

Course Description Form

1. Course Name:	
Mathematical Modeling	
2. Course Code:	
MS 303	
3. Semester / Year:	
first Semester/2024-2023	
4. Description Preparation Date:	
25-10-2024	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 hours/ 4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Reem Taha Abdulqader Email: Reemalhwez84@tu.edu.iq	
8. Course Objectives	
Course Objectives	<ol style="list-style-type: none"> 1- Give an introduction to mathematical modeling. 2- The student learns how to build a mathematical model. 3- The students awareness of the mathematical model by taking realistic applied examples. 4- The student learned how to program mathematical models using computer program. 5- For the student to become familiar with the applications of mathematical modeling in reality including modeling society. 6- To learn about economic modeling and environmental systems modeling.
9. Teaching and Learning Strategies	
Strategy	<p>There are several strategies that can be used in the learning and teaching process of mathematical modeling..</p> <ol style="list-style-type: none"> 1. Active learning: It requires students to actively participate in the learning process. This can be achieved by asking interesting questions and mathematical challenges to stimulate curiosity and interaction. Interactive activities such as group modeling and practical problem solving can be organised 2. Practical application: Learning in mathematical modeling should be linked to its practical applications. Real-life problems and challenges can be presented

- for students to solve using mathematical modeling. This allows students to see the value and importance of the material they are learning in everyday life
3. Cooperative learning: Students can be encouraged to work together in small groups to solve modeling problems. They can exchange knowledge, ideas and experiences, enhance their common understanding and develop communication and collaboration skills.
 4. Use of technology: Available technological tools and programs can be used to enhance the learning process and analyze mathematical models.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	System, variables, constants and models	Models and their types	Lectures	Discussion and tests
2	4	Classification of Mathematical models	Mathematical models	Lectures	Discussion and tests
3	4	Stages of building Mathematical model	Mathematical modeling	Lectures	Discussion and tests
4	4	Standardization (sizing) and time Standardization	Standardization (sizing) and time Standardization	Lectures	Discussion and tests
5	4	Error measures, rounding, and standard methods of rotation	Approximation and reasonableness of answers	Lectures	Discussion and tests
6	4	Case studies in change modeling	Modeling change	Lectures	Discussion and tests
7	4	Kinetic systems	Kinetic systems	Lectures	Discussion and tests
8	4	Solving linear difference equations of first order	Modeling with difference equations	Lectures	Discussion and tests
9	4	Study the modeling process	modeling process	Lectures	Discussion and tests
10	4	Modeling using proportionality and geometric similarity	proportion and geometric similarity	Lectures	Discussion and tests
11	4	Fitting time series models and special models	Model fit	Lectures	Discussion and tests
12	4	A general model for experimental data	Experimental modeling	Lectures	Discussion and tests
13	4	Transport traffic modeling case studies	Kinetic modeling of Kinetic systems	Lectures	Discussion and tests
14	4	Case studies in simulation modeling	simulation modeling	Lectures	Discussion and tests
15	4	Function graphs as models	Function graphs as models	Lectures	Discussion and tests

