entrainment rate)

Be able to identify the following model equations and know the bounds of their use:

- Garcia-Parker (1989) entrainment formula
- Smith et al. (1977) entrainment formula
- Parker et al. (1982) bedload formula
- Meyer-Peter-Mueller bedload formula
- Bagnold's stream power equation
- Sediment rating curve
- Bingham-fluid equation (for debris flows)

Be able to define and describe the environment where these features/processes are commonly found:

Antidunes
Dunes
Ripples
Exchange layer
Barchan dunes
Point bar
Riffle
Pool
Cut bank
Kinetic sieving
Turbidite
Avulsion
Overbank
Hiding
Selective transport
Capacity-limited streams
Supply-limited streams
Superelevation

Describe the origin of:

An exchange layer in a coarse-grained bed
Meandering in a channel
Inverse grading in debris flow deposits
Normal grading in turbidites
Hydroplaning debris flows
Liquefaction

Be able to describe where the following parameters are used:

Yield strength
Critical shear stress
Shields stress
Entrainment rate
Granular temperature
Friction number
Savage number
Bagnold number
Darcy number
Stream power