TECH 190A **New Product Proposal** Dr. Samuel C. Obi

* 1. Weeks)

The goal of new product proposal development is to develop a new product portfolio which includes detailed work on the product’s feasibility studies, specifications, analysis, evaluation and full documentation. It also provides a capstone experience in design to meet an identified need or problem, from concept to fabrication and validation of the final product. In accomplishing this, students will familiarize with general industry practices as well as develop creative abilities in solving design problems. Teamwork skills in the design of products and understanding of professional practices, engineering ethics, as well as global and societal issues are developed.

**Procedure**

The new product proposal development will be done in groups of 3-4 students, as much as possible from different concentrations. Preferably, an ideal team should have two CENT and one or two Manufacturing Systems students. It has both team aspects and individual aspects. Each individual team member has distinct responsibility to design, document, and produce the assigned product. Each team’s product proposal is expected to involve significant amounts of CAD and electronics components since the product should have mechanical and electronic/electrical components. CENT students are expected to undertake all the computer/electronics design and wiring while Manufacturing Systems students are expected to do all the CAD work. This project will be undertaken following a seven-step design process, namely: Conceptualization, Specifications, Analysis, Evaluation, Documentation, and Process Plan design. A project portfolio will be used to document the work as described below.

Each of the seven steps will be documented, submitted and graded before a team can move to the next step. Each team should receive a handout which has all the guidelines and requirements for each step. Each step takes approximately one week to be accomplished. Documented evidence is required for any points to be earned. There will be group presentations during the final week of the project.

**The secret to performing well in the new product development project is to do a detailed and well-documented work on each of the seven steps described below**. Instructor will issue points based on how well each of the steps is done. A good well documented work in this class will ensure that the product can be successful produced in Tech 190B course.

**Project Proposal Approval Form (20)**

The initial product idea should be expressed in the attached project proposal sheet. All pertinent assigned responsibilities, design brief, draft CAD sketches, descriptions, specifications, bill of materials, equipment, tooling, instrument, and requirements must be completed and attached to the form, and sections of the form filled in and submitted to the instructor before a project can be approved. After instructor’s approval, every one of these parts must be designed on CAD, Multisim and other appropriate systems.

**Product Design (50)**

Each team should identify a product of their choice. An ideal product should have both mechanical and electronic components. It is expected that these parts and components be designed (and produced in Tech 190B) by each team. Each product must have enough parts and electronic components that each team member can own at least two of these parts/components. CENT majors should design the electronic components while Manufacturing Systems majors will design the mechanical parts.

The product design stage will emphasize the following five areas of design: Conceptualization, Specifications, Analysis, Evaluation, and Documentation. Instructor will be providing specific guidelines and assessment sheets for completing, documenting and grading each step. Points are allotted as follows:

* Design conceptualization (10)
* Design synthesis (10)
* Design analysis (10)
* Design evaluation (10)
* Design documentation (10)

**Assembly Drawings (10 Points)**

The product’s assembly drawing must be documented. The assembly drawing must have a title block, product name, group members’ names, and properly labeled parts and components. This can be jointly done by the team members or by any one of the team members who wants to volunteer to do it for the group. If a volunteer is used to do the assembly drawing, then group members should approve the finished drawing before it is submitted as any lost points will affect the group members equally.

**Prototyped Model (10 Points)**

Each team member must produce one scaled and printed 3-D prototype of each of their assigned parts. This can be printed with permission in our IS facilities, or those who have access to outside facilities can use those facilities. It is expected that these prototypes will be shown to the class during oral presentations of the teams. It is your responsibility to show your prototype to the instructor for grading.

**Process Planning (10 Points)**

Each student should do a process plan that details step-by-step sequenced production processes that will be required for the fabrication of all of his/her parts using regular process sheets or other suitable tools. A computer-aided process planning (CAPP) technique is ideal. Each completed sheet must bear the part’s name, owner’s name, dates, time elements, equipment, tooling, complete list of processes, and total of all used processes contained in the chart.

An assembly chart is also required. This can be jointly done by the team members or by any one of the team members who wants to volunteer to do it for the group. If a volunteer is used to do the assembly chart, then group members should approve the finished assembly chart before it is submitted as any lost points will affect the group members equally.

**Log of Group’s Meetings (10 Points)**

Groups are expected to meet at least once every week. During the meetings, team member should take notes of their discussions, and keep notes of dates of meetings and attendance to these meetings. These notes and their dates should be typed out and placed in the portfolio as evidence (log) of the meetings. Instructor will also be observing these meetings and may attend any of them at any time.

**Compliance with Schedule (10 Points)**

Each team must develop a detailed schedule that will be guiding each of their meetings. This schedule should contain every topic and task needed for the efficient and complete execution of the team’s objectives. As noted above, groups are expected to meet at least once every week to plan and discuss the progress of their projects. Instructor will also be observing these meetings and may attend any of them at any time. At these meetings, the instructor will be checking the progress and compliance of members to their schedules and will be issuing points accordingly.

However, if the group could submit all the required team items as schedule, then all the 10 points could be awarded to the group. See the class schedule for what have been scheduled and their respective due dates.

**Report (10 Points)**

A **2 ½ - 3-page**, double-spaced written report is required from each student. The report should include the following (each with its own subheading or title): (1) A **one-page** description of all your **individual activities and personal contributions to the whole project**, including project idea and design, planning, meeting discussions, minutes, decisions and so forth, 2) **a one-page description of how your product design incorporated ethical considerations for the environment, society, employees, customers, organization etc.** and 3) a half page report on **how you think the project can be improved**. Each report should have the student’s name, assigned parts’ names, and product name on the top right hand corner. All individual reports should be collected and bound into one report as described in the portfolio section below.

**Oral Presentation** **(20 Points)**

Your group will be required to make a 20-30 minute oral presentation of your project. This presentation should include visual aids or appropriate graphics to illustrate your product design activities and products. Each student will describe their undertakings and perform their relative demonstration to show how the system relates to their product. This also an opportunity to show the class your prototype. Although optional, simulation and/or animation may also be used to demonstrate your system.

**Portfolio Content Organization and Submission (10 Points)**

The comprehensiveness of this project demands that each group submit their report in a well-bound portfolio: three-ring or professionally bound. All materials generated should be placed in a portfolio and their pages noted before submission. The project portfolio is due on the scheduled date (see class schedule). Most contents should be printed on standard letter-size paper. The only exception would be larger sheets if needed for readability in graphic drawings. However, larger sheets should still be folded such that they are nearly letter-size (no larger than 9"x 12" after folding). All photographs should normally be incorporated directly into the document as digital images printed on ordinary paper. The contents of each portfolio should be ordered as follows.

1. Cover Page that includes a title for the group, the course name, and the names of everyone in the group.
2. Project Proposal Approval Form (graded cover page only, not the whole proposal)
3. Log of Group’s Meetings
4. A copy of team’s schedule
5. Assembly Drawing (complete, titled and clearly labeled)
6. Assembly chart (complete and labeled as required)
7. Individual Cover Sheet for first team member
   1. 2 1/2-3-page report for the first team member
   2. Fully dimensioned, specified and titled part and/or component drawing(s) and documented design materials for which first team member had primary responsibility
   3. Individual process plans for first team member’s assigned parts and/or components
8. Individual Cover Sheet and work for second team member
   1. 2 ½-3-page report for the second team member
   2. Fully dimensioned, specified and titled part and/or component drawing(s) and documented design materials for which second team member had primary responsibility
   3. Individual process plans for second team member’s assigned parts and/or components
9. Individual Cover Sheet and work for third team member
   1. 2 ½-3-page report for the third team member
   2. Fully dimensioned, specified and titled part and/or component drawing(s) and documented design materials for which third team member had primary responsibility
   3. Individual process plans for third team member’s assigned parts and/or components

**Grading Criteria:** This is a 160-point project and is worth 39% of the overall course grade. Below is the weighting distribution. Specific expectations for each item are detailed in the attached grade sheet.

**Criterion**  **Points**

1) Project proposal approval form, evaluated on a TEAM basis 20

2) Portfolio organization, evaluated on a TEAM basis 10

3) Log of group’s meetings, evaluated on TEAM/INDIVIDUAL basis 10

4) Compliance with schedule, evaluated on TEAM/INDIV basis 10

5) Assembly drawings, evaluated on a TEAM basis 10

6) Product design, evaluated on a INDIVIDUAL basis 50

7) Process plans evaluated on a TEAM/INDIVIDUAL basis 10

8) Prototyped model, evaluated on a TEAM/INDIVIDUAL basis 10

9) Written report, evaluated on INDIVIDUAL basis 10

10) Oral presentation, evaluated on INDIVIDUAL basis 20

**Total Points Possible** **160**

**Grading Criteria for New Product Development (160 Points)**

**Criteria Points Points Received**

**Group Members’ Names**

**\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_**

**1. Project Proposal Approval Form** (See requirements) (20)\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

**2. Portfolio Organization:** Completeness,(10)\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

format, clear title page, team members’ names,

table of contents, detailed meeting log, sequenced

and well-organized members’ reports, well bound etc.

**3. Log of Group’s Meetings:** Completeness, (10) \_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

format, date, attendance, names, details

of each meeting etc.

**4. Compliance with Schedule:** Availability, (10) \_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

status report, participation in group, update, others.

**5. Assembly Drawings** (Complete and clear (10)\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

graphics, clear titles and labels, proper format,

easy to read etc.)

6. **Product Design (Documented Detailed Part and** (50)\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

**Component Conceptualization, Geometric**

**Drawing(s), Specifications, Analysis, Evaluation,**

**and Documentation):** Completeness, format, market

study analysis and conceptual development, finished

drawings, specifications, title block with part name, drawing

number, owner name, date, material, units, projection,

appropriate set of views showing all required dimensions

with no redundancy, tolerancing with reasonable values for

each dimension, meaningful and detailed product/parts

analysis, evidence of evaluation, clarity etc.

**7. Process Plan (Assembly & Process Charts):** (10) \_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

Completeness, format, clarity, analysis, correctness.

**8. Prototypes** (General completion per proposal, (10)\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

meeting product description as proposed, etc.)

**9. Written Report (1 ½-2 pages):** Completeness, (10) \_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

format, grammar, spelling, content, clarity etc.

**10. Oral Presentation & Demonstrations:** (20) \_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

Time, completeness, content, visual aids, clarity,

outline, audibility, appearance, etc.

**Total Points Received out of 160 \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_**

Comments: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**New Project Proposal Approval Form**

The design project proposal is due by the second week of introducing your project, before any work can begin. This cover sheet must be attached as the front page of your proposal. Please read carefully and ask for clarification as soon as possible.

Each team is encouraged to discuss its proposal with the instructor BEFORE submitting for approval. Asking instructors about scope and especially about needed resources will be tremendously valuable in choosing a project that is feasible, meaningful, eligible for full credit, and hopefully rewarding!

Your proposal should accompany the form below. Attach all required information to the completed form before submitting for approval. All work should be typed.

|  |  |
| --- | --- |
| **Title or Name of Product**   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Team Members Responsibilities (Assigned Parts**  **And/or Components)**  1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  3.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| **Requirements (should be attached)** | **Instructor’s Feedback/Comments** |
| A Design Brief report to include all the nine (9) criteria of an inspirational design brief, namely: philosophy, structure, innovation, social/human, environment, viability, process, function and expression (at least one page, typed). **(4 Points)** | **Score:** \_\_\_\_\_ |
| *Draft* CAD drawings for the overall assembly and for EACH part in the assembly. Only rough outer dimensions are required to show geometric features. **(4 Points)** | **Score:** \_\_\_\_\_ |
| Specific description of the purpose/use and nature of product, including number of parts, brief manufacturing processes and machines to be used (~ 50-70 words, typed). **(4 Points)** | **Score:** \_\_\_\_\_ |
| Detailed and categorized list of required machines, specific tools, tooling, cutter/bit sizes, instruments, and needed hardware and software. **(4 Points)** | **Score:** \_\_\_\_\_ |
| Complete bill of materials (BOM) including, part number, part name, material type, description, estimated size, and quantity for each. **(4 Points)** | **Score:** \_\_\_\_\_ |

**Total Score out of 20 = \_\_\_\_\_**