

Evolution of Cooperation Course At-A-Glance:

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
01	Introduction to evolution and game theory	<ol style="list-style-type: none"> How do evolutionary processes work? What constraints are there on evolution? What is game theory? How is game theory used to understand evolutionary processes? 	<ul style="list-style-type: none"> ▶ <i>Plan and Purpose in Nature</i> “Adaptationist Storytelling” [Ch 1] ▶ <i>Plan and Purpose in Nature</i> “Functional Design and Natural Selection” [Ch 2] ▶ <i>Evolutionary Games Infographic Project</i> “Prisoner’s Dilemma Interactive Guide” 	<ul style="list-style-type: none"> ➔ Syllabus distributed ➔ LMS Warm-up Assignments discussed ➔ Reading Response Questions & Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Evolutionary Trivia as a Dilemma</p> <ul style="list-style-type: none"> • x • x • x • x 	NO
02	Cooperation in evolutionary games	<ol style="list-style-type: none"> How has game theory contributed to our understanding of how cooperation evolves? How can experiments in game theory be used to understand how cooperation evolves? 	<ul style="list-style-type: none"> ▶ <i>Scientific American</i> “The Economics of Fair Play” ▶ <i>Scientific American</i> “The Traveler’s Dilemma” ▶ <i>Nature</i> “Winners don’t punish” ▶ <i>BMC Evolutionary Biology</i> “Reciprocal cooperation between unrelated rats...” 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ <i>Key Concept Presentation</i> guidelines distributed ➔ LMS Warm-up Assignments due [five days after this week’s class] @ 11:59 pm EST ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Experimenting with Game Theory</p> <ul style="list-style-type: none"> • x • x • x • x 	YES

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03	Evolution and the morality of nature	<ol style="list-style-type: none"> 1. What is altruism? 2. Can organisms interact in a harmonious manner? 3. Does nature have a moral code? 	<ul style="list-style-type: none"> ▸ <i>Plan and Purpose in Nature</i> “Philosophical Implications” [p. 211-218] ▸ <i>The Origin of Virtue</i> “Ecology as Religion” [Ch 11] ▸ <i>Darwin’s Blind Spot</i> “From Anarchy to Cooperation” [Ch 3] ▸ <i>Talk of the Nation</i>, Interview with Frans de Waal 	<ul style="list-style-type: none"> ➔ Sign up for a <i>Key Concept Presentation</i> slot by [Monday of this week’s class] @ 11:59 pm EST ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Experimenting with Game Theory (CONTINUED FROM PREVIOUS WEEK)</p>	YES
04	Selfish genes, cooperative genomes, and multicellular organisms	<ol style="list-style-type: none"> 1. What is “Selfish Gene Theory”? What evidence supports this theory? 2. What allows the genome to “cooperate”? 3. How did multicellular organisms evolve? 	<ul style="list-style-type: none"> ▸ <i>The Selfish Gene</i> “Why are people?” [Ch 1] ▸ <i>The Selfish Gene</i> “The replicators” [Ch 2] ▸ <i>The Selfish Gene</i> “Immortal coils” [Ch 3] ▸ <i>The Mermaid’s Tale</i> “The Cooperative Genome” [Ch 11] ▸ <i>The Scientist</i> “The Cheatin’ Amoeba” 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ Key Concept Presentations begin ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Divergent Views of Nature</p> <ul style="list-style-type: none"> • Use group discussion to compare, contrast, and categorize the different ways that the authors we have read over the past two weeks characterize nature. • Explain how the evidence used by each author relates to his/her perspective on nature. • Devise a way to represent commonalities and differences between these depictions of nature. • Represent these different perspectives on nature (and the evidence supporting each perspective) by creating a visual “concept map”. 	YES

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05	Inclusive Fitness	<ol style="list-style-type: none"> 1. What is inclusive fitness and how might it lead to kin selection? 2. How is kin selection related to altruistic behavior? 3. Does kin selection explain most forms of intra-species cooperation? 	<ul style="list-style-type: none"> ▶ <i>Animal Behavior</i> "Hamilton's legacy: kinship, cooperation and social tolerance in mammalian groups" ▶ <i>Philosophical Transactions of the Royal Society Biological Sciences</i> "Helping in cooperatively breeding long-tailed tits: a test of Hamilton's rule" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Experimental Detection of Kin Selection</p> <ul style="list-style-type: none"> • Design an experiment that can determine whether the evolution of altruism in <i>Dictyostelium</i> can be explained by kin selection. • Explain what predicted results would support or refute the hypothesis that the evolution of altruism in <i>Dictyostelium</i> can be explained by kin selection. 	NO
06	Sociality and group living	<ol style="list-style-type: none"> 1. Why do organisms live together? 2. What are some of the challenges of social living? 3. When does social living involve cooperation? 4. What adaptations can maintain cooperation amongst members of a social group? 	<ul style="list-style-type: none"> ▶ <i>Trends in Ecology & Evolution</i> "The Evolution of Social Behavior in Microorganisms" ▶ <i>National Geographic</i> "In the Whirl" ▶ <i>The New York Times</i> "African Wild Dogs, True Best Friends" ▶ <i>Scientific American</i> "Divided We Fall: Cooperation among Lions" ▶ <i>Nature</i> "Group living and hungry lions" ▶ <i>Nature</i> "Group formation stabilizes predator-prey dynamics" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Last hour of class used for <i>Midterm Exam Review</i> ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	MIDTERM REVIEW, no activity	NO
07	Midterm Exam taken <u>in class</u> on the LMS.			➔ Class visits a computer lab: remember to bring your Pratt ID!!	MIDTERM EXAM, no activity	YES

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
08	Symbiosis and mutualism	<ol style="list-style-type: none"> 1. What makes mutualism different from other forms of cooperation? 2. What allows the evolution from parasite to mutualist? 3. How does natural selection maintain mutualisms? 	<ul style="list-style-type: none"> › <i>Darwin's Blind Spot</i> "The other force of evolution" [Ch 2] › <i>Darwin's Blind Spot</i> "Symbiosis comes of age" [Ch 9] › <i>Darwin's Blind Spot</i> "The wonder of symbiosis" [Ch 10] › <i>Scientific American</i> "The Ultimate Social Network" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: What kind of mutualism?</p> <ul style="list-style-type: none"> • x • x • x • x 	NO
09	Superorganisms	<ol style="list-style-type: none"> 1. Why do some organisms live in cooperative colonies? 2. Can natural selection act on these colonies? 	<ul style="list-style-type: none"> › <i>The Superorganism</i> "The construction of a superorganism" [Ch 1] › <i>The Superorganism</i> "Genetic social evolution" [Ch 2] › <i>Science</i> "Ancestral monogamy shows kin selection is the key to the evolution of eusociality" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Class visits a computer lab: remember to bring your Pratt ID!! ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: How did eusociality evolve?</p> <ul style="list-style-type: none"> • x • x • x • x 	YES
10	Multilevel selection theory	<ol style="list-style-type: none"> 1. How do we extend simple models of evolution to explain the evolution of cooperative behaviors? 2. Under what conditions does selection operate on more than one level? 	<ul style="list-style-type: none"> › <i>The Quarterly Review of Biology</i> "Rethinking the theoretical foundation of sociobiology" › <i>The World</i> "Seeking the roots of kindness" › <i>PLoS One</i> "Multilevel selection and Neighborhood Effects..." 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Identifying potential levels of selection</p> <ul style="list-style-type: none"> • x • x • x • x 	NO

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
11	Human altruism	<ol style="list-style-type: none"> 1. In what ways do humans act towards the common good? 2. Should we label this behavior as altruistic? 3. What mechanisms foster cooperation in human groups? 	<ul style="list-style-type: none"> › <i>Nature</i> “The nature of human altruism” › <i>Nature</i> “Share and share alike” › <i>Nature</i> “Egalitarianism in Young Children” › <i>NPR All Things Considered</i> “Do We Choose Our Friends Because They Share Our Genes?” › <i>Proceedings of the National Academy of Sciences</i> “Friendship and natural selection” 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	<p>Group Activity: Are humans altruists?</p> <ul style="list-style-type: none"> • x • x • x • x 	NO
12	Human culture and cooperative behavior	<ol style="list-style-type: none"> 1. How do genes & culture interact to produce behavior? 2. In what ways has human culture allowed for the evolution of cooperative behaviors? 	<ul style="list-style-type: none"> › <i>The Origin of Virtue</i> “The Division of Labor” [Ch 2] › <i>Why Humans Cooperate</i> “Dual Inheritance Theory” [p. 7-11] › <i>Why Humans Cooperate</i> “Culturally evolved social norms lead to context-specific cooperation” [Ch 8] › <i>Evolutionary Anthropology</i> “Human Evolution and Human History: A Complete Theory” 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	CURRENTLY NO GOOD ACTIVITY	NO

Week	Major Topic(s)	Key Questions	Readings	Events & Assignments	In-class activities and objectives:	Comp Lab?
13	Contemporary social dilemmas	1. Why is understanding how cooperation evolves important in modern-day society? 2. What are some of the challenges to modern cooperative efforts?	<ul style="list-style-type: none"> ▸ <i>Why Humans Cooperate</i> "Cooperative dilemmas in the world today" ▸ <i>Scientific American</i> "No country is an island" ▸ <i>NPR Planet Money</i> "Give Me the Money or I'll Shoot the Trees" ▸ <i>National Geographic</i> "Rain Forest for Sale" ▸ <i>The Guardian</i> "Yasuni: Ecuador abandons plan to stave off Amazon drilling" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	Group Activity: Deciding the fate of Yasuni National Park <ul style="list-style-type: none"> • x • x • x • x 	NO
14	The future of cooperation	1. What social dilemmas present challenges to maintaining future cooperative civilizations? 2. How can an understanding of how cooperation evolves lead to a better future?	<ul style="list-style-type: none"> ▸ <i>Scientific American</i> "The ethics of climate change" ▸ <i>Harvard Business Review</i> "The Unselfish Gene" ▸ <i>Scientific American</i> "Don't talk, reproduce" 	<ul style="list-style-type: none"> ➔ Reading Response Questions due @ 5 pm EST on the day before your class section meets ➔ Course Evaluations ➔ Last hour of class used for <i>Final Exam Review</i> ➔ Follow-Up Questions due @ 11:59 pm EST 5 days after your class section meets 	FINAL REVIEW, no activity	NO
<i>Studio Days, No Class</i>					n/a	n/a
15	Final Exam taken <u>in class</u> on the LMS.			➔ Class visits a computer lab: remember to bring your Pratt ID!!	FINAL EXAM, no activity	YES

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