This is your last reading assignment! Read the lecture notes written by Mike Hill posted on CCLE and named Hill - Tensor Products. Don't worry too much about the details, try to get the big ideas.

Also read the first 6 pages (that is, read Section A.1) of the pdf posted on CCLE as Appendix A Multilinear Algebra. This is Appendix A of Geometric Continuum Mechanics and Induced Beam Theories by Eugster.

For the Hill notes, it may be helpful to know that the free vector space on a set X denoted $\mathbb{F}\{X\}$, is the vector space over $\mathbb{F}$ with basis set X.

1. From the Hill notes, what is the defining property of the free vector space on a set X? How does this agree with the definition given above?

2. From the Hill notes, if U and V are finite-dimensional vector spaces over the same field. What is the dimension of $U \otimes V$?

   Appendix A discusses the tensor product of multilinear maps, rather than the tensor product of vector spaces. Be sure to read footnote 1 about the distinction.

3. From Appendix A, what is the difference between a covariant tensor and a contravariant tensor?

4. From Appendix A, what is the rank of a tensor?