

W W - C o l l e g e o f A r t s & S c i e n c e s

Humanistic STEM: Project Update

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INTRODUCTION



H u m a n i s t i c S T E M

What is H-STEM and Why Do We Need It

Humanistic STEM is defined as the study of science, technology, engineering, and mathematics that **combines with** an interest in, and concern for, human affairs, welfare, values, or culture.

H-STEM: What it is and What it Ain't

H-STEM is:

- Creating multiple lenses of inquiry
- Examining ideas in their full intellectual context
- Team-developed and, ideally, team-taught (should we reimagine?)

H-STEM is not:

- STEAM
- "Science in Sci-fi" courses

The goal of H-STEM is to create a transferable model that blends humanities and STEM, showing connections between these disparate fields of study, and maintaining a content focus that reinforces the relevance of each meta-discipline.

Project Goals

1. Provide a number of curricular options for institutions seeking to engage in H-STEM initiatives—from in-course interventions, to complete courses, to full programs. Each H-STEM option will be adapted to specific institutional context.
2. Initiate the formation of a virtual Humanistic STEM Center. This center will provide a platform to share ideas, experiences, and successes for those who wish to implement similar initiatives. The H-STEM Center will initially be a storehouse for curricular strategies, a repository of materials and a place where collaboration can be facilitated.
3. Seek out additional partner institutions to join the consortium which will run a series of workshops to assist other institutions in developing their own H-STEM initiatives.
4. Develop an assessment framework that will be used to measure impact of the program using direct empirical data to inform future action.

Participating Institutions



Binghamton



ERAU Daytona



Ferris State



Lee University



**Norfolk State
University**



**University of Maryland
Eastern Shore**



Washington College



West Virginia University



Infusions



Courses



Credentials

Three Types of Assignments



Technology-driven
storytelling



Written analysis
blending STEM and
humanities content



Logic, argumentation,
cultural context through
active discussions

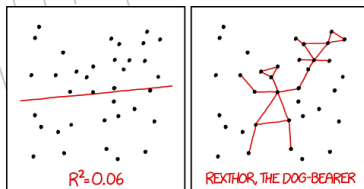
Course Description

Students will explore representations of mathematics and science in literature, film and popular culture. Traditional media (books, drama, film, and television), as well as web-based media (webcomics, YouTube series, and podcasts), will be the venues in which students discuss the portrayal of the lives of scientists and mathematicians as well as scientific theories and mathematics concepts.

Prerequisite: ENGL 123 and minimum of a 3-hour MATH course.

HUMN 333

How Fiction, Film and Popular Culture Represent Science and Mathematics



I DON'T TRUST LINEAR REGRESSIONS WHEN IT'S HARDER TO GUESS THE DIRECTION OF THE CORRELATION FROM THE SCATTER PLOT THAN TO FIND NEW CONSTELLATIONS ON IT.

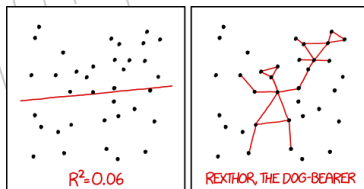


Learning Outcomes

1. Evaluate and write about the accuracy of the scientific/mathematical concepts depicted in works of fiction in various media.
2. Engage in integrative learning by making connections across disciplines.
3. Demonstrate critical thinking skills in discussions of literary elements.
4. Recognize and discuss how science/mathematics and the humanities influence each other in the intellectual environment of their time.
5. Demonstrate in writing an understanding of the portrayal of professional ethics in works that represent science and mathematics.

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Humanities & STEM

Sweet is love which Nature brings: Our meddling intellect
Misshapes the beautiful forms of things --
We murder the Greeks,
Wormwood, 'The Tables Turned'



Stargazing has been a human occupation at least as long as there have been written records from human civilizations. Curiosity drove our ancient ancestors to explain what they could see with the knowledge they had. We have been to view and investigate numerous objects in the space around our (relatively tiny) planet that these ancestors could not even imagine existed...yet we remain curious and equally fascinated.

Imagined lines between bright stars supported storytelling: tales of gods and heroes, happiness and sorrow.



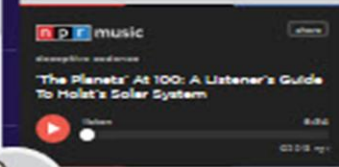
"I don't know anything with certainty, but seeing the stars makes me dream."

The Great Gatsby

"Painters understand nature and love it, and teach us to see."

"Music is the pleasure the human soul experiences from counting without being aware that it is counting."

- German mathematician and philosopher
Gottfried Wilhelm von Leibniz (1646-1716) who co-discovered calculus



Module Objectives

Upon successful completion of this module, you will be able to:

1. Explain the distinction between a scientific view and a humanistic view of the world.
2. Define scientific literacy.
3. Define critical thinking.

ENGAGE

Variety of perspectives on a scientific topic

LEARN

Three mini-lectures, one from each of us and one together

CONVERSE

Three discussion prompts; usually one STEM, one humanities and one blended

ACCOMPLISH

Due and upcoming assignments

BEFORE

Humanities is not very important. I think degree programs should focus on courses that prepare students for their future careers

Math and humanities have always seemed rather separate languages to me.

Just another humanities course.

I have no idea... up until today I had never heard the term STEM (as you use it in this class).











AFTER

Before this class I never knew what S.T.E.M and humanities was, and I never would've guessed they had an inseparable relationship.

I didn't realize how deeply STEM and humanities were actually related. I'm really proud of how much I've learned and taken away from this class by exploring a different side of humanities.

Little did I know, this course would have the most impact on me out of any other course that I've taken.

Humanities and Science, or STEM, are not mutually exclusive to each other. They serve to provide the drive to discover, and dream. The combination of the dream and discovery push boundaries of our existence, allowing for bigger and better of both. Accuracy has its high points, but equally so does the imaginary.

Humanities	Humanistic STEM Courses	STEM
Gen Ed Competencies: Communication Critical Thinking Cultural Literacy 	<i>How Fiction, Film and Popular Culture Represent Science and Mathematics</i> five +Collaborative Learning	Gen Ed Competencies: Critical Thinking Scientific Literacy Quantitative Reasoning 
Gen Ed Competencies: Communication Cultural Literacy Information Literacy 	<i>Baseball History and Stats</i> four +Collaborative Learning	Gen Ed Competencies: Quantitative Reasoning 
Gen Ed Competencies: Cultural Literacy Information Literacy 	<i>Digital Humanities</i> three +Collaborative Learning	Gen Ed Competencies: Technological Literacy 
Gen Ed Competencies: Communication Cultural Literacy 	<i>Visual Arts and Math</i> four +Collaborative Learning	Gen Ed Competencies: Critical Thinking Quantitative Reasoning 
Gen Ed Competencies: Critical Thinking Communication Cultural Literacy 	<i>Learning to Reason (I & II)</i> eight +Collaborative Learning	Gen Ed Competencies: Critical Thinking Quantitative Reasoning Information Literacy Scientific Literacy Technological Literacy 

Humanistic STEM Minor (15-18 credits)

Minor in Humanistic STEM

The Humanistic STEM minor course of study provides opportunities to enhance critical thinking skills, improve communication expertise and develop an interdisciplinary mindset. The interdisciplinarity across the meta-disciplines of Humanities and STEM demonstrates to employers that students can think beyond academic silos, using a variety of perspectives in creative problem solving.

Required Courses:		
HUMN 333	How Fiction, Film and Popular Culture Represent Science and Mathematics	3
PSYC 355	The Psychology of Creativity and Innovation	3
Take any three of the following Courses		9
HIST 119	U.S. History to 1865	
HIST 130	History of Aviation in America	
HUMN 240	History of Communication Technologies	
HUMN 241	Introduction to Digital Humanities	
HUMN 256	Baseball History and Statistics	
HUMN 400	Science and Aviation/Aerospace Technology in Society	
MATH 201	Learning to Reason: Art and Quotient	
MATH 202	Learning to Reason: Commerce and Flux	
Two of the following H-STEM "infusion" courses can substitute for one of the three non-required courses:		6
CHEM 110	General Chemistry I	
ECON 210	Microeconomics	
ECON 211	Macroeconomics	
PHYS 224	Astronomy	
PHYS 142	Introduction to Environmental Science	
STAT 211	Statistics with Aviation Applications	
or STAT 222	Business Statistics	
Total Credits		15-18

Focus on General Education Competencies

General Education Competencies

Critical Thinking

Quantitative Reasoning

Information Literacy

Communication

Scientific Literacy

Cultural Literacy

Collaborative Learning

Technological Literacy

Other H-STEM Options



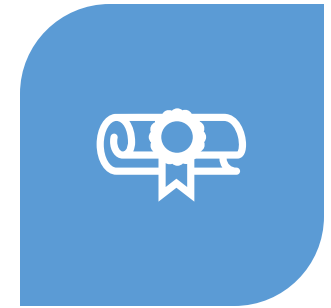
CERTIFICATES



DIGITAL
CREDENTIALS



COMMON
ASSIGNMENTS



DIPLOMA ADD-
ON

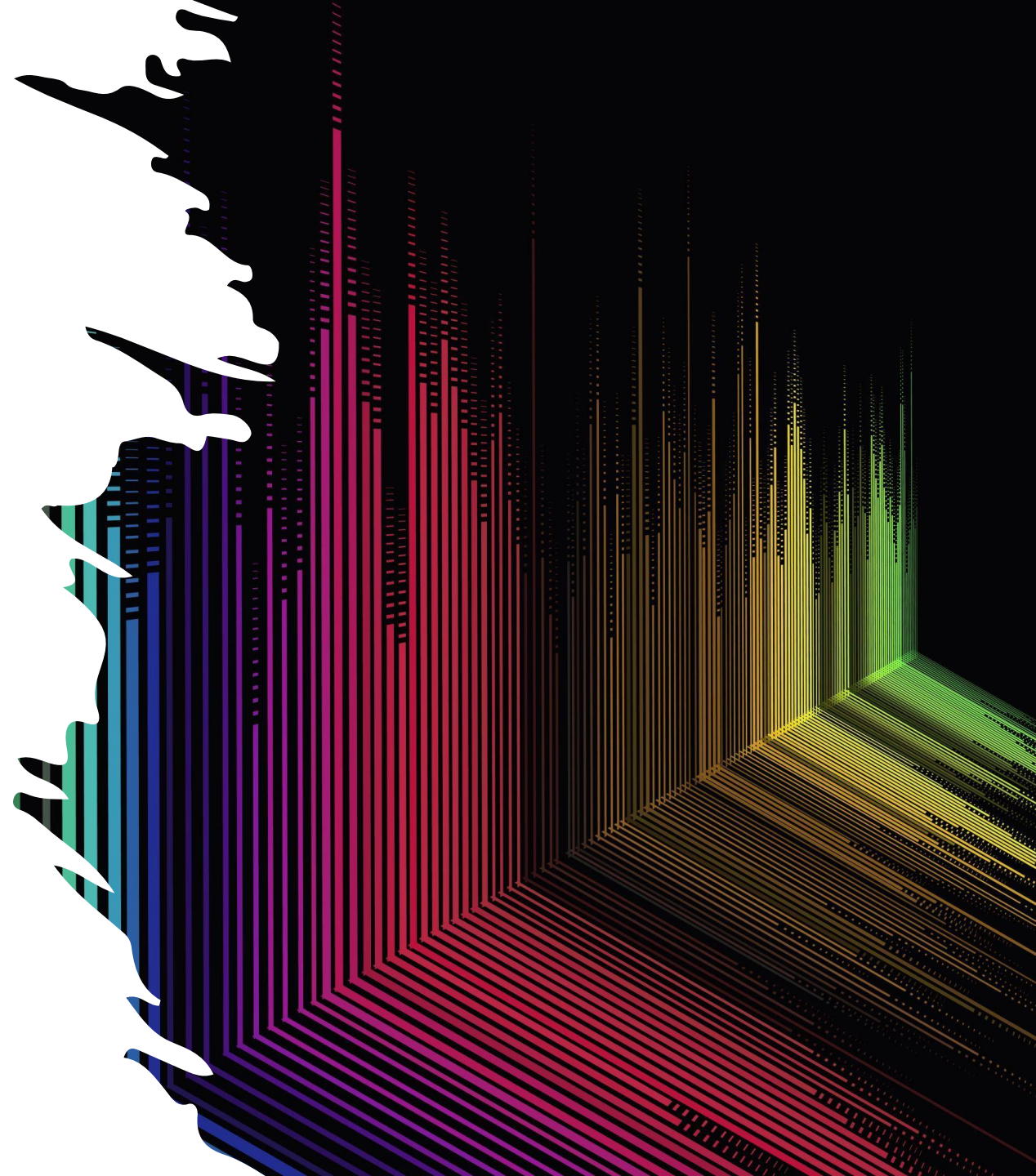
Publications

Bourdeau, D. & Wood, B. (2022). STEM students as storytellers. In S.L. Ganter, D.T. Bourdeau, V. Piercey, and A. Filippas (Eds.), *Engaging Students in Introductory Mathematics Courses Through Interdisciplinary Partnerships: The SUMMIT-P Model*, MAA Notes, Mathematical Association of America, Washington, DC.

Wood, B. & Bourdeau, D. (2022). Leveraging interdisciplinary expertise in developing an alternative mathematics pathway. *Journal of Mathematics and Science: Collaborative Explorations*, 18(1), Article 7: Virginia Mathematics and Science Coalition, Richmond, VA.

Bourdeau, D. & Wood, B. (2021, January) Humanistic STEM: From concept to course. *Journal of Humanistic Mathematics* 11(1), 32-52.

Bourdeau, D. & Wood, B. (2019). What is Humanistic STEM and why do we need it? *Journal of Humanistic Mathematics*, 9 (1), 205-216.



Workshops and Presentations

Bourdeau, D. & Wood, B. (2023, April). *Humanistic STEM: Blending STEM and Humanities in Asynchronous Courses to Improve the Student Experience*. Workshop accepted for the Online Learning Consortium Innovate 2023 conference, Nashville, TN

Bourdeau, D. & Roberts, D. (2023, February). *Occupy Canvas!: Disruption as Innovation*. Presentation at the 2023 Academic Innovation Virtual Conference, Daytona Beach, FL (virtual).

Bourdeau, D. (2022, October). *What is Humanistic STEM and Why Do We Need It?* Workshop at the 2022 Homeland Defense & Security Education Summit, Monterey, CA.

Aydiner, C., Bourdeau, D., Corbin, T., Roberts, D., & Siedschlag, A. (2022, October). *Holistic Education in Homeland Security/Emergency Management: Critical Competencies, Emerging Technologies, Innovative Methods*. Presentation at the 2022 Homeland Defense & Security Education Summit, Monterey, CA.

Bourdeau, D. & Wood, B. (2022, October). *How Partnering with the Humanities Can Produce a More Prepared Aviation Workforce*. Presentation at NTAS: 2022 National Training Aircraft Symposium, Daytona Beach, FL.

Bourdeau, D. (2022, June). *Humanistic STEM*. Workshop presented at the National Science Foundation IUSE Summit. Washington, DC.

Wood, B. & Bourdeau, D. (2022, March). *Collaborating with the humanities to improve quantitative habits of mind*. Presentation at the National Numeracy Network 2022 Annual Meeting (virtual).

Bourdeau, D. & Wood, B. (2022, March). *What is the future of Humanistic STEM?* Presentation at the Northeast Modern Language Association 52nd Annual Convention, Baltimore, MD.

Workshops and Presentations

Bourdeau, D. & Wood, B. (2022, March). *Building and sustaining interdisciplinary partnerships, Part 2*. Roundtable at the Northeast Modern Language Association 52nd Annual Convention, Baltimore, MD.

Bourdeau, D. & Wood, B. & Keene, K. (2021, November). *What do Victor Frankenstein, John Glenn, and Walt Whitman have in common?: Creating STEM/Humanities partnerships*. Workshop presented at AAC&U's 2021 Virtual Conference on Transforming STEM Higher Education. November 4-6, 2021.

Bourdeau, D. & Wood, B. (2021, March). *Humanistic STEM: From Concept to Course and Beyond*. Presentation at the Northeast Modern Language Association 52nd Annual Convention, virtual.

Bourdeau, D. & Wood, B. (2021, March). *Building and sustaining interdisciplinary partnerships* Roundtable chaired at the Northeast Modern Language Association 52nd Annual Convention, virtual.

Wood, B. & Bourdeau, D. (2021, February). *Too many cooks in the QR kitchen? Leveraging interdisciplinary expertise in developing an alternative mathematics pathway*. Paper presented at National Numeracy Network 2020-2021 Annual Meeting (virtual).

Wood, B. & Bourdeau, D. (2020, January). *Reaching STEM students through storytelling*. Paper presented at the Joint Mathematics Meetings, Denver, CO.

Bourdeau, D. & Wood, B. (2019, November). *Designing and implementing Humanistic STEM initiatives*. Paper presented at Association of American Colleges and Universities Transforming STEM Education Conference, Chicago, IL.

Bourdeau, D. & Wood, B. (2019, October). *How can Walt Whitman improve quantitative reasoning?* Paper presented at National Numeracy Network Annual Meeting, Austin, TX.

Bourdeau, D. & Wood, B. (2019, January). *What is Humanistic STEM and why do we need it?* Paper presented at the Joint Mathematics Meetings, Baltimore, MD.

Questions?



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