

# Mathematical Modeling Certificate

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This certificate prepares students to describe, formulate and analyze real world problems in mathematical terms. Students will be exposed to a broad range of applicable analytical tools arising in different areas of mathematics such as Dynamical Systems, Partial Differential Equations, Linear Algebra, Graph Theory, etc. Examples that can be treated with these tools include mathematical models that describe the flow of water in a pipe, Keynesian cross model of a national economy, opinion dynamics, protein dynamics, chemical oscillators, predator-prey model, genetic control systems, chaotic waterwheels, neural networks and network flows.

## Program Requirements

- At least 12 credit hours
- All courses must be taken for a grade.
- A grade point average of 3.0 or above is required for the completion of the certificate.
- All four courses must be taken at Miami University.

### Prerequisites:

- Mathematics courses: MTH 222, MTH 245 (MTH 246 or MTH 347), MTH 252, and MTH 331 (MTH 331 is only required for MTH 432 and MTH 438).

Code	Title	Credit Hours
<b>Select at least three of the following:</b>		<b>9</b>
MTH 432	Optimization	
MTH 433	Applied Linear Algebra	
MTH 455	Introduction to Partial Differential Equations	
MTH/MME 495	Introduction to Applied Nonlinear Dynamics	
<b>Select enough additional courses from the following list, or from the list above, to meet the hours requirement:</b>		<b>3</b>
MTH 435	Mathematical Modeling Seminar	
MTH 438	Theory and Applications of Graphs	
<b>Total Credit Hours</b>		<b>12</b>