Fall 2024

OPTIONAL Live Lecture: MWF 11:00 am-11:53 am, online (Zoom and Brightspace)

Stony Brook University
Department of Computer Science, Department of English
College of Engineering and Applied Sciences, College of Arts and Sciences
IAE 101 Introduction to Digital Intelligence
ARTS, TECH
Course Instructors: Elyse Graham, Christopher Kane
Section: 30
Credits: 3

Office Hours:
Office hours will take place over Zoom. At the beginning of the semester, we will send the class Zoom links.
Elyse Graham: Monday/Wednesday – 3:30 to 5:00 PM, on Zoom
Christopher Kane: Monday/Wednesday/Friday – 4:00 to 6:00 PM, on Zoom

Instructor contact information:
Elyse Graham: elyse.graham@stonybrook.edu
Christopher Kane: christopher.kane@stonybrook.edu

COURSE DESCRIPTION:

An introduction to methods and theories in computer science, media studies, and the computational humanities. Students will learn to understand works of art and works of artifice from poetry to Python to prototyping. They will also learn computational tools and how to apply them to practical and creative problems. They will learn to understand the world of technology as a world shaped by human norms, beliefs, and agendas, and how to intervene in that world as critics and makers. They will explore the connections between human intelligence and digital intelligence. Fulfills general education requirements in both ARTS and TECH.

Course Pre/co-requisites
No prerequisites or co-requisites.

COURSE LEARNING OBJECTIVES:

ARTS:

1. By exploring the concept and articulation of style in the arts, and by discussing factors that have borne on the history of style in both poetry and music, students will learn methods for critically appreciating art within the context of its creation.
2. Students will demonstrate an understanding of poetic form and style through the reading of poetry, study of poetry critics, and the creation of a poetry generator using Python.
3. Students will demonstrate an ability to apply programming skills to creative self-expression through the creation of a Twitter Bot, a poetry generator, and a music generator using Python. Through contact with critical writing on new media and media studies, they will develop an understanding of new media AS a medium with which they can engage as critics and artists.
4. Students will study and discuss a critical tradition that considers activity on Twitter as, specifically, a form of theatrical performance, and will use the creation of a Twitter Bot to demonstrate an understanding of the performative opportunities of the Twitter platform.
5. They will learn how the arts can intervene in conversations about science, technology, and engineering.
6. Students will devote significant time to the consideration of art and its principles, through the experience of fine art, the study of formal principles for the creation of art, and critical writings about art by Jeffrey Dolven, John Muse, Norbert Elias, and others.

TECH:

1. Students will demonstrate an ability to implement data mining and text processing algorithms in Python and apply them to creative ends in the fine arts via the completion of a poetry generator using Python.
2. Through the formal study of algorithms and programming, and by engaging with technology critics such as Langdon Winner, Alan Galey, and Safiya Noble, students will learn to understand and critically engage with the "human-made world." By studying how they are built, they will learn to place technologies, artifacts, prototypes in their technological context; they will also learn to place these artifacts in a humanistic context as products of the agendas, norms, and politics of their creators, maintainers, and users. They will learn to intervene in their surroundings as critical thinkers and critical makers.

TEXTBOOK:
Python Programming: An Introduction to Computer Science, 3e. John Zelle. Franklin, Beedle, and Associates. 2016

PIAZZA: We will use the Piazza platform to host a discussion forum for the class. Student can post questions about the lectures, programming, the homeworks, the projects etc. and get feedback from the instructors, TAs, and other students. Please use the following link to sign-up:
https://piazza.com/stonybrook/fall2024/iae101

COURSE REQUIREMENTS:

Description and schedule of Required Readings and/or Assignments.

Readings will be distributed through Blackboard

4 programming or design assignments:

1. Creating a music generator using Python.
2. Creating a poetry generator using Python.
3. Drawing a Sierpinski triangle using Python.
4. Building a Twitterbot using Python.

Exams

2 Quizzes – Multiple-choice exams to ensure students are keeping up with programming and key topics.

GRADING:

Quizzes: 20%
Projects: 60%
Homework: 20%

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A  = 95 - 100
A- = 90 - 95
B+ = 85 - 90
B  = 80 - 85
B- = 75 - 80
C+ = 70 - 75
C  = 65 - 70
C- = 60 - 65
D+ = 55 - 60
D  = 50 - 55
F  =  0 - 50
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TECHNICAL REQUIREMENTS:

Because this class will be taught, in part, using videos over Brightspace and Zoom, students are advised to have a computing device (such as a smart phone or laptop) with a front-facing video camera available during the hours that class takes place. If this is not possible, please talk with the instructors about accommodations.

A computer is required to complete the programming assignments (tablets, Chromebooks, and other similar limited devices may not be enough).

MEETING SCHEDULE:

Updated Schedule on Course Website: https://www3.cs.stonybrook.edu/~ckane/fall2024/iae101/index.html

Monday, August 26:
Introduction and Syllabus

Wednesday, August 28:
Introduction to Programming, Hello World, how to run programs in your chosen language

Friday, August 30:
Early History of Computing [Babbage, Lovelace, Al-Khwarizmi, human computers]
Readings: Arthur C. Clarke, “The Steam-Powered Word Processor” (1986)
N.K. Jemisin, “The Effluent Engine” (2018)

Monday, September 2:
Labor Day (No Classes)

Wednesday, September 4:
Data types and assignment (1 Friday)
-What sort of values exist in the language.
-How are those values store and used.

Friday, September 6:
Basic Operators, Part 1
-arithmetic
-logical

Monday, September 9:
Readings: Jonathan Zittrain, “Introduction”, __The Future of the Internet and How to Stop it__.
Excerpt from Vernor Vinge, __Rainbow’s End__

Terms: Hacker Ethic, Generative, Sterile, Tethered

Wednesday, September 11:
Basic Operators, Part II
-string-based
-comparison

Friday, September 13:
Readings: Jonathan Lethem, “My Internet”
History of the Internet
Terms: Internet, ARPAnet, MILnet, Whole Earth ’Lectronic Link, Usenet, World Wide Web

Monday, September 16:
Function/Method Definition, Part 1:
-blocks of code
-code reuse and modularity

Wednesday, September 18:
Readings: Alan Galey, Stan Ruecker, "How a Prototype Argues," Literary and Linguistic Computing, 2010
John Donatich, "Why Books Still Matter," Journal of Scholarly Publishing, 2009

Friday, September 20:
Function/Method definition, Part 2:
-parameters and arguments
-return values

ASSIGNMENT: CREATING A MUSIC GENERATOR

Monday, September 23:
Reading/writing/playing musical files

Wednesday, September 25:
Readings: Original artworks: Wolfgang Amadeus Mozart, K. 516f, *Musikalisches Würfelspiel* (musical dice game)
Critical works: excerpt from James Carse, __Finite and Infinite Games__, 1997
Bernard Suits, “Elements of Sport,” 1973

Optional readings: Original artworks: Wolfgang Amadeus Mozart, Serenade no. 13 in G major, K. 525, *Eine kleine Nachtmusik*
Wolfgang Amadeus Mozart, K. 626, *Requiem Mass in D Minor*
Critical works: Excerpts from Leonard Meyer, __Style and Music__, 1996
Excerpt from Norbert Elias, __Mozart: Portrait of a Genius__, 1993

Friday, September 27:
Syntactical rules and randomness
Assignment: Create a Music Generator using Python **[Due Thursday, October 10]**

Monday, September 30:
Readings: Lev Manovich, __The Language of New Media__, 2001

Wednesday, October 2:
Data structures, Part 1

Friday, October 4:
Readings: Langdon Winner, "Do Artifacts Have Politics?," Daedalus, 1980
Safiya Noble, __Algorithms of Oppression__, 2018
Note: The people who create the tools we use are humans with agendas and biases that even they may not be aware of.

ASSIGNMENT: DRAWING RECURSIVE PATTERNS

Monday, October 7:
Recursion
Recursive programming
Terms: Recursion, Functional Programming, Abstraction, Patterns, Benoit B. Mandelbrot

Wednesday, October 9:
Readings: Original artworks: George Hart, “3D print of a Sierpinski Tetrahedron,” “Four Sierpinskis.”
M.C. Escher, “Sky and Water I,” “Sky and Water II,” “Waterfall,” “Metamorphosis II.”
Critical works: Excerpts from Douglas Hofstadter, __Gödel, Escher, Bach__, 1979

Friday, October 11:
Fractals, Golden Mean, fractals in art and nature, graphics libraries
Terms: Fractal Geometry, Dimensionality, Leonardo da Vinci,
Computer Graphics, Algorithmic Drawing
Assignment: Create a Sierpinski Triangle **[Due Thursday, October 24]**

Monday, October 14: **THIS IS FALL BREAK - NEEDS TO BE MOVED**
Readings: Ted Underwood, "Theorizing Research Tools that We Forgot to Theorize Twenty Years Ago"
Note: Bringing a critical approach to the tools we use

Wednesday, October 16:
Programming lecture
Readings: Video playthrough of _No Man's Sky_, 2016
Key terms: algorithmically generated art, procedural generation

Friday, October 18:
Readings: __Raw Data Is an Oxymoron__, Introduction
Johanna Drucker, "Humanities Approaches to Graphical Display," 2011
Paul Duguid and John Seeley Brown, from *The Social Life of Information*, 2000
Terms: Big Data, Data Visualization, Machine Learning, Supervised Learning, Unsupervised Learning, Cleaning Data, Stop Words, Distant Reading

Quiz 1: weekend of Friday, October 18

Monday, October 21:
Class/Module Definitions, Part 1:
-Type
-User-defined types
-code re-use and modularity

Wednesday, October 23:
Readings: Robert Darnton, “Philosophers Trim the Tree of Knowledge”
Alan Galey, “Signal to Noise”
Aristotle, __Categories__
Terms: Categories, Classes, Kinds, Types, Taxonomy, Folksonomy, Metadata

Friday, October 25:
Class/Module Definitions, Part 2:
-Types
-User-defined types
-code re-use and modularity

Monday, October 28:
Readings: Excerpt __The Most Human Human__
Note: Behaviorism, Stimulus/Response, Theory of Mind, AI

Wednesday, October 30:
Data Structures, Part 2

Friday, November 1:
Readings: Matthew Kirschenbaum, from “Mechanisms: New Media and the Forensic Imagination”, 2008
Terms: Digital forensics

ASSIGNMENT: CREATING A POETRY GENERATOR

Monday, November 4:
File I/O
Natural Language Processing
Syntactical rules
Randomness

Wednesday, November 6:
Readings: Original artworks: Frank O’Hara, “Autobiographia Literaria,” “A True Account of Talking to the Sun on Fire Island”; “Song”; “Today”; “Poem”; “Biotherm” (excerpt).
Thomas Wyatt, “They Flee from Me,” “Whoso List to Hunt,” “My Galley, Charged with Forgetfulness,” “My Lute Awake,” “The Long Love,” “Forget Not Yet,” “Though I Myself Be Bridled of my Mind.”
Critical works: excerpts from Jeff Dolven, __Senses of Style: Poetry Before Interpretation__, 2018

Friday, November 8:
Distribution/distributed algorithms, networking, games
Interactivity, collecting inputs
Note: How rules in game play can structure and constrain randomness
Terms: Distributed Computation, Asynchronicity, Coordination, Rules, Games
Assignment: Create a Poetry Generator using Python **[Due Tuesday, November 26]**

Monday, November 11:
Readings: John Unsworth, "Scholarly Primitives," 2000
Exercise: How could Google Book Search be altered to support all 7 scholarly primitives?

Wednesday, November 13:
Data Visualization, Part 1
Explanatory visualization
Readings: Florence Nightingale, sunburst charts of wartime ailments
John Snow, map of cholera epidemic in London
Charles Minard, Sankey diagram of the march of Napoleon's army in and out of Russia
Key terms: word cloud, sunburst diagram, flow chart, Sankey diagram, dot map, bubble map, tree map, radar chart, explanatory data visualization, exploratory data visualization, deceptive data visualization

Friday, November 15:
Data Visualization, Part 2
Exploratory visualization, drawing as reasoning
Readings: Gemma Anderson, John Dupré, and James G Wakefield, "Philosophy of Biology: Drawing and the dynamic nature of living systems," 2019
Lorraine Daston and Peter Galison, "Four-Eyed Sight," 2007

ASSIGNMENT: BUILDING A TWITTER BOT

Monday, November 18:
Basic network programming
Terms: Bots, automation, interactivity, reporting, troll bots, scraping

Wednesday, November 20:
Twitter bots as performances
Readings: Original artworks: The Royal Shakespeare Company and the Mudlark Production Company, "Such Tweet Sorrow" (2010).
Critical works: John Muse, "140 Characters in Search of a Theater: Twitter Plays" (2012)
Erin Sullivan, "Shakespeare, Social Media, and the Digital Public Sphere: *Such Tweet Sorrow* and *A Midsummer Night's Dreaming*" (2018)

Friday, November 22:
Importing libraries (using other people's code responsibly)
Twitter developer accounts
Oauth tokens
Twitter API (Application Programming Interface) - These are the commands that Twitter makes available to developers building on top of the Twitter framework.
Assignment: Create a Twitter Bot using Python **[Due Friday, December 13]**

Quiz 2: weekend of Friday, November 22

Monday, November 25: **NOT BREAK, MAY BE LANDING SPOT FOR READINGS/LECTURE FROM 10/14**

Wednesday, November 27:
Thanksgiving Break (No Class)

Friday, November 29:
Thanksgiving Break (No Class)

Monday, December 2:
Problem of Uselessness
Readings: Jeff Dolven and Graham Burnett, in Harper's, "The Ironic Cloud," 2009
Terms: Zipf's Law, value, meaning, purpose, function

Wednesday, December 4:
Systems, Languages, and Tools: An Entry Ramp to Other Roads in Computing

Key terms: Java, JavaScript, R, C, C++, SQL, Excel, Access, HTML, XML, CSS

Friday, December 6:
Guest lecture by Nathan Mathias

Monday, December 9:
Speed Data-ing/Course Overview/Wrapping Up

CLASS PROTOCOL:

1. Students will not be permitted to talk or text on their phones during class.

CLASS RESOURCES:

1. Brightspace

STUDENT ACCESSIBILITY SUPPORT CENTER (SASC) STATEMENT:

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

ACADEMIC INTEGRITY STATEMENT:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Professions, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

CRITICAL INCIDENT MANAGEMENT STATEMENT:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.