Program Assessment Report (PAR)

Industrial + Systems Egr (ISE) Baccalaureate Degree

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ACADEMIC YEAR COVERED BY THIS REPORT: 2021-2022

I. PROGRAM LEARNING OUTCOMES

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors 3. an ability to communicate effectively with a range of audiences 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

II. PROCEDURES USED FOR ASSESSMENT

A. Direct Assessment

Assessment Measure Direct Assessment Means of Measurement - Assessment of student artifacts Academic years in which this data is collected (at least once every five years) - Every two years. The below list includes the learning outcomes assessed in the reporting year 2021-2022. In the attached document we have included the analysis for all the learning outcomes assessed in alternating years. Learning Outcomes 1 of 7 Graduates will be able to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics ISE 4400 1) A company purchases an asset at a cost $200,000 and depreciates as a MACRS 5-year property. The Market value of the asset the end of year 6 is $40,000. the company's incremental income-tax rate is

35%. The company's cash flows for the asset are as shown. ISE 2211 Use Analysis of Variance (ANOVA) to test the null hypothesis that the treatment means are equal at the $\alpha = 0.05$ level of significance. Fill in the ANOVA table. Use Fisher's Least Significant Difference to determine which, if any, pairs of treatments show significant difference at $\alpha = 0.05$. a) The first-year after tax-cash flow is . b) The fourth -year taxable income is equal to . c) The tax on depreciation recapture in year 6 is equal to _____. 2 of 7 Graduates will be able to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors Example from previous years: Method of assessment ISE 4310 Final exam question Question #2 List 5 actions related to lighting to solve eye strain problem for an employee working on an inspection job. ISE 4310 Final exam question Question #3 Write 10 recommendations about buying or using hand tools to reduce the risk of cumulative trauma disorders. 3 of 7 Graduates will be able to communicate effectively with a range of audiences Method of assessment ISE 4910 Evaluation of oral presentation of project proposal ISE 4920 Evaluation of Senior Design final presentation 4 of 7 Graduates will be able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts Example from previous years: Attached. ISE 4320 HW 2 - Complete the CITI training and save the certificate as a pdf and submit it in the dropbox. https://about.citiprogram.org/ Complete the Responsible Conduct of Research for Social and Behavioral training ISE 4920 Assignment: Your task is to assess the potential impact of your senior design project solution under each of the following contexts: global, economic, environmental, and societal. Assume that your prototype will transition to a marketplace product and that your team is the "company" who will market and support that product. Describe how each of these influences has affected or may affect your engineering design and product life cycle. In add cases, "company" refers to your client, and the "product" may be a physical product, or a system or process. Begin your paper with a concise yet thorough project description (~400 words). Then address each of the four contexts in a separate, focused subsection of your paper (~1000 words each). A set of questions related to each context is provided below to jumpstart your thinking. For full credit, you are encouraged to think beyond these sample questions rather than just answering what is listed. Format: Use 1" margins, 10-12 pt. font, and 1.5 line spacing. A title page is not required. Include a header (project name, team number, course, team member names) on the first page. Clearly label your subsections. Required Subsections1: 1. Project Description 2. Global Factors are influences that result from cultural and geographic features specific to a region or originating from the interaction of two or more culturally/geographically distinct regions. What is the purpose of the product, how does it work, what are the intended global market segments, and how are cultural needs addressed with the product? How do people with different cultures and demographics use the product and what are the functions that the product fulfills? How does the company address global market needs in the design of their current line of products? How can the company address these issues better in their future global product lines? 3. Economic Factors are influences that result from the economic conditions at the time of a product's development and its past, present, and projected sales and support life cycle. What were the economic conditions at the time this product

was designed and manufactured and how are economic issues reflected in the product's design? To dissect the product, what tools are required, how many steps are needed, and how easy is it to do this? What are the competing products, and how are these economic issues reflected in the design of the product? Given current and projected economic conditions, what can engineers at the company do to enhance the economic impact of the product on the company? 4. Environmental Factors are influences that result from the product's environmental impact during development, manufacturing, sales, operation and disposal. What are the planned environmental impacts of this product and what are the environmental factors engineers had to consider in the design of the product? What material type and manufacturing process was used for each major component or group of components? What are the actual environmental impacts of this product and what are the environmental factors engineers have to consider in the design of the product? How can the company reduce the cradle to grave environmental impact in future products and product lines? 5. Societal Factors are influences that result from considering impacts, such as safety, ergonomics and lifestyle, on the people and society within which a product is being used. What is the planned impact of the product on the culture and lifestyles of the customer base? What is the primary function of each major component or group of components? Note how its structural form helps fulfill its function. What is the actual impact of the product on the culture and lifestyles of the customer base? How can the company address social use issues such as safety, ergonomics, product use experiences, and lifestyle impact better in future products?
Grading: The Writing Assignment 3 grade breakdown is Project Description: 20% Each Factor Subsection: 20% Each subsection will be evaluated based on: Content – 40% Ideas, originality of thought, demonstrated understanding of the impact of engineering solutions and the associated factors that influence engineering design Assignment Completeness and Organization – 30% Logical, well-organized, and easy-to-follow presentation of ideas, supporting information shared/ cited, adherence to specified formatting and general expectations for required word count (no penalty for exceeding suggested word count) Fluency and Professionalism – 30% Professional writing style, appropriate use of English language (correct grammar), no typos or spelling errors 1. Definitions and sample questions from Devendorf E, Cormier P, Moore-Russo D and Lewis K (2011). Using Product Archaeology to Integrate Global, Economic, Environmental, and Societal Factors in Introductory Design Education, Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE), Washington DC, USA. 5 of 7
Graduates will be able to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives Example from previous years: Method of Assessment ISE 4910 Term paper assignment Define a project that requires a multi-disciplinary team. Decide what disciplines from engineering are required on the team and plan a set of tasks for the team that utilize those disciplines. You can choose a project that might be utilized for senior design, a practical project of interest to you, or a more ""fantastic"" project that interests you. You should demonstrate your knowledge of other disciplines and how they can contribute to a team. Originality and creative thinking are encouraged and will be rewarded. Submit via MS Word document. No PDF files. Use 12 point, Times New Roman font. Double-spaced with standard margins. Design and include appropriate cover page with all relevant information. References are optional. Cite

references (if applicable) in the body of your paper. Minimize quotations. 500-750 words of writing/text. Cover page, reference page and any numbering will not be included in the word count. Submit the paper on time to the appropriate pilot drop box. Late papers will receive a score of no more than 75%. Papers in excess of one week late receive a score of zero. ISE 4920 Advisor evaluation of senior design team project 6 of 7 Graduates will be able to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions ISE 4150 The following table presents data on the ratings of quarterbacks for the 2008 National Football league season (source: The Sports Network). It is suspected that the rating (y) is related to the average number of yards gained per pass attempt (x). Player Team Yards per Attempt Rating Points Philip Rivers SD 8.39 105.5 Chad Pennington MIA 7.67 97.4 Kurt Warner ARI 7.66 96.9 Drew Brees NO 7.98 96.2 Peyton Manning IND 7.21 95 Aaron Rodgers GB 7.53 93.8 Matt Schaub HOU 8.01 92.7 Tony Romo DAL 7.66 91.4 Jeff Garcia TB 7.21 90.2 Matt Cassel NE 7.16 89.4 Matt Ryan ATL 7.93 87.7 Shaun Hill SF 7.10 87.5 Seneca Wallace SEA 6.33 87 Eli Manning NYG 6.76 86.4 DonovanMcNabb PHI 6.86 86.4 Jay Cutler DEN 7.35 86 Trent Edwards BUF 7.22 85.4 Jake Delhomme CAR 7.94 84.7 Jason Campbell WAS 6.41 84.3 David Garrard JAC 6.77 81.7 Brett Favre NYJ 6.65 81 Joe Fiacco BAL 6.94 80.3 Kerry Collins TEN 6.45 80.2 Ben Roethlisberger PIT 7.04 80.1 Kyle Orton CHI 6.39 79.6 JaMarcusRussel OAK 6.58 77.1 Tyler Thigpen KC 6.21 76 Gus Freotte MIN 7.17 73.7 Dan Orlovsky DET 6.34 72.6 Marc Bulger STL 6.18 71.4 Ryan Fitzpatrick CIN 5.12 70 Derek Anderson CLE 5.71 66.5 a) Provide a scatterplot of the data. Does it suggest any correlation? b) Fit a least squares regression line to the data to predict the rating from the yards per attempt and provide the relevant coefficients. c) If a quarterback averages 7.84 yd.s/attempt, what would you estimate his rating to be? ISE 4300 Conduct a HTA of "viewing your bank checking account balance on the smartphone". Assume your smartphone has the banking app installed and you already have signed up for online banking. 7 of 7 Graduates will be able to acquire and apply new knowledge as needed, using appropriate learning strategies Example from previous years: Method of assessment ISE 3211 midterm exam question 1- The uniform beam has a mass of 50 kg per meter of length. Compute the reactions at the support O and draw FBD. The force loads shown lie in a vertical plane. (16points) 2- A mechanic pulls on the 13-mm combination wrench with the 140 N force shown. Determine the moment of this force about the bolt center O. Magnitude(N.m) and direction . (4 points) 3- The bridge support structure has a mass of 101.94 kg with center of gravity located midway between A and B. Calculate all the reaction forces and draw FBD if a 3 kN load is applied at the point indicated in the figure. (7 points)"

B. Scoring of Student Work

Scoring of assessment items was done using an answer key for marker questions on tests and using a rubric for more subjective assessment items. Scoring was done by the course instructor or by a student grader supervised by the course instructor. The students' level of performance was scored based on the following criteria, (based on a bell curve assessment for ABET) - We want at least 80% of the students to score 60% or better - We want at least 15% of students to score

85% or better

C. Indirect Assessment

Course evaluations and exit interviews are used as indirect assessment measures for the BSISE program. Details of assessment of the BSISE program can be found in the ABET self study.

III. ASSESSMENT RESULTS/INFORMATION:

Details of assessment and findings can be found in Criterion 4 of the ABET self-study.

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IV. ACTIONS TO IMPROVE STUDENT LEARNING

Assessment data are shared in program committee meetings, and faculty then discuss what, if any, actions to take to improve results. Student outcomes are assessed on an alternating two year schedule. About half of the outcomes are assessed in one year and the other half in the following year. Analysis and change implementation happens in the opposite year.

V. SUPPORTING DOCUMENTS

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.