

Core Course Assessment Plan, 2018-19
Element 6: Natural Sciences

Please complete all sections; do not delete section information. Submit to Pilot when complete.

SECTION 1: GENERAL INFORMATION

Course Dept. Prefix: **CS** Course #: **1150**

Semester when assessment will occur: Spring Summer Fall Year: 2018

Course Title: **Introduction to Computer Science**

Section Types and number of sections offered in 2018-19. Complete all that apply.

<input checked="" type="checkbox"/> Dayton face-to-face	<input type="checkbox"/> Lake face-to-face
<input type="checkbox"/> Dayton online	<input type="checkbox"/> Lake online
<input type="checkbox"/> Dayton Honors	<input type="checkbox"/> Lake Honors

Attributes: Integrative Writing in Core
 Multicultural Competency in Core
 Service Learning in Core

Dept. Core Assessment Lead: Karen Meyer
Name

karen.meyer@wright.edu
email

List at least two assessors; this may include course instructor only if there are multiple sections and multiple instructors of the course. Note - The instructor may not assess his/her students' papers.

- Vance Saunders
- Karen Meyer
- _____
- _____

SECTION 2: ASSESSMENT PLAN

It is preferable to have the assessment plan for all sections of a course. If not feasible, please complete an assessment plan for separate sections.

Course Outcomes. X Check here if Outcomes have been modified.

The course must address all 5 outcomes but must assess a minimum of 1 outcome. Highlight in yellow the outcome(s) you will assess. If you have modified the outcomes, please insert here in place of standard outcomes.

1. Understand the nature of scientific inquiry in today's information society;
2. Critically apply knowledge of scientific theory and methods of inquiry to evaluate information from a variety of sources;
3. Distinguish between science and technology and recognize their roles in society;
4. Demonstrate an awareness of the theoretical, practical, creative and cultural dimensions of scientific inquiry; and

5. Discuss fundamental theories underlying modern science.

Assignments. Select **one** of the options below for assessment of one or more outcomes

- X Written lab assignment(s) that addresses/address outcome(s). Include outcome #, title and description for each assignment.

Outcome #: **1, 2** Title: **Artificial Intelligence Lab**

Description of assignment:

X Essay question(s). Provide the question(s) and outcome(s) below.

1. Outcome #: 1 Exercise 1 Semantic Networks
2. Outcome #: 2 Exercise 2 Bot Investigation
3. Outcome #: 2 Exercise 3 Application of Scientific Inquiry using Technology

Lab Material:

Exercise 1 - Part 1

Semantic Networks

1. Start the “Semantic networks” applet.

Lab 13: Artificial Intelligence

[Semantic networks -- logic deduction](#)

[Eliza therapist](#) -- conversational computer program using some simple rules for textual transformation

2. Hit “Examples” to fill in some rules to start you off.
3. Add a new “isa” rule to the rule base. This rule may extend the human/animal categories or do something entirely different. [Example: An animal is a pizza]

Type your new rule here, below this line:

4. Add a new rule that uses a verb other than “is” and mentions your new category. [Example: a dog jumps]

Type your new rule here, below this line:

5. Add a new rule that gives a characteristic of your new category. This rule puts your new category in front, in the form of a possessive noun. [Example: dog has four legs]

Type your new rule here, below this line:

6. Type in one query that makes use of your rules, and which should evaluate to “true.” Take a screenshot showing the query, all the rules you made, and the answer the applet gave you.

Copy the screenshot that shows all those things here, below this line:

- 7. Type in one query that makes use of your rules, and which should evaluate to “false.” Take a screenshot showing the query, all the rules you made, and the answer the applet gave you.

Copy the screenshot that shows all those things here, below this line:

Exercise 2

Bot Investigation

What is a Chatbot?

A chatbot is a computer program that tries to engage in a conversation with the user who interacts with it. The conversations between a chatbot and a user can take place using textual inputs via a keyboard or audio inputs via a microphone. The task of the chatbot is to mimic humans when answering the questions in a way that the user who interacts with the chatbot will not be able find out that he/she is actually conversing with a computer program. Today, chatbots or conversational agents are a part of many real-world applications such as mobile phone assistants (e.g., Apple’s Siri, Microsoft’s Cortana, and Google Assistant), virtual support systems (e.g., customer support call handling), and Internet messaging systems.

How to find whether how well a Chatbot imitates humans?

Evaluating how well a Chatbot (a computer) imitates humans is a challenging task. To do this, in 1950, Alan Turing, an English Computer Scientist, developed the Turing Test, a method that tests a computer’s ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human (see - https://en.wikipedia.org/wiki/Turing_test). In Turing’s test, he described that the ability of a machine to mimic human behavior can be evaluated by an evaluator who converses with the machine using natural language (text inputs). He designed an experiment that involves a computer (the Chatbot in our case), a human, and an interrogator (evaluator). In his experiment setup, the interrogator cannot see the computer or the human and he continuously post questions to the computer and the human (same questions are posted to both the human and the computer). The interrogator tries to determine the answers generated by the computer after each round of questions. If the interrogator cannot find any differences in the answers provided by the computer and the human, the computer is said to have passed the Turing test. In other words, the machine operates at an intelligence level of a human in answering the questions.

Question 1.

In this exercise, you will interact with several online chatbots. Note that some of them have won the Loebner Prize (i.e., have successfully passed the Turing Test) multiple times. Your task is to converse with the chatbots and evaluate how well they converse with you when asked a standard set of questions (we’ve listed the questions to ask for each of the bots below). Then you will evaluate how each chatbot performed based on the answers you received for the standard questions asked. Record the answers from each chatbot in a table (see the table with questions below). **Note that if a chatbot says it does not know the answer to a question you post, try to ask the same question a few times and it may come up with an answer.** “I don’t know” is not accepted as a valid answer from any chatbot. If you feel that a chatbot does not know how to answer a particular question after posting the same question a few times, then list the last three responses you received from the chatbot when you post the same question over and over again.

	Bot Name: Mitsuku	Bot Name: Rose	Bot Name: Cleverbot
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	URL: http://www.square-bear.co.uk/mitsuku/nfc-hat.htm	URL: http://ec2-54-215-197-164.us-west-1.compute.amazonaws.com/speech.php	URL: http://www.cleverbot.com/
1. How are you?			
2. What is your name?			
3. What is JavaScript?			
4. What is Thanksgiving?			

Question 2.

Now, create your own questions for each chatbot and try to see whether the chatbots can still maintain a sensible conversation with you. Try to make the chatbots give you nonsensical answers. Try to get at least one nonsensical answer from each chatbot. Write the question that you posted for the bot and the nonsensical answer that it came up with, in the table below.

Chatbot	Your Question	Nonsensical Answer
Mitsuku		
Rose		
Cleverbot		

Exercise 3

How to Discern Truth

The Internet has been a part of our everyday life. It provides a medium for us to connect with anyone around the world via technologies such as chat, messaging, and email within seconds. We also rely on the Internet to learn new information. However, not every bit of information on the Internet is valid or truthful. In this exercise, we will look at some information sources published on the web and determine ways to identify whether they are valid or not.

Question 1

Watch the video published by Virgin Atlantic about one of their latest aircrafts in the video titled “Is it a bird, is it a plane? Virgin Atlantic harnesses “flapenergy” with new Dreambird 1417”. Here’s the video link - https://www.youtube.com/watch?v=n_ob-5eC8uw

Do you believe that the technology shown in this video is real and the information presented in the video is true? Provide information that proves whether the content presented in this video by Sir Richard Branson, the President of Virgin Atlantic, is true or not. Why or why not?

Question 2

In this exercise, we will experiment with the Google Search engine to determine if it always list correct information in its search results. Before we move to the experiment section, answer the following question.

Q1. Google search can find any information that we request and it has access to billions of information available on the Internet. Do you think Google search is intelligent as it can find information on the web and can answer questions we ask it? _____

Now go to <https://www.google.com> and search “is pluto still a planet” (do not use the quotes in your search query). You will see a set of search results presented to you. You will see an article listed in your results titled “[Pluto Has Been Officially Reclassified As A Planet! - Futurism](https://www.futurism.com/pluto-reclassified-as-a-major-planet/)”. Google lists this as the 2nd or the 3rd result in the search results returned for the above search query. Read the article titled “[Pluto Has Been Officially Reclassified As A Planet! - Futurism](https://www.futurism.com/pluto-reclassified-as-a-major-planet/)” and try to answer the question “is pluto still a planet”. (Link to the Article - <https://www.futurism.com/pluto-reclassified-as-a-major-planet/>)

Q2. Do you think that the above article carries correct information?

Q3. If the above article carries false information, do you think Google should not list that article in the search results?

Q4. Now revisit the statement “Google search is intelligent”. Do you still agree with this statement? Please explain why you would agree or disagree with the above statement.

Rubric (30 pts possible):

Exercise		Points
Q1 – Part1	Question 1	0.5
	Question 2	0.5
	Question 3	0.5
	Question 4	1
	Question 5	1
	Question 6	1
	Question 7	0.5
Q1 – Part2	Question 1	0.5

	Question 2	0.5
	Question 3	0.5
	Question 4	1
	Question 5	1
	Question 6	1
	Question 7	0.5
	Q2	Question 1
Question 2		6
Question 3		3
Q3	Question 1	2
	Question 2 – Q1	1
	Question 2 – Q2	1
	Question 2 – Q3	1
	Question 2 – Q4	2
Total		30

Pilot asynchronous written discussion that addresses outcome(s). Provide the outcome # and question(s).

1. Outcome #: _____ Discussion Question: _____
2. Outcome #: _____ Discussion Question: _____
3. Outcome #: _____ Discussion Question: _____

Multiple Choice or T/F Marker questions – 3 to 4 questions per outcome. List the outcome and question numbers. A rubric is not used for Marker questions. “All the above” should not be used as the correct answer more than once. **Courses that are IW or SRV/SRVI must use written assignments for those attributes.** Complete the benchmark: We expect _____% of students to answer _____% of the question(s) correctly.

1. Outcome #: _____
 - a) Question: _____
 - b) Question: _____
 - c) Question: _____
 - d) Question: _____
2. Outcome #: _____
 - a) Question: _____
 - b) Question: _____
 - c) Question: _____
 - d) Question: _____
3. Outcome #: _____

- a) Question: _____
 b) Question: _____
 c) Question: _____
 d) Question: _____

Collecting and submitting the student assignment(s)

___ Will upload assignment(s) to Pilot X Will give access to assignment(s) on Pilot

Other: _____

Rubric Selection (A, B). Select the items you feel best match your assignment(s) in the rubric(s) on the next pages. Please highlight in yellow. **If this course has an IW attribute, please also see section B.**

A. Element 6 Rubric. Select the item(s) you will use in your rubric by highlighting in yellow the item(s). You may select one or more of them. As there is overlap, choose the items that best fit the assignment you select for assessment. The items below are taken from the Association of American Colleges and Universities (AACU) Value Rubrics for Critical Thinking and Inquiry and Analysis.

IF YOU ARE USING MARKER QUESTIONS FOR THE OUTCOME, DO NOT USE THIS RUBRIC.

Item	Mastery	Partial Mastery 3	Progressing 2	Emerging 1
AACU Critical Thinking VALUE Rubric Items				
Explanation of issues	Issue/ problem to be considered critically is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding.	Issue/ problem to be considered critically is stated, described, and clarified so that understanding is not seriously impeded by omissions.	Issue/ problem to be considered critically is stated but description leaves some terms undefined, ambiguities unexplored, boundaries undetermined, and/ or backgrounds unknown.	Issue/ problem to be considered critically is stated without clarification or description.
Evidence <i>Selecting and using information to investigate a point of view or conclusion</i>	Information is taken from source(s) with enough interpretation/ evaluation to develop a comprehensive analysis or synthesis. Viewpoints of experts are questioned thoroughly.	Information is taken from source(s) with enough interpretation/ evaluation to develop a coherent analysis or synthesis. Viewpoints of experts are subject to questioning.	Information is taken from source(s) with some interpretation/ evaluation, but not enough to develop a coherent analysis or synthesis. Viewpoints of experts are taken as mostly fact, with little questioning.	Information is taken from source(s) without any interpretation/ evaluation. Viewpoints of experts are taken as fact, without question.

Influence of context and assumptions	Thoroughly (systematically and methodically) analyzes own and others' assumptions and carefully evaluates the relevance of contexts when presenting a position.	Identifies own and others' assumptions and several relevant contexts when presenting a position.	Questions some assumptions. Identifies several relevant contexts when presenting a position. May be more aware of others' assumptions than one's own (or vice versa).	Shows an emerging awareness of present assumptions (sometimes labels assertions as assumptions). Begins to identify some contexts when presenting a position.
Student's position (perspective, thesis/hypothesis)	Specific position (perspective, thesis/ hypothesis) is imaginative, taking into account the complexities of an issue. Limits of position (perspective, thesis/ hypothesis) are acknowledged. Others' points of view are synthesized within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) takes into account the complexities of an issue. Others' points of view are acknowledged within position (perspective, thesis/ hypothesis).	Specific position (perspective, thesis/ hypothesis) acknowledges different sides of an issue.	Specific position (perspective, thesis/ hypothesis) is stated, but is simplistic and obvious.
Conclusions and related outcomes (implications and consequences)	Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.	Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.	Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.	Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
Item	Mastery	Partial Mastery 3	Progressing 2	Emerging 1
AACU <u>Inquiry and Analysis</u> VALUE Rubric Items				
Topic selection	Identifies a creative, focused, and	Identifies a focused and manageable/ doable	Identifies a topic that while manageable/	Identifies a topic that is far too

	manageable topic that addresses potentially significant yet previously less-explored aspects of the topic.	topic that appropriately addresses relevant aspects of the topic.	doable, is too narrowly focused and leaves out relevant aspects of the topic.	general and wide-ranging as to be manageable and doable.
Existing Knowledge, Research, and/or Views	Synthesizes in-depth information from relevant sources representing various points of view/ approaches.	Presents in-depth information from relevant sources representing various points of view/ approaches.	Presents information from relevant sources representing limited points of view/ approaches.	Presents information from irrelevant sources representing limited points of view/ approaches.
Design Process	All elements of the methodology or theoretical framework are skillfully developed. Appropriate methodology or theoretical frameworks may be synthesized from across disciplines or from relevant sub disciplines.	Critical elements of the methodology or theoretical framework are appropriately developed, however, more subtle elements are ignored or unaccounted for.	Critical elements of the methodology or theoretical framework are missing, incorrectly developed, or unfocused.	Inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.
Analysis	Organizes and synthesizes evidence to reveal insightful patterns, differences, or similarities related to focus.	Organizes evidence to reveal important patterns, differences, or similarities related to focus.	Organizes evidence, but the organization is not effective in revealing important patterns, differences, or similarities.	Lists evidence, but it is not organized and/ or is unrelated to focus.
Conclusions	States a conclusion that is a logical extrapolation from the inquiry findings.	States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.	States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.	States an ambiguous, illogical, or unsupported conclusion from inquiry findings.
Limitations and Implications	Insightfully discusses in detail relevant and supported limitations and implications.	Discusses relevant and supported limitations and implications.	Presents relevant and supported limitations and implications.	Presents limitations and implications, but they are possibly irrelevant and unsupported.

B. If this is an IW course, you will use the items on this page. You may select one or more of them. Please highlight in yellow.

Item	Mastery	Partial Mastery 3	Progressing 2	Emerging 1
Includes considerations of audience, purpose, and the circumstances surrounding the writing task(s).	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focuses all elements of the work.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s) (e.g., the task aligns with audience, purpose, and context).	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s) (e.g., begins to show awareness of audience's perceptions and assumptions).	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s) (e.g., expectation of instructor or self as audience).
Content Development	Uses appropriate, relevant, and compelling content to illustrate mastery of the subject, conveying the writer's understanding, and shaping the whole work.	Uses appropriate, relevant, and compelling content to explore ideas within the context of the discipline and shape the whole work.	Uses appropriate and relevant content to develop and explore ideas through most of the work.	Uses appropriate and relevant content to develop simple ideas in some parts of the work.
Formal and informal rules inherent in the expectations for writing in particular forms and/or academic fields (please see glossary).	Demonstrates detailed attention to and successful execution of a wide range of conventions particular to a specific discipline and/or writing task (s) including organization, content, presentation, formatting, and stylistic choices	Demonstrates consistent use of important conventions particular to a specific discipline and/or writing task(s), including organization, content, presentation, and stylistic choices	Follows expectations appropriate to a specific discipline and/or writing task(s) for basic organization, content, and presentation	Attempts to use a consistent system for basic organization and presentation.
Sources and Evidence	Demonstrates skillful use of high-quality, credible, relevant sources to	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within	Demonstrates an attempt to use credible and/or	Demonstrates an attempt to use sources to support ideas in the writing.

	develop ideas that are appropriate for the discipline and genre of the writing	the discipline and genre of the writing.	relevant sources to support ideas that are appropriate for the discipline and genre of the writing.	
Control of Syntax and Mechanics	Uses graceful language that skillfully communicates meaning to readers with clarity and fluency, and is virtually error-free.	Uses straightforward language that generally conveys meaning to readers. The language in the portfolio has few errors.	Uses language that generally conveys meaning to readers with clarity, although writing may include some errors.	Uses language that sometimes impedes meaning because of errors in usage.

SECTION 3: UCRC COMMITTEE REVIEW ONLY. DO NOT delete this section. CS 1150

Item	Complete / NA / Revision Requested	Comments
Learning Outcomes for Element 6 Natural Science	Complete. Measuring LOs 1 & 2	
Assignments matched to Element 6 LOs	Complete.	
Rubric for LOs	Complete, but . . .	If the department wants to use their own grading rubric, then this may be treated more as a closed-ended exam question rather than an open-ended narrative, essay question. If the department wants to use this as an essay question, the selected rubric is OK.
Rubric for IW Attribute	NA	
Assigned Approved Reviewers	Complete	

Committee Review Completed

Note: Report Template will be added to each of the individualized assessment plans to facilitate having one final document (assessment and report) for each course.

SECTION 4: ASSESSMENT REPORT DUE May 7, 2021

A separate report needs to be submitted for each assessment plan approved by the Undergraduate Core Oversight Committee (UCOC).

Please upload this entire document to the Pilot course called Element 5 Core Course Assessment 2020-21 (continuous year) by Friday, May 7, 2021. The Final Report Dropbox link can be accessed via Content > Dropbox (Plans, Reports) > Final Report Dropbox.

Date Report Submitted: 6 Feb 2022

Element: Core Element 6 – Natural Science

Academic Year: Element 6 – 2021 to 2022

Course and Sections Assessed:

Describe the final assessment plan that was implemented and explain any changes made to the approved plan.

I. Core Learning Outcomes Assessed (list):

1. Understand the nature of scientific inquiry in today's information society
2. Critically apply knowledge of scientific theory and methods of inquiry to evaluate information from a variety of sources

II. Procedures Used for Assessment

Both learning outcomes were evaluated based on student submissions of the Artificial Intelligence lab assignment during the spring semester of 2022. More specifically, the part of this lab that asks students to pick one of two statements about current ethical issues in computer science and either support or disagree with them using at least three reputable citations was used to assess the first outcome, while an activity that asks them to converse with chatbots and try to manipulate them to get first reasonable and then nonsensical answers was used to assess the second. Performance on these tasks were assessed by two professors who did not teach the course in question, according to the following rubrics, which were taken from the Association of American Colleges and Universities (AACU) Value Rubrics for Critical Thinking and Inquiry and Analysis:

Outcome 1

Evidence: Selecting and using information to investigate a point of view or conclusion

1. Emerging: Information is taken from sources without any interpretation/evaluation; Viewpoints of experts are taken as fact, without question.

2. Progressing: Information is taken from sources with some interpretation/evaluation, but not enough to develop a coherent analysis or synthesis; Viewpoints of experts are taken as mostly fact, with little questioning.
3. Partial Mastery: Information is taken from sources with enough interpretation/evaluation to develop a coherent analysis or synthesis; Viewpoints of experts are subject to questioning.
4. Mastery: Information is taken from sources with enough interpretation/evaluation to develop a comprehensive analysis or synthesis; Viewpoints of experts are questioned thoroughly.

Conclusions and related outcomes (implications and consequences)

1. Emerging: Conclusion is inconsistently tied to some of the information discussed; related outcomes (consequences and implications) are oversimplified.
2. Progressing: Conclusion is logically tied to information (because information is chosen to fit the desired conclusion); some related outcomes (consequences and implications) are identified clearly.
3. Partial Mastery: Conclusion is logically tied to a range of information, including opposing viewpoints; related outcomes (consequences and implications) are identified clearly.
4. Mastery: Conclusions and related outcomes (consequences and implications) are logical and reflect student's informed evaluation and ability to place evidence and perspectives discussed in priority order.

Outcome 2

Conclusions

1. Emerging: States an ambiguous, illogical, or unsupported conclusion from inquiry findings.
2. Progressing: States a general conclusion that, because it is so general, also applies beyond the scope of the inquiry findings.
3. Partial Mastery: States a conclusion focused solely on the inquiry findings. The conclusion arises specifically from and responds specifically to the inquiry findings.
4. Mastery: States a conclusion that is a logical extrapolation from the inquiry findings.

Limitations and Implications

1. Emerging: Presents limitations and implications, but they are possibly irrelevant and unsupported.
2. Progressing: Presents relevant and supported limitations and implications.
3. Partial Mastery: Discusses relevant and supported limitations and implications.
4. Mastery: Insightfully discusses in detail relevant and supported limitations and implications.

III. Summary of Assessment Results:

29 students turned in something for the part of the lab related to the first outcome. The average scores according to the rubric were:

Evidence:

Reviewer A: 2.2 Reviewer B: 1.4

Conclusions:

Reviewer A: 2.0 Reviewer B: 1.3

31 students turned in something for the part of the lab related to the second outcome. The average scores according to the rubric were:

Conclusions:

Reviewer A: 1.8 Reviewer B: 1.2

Limitations and Implications:

Reviewer A: 1.8 Reviewer B: 1.1

Benchmark Met Yes or No

If not met, please identify conditions (if any) that may have impacted these findings.

The reviewers had some concerns related to students' performance on these tasks. The overall quality of the writing was quite poor in many cases, and demonstration of critical thinking and analysis was lacking in many submissions. One factor that may have impacted these results is that the rubric used for evaluation of the students' work for this assessment differed from the one used for grading, which was more focused on completion of a checklist of things to include, such as "cites at least three sources" and "discuss any patterns you noticed across the chatbots."

IV. ACTIONS TAKEN/PLANNED TO IMPROVE STUDENT LEARNING

Discussion of these results with the course coordinator are currently in progress, as part of a conversation about relatively high DFXW rates in this course. The coordinator has indicated that this lab assignment is one that students often struggle on, particularly those who do not attend the lab sessions. Beginning this semester, the instructor of the course will begin taking attendance in labs to encourage students to attend, and this lab assignment (together with another one that is often challenging for students) will be modified to require that students demonstrate their progress to the lab assistant during each lab session in order to receive incremental feedback.

V. Assessment Administration Feedback

I recommend a personnel change related to the leadership of this process.

UCOC Report Review

Item	Complete/NA	Revision Requested	Comments
Identified Outcome Assessed	XX		
Identified Procedure for Assessment	XX		
Summary of Results	XX		
Results Shared with Instructor, Dept Curriculum Committee, etc.	XX		
Plan for Improvements	XX		

Committee Review Completed XXX

Committee Chair Signature Dr. Anne M. Bowling Date 2/13/2023