A BRIEF HISTORY OF CURRICULUM AT HARVEY MUDD COLLEGE

FROM 1957 TO THE MID-SIXTIES

The first two years were a rigid core curriculum involving two years of mathematics, two years of chemistry, two years of physics, two years of primarily literature and history. Engineering was introduced for the very first few years as an engineering drawing course taught at Pomona College. Chemistry curriculum in the second year was a full year of physical chemistry accompanied by a full year laboratory. Physics first year was a fairly traditional mechanics, heat, sound, and history of science, accompanied by a laboratory. Physics second year covered fairly traditional E&M topics accompanied by a laboratory. In those early days E&M was not a tour through Maxwell’s equations. Mathematics first year was effectively single variable calculus and analytical geometry. Second year was multivariable calculus with some differential equations. Humanities the first year was English featuring anthologies of Western literature with a strong critical writing component. Second year literature continued and a Western civilization history course was added. it was not until the junior year that students could select majors - chemistry, physics, engineering, mathematics. There was no IPS provision at that time. Chemistry from the beginning had a senior research requirement that first only required a report but now requires a research thesis. An engineering design project was required by engineering and physics strongly recommended a research experience.

MID-SIXTIES

Somewhere in the mid-sixties the chemistry requirement was reduced to three semesters where the third semester was physical chemistry with laboratory. Physics changed their offering in the first semester of the sophomore year to focus on electricity and magnetism featuring Maxwell’s equations and in the second semester to focus on modern physics. A laboratory was required to go along with the fall course. Physics 52, modern physics, was not required. Early, the engineering drawing course was replaced by a freshman project which was team work trying to address solutions to a posed problem. Project Noah was quite the rage for a while. Instructors for projects were drawn from the faculty as a whole, not just engineering faculty. In fact, few engineering faculty actually taught in that project (there were few engineering faculty then). This project concept was the genesis for the engineering clinic. Little remembered is E90 which was a engineering requirement of 2 weeks before the start of the junior year focusing on engineering drawing and shop practice. This course was the precursor to the modern E54. Systems engineering E53 as the core engineering course was introduced in 1964. Also in this time period required but no credit courses on computing were introduced. Toward the end of the sixties a new grading scheme called the SX system was introduced, S=satisfactory and X=not satisfactory. Courses graded X only needed to be made up by completing the deficiency that led to the X grade and not the entire course.

EARLY SEVENTIES

Probably the most wide-ranging experiments in curriculum change were introduced in 1970 with the Quest for Commonwealth, Natural Philosophy, and the introduction of the Freshman Division. Quest was a six unit per semester two semester long course that was intensive in writing and reading selected books primarily from Western civilization but some from other cultures. Some faculty not in the humanities and social sciences department participated in teaching Quest. Natural Philosophy was a blending of topics in physics and chemistry. Structurally physics and
chemistry alternated teaching topics. Physicists and chemists taught recitations in these areas, and in some cases gave lectures in the other discipline. Mathematics still maintained the four-semester program, but there was an attempt at a quick introduction to the differential calculus with the goal of helping physics and chemistry use differential calculus early in the fall semester. This one-month calculus course was taught by many faculty. Along with the introduction of the Freshman Year and Division, chemistry introduced the integrated junior-year-long laboratory that combined 4 separate laboratories into 2. The program is still in place. In addition half-semester courses were introduced in the senior year to provide greater variety and flexibility in advanced physical chemistry and organic chemistry course offerings. In 1974 the third semester of physical chemistry as a college graduation requirement became a third semester of chemistry which could be physical chemistry, organic chemistry, or chemical analysis. Since, however, the engineers, the physicists, and the chemists required physical chemistry, only the mathematics and the IPS majors had an option.

Grading practice in the Freshman Division went from the SX system to the high pass/pass/no credit system that remained unchanged until 1990. The sophomore year remained little changed from prior to Quest and NP. The early seventies was really the time of development of engineering clinic as the capstone engineering experience. Moreover, by 1973 the Mathematics Clinic was in operation. Quest and NP held sway for about four years and were dropped. The reasons for their demise are several and probably shouldn’t be discussed here, but could be brought up. Basically it was a difficulty in maintaining the intensity on the part of the faculty for these very time demanding courses in a time when expectations as to research for junior faculty were increasing. Also the demands for faculty to teach another discipline from their primary discipline, and at least in natural philosophy led to dissatisfaction. The lack of apparent continuity of the physics and chemistry material also contributed to the demise.

The assessment of students in natural philosophy at the end of the year was interesting in that all students underwent an oral examination. The examiners were generally three faculty members, drawn from mathematics, physics, chemistry, or engineering.

In the early 70’s the graduation requirement necessitating the completion of a set number and type of courses was replaced by a 128 unit credit requirement along with prescribed courses in the core, the major, and hum/soc. The establishment of the graduate program in mathematics at CGS provided opportunities for advanced work in mathematics throughout all of the math departments. Many students took required math courses off-campus. A retreat at Lake Arrowhead focused faculty attention on self-paced and computer-aided instruction. A result of the retreat was the development of self-paced course offerings for P51 and E53 that have been dropped.

**MID-SEVENTIES**

With the demise of Quest and Natural Philosophy, science reverted to three-quarters of the year of chemistry with a 3/4 year laboratory, a year of physics including a unit of relativity and a 3/4 year laboratory. Humanities and social sciences returned to more traditional offerings. Here humanities and social sciences introduced the 5 course on-campus and 5 course distribution requirement for graduation. For a few years the first days of the spring semester in the freshman program were dedicated to exploring various topics intensely but briefly. The program was patterned after similar offerings of other institutions but much shorter in duration. Short courses were offered in science and technology as well as hum/soc.
LATE SEVENTIES
In the late seventies biology courses were added to the curriculum, and an increasing number of
computer science courses were added to the curriculum. The IPS major which had been intro-
duced in the late sixties drew a reasonable number of students. Engineering clinic became a major
force in the engineering department. Research in physics became much more dominant, impor-
tant, and required.

EARLY EIGHTIES
Rhetoric and the writing center concept were introduced in this time period. Linear algebra M73
and differential equations M82 as fall and spring sophomore math courses were introduced.

MID-EIGHTIES
Engineering added E96 electrical engineering and dropped a 6th semester of mathematics as re-
quirements. Here the next major curriculum changes came with re-looking at the freshman and
the sophomore courses to provide more flexibility for the students in common core. Chemistry
was reduced to one required year but with one full year of laboratory. Physics was reduced two
units to a smaller number of lectures in the freshman year and maintained the same amount of
laboratory. A smorgasbord pick of three courses from a menu of seven where no department
could choose or require of its majors more than one of the three choices in the menu of seven was
introduced. To accommodate the core changes, engineering introduced E94 Chemical Engineer-
ing, E114 Computer Engineering, and E118 Mechanics. A biology course was added as a college
graduation requirement. In the late eighties, 1989, the decision was made to add a biology major.
In 1990 the decision was made to add a computer science major, though its implementation
would be delayed for senior staff. Now there are majors in mathematics, chemistry, biology, phys-
ics, computer science, engineering and IPS.

THE NINETIES
Biology 52 was made a college core graduation requirement. Also at this time pass/no credit grad-
ing for the entire freshman year was abandoned and grades were introduced for the spring semes-
ter of the freshman year. High pass/pass/no credit were maintained for the fall semester of the
freshman year.

The thrust of the curriculum changes has been toward variety in the core with slightly greater
choice of electives in that variety. The changes in the core have come at the expense of depth of
material in the core and the emphasis on the major and the necessity for choosing a major earlier.
For a long time the major was decided at the start of the junior year. Today the student can in
practice only maintain the choice of two majors up to the 3rd semester since the 4th semester,
spring sophomore year, has become the starting place for the majors.

In 1992 the College Presentation Days program that sets aside three days for students to present
the results of projects was inaugurated and appears to be growing in importance each year since.

Many innovations have been tried and many established along with the curriculum changes that
are not obvious from simple catalog reading. Core curriculum changes are chronicled by disci-
pline offerings in the two charts: First Year and Sophomore Year Core Courses presented at the
end of this history. Both physics and chemistry offered one semester courses that would fulfill the
normal year long course requirement. Various approaches to advanced placement continue to be tried in all subjects. Physics conducted an experiment called conference physics consisting of no regular courses or grades for selected junior and senior students. Both chemistry and physics had oral examinations for seniors. Chemistry dropped the practice in the early 60’s but physics maintained the practice until 1988. Freshman oral exams have been mentioned. Indeed on a college wide-basis, a program called HMC Scholars was tried in the late 80’s. Here selected students were freed of normal requirements and given considerable latitude in setting their own programs. Chemistry initiated an exchange program with Cambridge and Oxford to send a chemist to those institutions for their junior year. Cambridge dropped out of the program but Lincoln College Oxford still participates.

A quick summary of major curriculum changes and innovations is presented below.

**Major Curriculum Changes/Innovations**

- The core of technical and hum/soc courses
- Systems engineering
- Natural Philosophy
- Quest for Commonwealth
- Integrated laboratories
- Half-courses
- Project work: engineering, mathematics clinic
- Research
- Quantitative biology
- Presentation Days

What might be called grand curricular experiments is given below.

**Grand Experiments**

- Oral examinations
- HMC Scholars
- Self-paced instruction
- Conference physics
- Senior seminar
- Exchange programs
- Advanced placement
- Up-to-speed programs
- Bridge program

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