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Program Assessment Plan and Schedule for Fall 2014 – Spring 2015

College: Science, Engineering & Mathematics **Program:** Engineering Science

#1: <u>MISSION STATEMENT & PROGRAM OUTCOMES</u>: Submit to College Liaison & Amy Coots • **1st Draft: Due September 12th** • **2nd Draft w/Revisions (if needed): Due October 10th** **ATTN: Has your program Mission Statement or Program Learning Outcomes changed from last year? Place an 'x' by YES or NO.** **<u>Mission Statement</u>** **YES:** **NO: X** **<u>Program Learning Outcomes</u>** **YES:** **NO: X**	**Mission Statement** The mission of the Vincennes University Engineering Science program is to equip students to develop technologies that maintain our nation's economy and environment. Students will complete course and laboratory work that allow them to gain the critical thinking, mathematical, and inter-personal skills necessary to further their educations in the engineering field. The Engineering Science program prepares students for transfer into Bachelor of Science programs. **Program Learning Outcomes** Students who complete course work in the Engineering Science program will be able to: • apply critical thinking and analytical skills to solve scientific and engineering problems. • demonstrate an understanding of core knowledge in their specific area of engineering. • demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.
#2: <u>LEARNING TO BE ASSESSED</u>: Submit to Program Faculty, College Dean, College Liaison, and Amy Coots. • **1st Draft: Due September 12th** • **2nd Draft w/Revisions (if needed): Due October 10th**	**<u>Outcome 1: Demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.</u>** **Learning Skill/Knowledge to be Assessed:** Students' ability to present technical information (a comparison of student-generated theoretical results with experimental results) graphically in a meaningful, easily interpreted manner. Graphical information should stand on its own (with appropriate labels, units, legends and titles). **Why is this Assessment Significant?** A fundamental engineering task is to compare generated theoretical results with experimental results. This will be required in other engineering courses. In the real world, such results may need to be shared with other engineers, managers, and on occasion, the general public. **Faculty Collaborators:** Andy Wagner, John Ostendorf

	<u>Outcome 2: Demonstrate an understanding of core knowledge in their specific area of engineering.</u> **Learning Skill/Knowledge to be Assessed:** Students' ability to use an appropriate repetition structure(s) and conditional structure(s) to produce a specified outcome. **Why is this Assessment Significant?** Repetition structures and conditional structures are the sine qua non of programming. They will be encountered in later engineering courses. **Faculty Collaborators:** Andy Wagner, John Ostendorf
#3: <u>PROJECT DETAILS</u>: Submit to Program Faculty, College Dean, College Liaison, and Amy Coots. • **1st Draft: Due September 12th** • **2nd Draft w/Revisions (if needed): Due October 10th**	**<u>Outcome 1: Demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.</u>** **<u>Project A Title</u>:** Graphical Presentation of Theoretical/Experimental Results Test **Is this the first, second or third year for this project?** First **Brief Project Description:** The students will be given experimental data and will use Matlab to generate theoretical data. A Matlab script will be used to produce a graph of the data with appropriate titles, labels and units. The script will be part of a test. **Assessment Tool(s)Used:** A checklist where each item is either correct or incorrect. **Success Standard:** An item will be deemed a success if at least 80% of the students do it correctly. **Course(s):** CSCI 126, *Introduction to Computer Tools for Scientists and Engineers* **Faculty Assessing Course(s) & Campus:** Andy Wagner, Vincennes Campus **Projected Sample Size:** 26 **Student Assessment will Occur: Fall? Spring? Both Semesters?** Fall **Faculty Responsible for Oversight/Compiling Student Results:** Andy Wagner **<u>Project B Title</u>:** Graphical Presentation of Theoretical/Experimental Results Exam **Is this the first, second or third year for this project?** First **Brief Project Description:** As part of an exam, the students will be given experimental data and will use Matlab to generate theoretical data. Matlab will be used to produce a graph of the data with appropriate titles, labels and units. The script will be submitted as portion of a test. **Assessment Tool(s)Used:** A checklist where each item is either correct or incorrect. **Success Standard:** An item will be deemed a success if at least 80% of the students do it correctly. **Course(s):** CSCI 126, *Introduction to Computer Tools for Scientists and Engineers* **Faculty Assessing Course(s) & Campus:** Andy Wagner, Vincennes Campus **Project Sample Size:** 26 **Student Assessment will Occur: Fall? Spring? Both Semesters?** Fall **Faculty Responsible for Oversight/Compiling Student Results:** Andy Wagner

	Outcome 2: Demonstrate an understanding of core knowledge in their specific area of engineering. **Project A Title:** Programming Test **Is this the first, second or third year for this project?** First **Brief Project Description:** The students will be given a description of an output which requires the use of repetition structures and conditional structures. The students will provide the required script to produce the output. **Assessment Tool(s)Used:** A checklist where each item is either correct or incorrect. **Success Standard:** An item will be deemed a success if at least 80% of the students do it correctly. **Course(s):** CSCI 126, *Introduction to Computer Tools for Scientists and Engineers* **Faculty Assessing Course(s) & Campus:** Andy Wagner, Vincennes Campus **Projected Sample Size:** 26 **Student Assessment will Occur: Fall? Spring? Both Semesters?** Fall **Faculty Responsible for Oversight/Compiling Student Results:** Andy Wagner **Project B Title:** Programming Exam **Is this the first, second or third year for this project?** First **Brief Project Description:** The students will be given a description of an output which requires the use of repetition structures and conditional structures. The students will provide the required script to produce the output. **Assessment Tool(s)Used:** A checklist where each item is either correct or incorrect. **Success Standard:** An item will be deemed a success if at least 80% of the students do it correctly. **Course(s):** CSCI 126, *Introduction to Computer Tools for Scientists and Engineers* **Faculty Assessing Course(s) & Campus:** Andy Wagner, Vincennes Campus **Projected Sample Size:** 26 **Student Assessment will Occur: Fall? Spring? Both Semesters?** Fall **Faculty Responsible for Oversight/Compiling Student Results:** Andy Wagner
STEP 4: ASSESSMENT TOOLS & DATA – Submit aggregated assessment data and blank copies of assessment tools to: Amy Coots, College Liaison, and College Dean. **FALL ASSESSMENTS = DUE DECEMBER 17 / SPRING ASSESSMENTS = DUE MAY 13**	
#5: DATA ANALYSIS: Submit to Program Faculty, College Dean, College Liaison, and Amy Coots. **FALL ASSESSMENTS:** • **1st Draft: Due February 6th** • **2nd Draft w/Revisions (if needed):**	**Outcome 1: Demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.** **Project A:** Graphical Presentation of Theoretical/Experimental Results Test Success Standard: An item will be deemed a success if at least 80% of the students do it correctly. ***Projected Sample Size:*** 26

Due March 20th **SPRING ASSESSMENTS:** • **1ST Draft: Due May 22nd** • **2nd Draft w/Revisions (if needed): Due September 14**	***Actual Sample Size:*** 22 (3 students dropped the class; 1 student did not take the test) Data Indicating Student Strengths/Learning: 80% or above Data Indicating Student Weaknesses: Below 80% Criteria/Step — Success % by item Correct use of labels — weakness — 78 (i.e., 78% of students correctly used labels) Correct use of legends — weakness — 65 Generate theoretical data — weakness — 48 Display theoretical data — weakness — 70 Display experimental data — weakness — 61 Correct use of subplots — strength — 83 Data Indicating Learning Trends: N/A – This is the first year for this assessment. **Project B:** Graphical Presentation of Theoretical/Experimental Results Exam Success Standard: An item will be deemed a success if at least 80% of the students do it correctly. ***Projected Sample Size:*** 26 ***Actual Sample Size:*** 21 (3 students dropped the class; 2 students did not take the final) Data Indicating Student Strengths/Learning: 80% or above Data Indicating Student Weaknesses: Below 80% Criteria/Step — Success % by item Correct use of labels — strength — 86 Correct use of legends — strength — 81 Generate theoretical data — weakness — 76 Display theoretical data — weakness — 67 Display experimental data — weakness — 76 Correct use of subplots — weakness — 76 Data Indicating Learning Trends: N/A – This is the first year for this assessment.

Analysis: Project A and Project B covered similar material. Project A occurred earlier in the semester than Project B, and in the time between the two, the student had other assignments that reinforced the concepts. The increase in success rates reflects this.

Considering the individual items (the six steps on the checklist):

Although most of the items had increases in the *Success % by Item* from Project A to Project B, the *Display theoretical data* and the *Correct use of subplots* had decreases. I don't know why this slight decrease occurred. The largest gain was in the *Generate theoretical data*. The other items are easier, so it's not surprising that most students master them early on, leaving less room for improvement.

Outcome 2: Demonstrate an understanding of core knowledge in their specific area of engineering.

Project A: Programming Test
Success Standard: An item will be deemed a success if at least 80% of the students do it correctly.

Projected Sample Size: 26
Actual Sample Size: 23 (3 students dropped the class)

Data Indicating Student Strengths/Learning: 80% or above
Data Indicating Student Weaknesses: Below 80%

Criteria/Step	Success % by item	
Correct for loop range	64	weakness
Generation of x equation in loop	27	weakness
Generation of y equation in loop	50	weakness
Correct matrix notation	59	weakness
if condition	64	weakness
if result	73	weakness

Data Indicating Learning Trends: N/A – This is the first year for this assessment.

Project B: Programming Exam
Success Standard: An item will be deemed a success if at least 80% of the students do it correctly.

	Projected Sample Size: 26 ***Actual Sample Size:*** 21 (3 students dropped the class; 2 students did not take the final) Data Indicating Student Strengths/Learning: 80% or above Data Indicating Student Weaknesses: Below 80% Criteria/Step — Success % by item Correct for loop range — 86 strength Generation of x equation in loop — 67 weakness Generation of y equation in loop — 86 strength Correct matrix notation — 71 weakness if condition — 86 strength if result — 86 strength Data Indicating Learning Trends: N/A – This is the first year for this assessment. **Analysis:** Project A and Project B covered similar material. Project A occurred earlier in the semester than Project B, and in the time between the two, the student had other assignments that reinforced the concepts. The increase in success rates reflects this. The largest gain was in the *Generation of x equation in loop*. The other items are easier, so it's not surprising that most students master them early on, leaving less room for improvement.
#6: LEARNING IMPROVEMENT PLAN: Submit to Program Faculty, College Dean, College Liaison, and Amy Coots. **FALL ASSESSMENTS:** • **1st Draft: Due February 6th** • **2nd Draft w/Revisions (if needed): Due March 20th** **SPRING ASSESSMENTS:** • **1ST Draft: Due May 22nd**	**Outcome 1: Demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.** **Impact of Previous Year's Plan:** N/A – This was the first year for this assessment. **New Improvement Plan:** Why these changes are being made and what evidence led to the decision to make these changes: Modify existing assignments to include additional opportunities for practice in the areas of *Display theoretical data* and *Correct use of subplots* to prevent the success rate in these areas decreasing over the semester. How the department will ensure collaboration and consistency in the improvements: Feedback will be

• **2nd Draft w/Revisions (if needed): Due September 14**	provided from faculty who teach higher level classes that require skills gained in the class. **Outcome 2: Demonstrate an understanding of core knowledge in their specific area of engineering.** **Impact of Previous Year's Plan:** N/A – This was the first year for this assessment. **New Improvement Plan:** Why these changes are being made and what evidence led to the decision to make these changes: Modify existing assignments to include additional opportunities for practice in matrix notation to increase the success rate in that area. How the department will ensure collaboration and consistency in the improvements: Feedback will be provided from faculty who teach higher level classes that require skills gained in the class.
#7: ASSESSMENT TOOLS IMPROVEMENT PLAN: Submit to Program Faculty, College Dean, College Liaison, and Amy Coots. **FALL ASSESSMENTS:** • **1st Draft: Due February 6th** • **2nd Draft w/Revisions (if needed): Due March 20th** **SPRING ASSESSMENTS:** • **1ST Draft: Due May 22nd** • **2nd Draft w/Revisions (if needed): Due September 14**	**Outcome 1: Demonstrate written, visual, and/or oral presentation skills to communicate scientific knowledge.** **Project A:** Graphical Presentation of Theoretical/Experimental Results Test **Improvement Plan:** Initially, the project was to be a homework assignment, in which the student is able to seek help from the instructor. It was determined that the success might be a measure of perseverance rather than mastery. The project was changed to a problem on a test. I will continue to use a test question rather than homework. **Project B:** Graphical Presentation of Theoretical/Experimental Results Exam **Improvement Plan:** None at this time. **Outcome 2: Demonstrate an understanding of core knowledge in their specific area of engineering.** **Project A:** Programming Test **Improvement Plan:** Initially, the project was to be a homework assignment, in which the student is able to seek help from the instructor. It was determined that the success might be a measure of perseverance rather than mastery. The project was changed to a problem on a test. I will continue to use a test question rather than homework. **Project B:** Programming Exam **Improvement Plan:** None at this time.