REVISED – 9/16/09

**UNIVERSITY OF NOTRE DAME**
**DEPARTMENT OF AEROSPACE AND MECHANICAL ENGINEERING**
AME30362: Design Methodology, Fall 2009

**P3 – Product requirements project**
**Project Due Dates: Phase I – Oct. 1, 2009 (NOTE CHANGE)**
**Phase II – Nov. 5, 2009**
**Phase III – Dec. 10, 2009**

During this multi-phase project you will work both individually and in groups to develop design requirements for a new product. This represents another key step in the design process and it will provide quantitative design specifications and performance requirements for a proposed product. It will also result in a plan for testing and validating the product's performance.

**Project Description:**
You will be developing design requirements for players (mechatronic systems) for a proposed second-generation mechatronic football game. The specifications will be expressed in a somewhat unusual form. The final results of project P3 will be a detailed plan for a player combine (i.e. a performance testing session similar to those used to evaluate prospective professional football players) that will be used to measure the technical performance of the next generation mechatronic devices. The combine design will include details on the type of tests, the organization and manner in which the overall combine and the individual tests will be conducted, and specific target performance values for both basic and specialized players. These target values will represent the design requirements for the next generation mechatronic devices. The only requirement imposed at this time is that the combine be conducted in a single, three-hour session by the device designers. Thus the project will develop all aspects of the player combine and will be used to conduct the combine. It is anticipated that information gained in the customer needs and product assessment projects will directly contribute to the outcomes of this project.

This project will be conducted in three phases. The first phase will be conducted as an individual project and the second and third phases will be conducted as group efforts.

**Project Requirements: Phase I – Individual (Due Oct. 1, 2009)**
1) Each student will develop an individual combine concept design proposal that will include readily identifiable sections for:
    i) Basic performance criteria (quantified), justification for each criteria and associated testing process for every robot,
    ii) Advanced performance criteria (quantified), justification for each criteria and associated testing process for specialized robots (passing, kicking, QB, etc.),
    iii) Framework and plan for conducting the combine.
2) The proposal should be submitted as a formal, written concept paper. The format of the report is at your discretion but figures, tables, charts, etc. should be used when appropriate. The document should be no longer than 5 pages and any text elements should be 12 pt font, double spaced. The report should be submitted in hard-copy in class and electronically in .pdf form.

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**Project Requirements: Phase II – Group (Due Nov. 5, 2009)**

1) Upon completing Phase I of the project, project teams of 7-8 students will be formed. The groups will be tasked with evaluating each of the individual combine concept papers from their group and developing a group proposal. The group proposal should include readily identifiable sections for:
    i) Basic performance criteria (quantified), justification for each criteria and associated testing process for every robot,
    ii) Advanced performance criteria (quantified), justification for each criteria and associated testing process for specialized robots (passing, kicking, QB, etc),
    iii) Framework and plan for conducting the combine.
2) The group proposal should be submitted as a formal, written concept paper. The format of the paper is at your discretion but figures, tables, charts, etc. should be used when appropriate. The document should be no longer than 5 pages and any text elements should be 12 pt font, double spaced. The report should be submitted in hard-copy in class and electronically in .pdf form.
3) Upon completion of Phase II, the group will select a representative who will voluntarily participate in Phase III.

**Project Requirements: Phase III – Group (UNGRADED activity – Due Dec. 10, 2009)**

1) Each Phase II group representative (there will be 10 students in this group) will work to integrate group ideas into a single proposal for the combine. The results of this special group effort will be presented to the class at the end of the semester and the evaluated by the mechatronic football league commissioners. As with each of the previous phases of the project, this final, class-approved version should include readily identifiable sections for:
    i) Basic performance criteria (quantified), justification for each criteria and associated testing process for every robot,
    ii) Advanced performance criteria (quantified), justification for each criteria and associated testing process for specialized robots (passing, kicking, QB, etc.),
    iii) Framework and plan for conducting the combine.
2) The final proposal should be submitted as a formal, written combine guidelines. The format of the final document is at your discretion but figures, tables, charts, etc. should be used when appropriate. There is no limit on the length of the document and any text elements should be 12 pt font, line and ½ spacing. The report should be submitted in hard-copy and electronically in .pdf **and** .doc form.