

Information on required courses for the Doctoral Concentration in Complex Adaptive Systems Science

Required Core Courses for the Environmental Social Science Degree			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
ESS501	Environmental Social Science: Theory and Practice I	no	3
ESS502	Environmental Social Science: Theory and Practice II	no	3
ASM579 or equivalent	Proposal writing or equivalent	no	3
Three of the Following	Three courses covering the methods and theories of the topical foci of ESS		
ESS510	Urban Environments	No	3
ESS511	Origins and Consequences of Technologies	No	3
ESS512	Landscapes	No	3
ESS513	Institutions, Society and the Environment	No	3
ESS514	Health and the Environment	No	3
One of the Following	Course with the specific focus determined based on the student's interest and research plan		
SSH603	Research Design and Proposal Writing in Social Science and Health	No	3
SSH591	Research Design and Proposal Writing in Anthropology	No	3
	Two courses that provide intensive background in some area of science	No	6
	Electives	no	6
ESS792/799	Research/Dissertation Hours	no	24
Required Concentration Courses			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
ASM591/ BIO591/ APM591	Fundamentals of CASS	no	3-4
<i>One of the following</i>	<u>One course in mathematics of CASS</u>		
AML610	Topics in Applied Mathematics for the Life and Social Sciences	no	3
AML 591	Probability Theory ...or equivalent		

<p><i>One of the following</i></p> <p>AML612</p> <p>AML591</p> <p>ASM591</p> <p>PUP598</p> <p>CES561</p> <p>PAF591</p> <p>BIO545</p>	<p><u>One course in modeling CASS</u> Choose from...</p> <p>Applied Mathematics for the Life and Social Sciences Modeling Seminar</p> <p>Agent Based Modeling</p> <p>Dynamic Modeling in Social and Ecological Systems</p> <p>Modeling and Simulating Urban Environments</p> <p>Modeling & Simulation Theory & Application</p> <p>Introduction to Policy Informatics</p> <p>Populations: Evolutionary Genetics</p> <p>...or equivalent</p>	no	3-4
<p><i>One of the following</i></p> <p>ASM591/BIO591</p> <p>PAF591</p> <p>SOS598</p> <p>PSY576</p> <p>PSY598</p> <p>ANB502</p> <p>BIO591</p> <p>BIO522</p>	<p><u>One course in application of CASS approaches.</u> Choose from...</p> <p>Readings in Complexity</p> <p>Complexity in Public Policy & Management</p> <p>Social Network Analysis</p> <p>Dynamics in Psychology</p> <p>Dynamics in Perception, Action, & Cognition</p> <p>Current Issues in Animal Behavior</p> <p>Topics in Mathematics for Life and Sustainability Science</p> <p>Populations: Evolutionary Ecology</p> <p>...or equivalent</p>	no	3
<p align="center"><u>Elective or Research Courses</u> (as deemed necessary by supervisory committee)</p>			<p align="center"><u>Credit Hours</u></p>
<p>(Prefix & Number)</p>	<p>(Course Title)</p>	<p>(New Course?) Yes or No?</p>	<p>(Insert Section Sub-total)</p>
	<p>Research (CASS related)</p>	no	3
	<p>Research (degree related)</p>	no	9
<p align="center"><u>Culminating Experience</u> <i>E.g. - Capstone project, applied project, thesis (masters only) – 6 credit hours) or dissertation (doctoral only) – 12 credit hours) as applicable</i></p>			<p align="center"><u>Credit Hours</u> (Insert Section Sub-total)</p>
<p align="center">Doctoral Dissertation</p>			<p align="center">12</p>

<p style="text-align: center;"><u>Other Requirements</u> <i>E.g. - Internships, clinical requirements, field studies as applicable</i></p>	<p style="text-align: center;">Credit Hours (Insert Section Sub-total)</p>
<p><i>For doctoral programs</i> – as approved by the student's supervisory committee, the program can allow 30 credit hours from a previously awarded master's degree to be used for this program. As applicable, please indicate the total credit hour allowance that will be used for this program.</p>	<p>45-47</p>
<p>Total required credit hours</p>	

Required Core Courses for the Social Science & Health Degree			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
ASB591/ SSH510	Health: Social and Bio-cultural Theories	no	3
ASB500 or equivalent	Ethnographic Research Methods	no	3
SSH511, ASB591, or equivalent	Ethics, Social Justice, and Health Social Science	No	3
	Poverty, Social Justice, and Global Health	No	3
	Or Equivalent	no	3
	A research design/proposal writing course	No	3
	At least two advanced statistical courses	no	6
	At least one advanced course in epidemiology		3
	At least two additional methods courses		6
	A relevant community-based internship/practicum		
	A foreign language		
Required Concentration Courses			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
ASM591/ BIO591/ APM591	Fundamentals of CASS	no	3-4
<i>One of the following</i> AML610 AML 591	<u>One course in mathematics of CASS</u> Topics in Applied Mathematics for the Life and Social Sciences Probability Theory <i>...or equivalent</i>	no	3

<p><i>One of the following</i></p> <p>AML612</p> <p>AML591</p> <p>ASM591</p> <p>PUP598</p> <p>CES561</p> <p>PAF591</p> <p>BIO545</p>	<p><u>One course in modeling CASS</u> Choose from...</p> <p>Applied Mathematics for the Life and Social Sciences Modeling Seminar</p> <p>Agent Based Modeling</p> <p>Dynamic Modeling in Social and Ecological Systems</p> <p>Modeling and Simulating Urban Environments</p> <p>Modeling & Simulation Theory & Application</p> <p>Introduction to Policy Informatics</p> <p>Populations: Evolutionary Genetics</p> <p>...or equivalent</p>	no	3-4
<p><i>One of the following</i></p> <p>ASM591/BIO591</p> <p>PAF591</p> <p>SOS598</p> <p>PSY576</p> <p>PSY598</p> <p>ANB502</p> <p>BIO591</p> <p>BIO522</p>	<p><u>One course in application of CASS approaches.</u> Choose from...</p> <p>Readings in Complexity</p> <p>Complexity in Public Policy & Management</p> <p>Social Network Analysis</p> <p>Dynamics in Psychology</p> <p>Dynamics in Perception, Action, & Cognition</p> <p>Current Issues in Animal Behavior</p> <p>Topics in Mathematics for Life and Sustainability Science</p> <p>Populations: Evolutionary Ecology</p> <p>...or equivalent</p>	no	3
<p><u>Elective or Research Courses</u> (as deemed necessary by supervisory committee)</p>			<p><u>Credit Hours</u></p>
<p>(Prefix & Number)</p>	<p>(Course Title)</p>	<p>(New Course?) Yes or No?</p>	<p>(Insert Section Sub-total)</p>
	<p>Research (CASS related)</p>	no	3
	<p>Research (degree related)</p>	no	9
<p><u>Culminating Experience</u> <i>E.g. - Capstone project, applied project, thesis (masters only) – 6 credit hours) or dissertation (doctoral only) – 12 credit hours) as applicable</i></p>			<p><u>Credit Hours</u> (Insert Section Sub-total)</p>
<p>Doctoral Dissertation</p>			<p>12</p>

<p style="text-align: center;"><u>Other Requirements</u> <i>E.g. - Internships, clinical requirements, field studies as applicable</i></p>	<p style="text-align: center;">Credit Hours (Insert Section Sub-total)</p>
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Total required credit hours	

Required Core Courses for the PhD in Sustainability Degree			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
SOS510	Perspectives on Sustainability	no	3
SOS511	Introduction to Research Methods in Sustainability	no	3
SOS512 SOS513 SOS514 SOS515 SOS516 SOS591 SOS591	In addition, students must take 6 hours of the following if admitted with a Master's Degree and 9 hours with a Bachelor's Degree Sustainable Resource Allocation Science for Sustainability Human Dimensions of Sustainability Industrial Ecology and Design for Sustainability Science, Technology and Public Affairs Uncertainty and Decision Making Sustainability and Enterprise	No, for all	3 for all
SOS530 SOS532 SOS533 SOS534 SOS535 SOS536 SOS591 SOS598	At least one Challenge Area Seminar: International Development and Sustainability Sustainable Urban Dynamics Sustainable Water Sustainable Energy and Material Use Sustainable Ecosystems Food System Sustainability Legal Issues in Sustainability Urban Ecological Systems	No, for all	3 for all (except 4 for SOS535)
	Required Solutions Workshop	no	3
SOS792/799	Required Research and Dissertation	no	24
Required Concentration Courses			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
ASM591/ BIO591/ APM591	Fundamentals of CASS	no	3-4
<i>One of the following</i> AML610 AML 591	<u>One course in mathematics of CASS</u> Topics in Applied Mathematics for the Life and Social Sciences Probability Theory <i>...or equivalent</i>	no	3

<p><i>One of the following</i></p> <p>AML612</p> <p>AML591</p> <p>ASM591</p> <p>PUP598</p> <p>CES561</p> <p>PAF591</p> <p>BIO545</p>	<p><u>One course in modeling CASS</u> Choose from...</p> <p>Applied Mathematics for the Life and Social Sciences Modeling Seminar</p> <p>Agent Based Modeling</p> <p>Dynamic Modeling in Social and Ecological Systems</p> <p>Modeling and Simulating Urban Environments</p> <p>Modeling & Simulation Theory & Application</p> <p>Introduction to Policy Informatics</p> <p>Populations: Evolutionary Genetics</p> <p>...or equivalent</p>	no	3-4
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<p><u>Elective or Research Courses</u> (as deemed necessary by supervisory committee)</p>			<p><u>Credit Hours</u></p>
<p>(Prefix & Number)</p>	<p>(Course Title)</p>	<p>(New Course?) Yes or No?</p>	<p>(Insert Section Sub-total)</p>
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<p><u>Culminating Experience</u> <i>E.g. - Capstone project, applied project, thesis (masters only) – 6 credit hours) or dissertation (doctoral only) – 12 credit hours) as applicable</i></p>			<p><u>Credit Hours</u> (Insert Section Sub-total)</p>
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<p>Total required credit hours</p>	

Required Core Courses for the PhD in Applied Mathematics for the Life and Social Sciences			Credit Hours
<i>(Prefix & Number)</i>	<i>(Course Title)</i>	<i>(New Course?) Yes or No?</i>	(Insert Section Sub-total)
AML610	Topics in AMLSS	no	3
AML611	Research Design and Proposal Writing	no	3
AML612	AMLSS Modeling Seminar	No	3
AML613	Probability and Stochastic Modeling for LSS	no	3
	One course in bio-statistics	no	3
	Elective and Research Courses At least 6 hours in the Life Sciences and 6 hours in the Social Sciences	no	12
	One course in Numerical Analysis	no	3
AML792	Dissertation Research	no	12
AML799	Dissertation	no	12
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