

Capstone Global Design Collaboration : The NUS Experience



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Overview of NUS Capstone Program

Many universities in the world have started to incorporate the capstone design program into their curriculums so that their undergraduates have the opportunity to apply what they have learned into real-life design problems. NUS Mechanical Engineering (ME) capstone program was started in August 2005. These capstone projects are done by junior year students, instead of senior year students. This program spread over two semesters course duration; Semester 1 starts in August and Semester 2 starts in January. Most of the capstone projects were done by purely ME students, but students from the Industrial Design (ID), under the School of Design and Environment (SDE) have also joined forces with the team of ME students to work on several projects from consumer product companies, on several occasions. Since 2009, NUS ME has started to partner with 2 USA and 1 China universities.

NUS Academic Year

NUS academic year consists of two semesters. Each semester includes 13 weeks of instruction and 2 weeks of examinations.

Semester 1 starts from 6 Aug 2012 to 8 Dec 2012. Semester 2 starts from 14 Jan 2013 to 11 May 2013.

All projects have to come to a stop in early Nov and early April as the students need to start preparing for their coming exams.

Partnering Universities

- From 2009 til present : With Peking University (PKU)
- From 2010 til present : With Penn State University (PSU)
- From 2010 til present : With Brigham Young University (BYU)
- In 2011 : Tri-parties collaboration between NUS, BYU and PSU was initiated.



Format of NUS ME Capstone

- Semester 1 focus on conceptual design only; a presentation and detailed report has to be completed by week 13 (early Nov).
- Semester 2 translate the conceptual design in Semester 1 into a prototype; a presentation and detailed report has to be completed by week 13 (early April).
- Each group consist of four to six ME students, depending on the scope of the project and request of the companies.
- Students were asked to form a group on their own.
- Each group can only opt for only 1 project from the given list.
- Competition via presentation and interview to the company is needed should there be more than 1 group wanting the same project.
- Company will decide who group to be given the project.
- Project will only start officially in late August or early September.
- Option to continue to the capstone project as Final Year Project (FYP) in the senior year.

Challenges Encountered

1. Selling the Idea to Singapore based Companies
2. Different Sponsorship Amount Received
3. Time Zone Difference
4. Difference in Academic Calendar
5. Effective Communication Mode
6. Difference in the University Syllabus
7. Division of Tasks Among Universities

Solutions to Some of the Challenges

- Company that has offices in both countries and each office is willing to provide support, will be ideal.
- Sponsoring company willing to pay both universities.
- Partnering university selects their students to work and communicate with NUS students earlier
- High resolution camera and noise cancelation microphone

Benefits Gained

- Opportunities for students to learn how to interact and work with future overseas colleagues, such as in China and USA.
- Foretaste of the real-life international collaboration experience on design before they graduate.
- Understanding that culture difference has great impact on design concepts.

Awards Achieved by Some Capstone Projects

- 1 of the solution develop by a group of students in 2011, is in the mist of undergoing provincial patent process.
- 3rd position in 3rd International Convention on Rehabilitation Engineering & Assistive Technology 2009.
- 3rd prize in 2009 ASME Student Mechanism and Robot Design Competition
- 2nd place in 2010 Shell Inter-Varsity Student Paper Presentation Contest in UTM, Malaysia
- Silver Award in 2010 from Association of Singapore Marine Industries (ASMI) Workplace Safety and Health Innovation (WSHI)