

## IUPUI GAC Reviewer Form

**Reviewer:**

**School:**

**Department:**

**Email:**

**Date Reviewed:** December, 12, 2006

**Documents Reviewed:** IUPUI request for a new graduate certificate program: System Engineering, from the Department of Mechanical Engineering, Purdue School of Engineering and Technology, IUPUI.

**Summary of Proposal:** System engineering (SE) is an engineering specialty that applies engineering skills and techniques coupled with management skills to entire engineering systems. Engineers trained in traditional fields of engineering (e.g., mechanical, electrical, etc.) who also have training in system engineering are in demand among employers in central Indiana. Although several programs have developed on other Purdue campuses, currently there is no program in central Indiana that educates system engineers. Hence, this proposal is for the development of a 12-hour post-baccalaureate Certificate in Systems Engineering. Students who possess baccalaureate engineering degrees with commendable academic performance (GPA > 3.0) are eligible for admission. The planned curriculum is comprised of two core courses in system engineering, one elective course to be selected out of a potential set of nine other system engineering courses, and one additional elective from another set of existing courses in other engineering areas and mathematics (statistics).

1. Are the goals clear and achievable? The goal of a 12-hour certificate seems achievable with added resources. The proposal calls for two additional faculty because of an absence of specifically educated system engineers within the current faculty. Both core courses and at least one of the SE electives must be developed to provide a minimum curriculum. The expectation is that these new faculty will be largely responsible for the development of syllabi and completion of the necessary paperwork. These planned courses are not accompanied by paperwork for course submissions as requested in section IV. Brief course descriptions are included for the two planned core courses but not for the nine additional new SE courses. These elective courses will be phased in over time.

The additional faculty and possibly the need for new courses are not consistent with certificate guidelines that state that new certificates

are “usually built on current faculty and facility resources.” It appears that this substantial development effort intentionally lays the ground work for the development of a graduate program in Engineering Management and may also lead to graduate program development in SE.

I think that the proposal is a bit unclear about the program timeframe for certificate completion and the number of expected students. Will most or all students be part-time? All courses could be completed within one semester assuming that some courses are not prerequisites for others (this is unclear because of the absence of some course descriptions; the two required core courses are not sequenced with one being the prerequisite of the other). Will courses be offered to allow for completion within a certain number of semesters? How many students are expected? From the proposal it seems these courses will be populated by a mix of part-time graduate engineers seeking the certificate, graduate students in other engineering programs who wish to earn the certificate along with another degree, and graduate students outside of engineering who find the content of some of the courses complementary to their current program. There are no numerical estimates or planned numbers presented. Student interest in an SE certificate is mostly inferred from needs of local employers or the possibility that existing programs in other departments may find SE courses useful. At one point the proposal indicates that local industry representatives believe that there might be 10-15 local current employees interested. These seem thin numbers to support development effort and new resources.

The proposal can be strengthened with estimates of student demand (e.g., surveys of current students or graduates, enrollment experiences in other similar programs, surveys of potential demand from other IUPUI programs) and a more detailed snapshot of how the curriculum will be offered over an academic year. This information gives the proposal reader a realistic plan for student throughput and certificate completion. I do not know if such detail is usually included in these requests but I think that the proposal is strengthened if these issues are addressed.

TOEFL criteria for international students might be updated to include the recent scoring modifications attached to different forms of administration.

**2. Is the program academically sound?**

**As I am not knowledgeable about engineering education I cannot make this judgment with any confidence.**

**3. Are faculty resources available to offer this certificate without undercutting other key missions of the unit?**

**Because added resources are needed, it does not seem that this effort will undercut other key missions.**

**4. Is there overlap, either real or potential, with any other unit that could harm the program or be exploited to help the program?**

**The proposal indicates that no similar program exists as IUPUI.**

**5. My recommendation, comments/concerns regarding this proposal...**

**SE appears to be an interesting and potentially productive direction for future program development in the School of Engineering.**

**Justification of resources and effort of a certificate program may be less compelling than justification for the development of graduate degree programs in SE and similar areas (Engineering Management). More detail with regard to the numbers of expected students and expected time to certificate completion (student throughput) will in my view enhance the proposal. Strictly following the guidelines, course descriptions and course submission paperwork which I believe includes a course syllabi should be submitted for at least three if not four (can't really have a curriculum elective with only one choice) courses. The requirement in this case is a bit of a catch-22 if necessary additional faculty are predicated on certificate approval.**