CME 451 Assignment 2 (Due: Feb 6, 2017)

Solution Sketch

Note: in the following you will find not full solutions, but instead sufficient hints towards the full solutions. When appropriate, pointers to appropriate lecture slides are provided in parentheses. When in doubt, feel free to contact the teaching assistant or the instructor for further help on your assignments.

0. Read chapters 3 and 4 in the textbook.
1. (**C02 – Slide 8, C03 – Slide 6**) Justify approximate range of 1280 – 1650 nm.
2. Assume range from previous question, and proceed using freq = c/wavelength to find the corresponding frequency range. Find spectral efficiency based on this range (recall analogy of car lane size and desired car speed: for a given car lane size, is it more efficient to achieve higher or lower vehicle speed?).
3. (**C03 – Slide 4**) ITU type channel spacing scheme allocation. Should solve corresponding quadratic equation. Basically, find wavelength *x* where:
   - $\left(\frac{c}{x} - \frac{c}{x+0.8nm}\right) = 110\ GHz$
4. (**C03 – Slide 18 and lecture example**) Do calculations based purely on fiber loss first; then take dispersion into account. Revise the distance if necessary, so that the resulting dispersion is reduced.
5. (**C03 – Slide 17, C04 – Slides 2, 21**) Discuss physically separated cables, and OAM&P methods.
6. (**C04 – Slide 11**) STS-1 frame format: Figure 4.8.
7. (**C04 – Slide 8)** Discuss synchronization network and OAM&P network.
8. (**C04 – Slide 14**) Contrast channelization vs. concatenation.
9. (**C04 – Slide 4**) No need to memorize the actual values of bandwidth rates; it is sufficient to do relative computations.
10. (**C04 – Slides 11 and 24**) Discuss the lower overhead with SDH, and implications on equipment specifications / cost.
11. **(C04 – Slide 29)** Describe jitter and wander.