# Course Approval Form

**For instructions:**
*http://registrar.gmu.edu/facultystaff/catalog-revisions/course/*

**Action Requested:** (definitions available at website above)
[X] Create NEW [ ] Inactivate
[ ] Modify (check all that apply below)

[ ] Title (must be 75% similar to original) [ ] Repeat Status [ ] Prereq/coreq [ ] Grade Mode
[ ] Credits [ ] Schedule Type [ ] Restrictions [ ] Other: _____

**Course Level:**
[X] Undergraduate [ ] Graduate

**College/School:** COS **Department:** Computational and Data Sciences
**Submitted by:** Andrew Crooks **Ext:** 34640 **Email:** Acrooks2@gmu.edu

**Subject Code:** CDS **Number:** 205
(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

**Effective Term:** [ ] Fall [X] Spring [ ] Summer *Year* 2017

**Title:**
Current: Introduction to Agent-based Modeling and Simulation
Banner (30 characters max w/ spaces): Intro Agent-based Model & Sim
New:

**Fulfills Mason Core Req?** (undergrad only)
[ ] Currently fulfills requirement
[ ] Submission in progress

**Credits:** (check one)
[X] Fixed → 3
[ ] Variable → to
[ ] Lec + Lab/Rct→ 0 or

**Repeat Status:** (check one)
[X] Not Repeatable (NR)
[ ] Repeatable within degree (RD) →
[ ] Repeatable within term (RT) →
Max credits allowed: (required for RT/RD status only)

**Grade Mode:** (check one)
[X] Regular (A, B, C, etc.)
[ ] Satisfactory/No Credit
[ ] Special (A, B C, etc. +IP)

**Schedule Type:** (check one)
LEC can include LAB or RCT if linked sections will be offered
[X] Lecture (LEC)
[ ] Lab (LAB)
[ ] Recitation (RCT)
[ ] Internship (INT)
[ ] Independent Study (IND)
[ ] Seminar (SEM)
[ ] Studio (STU)

**Prerequisite(s)** (NOTE: hard-coding requires separate Prereq Checking form; see above website):
None

**Corequisite(s):**

**Restrictions Enforced by System:** Major, College, Degree, Program, etc. Include Code(s).
None

**Equivalencies** (check only as applicable):
[ ] YES, course is 100% equivalent to _____
[ ] YES, course renumbered to or replaces _____

**Catalog Copy for NEW Courses Only** (Consult University Catalog for models)

| **Description** (No more than 60 words, use verb phrases and present tense) | **Notes** (List additional information for the course) |
|---|---|
| Undergraduate-level introduction to Agent-based Modeling. Provides a background onto why agent-based models and hands-on examination of agent-based models in the social sciences by examining and experimenting with a variety of social simulation projects. | |

**Indicate number of contact hours:** Hours of Lecture or Seminar per week: 3 Hours of Lab or Studio: 0
**When Offered:** (check all that apply) [ ] Fall [ ] Summer [X] Spring

## Approval Signatures

Department Approval Date College/School Approval Date

**If this course includes subject matter currently dealt with by any other units**, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

| Unit Name | Unit Approval Name | Unit Approver's Signature | Date |
|---|---|---|---|
| | | | |
| | | | |

## For Graduate Courses Only

Graduate Council Member Provost's Office Graduate Council Approval Date

*Form revised 9/14/2015*

# Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

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**FOR ALL COURSES** (required)

Course Number and Title: CDS 205: Introduction to Agent-based Modeling and Simulation

Date of Departmental Approval: 10th November 2015

**FOR NEW COURSES** (required if creating a new course)

- Reason for the New Course:
  - The growth in computational power has enabled us to explore more complex problems and build and analyze more complex models. With respect to the social sciences, the agent-based modeling methodology is leading in this domain. There is no undergraduate course at Mason that exposes students to such a methodology which can be applied to all social science disciplines.
  - Students will be required to carry out short modeling exercises in this course thus turning what has been taught in the class into practice.
  - By the end of the course the student will not only understand what agent-based modeling offers to the social and computational sciences but also be able to design, implement and analyze a simple agent-based model by themselves.
- Relationship to Existing Programs: None, new course which has no overlap with others at GMU.
- Relationship to Existing Courses: New course which will enhance our offerings to modeling and simulation.
- Semester of Initial Offering: Spring 2017
- Proposed Instructors: TBD
- Tentative Syllabus Below

# CDS 205
# Introduction to Agent-based Modeling and Simulation

**-- DRAFT SYLLABUS --**

**Prerequisites:** None

**Credits: 3**

**Instructor: TBD**

**Office Hours: TBD**

**Course Description:** Undergraduate-level introduction to Agent-based Modeling. Provides a background onto why agent-based models and hands-on examination of agent-based models in the social sciences by examining and experimenting with a variety of social simulation projects.

**Lecture Content:**

1. Introduction to Agent-based modeling
2. Why agent-based modeling
3. What is Agent-based modeling
4. Creating Simple agent-based models
5. The components of agent-based modeling
6. Exploring and Extending Agent-based models
7. Analyzing agent-based models
8. Verification, Validation and Replication
9. Advanced topics and Applications

**Homework:** Students will be expected to complete bi-weekly assignments and 1 project.
**Exams:** There will be one final exam and a midterm.
**Evaluation:** Homework (40%), Project (20%), Midterm (10%), Final Exam (30%)

**Required Textbooks:** Wilensky, U., & Rand, W. (2015). An Introduction to Agent-Based Modeling: Modeling Natural, Social, and Engineered Complex Systems with NetLogo. MIT Press.