Course Code and Course Title	English SCIN 171 Modelling and Simulation Thai วทนว 171 การสร้างแบบจำลองและการจำลองสถานการณ์
Number of Credits	2 (2-0-4)
Curriculum and Course Type	Program of Study Bachelor's Degree Program in Science and Technology (International Program, Multidisciplinary Program) Course Type Specific Courses
Course Coordinator	Asst.Prof. Somkid Amornsamankul, Ph.D Address: Department of Mathematics, Faculty of Science, Mahidol University Tel: (66) 02-201-5341 email: somkid.amo@mahidol.ac.th
Semester/Year of Study	Academic Year 2023 First Semester (1/2023) / First Year
Prerequisite	None
Co-requisite	None
Day/Time/Study Site Location	Tuesday / 10:30AM-12:30PM Faculty of Science, Mahidol University, Salaya Campus
Date of Latest Revision	July **2023**

Course Learning Outcomes (CLOs)

After successful completion of this course, students are able to

1) CLO1 model deterministic systems and differentiate between nonlinear and linear models.
2) CLO2 numerically simulates linear and non-linear ordinary differential equations and deterministic systems.
3) CLO3 estimates and validates a model based upon input and output data.
4) CLO4 creates a model prediction based upon new input and validates the output data.
5) CLO5 comprehends and apply theory-based understanding of fundamentals of knowledge in the selected discipline area to predict the effect of activities.
6) CLO6 apply natural, physical and biological sciences, mathematics, statistics, computer and information sciences to applications

1.

Course Description

Modelling and simulation concepts. Real world and model world. Continuous, and discrete models. Computational simulation. Monte Carlo method. Numerical methods, Visualization and analysis of simulation results.

Credit Hours / Trimester

Theory (Hours)	Addition Class (Hours)	Laboratory/Field trip/ Internship (Hours)	Self-study (Hours)
30 Hours/Semester (2 Hours x 15 Weeks)	-	-	60 Hours/Semester (4 Hours x 15 Weeks)

Number of Hours per Week for Individual Advice

2 hours per week or student requirement during prescribed date and time

Evaluation of the CLOs

Course Learning Outcomes		Evaluation Strategies			Weight (%)
		Class Attendance, Participation and Behavior in Class	Written Exam	Class Project Executed without Plagiarism	
CLO1	model deterministic systems and differentiate between nonlinear and linear models.	2%	-	10%	12%
CLO2	numerically simulate linear and non-linear ordinary differential equations and deterministic systems.	2%	20%	10%	32%
CLO3	estimate and validate a model based upon input and output data.	2%	10%	-	12%
CLO4	create a model prediction based upon new input and validate the output data.	2%	-	10%	12%
CLO5	comprehend and apply theory-based understanding of fundamentals of knowledge in the selected discipline area to predict the effect of activities.	2%	10%	10%	22%
CLO6	apply natural, physical and biological sciences, mathematics, statistics, computer and information sciences to applications	-	-	10%	10%
	Total	**10%**	**40%**	**50%**	**100%**

Measurement and evaluation

After completion of the evaluation process each student is assigned a criterion-referenced grade (as shown in the table below). Evaluation and achievement will be justifying according to Faculty and University code, conducted by grading system of A, B+, B, C+, C, D and F. To pass this course, student must earn a grade of a least D.

Total Percentage of Evaluation	Below 20	20-29.99	30-39.99	40-49.99	50-59.99	60-69.99	70-79.99	80-100
Grade	F	D	D+	C	C+	B	B+	A

Teaching staff:

Code	Name	Email
SA	Somkid Amornsamankul M 203, M. Bld. (MUSC-Phayathai)	somkid.amo@mahidol.ac.th

Teaching Schedule 1st Semester of Academic Year 2023

Tuesday 10:30AM-12:30PM, Faculty of Science, Mahidol University, Salaya Campus

Week	Date	Topic	Number of Hours		Instructor
			Lecture	Laboratory	
1	8 Aug 2023	Introduction of course discipline and class orientation, What is Modelling? What is simulation?	2	0	Asst. Prof. Somkid Amornsamankul
2	15 Aug 2023	What is Modelling? What is simulation?	2	0	Asst. Prof. Somkid Amornsamankul
3	22 Aug 2023	Real world vs. model world	2	0	Asst. Prof. Somkid Amornsamankul
4	5 Sep 2023	Real world vs. model world	2	0	Asst. Prof. Somkid Amornsamankul
5	12 Sep 2023	Continuous, and discrete models	2	0	Asst. Prof. Somkid Amornsamankul
6	19 Sep 2023	Continuous, and discrete models	2	0	Asst. Prof. Somkid Amornsamankul
7	26 Sep 2023	Computational simulation	2	0	Asst. Prof. Somkid Amornsamankul
Midterm Examination (2 to 6 Oct 2022)					
8	10 Oct 2023	Computational simulation	2	0	Asst. Prof. Somkid Amornsamankul
9	17 Oct 2023	Computational simulation	2	0	Asst. Prof. Somkid Amornsamankul
10	24 Oct 2023	Monte Carlo method	2	0	Asst. Prof. Somkid Amornsamankul
11	31 Oct 2023	Monte Carlo method	2	0	Asst. Prof. Somkid Amornsamankul
12	7 Nov 2023	Numerical methods	2	0	Asst. Prof. Somkid Amornsamankul
13	14 Nov 2023	Numerical methods & visualization	2	0	Asst. Prof. Somkid Amornsamankul
14	21 Nov 2023	Analyses of simulation results	2	0	Asst. Prof. Somkid Amornsamankul
15	28 Nov 2022	Analyses of simulation results	2	0	Asst. Prof. Somkid Amornsamankul
Final Examination (4 Dec to 15 Dec 2023)					