ENSC 201 Assignment 3

3.1

A company is about to choose from the following two alternatives, which option do you recommend? Both alternatives will offer the same service over their lifetimes. When they come to the end of their service lives, they have no salvage value and will be replaced by another machine of the same type.

MARR is 9%.

Alternative I Build necessary equipment:		
First cost	$15, 000	
Labour	$ 3, 300	per year
Maintenance	$ 2,400	per year
Power	$ 400	per year
Taxes and insurance	$ 300	per year
Service life		10 years

Alternative II Buy necessary equipment:		
First cost	$25, 000	
Labour	$ 1, 450	per year
Maintenance	$ 3,075	per year
Power	$ 600	per year
Taxes and insurance	$ 500	per year
Service life		15 years

3.2

You have a small company that has grown by 20% every year for the last three years. You sell that company for $800 000 in order to start a new company. You borrow $400 000 at 15% interest, and sell $500 000 worth of stock in the new company, to members of the public who were impressed by the performance of your last company. What is the weighted cost of capital to the new company, and what should the pre-tax MARR be?

3.3

A company expects a new machine to save $20 000 per year for four years, after which it will have a salvage value of $4 000. 70% of the firm's capital is represented by common stock that sells for $30/share, pays annual dividends of $3, but has not increased in selling price over the last four years. The other 30% of its capital comes from long-term debt on which the annual interest rate averages 10%. How much can the company pay for the new machine if the investment is to earn twice the cost of capital?

3.4

Engineering department at SFU is considering the feasibility of several possible projects for Fall 2013. In increasing order of first cost these proposed projects are as following:

1. Hire a sophisticated lab-leader who is specialized and highly experienced in micro/ Nano design systems to work in the existing Clean Room (the Clean Room is one of the Engineering labs located on 8000 level, this lab provides a super-clean work space for fabrication of different micro devices) This will cost $120 000 a year, but is expected to increase enrolments to the School of Engineering by 100 undergraduate students per year for the next 10 years – that is, the University expects total enrolment to go up by 100 students in the first year, 200 in the second year, and so on. Each additional student increases the University's profits by $500.
2. Convert the Underwater lab (The Underwater lab is another lab in the Engineering School, also located on 8000 level, where researchers design and test under-water devices such as submarines) to a sophisticated IC design lab where the final product is expected to release to the US market. This will require an initial investment of $400 000, but will save $100 000 a year on salaries of previous researchers in the Underwater lab. This saving will start to be realised after the first year, since the incumbent Underwater researchers must be given a year's notice. The IC design business is expected to bring in $50 000 in profit every year. More importantly the enrolment will not be significantly affected.
3. Convert the existing Clean Room to a sophisticated IC design lab, in this case previous researchers in Clean Room could be able to maintain their job with minor adjustment to new work space. This project has an initial cost of $450 000, but, as mentioned in option number 2, the IC design business is expected to bring in $50 000 in profit every year, and with the assistance of previous Clean Room users who are familiar with IC design, an additional $10 000 profit will be added to the annual profit. (So the total annual profit will now be $60,000).
4. Lease the Clean Room facilities to UBC Electrical and Mechanical departments. This proposed project will yield an immediate income of $350 000, but the SFU Engineering School will have to agree to pay the repair and maintenance of Clean room facilities after 10 years without UBC financial support, at a cost of $200 000(Some of the Clean Room facilities are super-sensitive and after 10 years will needed to be completely replaced). If this lease is signed, SFU enrolment will drop by 10%, which will lose the University $50 000 a year for the next ten years.

SFU can borrow or invest money at 10%.

Which combinations of projects are feasible? For example, there's no point in hiring someone to work in the Clean Room if we've lost the use of the Clean Room. Which projects or combinations of projects would it be profitable to undertake? (For the purposes of this question, we're just considering financial desirability, not the effects on education.)