# TQF3 Course Specification

## Section 1 General Information

**1.** Course Code and Title

Thai ICGH105, sec 1: เทคโนโลยี ปรัชญา และมนุษยชาติ: เราอยู่ที่ไหน ณ จุดนี้

English ICGH105, sec 1: Technology, Philosophy and Human Kind: Where Are We Now?!

2. Number of Credits (Theory 4 hrs. Self-study 0 hrs Practice 8 hrs. / week)

3. Curriculum and Course Type

3.1 Program of Study International Bachelor's Degree

3.2 Course Type General Education

3.3 Please Specify Course's Literacy

- ☐ MU Literacy (Core Values, SEP, GE for Human Development)
- ☐ Health Literacy (Health, Sport)
- ☐ Digital Literacy (ICT, Applied Mathematics)
- X Social and Humanity Literacy (Social, Humanity, Law, Ethics,Arts)
- ☐ Communication Literacy (language, Academic Communication)
- ☐ Science and Environmental Literacy (Applied Science for Life,Environmental Responsibility)
- ☐ Finance and Management Literacy (Finance, Management, Entrepreneur)

3.4 Please Specify Relationship between course and corporate culture

| | | |
|---|---|---|
| x | M - Mastery | รู้แจ้ง รู้จริง สมเหตุ สมผล |
| x | A - Altruism | มุ่งผลเพื่อผู้อื่น |
| x | H - Harmony | กลมกลืนกับสรรพสิ่ง |
| | I - Integrity | มั่นคงยิ่งในคุณธรรม |
| x | D - Determination | แน่วแน่ทำ กล้าตัดสินใจ |
| x | O - Originality | สร้างสรรค์สิ่งใหม่ |
| ☐ | L - Leadership | ใฝ่ใจเป็นผู้นำ |

4. Course Coordinator and Instructor

4.1 Course Coordinator: Asst. Prof. York Gunther -- HLD -- phone: 082- 220-1072 -- email: yorkgun@mahidol.ac.th

4.2 Instructor: Mr. Joel Littler

5. Trimester/Class Level

5.1 Trimester: 1-3/ Class Level: undergraduate GE

5.2 Number of Students Allowed: approximately 40 Students

6. Pre-requisite

- none

7. Co-requisites

- none

8. Study Site Location

- MUIC

## Section 2 Aims and Objectives

### 1. Course Goals

By tracing great scientific and technological innovations and inventions through human history, students will be made aware and argumentatively capable of critically evaluating the details and variations in the interplay between different points in human history and the future to come. Students will encouraged to communicate these details and variations, consider the positive and negative impacts of these changes on societies, and develop a flexibility of perspective and open-mindedness to both the pros and cons of science and technology and how future developments may impact our lives in the future.

Course Goals: From the overview perspective of the course instructor, based on the principles, knowledge and skills related to the Program, describe the learning skill the students can develop and apply for further study or work in the future according to the goals set by the instructor in-charge.
This has to correspond to MU-GE Module LOs to equip the students with MU-Graduate Attributes.

### 2. Objectives of Course Development/Revision

2.1 Course Objectives

By tracing great scientific and technological innovations and inventions through human history, students will have grown aware and argumentatively capable of critically evaluating the details and variations in the interplay between different points in human history and the future to come. Students will be able to communicate these details and variations, consider the positive and negative impacts of these changes, and develop a flexibility of perspective and open-mindedness to both the pros and cons of science and technology and how future changes might impact our lives in the future.

Course Objectives: Describe in detail the knowledge, understanding, skills and abilities of students after the course learning achievement, from the perspective of the course instructor in-charge. The objectives can be written based on the domains of learning (cognitive, affective, psychomotor, etc.)

2.2 Course-level Learning Outcomes (CLOs)

By the end of the course, students will be able to (CLOs)

CLO1 To understand pivotal technological innovation, inventions and theories through human history.

CLO2 To recognize the impact such technologies and theories have on the lives of human beings past and present.

CLO3 To critically evaluate and assess the pros and cons of such changes to human life and behavior.

CLO4 To consider how social changes themselves impact both technological innovation and scientific theorizing.

CLO5 To speculate about where human kind will be in the near and distant future.

Remarks:

A. "The course-level expected learning outcomes (CLOs)": Based on the course objectives, explain the knowledge, abilities and skills of students that can be measured and evaluated to make sure that the students get the learning experience, pass the course evaluation based on criteria defined, and achieve the objectives in section 2.1 and the performance based on the standards defined.
B. A good CLO should consist of 3 structural components:
    1. AN ACTION VERB: Identify the ability or skill that the students must perform to be observed or measured.
    2. LEARNING CONTENT: Identify the knowledge that the students will gain and apply for other courses in the program or for future work.
    3. CRITERIA OR STANDARD: Identify the criteria or standards of competency defined in the course to judge the students' achievement.
C. In a CLO, more than one learning domain can be included.
D. Each course should have about 4 – 8 CLOs.

## Section 3 Course Description and Implementation

### 1. Course Description

An examination of major technological and scientific innovations across the globe and their effects on human life and thought. Focus on agriculture, steel, the printing press, the mechanical clock, magnifying lenses, antibiotics, electricity, steam and combustion engines, and the transistor.

การตรวจสอบนวัตกรรมทางเทคโนโลยีและวิทยาศาสตร์ทั่วโลกและผลกระทบต่อชีวิตมนุษย์และความคิด เน้นด้านเกษตรกรรม การพิมพ์ นาฬิกากลจักร เลนส์ขยาย ยาปฏิชีวนะ ไฟฟ้า เครื่องจักรไอน้ำและเครื่องยนต์สันดาป และ ทรานซิสเตอร์

### 2. Number of Hours Per Trimester

| Theory (hours) | Practice (hours) | Self-study (hours) |
|---|---|---|
| 48 | 0 | 96 |

### 3. Number of Hours per Week for Individual Advice

- 4 hours/week
- Students can requests for appointments anytime in the term

Identify the following information: The process or method that the person in-charge uses and time allocated for individual students.

Section 4: Development of the expected learning outcomes

A brief summary of the knowledge or skills expected to develop in students; the course-level expected learning outcomes (CLOs)

By the end of the course, students will be able to

2.2 Course-level Learning Outcomes: CLOs

By the end of the course, students will be able to (CLOs)

CLO1 To understand pivotal technological innovation, inventions and theories through human history.

CLO2 To recognize the impact such technologies and theories have on the lives of human beings past and present.

CLO3 To critically evaluate and assess the pros and cons of such changes to human life and behavior.

CLO4 To consider how social changes themselves impact both technological innovation and scientific theorizing.

CLO5 To speculate about where human kind will be in the near and distant future.

2. Teaching methods for developing the knowledge or skills specified in item 1 and evaluation methods of the course learning outcomes

| | Teaching methods | Evaluation Methods |
|---|---|---|
| CLO1 | Lecture, Class Discussion, Text Analysis | Quizzes, Individual Assignment, Final Examination |
| CLO2 | Lecture, , Class Discussion, Text Analysis | Quizzes, Individual Assignment, Final Examination |
| CLO3 | Lecture, Class Discussion, Text Analysis | Quizzes, Individual Assignment, Final Examination |

| | | |
|---|---|---|
| CLO4 | Lecture, Class Discussion, Text Analysis | Quizzes, Individual Assignment, Final Examination |
| CLO5 | Lecture, Class Discussion, Text Analysis | Quizzes, Individual Assignment, Final Examination |

## Section 5 Lesson Plan and Evaluation

1. Lesson Plan

| Week | Topic/Activity | Number of Hours | | Online | Lecturer | Note |
|---|---|---|---|---|---|---|
| | | Lec-ture Hours | Lab/Field Trip/Intern-ship Hours | | | |
| 1, Friday, 14-17:50 | Introduction / Clean 1 (How We Got to Now, chap 1) | 4 | | x | Joel Littler | Zoom |
| 2 | Clean 2 / Clean 3 (How We Got to Now, chap 1) | 4 | | x | | |
| 3 | Time 1 / Time 2 How We Got to Now, chap 2) | 4 | | x | | |
| 4 | Time 3 How We Got to Now, chap 2) / Glass 1 | 4 | | x | | |
| 5 | Glass 2 / Glass 3 (How We Got to Now, chap 3) | 4 | | x | | |

| Week | Topic/Activity | Number of Hours | | Online | Lecturer | Note |
|---|---|---|---|---|---|---|
| 6 | Light 1 / Light 2 (How We Got to Now, chap 4) | 4 | | x | | |
| 7 | Light 3 (How We Got to Now, chap 4) / Cold 1 | 4 | | x | | |
| 8 | Cold 2 (How We Got to Now, chap 5) / Sound 1 | 4 | | x | | |
| 9 | Sound 2 / Sound 3 (How We Got to Now, chap 6) | 4 | | x | | |
| 10 | The Genealogy and Sociology of Knowledge 1 (Foucault, Bloor) | 4 | | x | | |
| 11 | The Genealogy and Sociology of Knowledge 2 (Hacking, Kuhn) | 4 | | x | | |
| 12 | Review and Open Q&A | 4 | | x | | |
| 13 | Final Examination | | | | | |

| Week | Topic/Activity | Number of Hours | | Online | Lecturer | Note |
|---|---|---|---|---|---|---|
| | Total | 48 | | | | |

2. Plan for Assessing Course Learning Outcomes

2.1 Assessing and Evaluating Learning Achievement

a. Formative Assessment

Problem analysis with concepts maps

Construction of both informal and formal arguments

b. Summative Assessment

(1) Tools and Percentage Weight in Assessment and Evaluation

| Learning Out-comes | Assessment Methods | Assessment Ratio (Percentage) | |
|---|---|---|---|
| CLO3 | Assignment | 20 | 40 |
| | Midterm Exam | 5 | |
| | Final Exam | 15 | |
| CLO1, 2, 4 and 5 | Final Exam | 30 | 60 |
| | Midterm Exam | 30 | |
| Total | | | 100 |

(2) Grading System

| Grade | Achievement | Final Score (% Range) | GPA |
|---|---|---|---|
| A | Excellent | 90-100 | 4.0 |
| B+ | Very good | 85-89 | 3.5 |
| B | Good | 80-84 | 3.0 |
| C+ | Fairly good | 75-79 | 2.5 |
| C | Fair | 70-74 | 2.0 |
| D+ | Poor | 65-69 | 1.5 |
| D | Very Poor | 60-64 | 1.0 |
| F | Fail | Less than 60 | 0.0 |

(3) Re-examination (If course lecturer allows to have re-examination)

- students with legitimate medical or personal emergencies may re-examine with the lecturer's and PD's permission

3. Student Appeals

- students may appeal to the lecturer, PD, chair or OAA.

## Section 6 Teaching Resources

1. Texts and Primary Sources

- S. Johnson, How We Got To Now (Riverhead Books, 2015)
- S. Johnson, Where Good Ideas Come From (Riverhead Books, 2011)
- S. Hansson (ed.), The Role of Technology in Science: Philosophical Perspectives (Springer 2015)

2. Videos

- How We Got To Now, 6 episodes (PBS, 2014)
- Famous Inventions that Changed the World (Modern Marvels, 2015)
- Inventions that Changed the World (BBC series, 2010)
- Inventions that Shook the World (Discovery series, 2013)

3. Documents and important information

- eLearning course website (links to texts, maps, timelines and images)
- PowerPoint presentations
- Alternate textbooks available at the MUIC library and online including:
- D. Bloor, 'Sociology of Scientific Knowledge', Handbook of Epistemology (Kluwer, 2004)
- J. Diamond, Guns, Germs and Steel (Norton, 1997)
- M. Foucault, The Birth of the Clinic (U of Paris, 1973)
- I. Hacking, The Social Construction of What (Havard 1999)
- T. Kuhn, The Structure of Scientific Revolution (U of Chicago, 1963)
- M. Kusch, Psychologism (Routledge, 1995)
- J. Searle, The Social Construction of Reality (Simon & Schuster, 2011)
- S. Shapin, S. Schaffer, Leviathan and the Water Pump (Princeton 1985)

4. Documents and recommended information

(1) (same as above)

## Section 7 Evaluation and Improvement of Course Implementation

1. Strategies for evaluating course effectiveness by students

   Student evaluation

2. Strategies for evaluating teaching methods

   Student evaluation, Peer observation

3. Improvement of teaching methods

   Student evaluation, Peer observation, HR development

4. Verification process for evaluating students' standard achievement outcomes in the course

   Academic testing and assignments

5. Review and plan for improving the effectiveness of the course

   The aforementioned plus alumni feedback

Appendix

Relations between the course and the General Education

Table 1: The relationship between CLOs and MU-GE Module LOs (Number in table = Sub LOs)

| (Course Code) | Learning Outcomes in General Education (MU-GE LOs) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | MLO1 | MLO2 | MLO3 | MLO4 | MLO5 | MLO6 | MLO7 | MLO8 | MLO9 |
| CLO1 | | 2.2 | 3.1/2 | | | | | | |
| CLO2 | | 2.2 | 3.1/2 | | | | | | |
| CLO3 | 1.4 | 2.2 | 3.1/2 | 4.1 | | | 7.1 | 8.1 | |
| CLO4 | | 2.2 | 3.1/2 | | | | 7.1 | | |
| CLO5 | | 2.2 | 3.1/2 | | | | 7.1 | | |

Table 2 The description of MU-GE LOs and Sub LOs of the course

| MU-GE LOs | Sub LOs |
|---|---|
| MLO1 Select & use techniques and methods to solve open-ended, ill-de-fined and multistep problems | 1.4 Synthesize information to arrive at logical reasoning |

| | |
|---|---|
| MLO2 Select & use techniques and methods to solve open-ended, ill-defined and multistep problems | 2.2 Integrate alternative, divergent, or contradictory perspectives or ideas in the solution of a problem or question |
| ML03 Acquire specific strategies & skills within a particular discipline and adapt them to a new problem or situation | 3.1 Connect, synthesize and/or transform ideas or solutions within a particular framework |
| | 3.2 Integrate alternative, divergent, or contradictory perspectives or ideas in the solution of a problem or question |

MU-GE Module LOs: At the end of studying MU-GE Module, successful students will be able to

| Competences | LOs: | Sub LOs: |
|---|---|---|
| 1.Critical thinking & Analysis: Use various sources and methods to collect and manage data & information and make a logical judgement and decision to arrive at a solution or problem solving relevant to real-world issues/ problems | 1.Create & construct an argument effectively as well as identify, critique and evaluate the logic & validity of arguments | 1. Identify concepts related to the context of learned issues/topics<br>2. Demonstrate ICT literacy: use appropriate technology to find, evaluate, and ethically used information<br>3. Collect, analyze, synthesize data, & evaluate information and ideas from multiple sources relevant to issues/problems<br>4. Synthesize information to arrive at logical reasoning |

| Competences | LOs: | Sub LOs: |
|---|---|---|
| | 2. Select & use techniques and methods to solve open-ended, ill-defined and multi-step problems | 1. Apply simple mathematical methods to the solution of 'real-world' problems<br>2. Make judgement & decision through correct analysis, inferences, and evaluations on quantitative basis and multiple perspectives<br>3. Apply concept of process management to solve problems |
| 2. Creativity & Innovation: Show capability to initiate alternative/ new ways of thinking, doing things or solving problems to improve his/her or team solutions/ results by applying the evidence-based process management concepts | 3. Acquire specific strategies & skills within a particular discipline and adapt them to a new problem or situation | 1. Connect, synthesize and/or transform ideas or solutions within a particular framework<br>2. Integrate alternative, divergent, or contradictory perspectives or ideas in the solution of a problem or question |
| | 4. Create a novel or unique ideas, question, format, or product within a particular framework | 1. Create an original explanation or solution to the issues/problems<br>2. Articulate the rationale for & consequences of his/her solution- identify opportunities & risk<br>3. Implement innovation through process management approach |

| Competences | LOs: | Sub LOs: |
|---|---|---|
| | 5. Explore and situate oneself in a new physical environment and intellectual perspectives | 1. Demonstrate cultural competencies and adaptabilities in different working environments<br>2. Resort to multi-dimensional settings and tools to acquire knowledge and skills relevant to the problems or situation at hand |
| 3. Global perspectives & Ethics: Express one's own ideas, interact with others, guide or lead team, as proper, as an ethically- engaged and responsible member of the society | 6. act autonomously within context of relationships to others, law, rules, codes, and values | 1. Demonstrate an understanding of the principles upon which sustainable ecosystems and societies are built<br>2. Identify the national & global challenges associated with current economic, political, and social systems<br>3. Exhibit characteristics of responsible citizenship<br>4. Work effectively in diverse team (and multi-cultural settings) |
| | 7. Apply ethical frameworks or principles and consider their implications in his/her decision-making and interacting with others | 1. Identify ethical issues and recognize different viewpoint and ideologies<br>2. Guide & lead others<br>3. Apply principles of ethical leadership, collaborative engagement, and respect diversity |

| Competences | LOs: | Sub LOs: |
|---|---|---|
| 4. Communication: Communicate effectively and confidently using oral, visual, and written language | 8. Use a variety of means/ technologies to communicate effectively and purposefully; e.g., share information/ knowledge, express ideas, demonstrate or create individual & group product, etc. | 1. Communicate/present ideas effectively both oral & written forms to appropriate audience, such as verbal discussion with peers, and written project reports.<br>2. Prepare a purposeful oral presentation designed to increase knowledge, to foster understanding, or to promote change in the listeners' attitudes, values, beliefs, or behaviors.<br>3. Prepare written documents to express ideas/solutions using different writing technologies, and mixing texts, data, and images.<br>4. Demonstrate competence in a second or additional language |
| 5. Collaboration and Working with team: Collaborate and work effectively with team to arrive at team goals | 9. Collaborate and work effectively as part of a student group/team member to arrive at the team shared-goals in time | 1. Collaborate effectively with others as a responsible team member to achieve team goals in time<br>2. Interact with others respectfully, either as a team member or leader, to create a productive teamwork |