EMERGENCE, EXPLANATION AND COMPLEXITY

Course Code: 31042

Dates: 1st – 26th August 2011
10 ECTS

Lecturer: Alan Baker
Dept. of Philosophy, Swarthmore College

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Outline

The rise of the interdisciplinary scientific study of complex phenomena, from anthills to brains to global climate, raises many interesting philosophical questions. What is it for a phenomenon to be complex? Are there methodological approaches that are distinctive to complexity science? This course will provide an overview of these issues, with a focus on two topics in particular.

The first topic is emergence, which has been an important yet elusive concept in the debate over reductionism in both philosophy of science and philosophy of mind. We will explore potential links between emergence and complexity, and whether insights from complexity science can help sharpen the concept of emergence.

The second topic is explanation. We will examine the leading philosophical accounts of scientific explanation and assess the extent to which they capture the way explanation works for complex phenomena. We will also look at the relation between explanation and prediction for complex systems, and how explanation functions against the background of the widespread use of simulations in complexity science.

Set Text

There is one set text for the course, and students should plan to read as much of this as possible before arrival in Aarhus:


Electronic Resources / Readings

All of the core readings, and most of the further readings, will be available electronically through the Aula site for this course.
**Course Schedule**

**Week 1**

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<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Monday, 1(^{st}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Introduction Emergence</td>
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<tr>
<td>Tuesday, 2(^{nd}) August</td>
<td>16 – 18</td>
<td></td>
<td>discussion forum</td>
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<tr>
<td>Wednesday, 3(^{rd}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Explanation</td>
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<tr>
<td>Thursday, 4(^{th}) August</td>
<td>16 – 18</td>
<td></td>
<td>discussion forum</td>
</tr>
<tr>
<td>Friday, 5(^{th}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Complexity</td>
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**Week 2**

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<th>Day</th>
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<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Monday, 8(^{th}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Emergence: Parts and Wholes</td>
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<tr>
<td>Tuesday, 9(^{th}) August</td>
<td>16 – 18</td>
<td></td>
<td><em>discussion forum</em></td>
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<tr>
<td>Wednesday, 10(^{th}) August</td>
<td>9 – 12:30</td>
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<td>Emergence: Levels and Explanation</td>
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<tr>
<td>Thursday, 11(^{th}) August</td>
<td>16 – 18</td>
<td></td>
<td><em>discussion forum</em></td>
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<tr>
<td>Friday, 12(^{th}) August</td>
<td>9 – 12:30</td>
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<td>Weak Emergence and Simulation</td>
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**Week 3**

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<th>Day</th>
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<th>Time</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Monday, 15(^{th}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Emergence and Complex Systems</td>
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<tr>
<td>Tuesday, 16(^{th}) August</td>
<td>16 – 18</td>
<td></td>
<td><em>discussion forum</em></td>
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<tr>
<td>Wednesday, 17(^{th}) August</td>
<td>9 – 12:30</td>
<td></td>
<td>Explanation in Complex Systems</td>
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<tr>
<td>Thursday, 18(^{th}) August</td>
<td>14:45 – 19</td>
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<td>Workshop: Philosophy of Systems Biology</td>
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<tr>
<td>Friday, 19(^{th}) August</td>
<td>9 – 12:30</td>
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<td>Complex Networks</td>
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<td></td>
<td>14:45 – 19</td>
<td>Workshop: Philosophy of Systems Biology</td>
</tr>
<tr>
<td>Saturday 20(^{th}) August</td>
<td>9 – 13:15</td>
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<td>Workshop: Philosophy of Systems Biology</td>
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Week 4

Monday, 22nd August  9 – 12:30  student presentations (I)
Tuesday, 23rd August  9 – 12:30  student presentations (II)
Wednesday, 24th August  9 – 12:30  discussion of final papers

Assessment

1. Seminar Papers: At least three papers covering selected seminar topics. A schedule for each student will be worked out during Week 1.

Length of seminar papers should not normally exceed 1500 words. Seminar papers should be posted electronically on the Aula course site by 22:00 on the day before the relevant seminar.

2. Final Project: One final project, maximum length 5000 words, on a topic that must be approved in advance by the instructor. The deadline for having project topics approved is Saturday 20th August.

3. Class Participation: Active participation is expected in class discussion.

Core Readings

Week 1

Monday, 1st August  Emergence


Wednesday, 3rd August  Explanation


Friday, 5th August  Complexity

**Week 2**

**Monday, 8\textsuperscript{th} August**  
Emergence: Parts and Wholes


**Wednesday, 10\textsuperscript{th} August**  
Emergence: Levels and Explanation


**Friday, 12\textsuperscript{th} August**  
Weak Emergence and Simulation


**Week 3**

**Monday, 15\textsuperscript{th} August**  
Emergence and Complex Systems


**Wednesday, 17\textsuperscript{th} August**  
Explanation in Complex Systems


**Friday, 19\textsuperscript{th} August**  
Complex Networks