Guideline for the Conduct of IE490 – IE491 Courses

General Description:
IE490 is an individual study course in which the instructor and the student work together on an academic research problem. The research may be on
- defining, formulating, and/or solving a problem that has not been solved to the extent of instructor's knowledge,
- a critical examination of existing solution methods and comparison of them,
- developing a new approach to a solved problem in literature, and so on.

Not all students can take this course. The instructors may select any student from the ones who have outstanding academic record.

The main objectives of the student taking this course may be
- to learn how to conduct academic research,
- to find out what kind of problems are tackled and what type of solution methodologies exist,
- to be able to generate solid and acceptable solution methods to the problem defined, etc.

The main objectives of the instructor offering this course must be
- to properly expose the students to scientific research methods and motivate them in academic research who have an interest in being an academician,
- to benefit from the results obtained at the end of the course for one of his/her open research problems, and ultimately
- to write a paper based on the results obtained.

IE490 is a pre-requisite to IE491 course. Only IE490 is accepted as an IE restrictive elective. IE491 can be taken only as an overload to the IE Undergraduate Curriculum.

Selection of the Project Topics:
This course is an IE restricted elective which means that the students are taking this course instead of another senior level IE elective course. The instructor must take this fact into account while preparing the content and the requirements of the projects.

The instructor is free to select the project topic as far as
- it is not composed of only a literature survey, and
- it is not composed of only computer coding of an existing algorithm.

The instructors must submit the title of the research project and a brief description to the coordinator of the course. All projects must be approved by the coordinator. Any conflicts between the coordinator and the instructor arising in the approval process are resolved by the Undergraduate Committee. After the approval, the students can enroll to the course.

Conduct of the Course:
The students submit three reports during the semester. The first report is the "Project Proposal" which is to be submitted around the 3rd week of the semester. This proposal must include the problem definition, an explanation of the planned approach to solve the problem, and what type of results are being expected at the end of the semester. The second report is a
"Progress Report" which is to be submitted around the 7th week. This report must summarize the progress of the student made after the proposal. If there is any change in the problem definition or in the planned approach then these changes must clearly be stated in this report. The final report is due on the final exam dates. The final report must summarize all work performed during the semester and must be in the format of a scientific article. At the end of the semester, the student presents his/her work in a 20 – 30 minute seminar which is open to public. All reports and presentations must be prepared by the student. The exact dates of submissions and the presentation are announced by the coordinator during the 1st week of the semester.

In the final report submitted and in the presentations, all findings and their complete analysis must be presented and discussed. The instructors must assure that the problem being tackled and the solution methodology utilized have been totally comprehended by the student. After the end of the course, the instructor and/or the student are encouraged to publish a departmental technical report based on the final report, with the potential of being submitted to an academic journal.

**Grading:**

In grading the students, the instructor must make an assessment based on
- the work and effort of the student throughout the semester,
- the results obtained, and
- a comparison of the student and the outcome obtained with his/her existing and former IE490 students and the outcome of their projects.

Some criteria to be followed in assessing could include the contribution of the student to the problem solved, ability and capability of the student in conducting academic research, the degree of the effort spent by the student, etc.

The coordinator also assesses the projects and their content in terms of the objectives stated in the "General Description" section of this document. The coordinator makes a comparison among the existing and former IE490 students and project outcomes based on similar criteria.

The instructor suggests a grade for the student to the coordinator, and the coordinator decides on the final grade. In making the final decision, the coordinator may also consult a faculty member, other than the instructor of the student, and request an assessment of the content of the work done. The instructor's suggestion must have a significant importance and effect on the final grade. However, the final decision is up to the coordinator because he/she is the one who compares the success of all students taking this course. In making such a comparison, the coordinator will be aware of the natural and factual differences between the problems and the solution methodologies but the comparison will be on fair grounds based on the scientific and academic content of the projects.