

SCUDEM I 2017

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[Problem Statements](#)

Overview:

We offer an invitation for an Inaugural October 2017 SCUDEM, at [Mount Saint Mary College, Newburgh NY](#), with Competition Saturday, 14 October 2017, for schools within a two hour drive of [Newburgh NY USA](#).

The student competition takes place over a week-long period that begins at each team's individual home campus and culminates on Saturday, 14 October 2017, at a regional host site. At 8:00 AM EST on Monday, 9 October 2017, registered student teams can access three modeling scenarios involving differential equations, [posted at our SIMIODE website](#). These teams will work at their home institution, developing approaches and solutions to their chosen modeling scenario. The scenarios are designed so that every team may experience success in modeling, building their skills and confidence in differential equations. Each team will prepare a draft Executive Summary and 10 minute Presentation to bring to the regional host site on Competition Saturday, 14 October 2017. There, student teams will work on a small modification of the modeling scenario they have selected (for example, effects of new assumptions, variables or changes in parameters) for inclusion in their final submissions. In the morning faculty will participate in faculty development experiences to help them incorporate more modeling in their coursework. SIMIODE has faculty development materials available and will work with local campus coordinators to tailor the workshops. Student teams will address the expansion to their problem, refine their Executive Summary and practice their Presentation, adding any additional details needed. At noon, students will turn in the final draft of their Executive Summary which will be judged by coaches and faculty present. During the afternoon session, each team, in one of two tracks of six teams, will give a 10 minute Presentation, scored by an audience of coaches, faculty, and participating students. The competition culminates with an awards ceremony rounding out the day by 4:30 PM to allow time to travel home. There is a \$200 registration fee for each team participation and faculty development workshop for faculty coach. If there is room for an additional team from the same school with another coach the registration for the second team will be \$200 as well. Additional faculty, who are not coaching a team, may join workshop and judging activities at no cost. Membership in SIMIODE is FREE. Full Registration will consist of (1) coach registering and paying registration fee, (2) coach and team members registering at www.simiode.org, (3) completion of pre-event survey online, and (4) confirmation of registration by SIMIODE.

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Assumptions/Rules:

1. This competition is for three member teams of students at the undergraduate level or lower.
2. Registration begins 15 August 2017. Team member names are due 29 September 2017, the closing date for registration.
3. Competition begins 8:00 AM EST Monday, 9 October 2017, and closes on following Saturday, 14 October 2017, at noon local site time.
4. There will be twelve teams and 1 faculty coach per team at each local site.
5. Teams can register 8 weeks before the competition with team members registering for SIMIODE and SCUDEM and filling out pre-competition self-assessment form. Also coaches register at SIMIODE and fill out pre-development activities form.
6. At 8 AM EST Monday preceding Competition Saturday teams will access and select the one problem on which they wish to work. Problems will be from 3 different areas: physics/engineering, biology/chemistry, and social sciences/humanities.
7. During the Week (Monday through Friday) teams work on their problem, producing a two page Executive Summary and a 10 minute Presentation to bring (electronically/physically) to local site. An Executive Summary is typically a Summary of the results which is forwarded to an Executive for a decision. It might well be named Essential Summary as it should have the essentials of the activity described, with attention to terms, definitions, assumptions, details, results or conclusions, and reflection, but NOT be laden with computations or reference material. ***NO animate assistance to the team is permitted on the problem effort.***
8. On Competition Saturday morning the following break outs will occur from 9 AM to Noon at local site.
 1. Faculty meet for faculty development activities and discussions on using modeling in teaching.
 2. Student teams go to separate rooms to address a supplemental issue posed for each problem to be released at 9:00 AM on Competition Saturday and incorporate the results of their efforts in their Executive Summary and Presentation. This does NOT mean a rewrite of their products drawn up during the week. Rather, the team should address how they believe this additional information might alter their model and conjecture (in an informed manner) how their results might change, WITHOUT actually carrying out detailed analyses.
9. At noon local site time student teams post their Executive Summary and Presentation in SIMIODE Project Area and render an electronic copy to competition monitors for judging efforts.

Competition Saturday schedule: 8:30 AM – 4:30 PM (Local time)
Judging, Fellowship, Awards

8:30 AM	Teams arrive at local site. Debriefing, confirmation/registration, tour of facilities.
9:00 AM	<ol style="list-style-type: none">1. Faculty meet for faculty development and discussion on using modeling in teaching differential equations and other courses. Three 50 minute sessions with 10 minute breaks: (1) overview and active engagement in Modeling Scenarios from SIMIODE; (2) activities from mathematical biology course including "Zombie" modeling; and (3) round table discussion and sharing of opportunities, issues, and experiences in using modeling in differential equations courses and other courses.2. Student teams go to separate rooms to address an additional issue posed for each problem and incorporate the results of their efforts in the Executive Summary and Presentation.
Noon	Two page Executive Summary and Presentation submitted electronically. Printed out for faculty judges by student assistant during faculty lunch. Faculty and students break for lunch in college dining area on pay as you go basis. All visitors are expected to pay for their own lunch in institution dining area.
1:00 PM	Faculty and students return to designated rooms for faculty scoring/judging of Executive Summary in double blind system. Students compete in fun Math Bowl.
2:00 PM	Teams make Presentations— two sets of 6 Presentations —10 minutes each, 5 minutes for questions, and 5 minute break between Presentations for scoring by fellow students and faculty. (Total 2 hours.)
4:15 PM	(15 minute) Award presentations to first place and second place teams and perhaps some other awards, for example, incorporation of additional issue introduced in morning, and celebration followed by departure at 4:30 PM.

Objectives:

1. Offer students modeling opportunities in one area of mathematics, differential equations, to practice modeling skills and permit focus on modeling approach and mathematics.
2. Foster the value and applicability of differential equations as an area of study.
3. Bring faculty coaches together for Faculty Development to experience modeling activities and share ideas and activities from their own teaching in the area of modeling with differential equations and other courses.
4. Get students to think about value in teaching with modeling and invite exceptional student efforts to submit a full write-up for peer-reviewed Modeling Scenario publication in SIMIODE.

SCUDEM Offerings:

- Create a supportive and competitive environment for modeling at host sites (for schools within a 2 hour drive) that builds camaraderie for students through team work.
- Give students feedback on their work through seeing other group presentations, receiving feedback from on-site judges, and seeing final awards.
- Offer faculty development activities with respect to modeling in teaching.
- Recognize creative skills and communication of students.
- Have an enjoyable experience for faculty as well as for students.
- Period of time is given to invited teams with exceptional results to write-up their materials as publication-quality Modeling Scenarios, ready for SIMIODE referees.
- SCUDEM Leadership Group reviews the submissions of the finalists for publications and chooses national winners.

Benefits for school, students, and faculty

School:

For school there is the fact that a team has represented the school on the fields of friendly strife, a certificate of completion of a model in response to a real-world situation, and the possibility of winning a regional, even a national competition with attendant prizes. Most importantly, there is individual and school recognition as well as participation and dialogue with peers.

Students:

For students there is the camaraderie of the three person team and the opportunity to meet with other students who are passionate about applying mathematics. For students

of mathematics to be honored as a team effort is very motivating and students who compete in the COMAP MCM/ICM say, unequivocally that the time spent was the best undergraduate mathematics experience they have had. While on a different scale, SCUDEM should generate a comparable response. There would be a certificate of completion of a model in response to a real- world situation and the possibility of winning a regional, even a national competition with attendant prizes and publication.

Faculty:

For faculty this is a chance to share with colleagues their classroom modeling activities in an informal setting, perhaps as a prelude for a paper to present at a conference or write for a journal as well as experience modeling in a classroom setting through an informal faculty development program. Faculty will make contacts with others who are interested in modeling in their coursework, contacts which can function and last as they are made at the regional level. Faculty can come away from discussions held at the competition site refreshed with new ideas from other faculty, proud of what their students can accomplish, and in touch with new found professional friendships.