# PHIL421 Capstone Seminar / PHIL422 Honors Seminar
# The Nature of Life

## Spring 2024

**Instructor**: Dr Daniel J. Nicholson
**Modality**: In person (face coverings are optional)
**Contact: dnicho@gmu.edu**

· **When?** Mondays, 4:30 – 7:10 pm.

· **Where?** Horizon Hall 1010.

· **Student Hours**: Wednesdays, 1:30 – 2:30 pm. My office is on the 6th floor of **Horizon Hall**, room 6275. We can also meet via Zoom. If you are not available at this time, email me to schedule an appointment.

· **Where to find information about this course**: all course information, including announcements, assignments, and any changes to the schedule will be posted on the **Blackboard** site for this course.

· **Course Description:**

This course considers one of the most exciting and rapidly growing areas of contemporary philosophy: the ***philosophy of biology***. Biology is a fertile field of philosophical inquiry, dealing as it does with the very nature of life itself. As the life sciences have become increasingly specialized in recent decades, big-picture perspectives on how it is all supposed to hang together are needed more than ever. The purpose of this course is to supply you with the tools you need to gain that broader perspective. It will teach you to think critically about the ways in which biology is done affect the answers it provides, and how those answers sit alongside our broader views about the world and our place in it.

We will explore a range of fascinating puzzles lying at the very heart of biology, and we will examine the theoretical role(s) played by fundamental biological concepts, such as gene, organism, mechanism, function, adaptation, selection, and species. Some of the foundational questions we will address in this course include: Is biology an autonomous science or is it reducible to physics and chemistry? Does biology have laws? How do biologists explain the phenomena they study? What role do genes play in development? Is there such a thing as a biological essence? Are organisms very complicated machines or are they something different altogether? Anyone interested in getting past the textbook answers to think deeply about how biology works and what it tells us about ourselves will enjoy this course.

· **Course Objectives:**

Students who take this course can expect to learn to:

- Engage with classic and contemporary debates in the philosophy of biology.
- Apply philosophical reasoning to address unresolved problems in biological theory.
- Draw on insights from the life sciences to think about traditional philosophical questions.
- Hone their critical thinking and develop their expository and argumentative writing skills.

Students will be evaluated on their ability to engage with foundational problems in biology through journal entries, seminar discussions, a guide to the readings, two presentations, and a research paper.

MASON IMPACT As the Capstone course for the B.A. in Philosophy, ***PHIL421 / PHIL422 is designated as a 'Mason Impact' course***. These courses allow students to:

I. ***Investigate a meaningful question***: students will use your skills of analysis to articulate meaningful questions about challenging problems, engage in the process of inquiry, and situate the relevant texts, concepts, problems or arguments in philosophical, social, historical, and cultural contexts.

II. ***Engage multiple perspectives***: students will be able to identify and negotiate multiple perspectives, navigate complexity across multiple philosophical, textual, and/or social contexts, and produce an informed assessment of the relative merits of different arguments, approaches or positions.

III. ***Participate in knowledge creation***: students will come to a better understanding of the research process and how knowledge is generated and communicated, and of how philosophical approaches can be used to support the process of inquiry and address complex questions and problems.

In addition, ***PHIL421 / PHIL422 is designated a 'Writing Intensive' course***. Accordingly, it includes the following supplementary learning outcomes:

I. ***Writing-to-Learn***: students will use informal or formal writing in ways that deepen their awareness of the field of study and its subject matter.

II. ***Writing-to-Communicate***: students will compose one or more written genres specific to the field of study in order to communicate key ideas tailored to specific audiences and purposes; genres may be academic, public, or professional.

III. ***Writing-as-a-Process***: students will draft and revise written works based on feedback they receive from instructors and peers, using strategies appropriate to the genre, audience, and purpose.

This course fulfills the writing-intensive requirement through a structured series of assignments that will allow you to build towards a final paper that will exemplify your analytic, synthetic, and interpretative skills in an extended piece of philosophical writing. You will find details of all writing assignments in later sections of this syllabus and on Blackboard.

**· Required Readings:**

As we will be making use of a very wide a range of different texts, ***I have provided you with PDF files of all the readings in this course***. You can view all the readings on Blackboard. You can also download them directly by clicking on the appropriate links in the course schedule at the end of this syllabus.

To avoid copyright issues, please note that you remain subject to all the rights and restrictions of the publishers, and you are expected to honor those. Your copies of all the works I provide are to be used solely for the purposes of this class; they are not to be distributed, sold, or employed for any other purpose. Your participation in this class indicates your agreement to be bound by these limitations.

If you have the means to do so, I recommend printing off the reading pack for each session, as it is generally easier to annotate texts by hand. If you choose to work with the reading packs electronically, make sure that you are able to markup and annotate the PDFs (for example, by using **Adobe Reader**).

Regardless of the format you end up using, ***it is <u>essential</u> that you bring the relevant reading pack with you to class***, and that you have it in front of you during class discussions. Failing to bring the readings to class will negatively impact your participation grade.

**· Course Reading Expectations:**

This is an advanced seminar-based course, and you will have a considerable amount of reading to work through in preparation for each weekly session (typically three research papers). ***<u>Please make sure that you carefully read the entire reading pack before coming to class</u>***. If you do not, you will not be able to follow or meaningfully participate in discussions, and your grades will suffer as a result.

**· A Note About Reading Philosophy:**

Reading philosophy demands a different kind of attention compared to other sorts of reading. This is because philosophical texts typically aim to present rationally persuasive arguments, rather than to merely report facts, tell stories, evoke emotions, or offer opinions. These arguments are often subtle, and they tend to deal with ideas in ways with which you may not be familiar. To fully understand them requires time and patience. ***Give yourself enough time to work through the texts without rushing, taking notes in the margins or in a notebook and highlighting key passages as you go along***. If you do this, you will find it much easier to understand the reading and critically engage with it during class. And remember: ***if no questions come to your mind as you read, then you are not reading properly*.**

**· Questions, Contact, and Email Etiquette:**

If you have a question about the course, or a problem with an assignment, feel free to ask it at the start of class; often others will have the same concern, so doing this will help everyone. Alternatively, come to speak to me after class or during my student hours (in person or via Zoom). You can also send me an email. As I teach numerous classes, ***please start the subject of any emails you send me with 'PHIL694:'***. If you fail to do this, I cannot guarantee your email will be read. I respond to emails as soon as I can, though as a rule I do not answer emails during weekends.

**· Assignments and Grading:**

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| **Attendance & Participation** (expected in every session) | 10 % |
| **Thirteen Post-Seminar Reflections** (250 words, due the day after each session) | 15 % |
| **Discussion Facilitation Guide** (6 pages in total + 10-minute presentation per reading) | 25 % |
| **Outline of Final Paper** (1,000 words) | 10 % |
| **Infographic & 'Flash Talk' of Final Paper** (1 slide; 5 minutes + Q&A) | 10 % |
| **Final Paper** (on one of the topics covered in class, 2,500 words) | 30 % |
| **TOTAL** | **100 %** |

**- <u>Attendance and Participation (10%)</u>**: As this is an advanced, seminar-based course, your active participation is critical to the success of each weekly session. Merely showing up will not earn you full marks for participation. It is not enough to attend. ***You must come to each session prepared to discuss the readings and ready to take part in group discussions***. You will not be able to do this effectively if you have not read and thought about the texts in advance of each class. Your oral contributions should show that you have not only done the reading but have also made a serious effort to understand it.

Please come to each session with at least ***one question about each text in the reading pack*** that can be posed to the rest of the class. This can be either: (a) a request for ***clarification*** (something you did not understand) or (b) a suggestion for ***discussion*** (something you would like to discuss further in class).

***You are expected to attend every session***. You will not do well if you miss classes. If you cannot attend a particular class, please let me know in advance. A justified absence requires proper documentation (e.g., a doctor's note or written proof of participation in a university or work-related event). After the first week of term, ***every unjustified absence after the second will result in a 10% penalty in your participation grade***. Hence 12 absences will result in a 100% deduction of your participation grade (or 10% of your overall grade). Moreover, you must attend at least 14 classes overall to pass this course. Finally, if you are more than 15 minutes late for class, your lateness will be considered an absence.

**- Thirteen Post-Seminar Reflections (13 x 1% = 13% + 2% = 15%)**: As well as thinking about the readings before class, it is also important that you take time to think about what you have learnt after class. To incentivize this, ***you will submit a post-seminar reflection of about 250 words (2 or 3 paragraphs) the day after each session***. These reflections are intended to provide opportunities for you to consider what you found most interesting about the topic covered in that week. They will also allow me to keep track of your understanding of the course material as the semester progresses.

You will submit a post-seminar reflection after every weekly session except the last (i.e., Session #14 on Monday, April 29). ***Post-seminar reflections are due no later than 11:59 pm on the day after class (i.e., on Tuesdays)***. Reflections will be graded as either '1' or '0'. All late submissions will be '0'. Each reflection is worth **1%** of your final grade, so fulfilling this requirement will earn you 13% of your final grade. ***You will obtain an additional 2% as a bonus if you submit all your post-seminar reflections on time***. Conversely, if you fail to submit any post-seminar reflections, you will automatically disqualify yourself from obtaining a final grade higher than a B (even if you get an A+ in all other assignments!).

**- Discussion Facilitation Guide (25%)**: Each student is expected to lead the discussion for one session, for which they will provide a discussion facilitation guide. The guide should summarize and analyze each text in the reading pack assigned for that session. For each text, the guide must include:

**(a)** A description of the author's central thesis.
**(b)** A schematic overview of the most important arguments made to support that thesis.
**(c)** A critical assessment of the relative strengths and weaknesses of those arguments.
**(d)** A consideration of the implications of the author's thesis and how they relate to the other readings.
**(e)** A list of open questions to facilitate class discussion of the text.

Your guide should be ***six pages long***, with two pages on each of the three texts in the reading pack.

***The discussion facilitation guide must be submitted no later than 11:59 pm on the day before the seminar (i.e., on Sunday)***. Students are expected to bring to class their own copies of each guide, as well as their own notes on the readings. Please note that the guides are not a replacement for reading the texts. They will serve as the point of departure for our group discussions. During each session, the discussion facilitator will use their guide to offer a ***10-minute oral presentation of each reading***, which will be followed by a round of questions and a general discussion before moving on to the next reading.

Make sure that you sign up on Blackboard to present one session before the start of the semester. ***Note that if you do not attend class on the day you agreed to present, you will fail this assignment***.

**- Final Paper (10% + 10% + 30% = 50%)**: The most important assignment in this course—worth **50%** of your final grade—is a research paper that you will work during the final weeks of the semester. This can be on any of the themes, problems, or debates covered in class, though it cannot be on the same topic as your discussion facilitation guide. You are also free to choose a different topic altogether, as long as it pertains to the philosophy of biology. Please let me know if you need assistance choosing a topic; I can direct you to relevant sources to help you find something that matches your interests.

You will carry out the work for the research paper in three phases:

1. Once you have decided on the topic you want to write about, you will draft a **Outline of the Final Paper (10%)**. This outline should be ***1,000 words***, and it must state the concrete thesis or question that you wish to explore in your paper. What do you hope to accomplish? And how will you go about it? You should explain how you intend to develop an argument and not merely summarize the literature on your chosen topic. Your outline should also specify the structure of the paper, listing the various subsections that will make it up. Finally, you should indicate why you think the problem or question you have chosen to address is worth pursuing. ***The outline of the final paper is due no later than 11:59 pm on Tuesday, April 9***. I will provide you with feedback on your outline.
2. Having acted on the feedback you receive, you will deliver a **'Flash Talk' of the Final Paper (10%)** on the last class of the semester (***Monday, April 15***). You will use **one Google Slide** to schematically represent your paper's argumentative structure in the form of a detailed **Infographic**, and you will give a ***5-minute presentation*** of your infographic to the rest of the class. You will be evaluated on the content of your infographic (5%) as well as on the delivery of your 'flash talk' (5%). Each 'flash talk' will be followed by a ***Q&A*** with the rest of the class.
3. The last phase us the writeup of the **Final Paper (30%)**, which should incorporate the additional feedback received on your 'flash talk' and on the peer review of your outline. The final paper should be clearly written, thoughtfully structured, and carefully argued. You should not just present the views of the authors you are discussing, but also take a stand yourself and justify the position you defend (i.e., your thesis). You should also identify the weaknesses in the views you oppose, as well as anticipate and deal with potential objections that may be raised against your thesis. The final paper should be ***2,500 words*** and include a bibliography and a word count. Additional guidelines on how to for write, structure, and format the final paper can be found on Blackboard. Make sure that you plan ahead. As this is the most important assignment in this course, it is essential that you allow yourself enough time to do a good job. ***The final paper is due no later than Friday, May 3***.

**· Submission of Written Work and Lateness Penalties:**

All graded written work must be drafted in Word document format and uploaded on ***Blackboard*** via the pertinent link (a link will be provided for each assignment). Work must be submitted by the designated deadline. Deadlines are non-negotiable. Extensions will only be granted due to appropriate extenuating circumstances, and only if these are communicated to me in advance of the deadline. If you do not have a good reason for a late submission, ***your assignment will lose one letter grade for each day it is late***, including weekends (i.e., Saturday and Sunday count as two days). These penalties are to ensure fairness, so that everyone has the same amount of time to work on each assignment.

**· Grading Scale:**

The grading scale for all assignments in this course is as follows:

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| 97-100% = **A+** | 87-89% = **B+** | 77-79% = **C+** | 60-69% = **D** |
| 93-96% = **A** | 83-86% = **B** | 73-76% = **C** | 59% or below = **F** |
| 90-92% = **A-** | 80-82% = **B-** | 70-72% = **C-** | |

Final averages will be rounded up or down to the nearest whole number.

**· Student Use of Electronic Devices:**

Cell phones are not to be used during class. Please keep them stowed away, in silent mode, and out of sight. I prefer that you take notes by hand, but I will allow the use of laptops and tablets. I only ask that you are respectful of your peers and your instructor, and that you do not engage in activities that are unrelated to class (e.g., gaming, email, chat, surfing the web, etc.). Such disruptions show a lack of professionalism and will result in a reduction of your participation grade. If you are repeatedly found to be engaging in non-class activities on your electronic device, I will ask you to leave the classroom.

**· Academic Integrity and the Honor Code:**

This course is conducted in accordance with the **GMU Honor Code**. You are expected to abide by this code; any violation will be reported to the Honor Committee for adjudication. As members of the academic community, you are expected to be attentive to issues of academic integrity, particularly as they relate to the acknowledgement of sources. Passive plagiarism (e.g., failing to cite sources) is as bad as active plagiarism (e.g., downloading an essay off the internet). Always cite and reference your sources. Please note that any text generated by an artificial intelligence text-generation tool cannot be accepted as your own work, and its use in this class will be considered a serious violation of academic integrity.

**· Disability Accommodations:**

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding laws that ensure equal treatment of people with disabilities. If you require accommodations for this course, visit **http://ds.gmu.edu/** for information about the Disability Services registration process. Then please discuss your approved accommodations with me.

**· Commitment to Diversity and Inclusion:**

The Department of Philosophy seeks to create an inclusive learning environment that fosters respect for people across differences. We welcome and value individuals and their differences, including gender expression and identity, race, economic status, sex, sexuality, ethnicity, national origin, first language, religion, and age. We encourage everyone to engage with philosophical ideas personally, but to also be open to exploring and learning from experiences different than their own.

Please note that this does not mean not being critical. Respecting others' views means taking them seriously; and taking them seriously means thinking about their strengths and weaknesses, asking questions, and offering constructive criticisms or alternative viewpoints where appropriate. It also means thinking about where the views of others challenge our own, and being open to what they can teach us. Valuing diversity is not just an attitude—it is a matter of developing a practice that involves:

- learning to listen to other perspectives and to hear criticism of our own views;
- expressing criticisms and differences of opinion in ways that are not personal or hurtful and that leave space for other voices (as well as for the possibility that we are wrong);
- being generous in our interpretation of what others say, forgiving of missteps as moments for learning, and holding ourselves and others accountable for where we can do better;
- having good reasons for one's views, but being willing to change one's mind;
- not rushing to judgment; learning to assess different positions while being unsure where we stand; *and* being willing to accept that there will always be things one cannot see or understand.

# COURSE SCHEDULE

*(subject to change; please check Blackboard for updates)*

| Session # | **SEMINAR TOPIC** (& Readings) |
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| **Session #1** (Monday, January 22) | **INTRODUCTION / THE NATURE OF LIFE**<br>· **The Reading Pack for Session #1 consists of the following:**<br>1. Mayr, E. (2010 [1997]). What is the Meaning of "Life"? In M.A. Bedau & C.E. Cleland (eds.) *The Nature of Life* (Cambridge: Cambridge University Press), pp. 88–101.<br>2. Oparin, A.I. (2010 [1961]). The Nature of Life. in M.A. Bedau & C.E. Cleland (eds.), *The Nature of Life* (Cambridge: Cambridge University Press), pp. 70–87.<br>3. Mayr, E. (1996). The Autonomy of Biology: The Position of Biology Among the Sciences. *The Quarterly Review of Biology* 71: 97–106.<br>**Discussion Facilitator**: _____ |
| **Session #2** (Monday, January 29) | **ARE THERE LAWS IN BIOLOGY?**<br>· **The Reading Pack for Session #2 consists of the following:**<br>1. Beatty, J. (1995). The Evolutionary Contingency Thesis. In G. Wolters & J. Lennox (eds.), *Concepts, Theories, and Rationality in the Biological Sciences* (Pittsburgh: University of Pittsburgh Press), pp. 45–81.<br>2. Carrier, M. (1995). Evolutionary Change and Lawlikeness: Beatty on Biological Generalizations. In G. Wolters & J. Lennox (eds.), *Concepts, Theories, and Rationality in the Biological Sciences* (Pittsburgh: University of Pittsburgh Press), pp. 83–97.<br>3. Mitchell, S.D. (1997). Pragmatic Laws. *Philosophy of Science* 64: S468–S479.<br>**Discussion Facilitator**: _____ |
| **Session #3** (Monday, February 5) | **REDUCTIONISM & ITS DISCONTENTS**<br>· **The Reading Pack for Session #3 consists of the following:**<br>1. Kaiser, M.I. (2011). The Limits of Reductionism in the Life Sciences. *History and Philosophy of the Life Sciences* 33: 453–476.<br>2. Hull, D.L. (2002). Varieties of Reductionism: Derivation and Gene Selection. In M.H.V. Van Regenmortel & D.L. Hull (eds.), *Promises and Limits of Reductionism in the Biomedical Sciences* (Chichester: John Wiley & Sons), pp. 161–177.<br>3. Dupré, J. (2010). It Is Not Possible to Reduce Biological Explanations to Explanations in Chemistry and/or Physics. In J. Dupré (ed.), *Processes of Life* (Oxford: Oxford University Press), pp. 128–142.<br>**Discussion Facilitator**: _____ |

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| **Session #4**<br>(Monday, February 12) | **THE MECHANISMS DEBATE**<br>· **The Reading Pack for Session #4 consists of the following:**<br>1. Machamer, P., Darden, L., & Craver, C.F. (2006 [2000]). Thinking About Mechanisms. In L. Darden (ed.), *Reasoning in Biological Discoveries* (Cambridge: Cambridge University Press), pp. 13–39.<br>2. Nicholson, D.J. (2012). The Concept of Mechanism in Biology. *Studies in History and Philosophy of Biological and Biomedical Sciences* 43: 152–163.<br>3. Love, A.C. & Nathan, M.J. (2015). The Idealization of Causation in Mechanistic Explanation. *Philosophy of Science* 75: 761–774.<br>**Discussion Facilitator**: _____ |
| **Session #5**<br>(Monday, February 19) | **THE FUNCTIONS DEBATE**<br>· **The Reading Pack for Session #5 consists of the following:**<br>1. Wright, L. (1998 [1973]). Functions. In C. Allen, M. Bekoff, & G. Lauder (eds.), *Nature's Purposes: Analyses of Function and Design in Biology* (Cambridge, MA: The MIT Press), pp. 51–78.<br>2. Godfrey-Smith, P. (1998 [1993]). Functions: Consensus without Unity. In D.L. Hull & M. Ruse (eds.), *The Philosophy of Biology* (Oxford: Oxford University Press), pp. 280–292.<br>3. Mossio, M., Saborido, C. & Moreno, A. (2009). An Organizational Account of Biological Functions. *The British Journal for the Philosophy of Science* 60: 813–841.<br>**Discussion Facilitator**: _____ |
| **Session #6**<br>(Monday, February 26) | **THE GENE CONCEPT**<br>· **The Reading Pack for Session #6 consists of the following:**<br>1. Griffiths, P.E. & Stotz, K. (2007). Gene. In D.L. Hull & M. Ruse (eds.), *The Cambridge Companion to the Philosophy of Biology* (Cambridge: Cambridge University Press), pp. 85–102.<br>2. Dupré, J. (2005). Are There Genes? In A. O'Hear (ed.), *Philosophy, Biology and Life* (Cambridge: Cambridge University Press), pp. 193–210.<br>3. Boem, F., Ratti, E., Andreoletti, M., & Boniolo, G. (2016). Why Genes Are Like Lemons. *Studies in History and Philosophy of Biological and Biomedical Sciences* 57: 88–95.<br>**Discussion Facilitator**: _____ |

---------- ***SPRING BREAK*** ----------

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| **Session #7**<br>(Monday, March 11) | **EXPLAINING DEVELOPMENT**<br>• **The Reading Pack for Session #7 consists of the following:**<br>1. Lewontin, R.C. (2000). *The Triple Helix: Gene, Organism, and Environment*. Cambridge, MA: Harvard University Press, 3–38.<br>2. Keller, E.F. (2000). Decoding the Genetic Program: Or, Some Circular Logic in the Logic of Circularity. In P. J. Beurton, R. Falk, & H.-J. Rheinberger (eds.), *The Concept of the Gene in Development and Evolution* (Cambridge: Cambridge University Press), pp. 159–177.<br>3. Oyama, S., Griffiths, P.E., & Gray, R.D. (2001). Introduction: What is Developmental Systems Theory? In S. Oyama, P.E. Griffiths, & R.D. Gray (eds.), *Cycles of Contingency: Developmental Systems and Evolution* (Cambridge, MA: The MIT Press), pp. 1–8.<br>**Discussion Facilitator**: _____ |
| **Session #8**<br>(Monday, March 18) | **ADAPTATIONISM & ITS CRITICS**<br>• **The Reading Pack for Session #8 consists of the following:**<br>1. Gould, S.J. & Lewontin, R.C. (2006 [1979]). The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme. In E. Sober (ed.), *Conceptual Issues in Evolutionary Biology* (3rd ed.) (Cambridge, MA: The MIT Press), pp. 79–97.<br>2. Dennett, D.C. (1995). *Darwin's Dangerous Idea*. London: Penguin Books, pp. 238–251.<br>3. Walsh, D.M. (2012). Situated Adaptationism. In W.P. Kabasenche, M. O'Rourke, & M.H. Slater. (eds.), *The Environment: Philosophy, Science, and Ethics* (Cambridge, MA: The MIT Press), pp. 89–116.<br>**Discussion Facilitator**: _____ |
| **Session #9**<br>(Monday, March 25) | **POPULATION THINKING**<br>• **The Reading Pack for Session #9 consists of the following:**<br>1. Sober, E. (2006). Evolution, Population Thinking, and Essentialism. In E. Sober (ed.), *Conceptual Issues in Evolutionary Biology* (3rd ed.) (Cambridge, MA: The MIT Press), pp. 329–359.<br>2. Ariew, A. (2010). Population Thinking. In M. Ruse (ed.), *The Oxford Handbook of Philosophy of Biology* (Oxford: Oxford University Press), pp. 64–86.<br>3. Walsh, D.M. (2019). The Paradox of Population Thinking: First Order Causes and Higher Order Effects. In T. Uller & K.N. Laland (eds.), *Evolutionary Causation: Biological and Philosophical Reflections* (Cambridge, MA: The MIT Press), pp. 227–246.<br>**Discussion Facilitator**: _____ |

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| **Session #10**<br>(Monday, April 1) | **THE SPECIES PROBLEM**<br>· **The Reading Pack for Session #10 consists of the following:**<br>1. Hull, D.L. (2006 [1978]). A Matter of Individuality. *Philosophy of Science* 5: 335–360., E. (2006). Evolution, Population Thinking, and Essentialism. In E. Sober (ed.), *Conceptual Issues in Evolutionary Biology* (3rd ed.) (Cambridge, MA: The MIT Press), pp. 329–359.<br>2. Kitcher. P, (2003 [1984]). Species. In P. Kitcher (ed.), *In Mendel's Mirror: Philosophical Reflections on Biology* (Oxford: Oxford University Press), pp. 113–134.<br>3. Griffiths. P.E. (1999). Squaring the Circle: Natural Kinds with Historical Essences. In R. A. Wilson (ed.), *Species: New Interdisciplinary Essays* (Cambridge, MA: The MIT Press), pp. 208–228.<br>**Discussion Facilitator**: _____ |
| **Session #11**<br>(Monday, April 8)<br>***Final Paper Outline Due (Tuesday April 9)*** | **THE RETURN OF THE ORGANISM**<br>· **The Reading Pack for Session #11 consists of the following:**<br>1. Nicholson, D.J. (2014). The Return of the Organism as a Fundamental Explanatory Concept in Biology. *Philosophy Compass* 9: 347–359.<br>2. Walsh, D.M. (2006). Organisms as Natural Purposes: The Contemporary Evolutionary Perspective. *Studies in History and Philosophy of Biological and Biomedical Sciences* 37: 771–791.<br>3. Weber, A., & Varela, F.J. (2002). Life After Kant: Natural Purposes and the Autopoietic Foundations of Biological Individuality. *Phenomenology and the Cognitive Sciences* 1: 97–125.<br>**Discussion Facilitator**: _____ |
| **Session #12**<br>(Monday, April 15) | **ORGANISMS VS. MACHINES**<br>· **The Reading Pack for Session #12 consists of the following:**<br>1. Nicholson, D.J. (2013). Organisms ≠ Machines. *Studies in History and Philosophy of Biological and Biomedical Sciences* 44: 669–678.<br>2. Nicholson, D.J. (2018). Reconceptualizing the Organism: From Complex Machine to Flowing Stream. In D.J. Nicholson & J. Dupré (eds.), *Everything Flows: Towards a Processual Philosophy of Biology* (Oxford: Oxford University Press), pp. 139–166.<br>3. Nicholson, D. J. (2020). On Being the Right Size, Revisited: The Problem with Engineering Metaphors in Molecular Biology. In S. Holm, & M. Serban (eds.), *Philosophical Perspectives on the Engineering Approach in Biology: Living Machines?* (London: Routledge), pp. 40–68.<br>**Discussion Facilitator**: _____ |

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| **Session #13**<br>(Monday, April 22) | **METAPHYSICS & BIOLOGY**<br>· **The Reading Pack for Session #13 consists of the following:**<br>1. Waters, C.K. (2017). No General Structure. In M.H. Slater & Z. Yudell (eds.), *Metaphysics and the Philosophy of Science: New Essays* (Oxford: Oxford University Press), pp. 81–107.<br>2. Dupré, J. & Nicholson, D.J. (2018). A Manifesto for a Processual Philosophy of Biology. In D.J. Nicholson & J. Dupré (eds.), *Everything Flows: Towards a Processual Philosophy of Biology* (Oxford: Oxford University Press), pp. 3–45.<br>**Discussion Facilitator**: _____ |
| **Session #14**<br>(Monday, April 29) | **FINAL PAPER PRESENTATIONS**<br>**+ Final Paper Peer Review** |

***FINAL PAPER DUE ON FRIDAY, MAY 3***