**MIP 280A4: Microbial Sequence Analysis**

**Molecular Biology Review, In-class exercise questions**

*Due 8/30/2022 at 11:59 PM*

1. Write the reverse complement of the following sequences in 5′ to 3′ orientation. (1 pt each)
   1. 5′ CAAAGGT 3′
   2. 5′ GGGCCCAAATTT 3′
2. Download the sequence of the *Escherichia coli* pOSAK1 plasmid sequence (NC\_002127) in Geneious and answer these questions (1 pt each).
   1. How long (in base pairs) is this plasmid?
   2. What is the topology of this molecule?
3. Extract the coding sequence of the mobA gene to create a new nucleotide sequence in Geneious. Answer the following questions (1 pt each).
   1. How long in base pairs is the mobA gene (the mobA coding sequence)?
   2. What are the first 3 bases of the mobA gene?
   3. What are the last 3 bases of the mobA gene?
4. Extract the coding sequence of the largest gene (beginning at position 2388) *in its coding orientation* to create a new nucleotide sequence in Geneious. Answer the following questions (1 pt each).
   1. How long (in base pairs) is this coding sequence?
   2. What are the first 3 bases of this gene?
   3. What are the last 3 bases of this gene?
5. Translate the mobA coding sequence to create a new protein sequence in Geneious. Answer the following questions (1 pt each).
   1. How long (in amino acids) is the mobA protein?
   2. What is the predicted molecular weight of this protein in kDa? [hint: see the statistics tab in Geneious (% tab)].
   3. How many leucines are in this protein sequence?