Course Code and Course Title	English SCIN 295 Basic Engineering for Innovator Thai วทนว ๒๙๕ วิศวกรรมพื้นฐานสำหรับนวัตกร
Number of Credits	3 (2-2-5)
Curriculum and Course Type	Program of Study Bachelor's Degree Program in Science and Technology (International Program, Multidisciplinary Program) Course Type Core course
Course Coordinator	Thitisilp Kijchavengkul, Ph.D. Address: School of Bioinnovation and Bio-based Intelligence, Room SC1-306 Faculty of Science Building 1, Mahidol University, Salaya Campus Tel: 090-986-5764 email: thitisilp.kij@mahidol.edu
Semester/Year of Study	Academic Year 2022 Second Semester (2/2022) / Second Year
Prerequisite	None
Co-requisite	None
Day/Time/Study Site Location	Tuesday / 13.00 – 17.00 / Room: To be determined Faculty of Science, Mahidol University, Salaya Campus
Google Classroom link	https://classroom.google.com/c/NTA4OTU0NzQ3Mjkw?cjc=a2ucqxj
Google Classroom Code	a2ucqxj
Date of Latest Revision	**22 December 2022**

Course Learning Outcomes (CLOs)

After successful completion of this course, students are able to

1. Exhibit code of ethics for engineers, especially holding paramount the safety, health, and welfare of the public, in classroom and during practice
2. Describe basic theories of engineering as well as fundamentals and tools related to engineering drawing, prototype production, Industrial scale product processes, and statistical process control

Perform basic technical skills in engineering drawing manually and using comput-er software, and in prototype production using 3D printer with correct scale, measurement, and dimension

Objectives of Development / Revision

By the end of the course, students should have basic knowledge and sufficient basic skills about engineering, including engineering drawing, prototype production, Industrial scale product processes, and statistical process control, as well as understanding about code of ethics for engineers according to National Society of Professional Engineers (NSPE).

Course Description

An introduction to engineering and its relationship with science; code of ethics for engineers; basic engineering drawing; the 2-dimension computer-aided design; the 3-dimension computer-aided design; the design validation; the prototype production; industrial scale product processes; the statis-tical process control

Credit Hours / Trimester

Theory (Hours)	Addition Class (Hours)	Laboratory/Field trip/ Internship (Hours)	Self-study (Hours)
30 Hours/Semester (2 Hours x 15 Weeks)	-	30 Hours/Semester (2 Hours x 15 Weeks)	75 Hours/Semester (5 Hours x 15 Weeks)

Number of Hours per Week for Individual Advice

At least 1 hour / week on a designated date and time or by appointment according to student requirement. Students can contact the instructors by email which will be responded during the office hour.

Evaluation of the CLOs

Learning Outcomes	Measurement Method					Weight (Percentage)
	Student observation in class and during practices	Written examination	Quizzes	Quality of weekly individual class assignments using Rubrics	Quality of weekly individual practice assignments using Rubrics	
CLO1: Exhibit code of ethics for engineers, especially holding paramount the safety, health, and welfare of the public, in classroom and during practice	5			5	5	15
CLO2: Describe basic theories of engineering as well as		25	5	10		40

fundamentals and tools related to engineering drawing, prototype production, Industrial scale product processes, and statistical process control						
CLO3: Perform basic technical skills in engineering drawing manually and using computer software, and in prototype production using 3D printer with correct scale, measurement and dimension	5	10	5		25	45
Total	**10%**	**35%**	**10%**	**15%**	**30%**	**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	30-39	40-49	50-59	60-69	70-79	80-100
Grade	F	D	D+	C	C+	B	B+	A

Teaching Schedule 2nd Semester of Academic Year 2021

Week	Date	Topic	Number of Hours		Instructor
			Lecture	Laboratory	
1	10 Jan 23	No class today	-	-	-
2	17 Jan 23	Class introduction Introduction to engineering and its relationship to science Code of ethics for engineers Basic engineering drawing Lecture: Basic for sketching, lettering, and symbols Practice: Lettering skill	2	2	Thitisilp Kijchavengkul, Ph.D.
3	24 Jan 23	Basic engineering drawing Lecture: Basic for drafting equipment and supplies Practice: Manual drawing of equipment	2	2	Thitisilp Kijchavengkul, Ph.D.
4	31 Jan 23	Basic engineering drawing Lecture: Basic drawing projection Practice: Isometric/Oblique manual drawing skill	2	2	Thitisilp Kijchavengkul, Ph.D.
5	7 Feb 23	Basic engineering drawing Lecture: Descriptive geometry 1 Practice: Descriptive geometry manual drawing skill 1	2	2	Thitisilp Kijchavengkul, Ph.D.
6	14 Feb 23	Basic engineering drawing Lecture: Descriptive geometry 2 Practice: Descriptive geometry manual drawing skill 2	2	2	Thitisilp Kijchavengkul, Ph.D.
7	21 Feb 23	Computer-aided design Lecture: Basic CAD Practice: Practice of 2D CAD drawing skill	2	2	Thitisilp Kijchavengkul, Ph.D.
8	28 Feb 23	Computer-aided design Lecture: 3D CAD Practice: Practice of 3D CAD drawing skill	2	2	Thitisilp Kijchavengkul, Ph.D.
Midterm examination week (7–10 Mar, 2023)					
9	14 Mar 23	Design validation	2	2	Thitisilp Kijchavengkul, Ph.D.
10	21 Mar 23	Prototype production Lecture: Different processes for prototype production Practice: Practice of using 3D CAD on 3D printer	2	2	Thitisilp Kijchavengkul, Ph.D.
11	28 Mar 23	Industrial scale product processes - Batch - Continuous Practice: Design of production process	2	2	Thitisilp Kijchavengkul, Ph.D.
12	4 Apr 23	Statistical process control Lecture/Practice: Statistics for Engineering	2	2	Thitisilp Kijchavengkul, Ph.D.

13	11 Apr 23	Statistical process control Lecture: Qualitative quality control Practice: Production sampling and calculation and construction of qualitative control chart	2	2	Thitisilp Kijchavengkul, Ph.D.
14	18 Apr 23	Statistical process control Lecture: Quantitative quality control Practice: Production sampling and calculation and construction of quantitative control chart	2	2	Thitisilp Kijchavengkul, Ph.D.
15	25 Apr 23	Statistical process control Lecture: Process capability, effectiveness, and efficiency Practice: Calculation of process capability, effectiveness, and efficiency	2	2	Thitisilp Kijchavengkul, Ph.D.
Final examination (1 – 12 May, 2023)					