|  |  |
| --- | --- |
| Course Code and Course Title | English SCIN 103 Bioinnovation and Sustainable Society  Thai วทนว ๑๐๓ ชีวนวัตกรรมและสังคมยั่งยืน |
| Number of Credits | 3 (3-0-6) |
| Curriculum and Course Type | Program of Bachelor’s Degree Program in Science and Technology  (International Program, Multidisciplinary Program)  Course Type General Education |
| Course Coordinator | **Assoc. Prof. Kanyaratt Supaibulwatana, Ph.D.**  Address: N.107 Rm., 1st Fl., N. Bld., Department of Biotechnology, Faculty of Science, Mahidol University, 272 Rama VI Road, Ratchathewi, Bangkok 10400, THAILAND  Tel. 02-201-5303; e-mail: kanyaratt.sup@mahidol.ac.th |
| Semester/Year of Study | Academic Year 2020-21 Second Semester **(2/2020) / First Year** |
| Prerequisite | None |
| Co-requisite | **None** |
| Day/Time/Study Site Location | Friday / 1.30 PM – 4.30 AM / Online + Onsite (SC1-158)  Faculty of Science, Mahidol University, Salaya Campus |
| Date of Latest Revision | **7 January 2021** |

**Course Learning Outcomes (CLOs)**

After successful completion of this course, students are able to

* 1. Explain how nature works regarding the climate, biodiversity and the flow of natural resources, and realize the impact of human activity on the environment based on bioinnovation and perspectives of sustainable society.
  2. Discuss on the case studies or situations in the context of science and technology that involve with bioinnovation and sustainable society.
  3. Apply the knowledge and information concerning bioinnovation and sustainable society for quality of life, sustainable benefits of mankind, society and global environment.
  4. Assess the benefits, opportunities, and challenges of bioresources in today's economy.

**Course Description** The philosophy and significant roles of natural resources management; biodiversity; relation of resource demand and supply with human and environment; potential of bioresources, bioproducts and biological wastes; creative strategies and integration of bioinnovation for sustainable benefits of mankind, society and global environment.

**Credit Hours / Trimester**

|  |  |  |  |
| --- | --- | --- | --- |
| **Theory**  **(Hours)** | **Addition Class**  **(Hours)** | **Laboratory/Field trip/ Internship (Hours)** | **Self-study**  **(Hours)** |
| 45 Hours/Semester | - | - | 90 Hours/Semester |
| (3 Hours x 15 Weeks) |  |  | (6 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** | | **Measurement Method** | | | **Weight (%)** |
| **Class Attendance, Participation and**  **Behavior in Class** | **Written Exam** | **Class**  **Project** |
| **CLO1** | Explain concepts of Bioinnovation and Sustainable Society | - | 25% | - | 25% |
| **CLO2** | Discuss importance of bioinnovation in various aspects related to agriculture, food, energy, environment, health and wellness | 5% | 35% | - | 40% |
| **CLO3** | Apply specific innovation to given problems and/or challenges related to innovation and sustainability using problem-based learning | 5% | - | 30% | 35% |
|  | **Total** | **10%** | **60%** | **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 50 | 50-54.99 | 55-59.99 | 60-64.99 | 65-69.99 | 70-74.99 | 75-79.99 | 80-100 |
| **Grade** | F | D | D+ | C | C+ | B | B+ | A |

**Teaching staff:**

|  |  |  |
| --- | --- | --- |
| **Code** | **Name** | **Email** |
| KS | **Assoc. Prof. Dr. Kanyaratt Supaibulwatana**  N.107, N. Bld. (MUSC-Payathai) | Kanyaratt.sup@mahidol.ac.th |
| SC | Asst.Prof. Dr. Somchai Chauvatcharin BT.208, BT. Bld. (MUSC-Payathai) | somchai.cha@mahidol.ac.th |
| SCh | Dr. Sitthivut Charoensutthivarakul K.617, K. Bld. (MUSC-Payathai) | sitthivut.cha@mahidol.ac.th |
| SN | Asst.Prof. Dr.Siriyupa Netramai  Office: SC1-316 (MUSC-Salaya)  Lab: SC1-353 (MUSC-Salaya) | Siriyupa.net@mahidol.ac.th |
| SS | Dr. Stefan SchreierOffice: SC2-204 (MUSC-Salaya) Lab: SC1-354B (MUSC-Salaya) | stefan.sch@mahidol.ac.th |
| TK | Thitisilp Kijchavengkul  Office: SC1-306 (MUSC-Salaya)  Lab: SC1-353 (MUSC-Salaya) | Thitisilp.kij@mahidol.ac.th |
| WC | Ms. Wannisa  Chuekong (Teaching Assistance) B.400, B. Bld. (MUSC-Payathai) | wannisa.chu@mahidol.ac.th |

| **Week** | **Date** | **Topic** | **Number of Hours** | | **Instructor** |
| --- | --- | --- | --- | --- | --- |
| **Lecture /**  **Conference** | **Laboratory** |
| 1 | 22 Jan. 2021 | Introduction and class assignment  - Bioinnovation and Sustainable Society  - Natural resource challenges & management : Socio-economic aspects of bioresources, environment & innovation | **3** | **0** | **KS** |
| 2 | 29 Jan. 2021 | Experimental design and modeling for bio-based products development | **3** | **0** | TK |
| 3 | 5 Feb. 2021 | Innovation in Food safety & Food security | **3** | **0** | **SN** |
| 4 | 19 Feb. 2021 | Biodegradable material and its roles in global environments | **3** | **0** | TK |
| 5 | 26 Feb. 2021 | Bio-based material & Intelligent packaging | **3** | **0** | SN |
| 6 | 5 Mar. 2021 | Biofuels of the future | **3** | **0** | **SS** |
| 7 | 12 Mar. 2021 | Green architecture & sustainable buildings: The cutting edge technology to build houses | **3** | **0** | **SS** |
| 8 | **Midterm examination week** **(15-19 Mar. 2021)** | | | | KS/WC |
| 9 | 2 Apr. 2021 | Biological wastes & sustainable management | **3** | **0** | **SC** |
| 10 | 9 Apr. 2021 | Innovation of drug discovery for coping with emerging diseases | **3** | **0** | SCh |
| 11 | 16 Apr. 2021 | Medicinal chemistry for health and wellness | **3** | **0** | SCh |
| 12 | 22 Apr. 2021 | DNA teleportation: Electromagnetism and DNA, research feature by Luc Montagnier | **3** | **0** | SS |
| 13 | 30 Apr. 2021 | DNA technology and genetically modified organisms: impact and risk | **3** | **0** | KS |
| 14 | 7 May  2021 | Conferences: Bioinnovation and sustainable ways (Project-based) | **3** | **0** | KS/SN/TK/SCh/WC |
| 15 | **Final examination week (10-21 May 2021)** | | | | KS/WC |