Design procedure for steel beam (Week 7-8)

- The general procedure for checking the lateral torsional buckling resistance according to BS 5950 part 1. are:

1. If the member or part being checked carries no loads between adjacent lateral restraints the equivalent uniform moment factor ***m*** is evaluated.
2. Calculate the equivalent uniform moment so that $M = \boldsymbol{m}M_A$, M_A is maximum moment in the beam considered.
3. Estimate the effective length L_E of the unrestrained compression flange. Minor axis slenderness $\lambda = L_E/r_y$
4. Calculate the equivalent slenderness: $\lambda LT = uv\lambda$.
5. Read the bending strength Pb from Table 11 in the code.
6. Calculate the buckling resistance moment: Mb = SxPb. For safe design, Mb>M
7. Check for local capacity at point of maximum combined moment. So that Mx/Mcx + My/Mcy <1.
8. Overall buckling check at the centre of the beam: so that, mMx/Mb + mMy/PyZy <1.
9. Check for deflection of beam.

Design procedure for steel beam (Plastic theory) (Week 9)

- Calculate factored and unfactored load
- Check for design strength of section: Py = 275N/mm^2 for grade 43 steel, 355N/mm^2 for grade 50 steel and 450N/mm^2 for grade 55 steel.
- Check for plastic modulus: S=M/Py
- The moment capacity is : PyS<1.2PyZ
- Check for deflection due to unfactored imposed load.
- Check the effect of shear at the support.

Design of compression members (Column) (Week 11-12)

- Consider the loads on the column, both vertical and lateral loads and chose a suitable section
- Chose a steel grade to determine it design strength. Py
- Check the plastic and elastic modulus in other to determine the section classification.
- Determine slenderness ratio, λ and compressive strength, Pc.
- Check local capacity
- Check overall buckling
- Determine Pb from table 11 of code
- Determine the equivalent uniform moment on both axis
- Determine the buckling resistance Mb.