CE 717 RIVER MECHANICS
Pierre Y. Julien –*Spring 2022*

Homework #1 – Chapters 1-4 due February 24

Problem #1 (30%) *Resistance to Flow*

a) Combine equations 3.5-3.7 for overland flow to develop the relationship between n and k in Eq. 3.13.
b) What would be the n value for a grassed surface with k = 50,000 on a 5% hill slope 300 ft long under a 1 inch per hour rainfall intensity.

Problem #2 (70%) *Flow-duration/sediment-rating curves (SI Units)*

Access the USGS web site from your home state and select a station with at least 20 years of discharge and sediment data. Determine the following:

(a) Superpose the hydrographs for each year for your period of record
(b) Plot the sediment rating curve in metric tons/day vs Q cms and define $Qs = AQ^B$
(c) Plot the flow duration curve in terms of log Q - log exceedance probability (like Fig. 4.6)
(d) Plot the same flow duration curve like Fig. 4.7a) and evaluate $\hat{a}$ and $\hat{b}$
(e) Plot a flood frequency curve based on the same data and fit the Gumbel and LPIII distributions
(f) Compare the 5 year discharge from both methods
(g) What is the ratio of the 10 year flood to the 2 year flood from both methods?

Discuss the results!
