

# Mathematics

## SUMMARY OF IDENTIFIED ISSUES

Four areas of concern arose in nearly every meeting:

1. The level of differential equations and linear algebra, which is sometimes upper division and sometimes lower division.
2. An alternative to IGETC for science/math/engineering majors.
3. The need for early warning and informal contacts between community colleges and four year institutions whenever curriculum changes are planned.
4. The need for a description for discrete mathematics, a course of great interest for Computer Science.
5. A CAN conference for mathematics.
6. A need for advice to students and counselors.

## IDENTIFY TRENDS/FUTURE DIRECTIONS

1. Attention needs to be paid to service courses in mathematics. This is an area that we need to work with CAN to address. We see this as the next area that needs clarification.
2. Business calculus is losing favor and is being replaced by finite mathematics or statistics. Usually, the statistics course taken is not from the Mathematics Department.

## COMMENTS FROM STATEWIDE MEETINGS AND THE GENERAL FIELD.

1. The Computer Science faculty presented their need for a course in discrete mathematics. Their professional organization had adopted a list of topics for such a course. At a joint meeting between mathematics and computer science, the design of this course was debated. We note that the prerequisite sets the level of the class. After reviewing the CS CAN descriptor for discrete mathematics, several community college discretions and recalling past discussions with CS, we believe there is a need for two CAN descriptors for discrete mathematics. We called the one needing calculus Discrete Structures. This again demonstrates the need for a CAN conference.
2. We continued the discussion on the desirability of stressing “proofs” at the community college level. The most likely places within the curriculum are in discrete mathematics and in linear algebra.

3. Much time was spent on the perfection of two “advice” letters to be sent to community college students and counselors. We hope IMPAC will adopt these letters and undertake their distribution. We ask that every participant in this year’s discussions be given the opportunity to comment on the letters; it is attached as Appendix A and appears on the IMPAC website.
4. Geometry is listed a prerequisite for several of the beginning mathematics classes, yet most four-year institutions do not have a separate geometry class. This presents problems that need to be addressed by CAN.

#### RECOMMENDATION FOR THE DISCIPLINE

1. When possible linear algebra should be taken at the community college. It plays a pivotal role later on and is an ideal place to emphasize proofs.
2. We should support the creation of a science oriented transfer package that is similar to IGETC, but tailored to meet the needs of science/math/engineering majors. Such majors need to start on core requirements early, while delaying some general education courses until the junior and senior year. During the debate on this proposal, it became clear that two paths were being pursued: one offering advice on a core curriculum, the other on the best general education choices.
3. If a four-year institution’s requirement for differential equations is at the upper division level and a transfer student has taken a similar course at the lower division level, the four-year institution should try to give “content” credit for the course even though they cannot transfer the course.
4. Four-year institutions should keep in close contact with their area community colleges. They should alert them early in the process about proposed changes in the curriculum including major course modifications. This is especially important if the proposed changes could affect articulation agreements. It is proposed that on a regional basis that there should be a face-to-face meeting at least once per year. Institutions could rotate hosting such meetings. We want to explore, with IMPAC’s help, the setting up list serves and regional annual math discipline meetings, perhaps to augment the ongoing IMPAC project.

#### RECOMMENDATIONS FOR SUPPORT COURSES

We believe that there are two discrete Mathematics courses. Both at one time or another a meet the needs of Computer Science. As a start we suggest:

*Discrete Mathematics: Elements of discrete mathematics with applications; methods of proof including mathematical induction. Topics include logic, sets, relations, graphs, trees, combinatorics and Boolean algebra. Prerequisite: Pre-Calculus*

The second version is:

*Discrete Structures: Propositional and Predicate Logic; Methods of proof: Direct, Indirect and Induction; Relations, Functions, Recursion; Algorithms; Combinatorics; Graph Theory, Boolean algebra; Applications; Prerequisite CAN Math 18 or 19.*

#### RECOMMENDATIONS TO BE FORWARDED TO CAN

Convene a CAN discipline review committee to thoroughly review CAN descriptors. CAN descriptors for Discrete Mathematics, and Discrete Structures need to be developed. Our review indicates that most of the descriptors need some modification. We note that to be effective, participants need to know that they will be working on CAN descriptors and that they are representing their constituents. That is why we choose this route instead of having IMPAC develop descriptors, especially for the service courses.

#### TOPICS FOR FURTHER DISCUSSION

1. The science version of SCIGETC, refined for mathematics.
2. The development of local articulation councils
3. The new structure of CAN.

#### OUTREACH

The ongoing activities of IMPAC are regularly reported to the Academic Senate of the CSU to the Executive Committee of the CSULA Academic Senate, and to the participants in the CAPI program.