Symposium on Engaging Undergraduates in Research And Inquiry:

A scholarly Dialogue, May 20, 2011, HKUST

1. Project/Course title

PHYS 191/291/391: Directed Studies in Physics I/II/III

PHYS 398: Independent Study Project

2. Project/Course team

Name	Institute	Post	Department/ Division	E-mail
Course Coordinator: *PHYS 191/291/391:* Prof Kam Sing WONG *PHYS 398:* Prof Zhaoqing ZHANG	HKUST	Professor	Physics	phkswong
Members in Spring 2011: *PHYS 191/291/391:* Prof Kwok Kwong FUNG Prof Kwok Yip SZETO Prof Rolf Walter LORTZ Prof Michael WONG *PHYS 398:* Prof Kwok Yip SZETO Prof Michael WONG Prof Tian Wen CHEN Prof Kwok Kwong FUNG Prof Tai Kai NG Prof Rolf Walter LORTZ Prof Chi Wai LAI	HKUST	Professor	Physics	 phkkfung phszeto lortz phkywong twchen phtai cwlai

BEFORE

3. Project/Course objectives (Intended Learning Outcomes) *(Suggested number of words 30-40 words)*

What did you intend students to learn from this project/course?

The courses cover special topics selected by the instructor/supervisor on the basis of individual student request. The student can request any physics faculty members to be the instructor/supervisor for this course if he/she so agrees. There is a course coordinator to overlook and coordinate the various logistics of this course. The topics can be a research project or review topic which is not normally covered in undergraduate courses. Respectively, PHYS 191/291/398 are normally intended for first, second, third, and third year students. The instructor's approval is required for taking this course. Prerequisites: CGA at grade B- or above

At the conclusion of the courses, students should be able to:

1. Acquire new skills (either experimental, computational or analytical) to learn and investigate non-text book problems at undergraduate level for the case of research projects.
2. Work semi-independently with limited advice by the instructor/supervisor, and be able to gather and analyze information relevant to the studied topic by themselves for the case of review topics.
3. Write brief reports and give short oral presentations.

We expect that the students participating in the project courses will have their undergraduate education greatly enhanced beyond the normal curriculum. They will be exposed to independent learning at a stage appropriate to their intellectual development, without having their academic interest and curiosity being stifled by the mass curriculum. They will have an opportunity to strengthen their skills in searching, discovering, integrating and organizing knowledge. Through working in groups, in which they start as members, and later as assistants to their juniors, they will strengthen their collaborative skills. Presentations will improve their communications skills.

DURING

4. Inquiry Based Learning Activities (*Suggested number of words: 75-85 words)*

What did students do (inquiry-based learning activities) during the course/project?

- Students investigated some chosen non-text book problems.
- They had to write up clear reports at the end and give short oral presentations to demonstrate their learning.

The learning activities varied among different research groups. Typically, students would join a research group and attend regular research group meetings, where they met with the professor(s), postdocs, PhD students, MPhil students, and UG students of different years. In the group meetings, students had chances to learn about the research work of other group members, and to explain the progress of their own research.

At the first stage, students had to read the relevant literature to acquire background knowledge. At the next stage, students performed experimental, computational or analytical work on the problem. The progress was presented in the regular group meetings, where other group members could make suggestions on how to solve certain research problems or how to proceed .

AFTER (*Suggested number of words for items 5 & 6: 50-60 words)*

5. How did you assess the effectiveness of students' learning?

Please give an account of the assessment methods and results.

1) A clear written report on the studied topic was expected. A 15-minute presentation of the studied or research topic was also required. Overall course grade was determined in part, by criteria such as the clarity and organization of the report and presentation, the ability to summarize concisely the key findings/results of the research finding or studied topic, and the performance and attitude of the student throughout the project duration. The course coordinator collected the initial grades from the project supervisors, and finalized the grades after moderation.

6. What were the major outcomes of this project/course? Do they match with your Intended Learning Outcomes (objectives)?

Examples of outcomes include educational software, improvement in student learning or change in student attitude.

A considerable number of students became interested in research and decided to pursue postgraduate studies in Hong Kong and overseas, some even entered renowned universities in the world.
The best-performing students are given the Paul and May Chu Research Award each year.
Several students with excellent research results attended the Canadian Undergraduate Research Conference in Canada.
Some research results of the students were presented in journal papers.