Introduction to knot theory, Spring 2013
Homework 4, due Thursday, February 21

Read sections 10.1-10.3 of Dummit and Foote.

1. Let $M_1, M_2$ be submodules of an $R$-module $M$. Show that $M_1 + M_2$ and $M_1 \cap M_2$ are submodules of $M$. Give an example of $R, M, M_1, M_2$ such that $M_1 \cap M_2 = 0$ and $M_1 + M_2 = M$.

Exercises 4, 10, 14, 18 from Section 10.1 (pages 343-344).

Exercise 3 from Section 10.2 (page 350).

Extra credit:
I. Exercise 2 from Section 10.3 (page 356)

II. Give an example of a ring $R$, module $M$ and its submodule $N$ such that $M/N$ and $N$ are isomorphic irreducible $R$-modules.