TQF. 3

☑ Bachelor's Degree

☐ Master's Degree

Course Specification

Course Code: MMA1303

Course Title: Linear Algebra

Credits: 3(3-0-6)

Programs: All

Semester: 1 **Academic Year:** 2021

College of Hospitality Industry Management

Suan Sunandha Rajabhat University

(CHM, SSRU)

Section 1 - General Information

1. Course code and course title

Course code: MMA1303

Course title (English): Linear Algebra

ชื่อวิชา (ภาษาไทย): พีชคณิตเชิงเส้น

2. Credits

3(3-0-6)

3. Curriculum and course category

Curriculums: Bachelor's of Education, Mathematics (Bilingual Program)

Course Category:

☐ General Education ☑ Required Course

☐ Elective Course ☐ Others: …….

4. Lecturer

Lecturer responsible for this course: Mr.Luechai Tiprungsri

Instructional course lecturers: Mr.Luechai Tiprungsri

5. Contact

Room Number: 305 Tel.: 081-972-5793 Email: luechai.ti@ssru.ac.th

Semester/Academic year

Semester: 1 Academic Year: 2021

Number of enrolled students: 19

6. Pre-requisite course

None

7. Co-requisite course

None

8. Learning center

CHM Building, Nakhon-Pathom Campus

9. Last date for preparing and revising this course

August 2021

Section 2 - Aims and Objectives

1. Course aims

At the end of this course students will reach the desired learning outcomes based on six domains, as mentioned in the curriculum specification (TQF2), as follows:

1.1 Morals and ethics

Learning outcomes to be developed

1) Have acting with respect to rules of agreement in mathematics.

2) Have integrity, honesty, and teaching profession ethics.

3) Have discipline, self, and social responsibility.

1.2 Knowledge

Learning outcomes to be developed

1) Be able to comply knowledge accordance with the standards of Basic Education Core Curriculum B.E.2008 (Revision 2017) in Mathematics.

2) Have strong mathematical content knowledge and pedagogical content knowledge needed to support students' learning.

3) Have knowledge and understanding principles and concepts of mathematics.

1.3 Cognitive skills

Learning outcomes to be developed

1) Be able to provide solutions for problems involving types of models and operations.

2) Be able to develop and demonstrate critical thinking to connect between various mathematical topics and between mathematics and other application areas.

3) Be able to identify and use mathematical representations to model and interpret concepts and principles for problem solving and proof reasonably.

1.4 Interpersonal skills and responsibility

Learning outcomes to be developed

1) Have responsibility for building positive attitude towards mathematics.

2) Be able to work collaboratively and demonstrate to be a good leader and a good follower.

3) Be able to strengthen teachers' potentiality and capabilities in teaching mathematics.

1.5 Numerical analysis, communication, and information technology skills

Learning outcomes to be developed

1) Have concepts, principles, and theories of technology and innovation that promote learning quality development.

2) Be able to apply mathematical processes and skills in solving problems.

3) Be able to design, create, implement, and evaluate innovation for improvement mathematics classroom environment.

1.6 Learning Management Skills

Learning outcomes to be developed

1) Be able to design learning activities and learning environments within the context of a unit of learning and real world.

2) Be able to provide the learners with essential opportunities to enhance learning concepts and motivate active learning in mathematical process for problem solving.

3) Be able to develop the learning materials to engage students' learning.

2. Objectives for developing/revising course (Content/Learning Process/Assessment/ etc.)

Using the Framework for the 21st Century Learning process, students learn to integrate supportive technologies (i.e., Online Learning), inquiry-and problem-based learning instructional approaches, and higher order thinking.

Section 3 - Characteristics and Operations

1. Course description

Introduction to linear algebra and artificial intelligence; Vectors and matrices; Determinants; Linear Equation; System of Linear Equation Using Matrices, Examplar of learning instruction in Linear Algebra incorporate with dynamic software program such as the Geometer's Sketchpad, Mathlab.

2. Time length per semester (Lecture/Practice/Self-study hours)

Lecture	Practice/ Field Work/Internship	Self-Study	Remedial Class
3 hours/week		6 hours/week	1 hour/week (If any)

3. Individual consulting and guidance

Self-consulting at the lecturer's office:

Room Number 305, CHM Building, Nakhon-Pathom Campus

Mon., 9 AM – 4 PM

Consulting via office telephone/mobile phone:

034-964946

Consulting via email:

luechai.ti@ssru.ac.th

Consulting via social media platform (Facebook/Twitter/Line):

None

Consulting via Computer Network (Internet/Web board):

www.elic.ssru.ac.th/luechai.ti/

Section 4 - Developing Students' Learning Outcomes

Expected students' learning outcomes are categorized into five domains, developed from curriculum specification (TQF2), as follows:

1. Morals and ethics

1.1 Learning outcomes to be developed

- 1) Have acting with respect to rules of agreement in mathematics.
- 2) Have integrity, honesty, and teaching profession ethics.
- 3) Have discipline, self, and social responsibility.

1.2 Teaching strategies

1) Train the students to have characteristics of good problem solvers with confidence, potential, and challenge.
2) Encourage the students to have integrity, honesty, and discipline such as unselfishness and self-control.

1.3 Assessment & evaluation strategies

1) Attendance record
2) Performance Assessment (on-site)
3) System log (online/on-demand)

2. Knowledge

2.1 Learning outcomes to be developed

- 1) Be able to comply knowledge accordance with the standards of Basic Education Core Curriculum B.E.2008 (Revision 2017) in Mathematics
- 2) Have strong mathematical content knowledge and pedagogical content knowledge needed to support students' learning.
- 3) Have knowledge and understanding principles and concepts of mathematics.

2.2 Teaching strategies

1) Using brainstorming to encourage students generate many ideas and using higher order thinking.
2) Using problem-based learning, research-based learning, and computer-based learning to enhance students' knowledge.

2.3 Assessment & evaluation strategies

1) Using rubrics for complex authentic task
2) Using formative and summative tests
3) Using mathematics tasks and presentation

3. Cognitive skills

3.1 Learning outcomes to be developed

- 1) Be able to provide solutions for problems involving types of models and operations.
- 2) Be able to develop and demonstrate critical thinking to connect between various mathematical topics and between mathematics and other application areas.
- 3) Be able to identify and use mathematical representations to model and interpret concepts and principles for problem solving and proof reasonably.

3.2 Teaching strategies

1) Encourage the students develop their higher thinking skills such as providing diversity environments for students to construct and implement their knowledge.
2) Using problem-based learning, research-based learning, and computer-based learning to enhance students' thinking skills.

3.3 Assessment & evaluation strategies

1) Using rubrics for complex authentic task
2) Using formative and summative tests
3) Using mathematics tasks and presentation

4. Interpersonal skills and responsibilities

4.1 Learning outcomes to be developed

- 1) Have responsibility for building positive attitude towards mathematics.
- 2) Be able to work collaboratively and demonstrate to be a good leader and a good follower.
- 3) Be able to strengthen teachers' potentiality and capabilities in teaching mathematics.

4.2 Teaching strategies

1) Using cooperative learning through interpersonal communication and interaction.
2) Demonstrate the ability to apply appropriate interpersonal and teamwork skills in a variety of learning environment.
3) Using problem-based learning, research-based learning to enhance students' experiences for further development their learning.

4.3 Assessment & evaluation strategies

1) Performance Assessment (on-site)
2) System log (online/on-demand)
3) 360-degree assessment

5. Numerical analysis, communication, and information technology skills

5.1 Learning outcomes to be developed

- 1) Have concepts, principles, and theories of technology and innovation that promote learning quality development.
- 2) Be able to apply mathematical processes and skills in solving problems.
- 3) Be able to design, create, implement, and evaluate innovation for improvement mathematics classroom environment.

5.2 Teaching strategies

1) Encourage the students develop their higher thinking skills such as providing diversity environments for students to construct and implement their knowledge.
2) Using problem-based learning, research-based learning, and computer-based learning to enhance students' thinking skills.

5.3 Assessment & evaluation strategies

1) Using rubrics for complex authentic task
2) Using formative and summative tests
3) Using mathematics tasks and presentation

6. Learning Management Skills

6.1 Learning outcomes to be developed

- 1) Be able to design learning activities and learning environments within the context of a unit of learning and real world.
- 2) Be able to provide the learners with essential opportunities to enhance learning concepts and motivate active learning in mathematical process for problem solving.
- 3) Be able to develop the learning materials to engage students' learning.

6.2 Teaching Strategies

1) Using real world problems within the math classroom.
2) Using dynamic mathematics tools to reduce mathematics anxiety and negativity attitude.

6.3 Assessment & evaluation strategies

1) Using rubric for group work
2) Using assignment task and presentation

Remark: Symbol ● means "major responsibility"
Symbol ○ means "minor responsibility"
No symbol means "no responsibility"

During of outbreak of COVID-19, teaching strategies may be changed by using Massive Open Online Courses prepared by lecturers and/or other educational organization.

Section 5 - Lesson Plan and Assessment

1. Lesson plan

Week	Topic/Outline	Teaching-Learning Model	Program/Teaching Strategies	Content Management	Assessment
1	**Course Introduction** - Course outlines - Grading criteria Pretest **Chapter 1**: Introduction to linear algebra	Online	Google Meet	- PowerPoint - GSP - YouTube VDO	- Attendance Record - System log
2 - 4	**Chapter 2**: Matrices	Online	Google Meet	- PowerPoint - GSP - YouTube VDO - Lecture Notes - Worksheet	- Attendance Record - System log - Quiz
5 - 7	**Chapter 3**: Determinant	Online	Google Meet	- PowerPoint - GSP - YouTube VDO - Lecture Notes - Worksheet	- Attendance Record - System log - Quiz
8	**Mid-term examination (On-site)**				
9	**Chapter 4**: Linear Equation	Online/ On Demand	Google Meet	- PowerPoint - GSP - YouTube VDO - Lecture Notes - Worksheet	- Attendance Record - System log - - Quiz
10-12	**Chapter 5**: System of Linear Equation Using Matrices	Online	Google Meet	- PowerPoint - GSP - YouTube VDO - Lecture Notes	- Attendance Record - System log - - Quiz

Week	Topic/Outline	Teaching-Learning Model	Program/Teaching Strategies	Content Management	Assessment
				- Worksheet	
13 - 14	**Chapter 6**: Vector-1	Online/ On Demand	Google Meet	- PowerPoint - GSP - YouTube VDO - Lecture Notes - Worksheet	- Attendance Record - System log - Assignment
15 - 16	**Chapter 7**: Examplar of learning instruction in Linear Algebra incorporate with the Geometer's Sketchpad, Mathlab.	Online/ On Demand	Google Meet	- PowerPoint - YouTube VDO - Lecture Notes - Worksheet - GSP	- Attendance Record - System log - Assignment
17	**Final Examination**				

Note: Lesson plan might be affected by the COVID-19 pandemic.

2. Learning assessment plan

Learning Outcomes	Assessment Activities	Schedule (Week)	Proportion for Assessment (%)
1.1, 1.2, 1.3 2.1, 2.2, 2.3, 4.1, 4.2, 4.3 5.1, 5.3 6.1, 6.2, 6.3	1) Attendance record 2) Performance Assessment (on-site/online) 3) System log (online/on-demand) 4) Quiz	1, 3, 5, 7, 9, 11, 13, 15	40
2.2, 2.3, 5.2	Examination	17	30
3.1, 3.2, 3.3 4.1, 4.2, 4.3, 5.1, 5.2, 5.3 6.1, 6.2, 6.3	1) Criteria for assignment 2) Self-and peer assessments 3) 360-degree assessment	2, 4, 6, 10, 12, 14	30

Section 6 - Learning and Teaching Resources

1. Textbook and main documents

Course materials provided by the lecturers available on the Moodle platform.

2. Important documents for extra study

Documents suggested by the lecturers

3. Suggested information (Printing Materials/Website/CD/Others)

Information retrieved from search engines (e.g., Google) and online videos

Section 7 - Course Evaluation and Revising

1. Strategies for course evaluation by students

Using a questionnaire to collect students' opinions to improve the course and enhance the curriculum. Sample questions:

1) The Learning Management System (e.g. Moodle & Google Classroom) and social media platforms (e.g. Facebook & Line) are useful and provide accessibility to learners. Other online learning tools such as Kahoot! and Quizizz are also fun to interact with.

2) Online contents are highly accessible and have better quality comparing with printed materials.

3) With the Learning Management System used, students can follow up with the course and check their learning progress.

4) Students can contact the lecturer easily using the internal messaging system, feedback system, and social networking.

5) As this course is skill-focused, students have mathematical knowledge and skills useful to students' studying and future jobs.

…….. etc. ……

2. Strategies for course evaluation by the lecturer

The lecturer observes the class and determine if:

1) The lecturer is well prepared for class sessions.
2) The lecturer answers questions carefully and completely.
3) The lecturer uses examples to make the materials easy to understand.
4) The lecturer stimulated interest in the course.
5) The lecturer made the course material interesting.
6) The lecturer is knowledgeable about the topics presented in this course.
7) The lecturer treats students respectfully.
8) The lecturer is fair in dealing with students.
9) The lecturer makes students feel comfortable about asking question.
10) Course assignments are interesting and stimulating.
11) The lecturer's use of technology enhanced learning in the classroom.

…….. etc. ……

3. Teaching revision

The lecturer revises teaching and learning process based on the results from the questionnaire results.

4. Feedback for achievement standards

CHM administrator committees monitor the assessment process and grading.

5. Methodology and planning for course review and improvement

1) Revise and develop course structure and process every two years.
2) Assign different lecturers to teach this course to enhance students' vision.

Curriculum Mapping Illustrating the Distribution of Program Standard Learning Outcomes to Course Level

Courses	1. Morals and Ethics			2. Knowledge			3. Cognitive Skills			4. Interpersonal Skills and Responsibility			5. Numerical Analysis, Communication and Information Technology Skills			6. Learning Management Skills		
Course Category: Requirement Course— Major Required Course	● **Major Responsibility**												○ **Minor Responsibility**					
	1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Course Code: MMA1301 Course Title: Principles of Mathematics	●	○	○	○	●	●	○	●	●	○	○	○	○	●	○	○	○	○

Remark: Symbol ● means “major responsibility”

Symbol ○ means “minor responsibility”

No symbol means “no responsibility”

Expected learning outcomes are combined for all types of instructional activities.