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| **Student Name**​ | ​Arya Kuttiyan | **Class Year** | ​2025 |

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| **Course Option**  List One | **Independent Study | Research-Oriented**  Any Academic Discipline | | **Independent Project | Construction-Oriented**  Tech/Computer Science | Fine & Performing Arts | |
| **Independent Study** | | | |
| **Academic Discipline**  **or Area of Study**  List One | ​English | ​ Mathematics | | Social Science |
| Fine & Performing Arts | Physical Education | | Spanish |
| Interdisciplinary | Science | | Tech / Computer Science |
| Computer Science | | | |
| **“Working”**  **Course Title**​ | Computer Science in Healthcare | | | |

**PART 1 | COURSE RATIONALE**​

**Explain in 150 words or fewer your rationale for wanting to design/propose an independent study**

**At minimum, address the following questions:​**

1. What previous coursework (i.e. content, techniques) and/or personal interest(s) are fueling your desire to design/propose an independent study/independent project in this academic discipline?
2. Why do you want to design/propose an independent study/independent project rather than enrolling in one of EPS’s existing course offerings?​
3. How might your experience with content connect to future pursuits at EPS, in college, and/or or beyond college?

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| I’m interested in this independent study because I have really enjoyed the tech classes I have taken and am very interested in computer science. I am also very passionate about healthcare and am interested in learning about how computer science is applied in real world situations. I want to propose an independent study rather than enrolling in a class at EPS because I think that by doing this, I can learn specifically how computer science is applied in healthcare, which is not offered at EPS. I am considering majoring in computer science when I go to college, so I think this experience will help me learn more about the field and different paths I may want to take if I pursue it. |

**PART 2 | RESEARCH / ESSENTIAL QUESTION**

What is the question guiding your research and construction of a culminating product?

*\*this question is directly related to the source research/analysis represented below and will refined throughout the proposal process*

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| How is computer science used to improve healthcare practices and solve the challenges? |

**PART 3 | ANNOTATED BIBILIOGRAPHY (4 – 6 sources)**

<https://owl.purdue.edu/owl/general_writing/common_writing_assignments/annotated_bibliographies/annotated_bibliography_samples.html>

List and analyze 4-6 resources that contribute to your initial understanding of this subject matter including:  
(1) a summary of each resource; (2) an evaluation of each resource; (3) a reflection on each resource’s applicability to your research question/culminating product

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| **Independent Study**  Any Academic Discipline | **Independent Project**  Tech/Computer Science | Fine & Performing Arts |
| Books, Articles, Interviews, Videos, etc. | Books, Articles, Tutorials, Build Requirements, Build Resource List, Proof of concept(s) (project is doable, outcomes are obtainable) |

**SAMPLE MLA ANNOTATION**

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| **Resource Title**  Lamott, Anne. Bird by Bird: Some Instructions on Writing and Life. Anchor Books, 1995. |
| **Summary** Lamott's book offers honest advice on the nature of a writing life, complete with its insecurities and failures. Taking a humorous approach to the realities of being a writer, the chapters in Lamott's book are wry and anecdotal and offer advice on everything from plot development to jealousy, from perfectionism to struggling with one's own internal critic. |
| **Evaluation**  In the process, Lamott includes writing exercises designed to be both productive and fun. Lamott offers sane advice for those struggling with the anxieties of writing, but her main project seems to be offering the reader a reality check regarding writing, publishing, and struggling with one's own imperfect humanity in the process. Rather than a practical handbook to producing and/or publishing, this text is indispensable because of its honest perspective, its down-to-earth humor, and its encouraging approach. |
| **Reflection On Its Applicability to Your Research / Construction** Chapters in this text could easily be included in the curriculum for a writing class. Several of the chapters in Part 1 address the writing process and would serve to generate discussion on students' own drafting and revising processes. Some of the writing exercises would also be appropriate for generating classroom writing exercises. Students should find Lamott's style both engaging and enjoyable. |

**INDEPENDENT STUDY / PROJECT RESOURCES**Include links to any online resources

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| **Resource Title 1** |
| “Princeton Engineering - Using the Tools of Computer Science to Improve Health Care.” *Princeton Engineering*, engineering.princeton.edu/news/2023/05/11/using-tools-computer-science-improve-healthcare. |
| **Summary** |
| This website talks about an initiative at Princeton that combines knowledge from several different fields to solve problems in healthcare. They specifically highlighted using computer science to process data to get rid of biases that exist in the healthcare system, and to find aspects of a person’s lifestyle that may impact their health. |
| **Evaluation** |
| This website talks a lot about computer science being used for public service and emphasizes the different applications of computer science. It goes beyond just talking about algorithms and different topics in technology and instead discusses how computer science can be used to make a positive impact on the world. |
| **Reflection On Its Applicability to Your Research / Construction** |
| This website serves as a good starting point for learning about computer science in healthcare, as it is not very dense and gives many examples of how tech is used in medicine. These topics could be further researched to get a deeper understanding of their applications. |

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| **Resource Title 2** |
| van der Lee, Maaike, and Jesse J. Swen. “Artificial Intelligence in Pharmacology Research and Practice.” *Clinical and Translational Science*, vol. 16, no. 1, 17 Oct. 2022, pp. 31–36, https://doi.org/10.1111/cts.13431. |
| **Summary** |
| This source talks about how AI is used in pharmacology. It shows how AI can be used for drug discovery, recruiting patients, monitoring the patients during the clinical trials, and predicting an individual’s response to the drug administered. The source also touches on the limitations of AI, such as how inaccurate data sets with biases will produce the same inaccuracies in the AI. It also says that the more accurate an AI model, the more complex and difficult the AI is to understand. |
| **Evaluation** |
| This is a very detailed source that goes into depth on the different ways AI is used in pharmacology. It also highlights the bigger picture benefits of AI, such as how streamlined patient recruitment leads to lower costs. I also think it is helpful how the site acknowledges the challenges with AI as well and the benefits, because it is important to understand that technology has limitations. |
| **Reflection On Its Applicability to Your Research / Construction** |
| This source may help narrow down what aspect of healthcare I want to focus on for this independent study. Since healthcare is a very broad topic, it may be helpful to specifically talk about a certain field in healthcare. Also, the length of this source makes it a great website to gain a thorough understanding of AI in pharmacology, rather than just a general understanding. |

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| **Resource Title 3** |
| MEHTA, VK, et al. “APPLICATION of COMPUTER TECHNIQUES in MEDICINE.” *Medical Journal Armed Forces India*, vol. 50, no. 3, July 1994, pp. 215–218, www.ncbi.nlm.nih.gov/pmc/articles/PMC6257447/, https://doi.org/10.1016/s0377-1237(17)31065-1. |
| **Summary** |
| This source gives a broad overview of different ways computer science is used in different aspects of healthcare. For example, it talks about medical imaging, computer assisted therapy, care of critically ill patients, and processing of data. It also talks about the limitations of computer science, such as the potential for computer viruses, difficulty of inputting data, and computers not having the ability to think like humans and make decisions. It also gives a short overview on computers as well. |
| **Evaluation** |
| This source reaches across many different fields of healthcare rather than just one and gives someone a wide overview of uses of computer science in healthcare. The summary of computer science and hardware is also helpful as it is good introductory information to have going into the article. The limitations mentioned are also helpful to give people an idea of what computer science isn’t capable of. |
| **Reflection On Its Applicability to Your Research / Construction** |
| I think that this article will also help me narrow down what aspect of healthcare I want to focus on, as well as if I want to do a more AI centered independent study or if I want to look at computer science in general. |

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| **Resource Title 4** |
| Bayat, Ardeshir. “Bioinformatics.” *BMJ : British Medical Journal*, vol. 324, no. 7344, 27 Apr. 2002, pp. 1018–1022, www.ncbi.nlm.nih.gov/pmc/articles/PMC1122955/#:~:text=Bioinformatics%20is%20defined%20as%20the. |
| **Summary** |
| This article gives a general overview on the field of bioinformatics and why it is important. It mentions DNA sequencing and how computer science allows the large amount of data of the DNA sequences to be processed. It also mentions predicting gene variations, designing primers, the human genome project and more. It also talks about the future hopes for bioinformatics and the positive impacts that tech will have on healthcare. |
| **Evaluation** |
| This source focuses mainly on gene sequencing using bioinformatics. Though it was helpful to get an idea of what bioinformatics can be used for, there were a lot of terms used in the article that I didn’t really understand, so at times it was hard for me to follow. |
| **Reflection On Its Applicability to Your Research / Construction** |
| I think with more research this source can help me understand more about healthcare and biology in general. This will help me gain a solid understanding of how computer science can be used to improve different aspects of healthcare. |