



TQF.3

Bachelor's Degree

Master's Degree

TQF. 3 Course Specification

Course Code: BMA 3304

Course Title: Research in Mathematics Mducation

Credits: 3(3-0-6)

Program: Bachelor of Education Program in Mathematics
(Bilingual Program)

Semester: 1 **Academic Year:** 2024

College of Hospitality Industry Management
Suan Sunandha Rajabhat University
(CHM, SSRU)

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Section 1 General Information

1. Code and Course Title:

Course Code: BMA 3304

Course Title (English): Research in Mathematics Education

ชื่อวิชา (ภาษาไทย): การวิจัยสำหรับคณิตศาสตร์ศึกษา

2. Credits: 3(3-0-6)

3. Curriculum and Course Category:

3.1 Curriculum: Bachelor of Education Program in Mathematics

3.2 Course Category:

- | | |
|--|---|
| <input type="checkbox"/> General Education | <input checked="" type="checkbox"/> Required Course |
| <input type="checkbox"/> Elective Course | <input type="checkbox"/> Cluster in Teaching Profession |

4. Lecturers Responsible for Course and Instruction

4.1 Lecturer Responsible for course:

Asst. Prof. Dr.Krongthong Khairiree

4.2 Instructional Course Lecturer:

Asst. Prof. Dr.Krongthong Khairiree

5. Contact / Get in Touch:

Room Number 305 Tel. 034-964946 Ext. 320

E-mail: krongthong.kh@ssru.ac.th

6. Semester / Year of Study

6.1 Semester: 2/2022 Year of Study: Undergraduate Student
Year 2

6.2 Number of students enrolled: 19

7. Prerequisite Course

None

8. Co-requisite Course

None

9. Learning Location

College of Hospitality Industry Management Building, Nakorn
Pathom Campus

Room No. 206

Tuesday 13.00 – 16.00

10. Last Date for Preparing and Revising this Course:

November 15, 2022

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

- (1) Have integrity, honesty, and teaching profession ethics.
- (2) Have discipline, self, and social responsibility.
- (3) Have knowledge and understanding of Regulation of Teachers Council of Thailand on Professional Standards and Ethics and Principles of research ethics.

1.2 Knowledge

- (1) Be able to use the core principles of research for the learning quality development.
- (2) Be able to describe research theory, model, design, and process.
- (3) Be able to identify statistics for research and classroom action research.

1.3 Cognitive Skills

- (1) Have ability to search for knowledge: research on teaching and learning mathematics.
- (2) Have analytical thinking to select the research topics for development of learning mathematical process.
- (3) Be able to search information about related research for doing classroom action research.

1.4 Interpersonal Skills and Responsibility

- (1) Have responsibility for building positive attitude towards using educational research to develop teaching and learning mathematics.
- (2) Have ability to work in team both as leader and follower.

(3) Be able to identify problems and seek best solutions to strengthen teachers' potentiality and capabilities in academic and professional career by using research concept.

1.5 Numerical Analysis, Communication and Information Technology Skills

(1) Be able to apply numerical analysis in problem solving.

(2) Have ability to use computer and IT for searching data base related to the research purposes.

(3) Be able to use correct language in oral and written research presentation.

1.6 Learning Management Skills

(1) Be able to design research model for learner's development.

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

(3) Be able to use a variety of data base to solve problems in mathematics classroom.

2. Course Objectives

At the end of this course, the student will be able to perform in the following areas of performance:

(1) Able to seek truth through the research process and can design research process to solve problems and improve the learning management.

(2) Able to synthesis a variety of related documents for learning development.

(3) Able to think systematically and effectively present the project research proposal.

2. Purposes for Developing / Revising Course (content / learning process / assessment / etc.)

According to TQF (Thailand Quality Framework: HEd.) and the Teachers' Council of Thailand with the standards of professional knowledge and experience for requirement courses, undergraduate students program in mathematics (bilingual program) should have essence of knowledge and competencies in research for learning development as follows:

- (1) Choose to use research results for learning management.
- (2) Conduct research to improve teaching and learning and develop learners.

Section 3 Course Structure

1. Course Outline

Principles, concepts, and techniques in conducting educational research; Statistics for research; Characteristics of good research; Classroom action research; Research ethics; Search and study on research for development of learning management process; Use of research process for problem solving; Project proposal for research; Research presentation.

หลักการ แนวคิด และเทคนิคในการทำวิจัยทางการศึกษา สถิติสำหรับการวิจัย คุณลักษณะของงานวิจัยที่ดี การวิจัยชั้นเรียน จรรยาบรรณของการวิจัย การสืบค้นและศึกษา งานวิจัยเพื่อพัฒนากระบวนการจัดการเรียนรู้ ใช้กระบวนการวิจัยสำหรับการแก้ปัญหา ข้อเสนอแนะ ได้โครงสร้างของโครงการเพื่อการวิจัย การนำเสนองานวิจัย

2. Time Length per Semester (Lecture – hours / Practice – hours / Self Study – hours)

Lecture	Practice/	Self-Study	Remedial Class
1 hour/week	2 hours/week	3 hours/week	3+ (according to student needs)

3. Time Length per Week for Individual Academic Consulting and Guidance

3.1 Self consulting at the lecturer's office: Room Number 305

3.2 Consulting via office telephone: Tel. 034-964946 Ext. 320

3.3 Consulting via E-Mail: chaweewan.ka@ssru.ac.th

Section 4 Developing Student's Learning Outcomes

Learning Standards/Outcomes	Learning Activities	Learning Assessment
<p>1. Morals and Ethics</p> <p>(1) Have integrity, honesty, and teaching profession ethics.</p> <p>(2) Have discipline, self, and social responsibility.</p> <p>(3) Have knowledge and understanding of Regulation of Teachers Council of Thailand on Professional Standards and Ethics and Principles of research ethics.</p>	<p>Work in group to discuss on research aspects of teaching and learning and research ethics.</p>	<p>Group discussion Report</p>
<p>2. Knowledge</p> <p>(1) Be able to use the core principles of research for the learning quality development.</p> <p>(2) Be able to describe research theory, model, design, and process.</p> <p>(3) Be able to identify statistics for research and</p>	<p>1. Introduce the educational research theory, model, design, and process.</p> <p>2. Compare and contrast among classical research and classroom action research.</p>	<p>1. Draft of synthesis research proposal</p> <p>2. Group report presentation</p>

Learning Standards/Outcomes	Learning Activities	Learning Assessment
classroom action research.		
<p>3. Cognitive Skills</p> <p>(1) Have ability to search for knowledge: research on teaching and learning mathematics.</p> <p>(2) Have analytical thinking to select the research topics for development of learning mathematical process.</p> <p>(3) Be able to search information about related research for doing classroom action research.</p>	<p>1. Use research-based learning and internet-based learning to search information about related research for doing classroom action research</p> <p>2. Discussion and presentation of research findings – students write reports and present their findings.</p>	<p>Written report and oral presentation</p>
<p>4. Interpersonal Skills and Responsibilities</p> <p>(1) Have responsibility for building positive attitude towards using educational research to develop teaching and learning mathematics.</p> <p>(2) Have ability to work in team both as leader and</p>	<p>1. Use internet-based learning on mathematics education research impact on students' achievement</p> <p>2. Students work in small group. They plan to use PBL technique to search information demonstrate interpersonal skills and</p>	<p>1. Term papers</p> <p>2. Group report presentation</p>

Learning Standards/Outcomes	Learning Activities	Learning Assessment
<p>follower.</p> <p>(3) Be able to identify problems and seek best solutions to strengthen teachers' potentiality and capabilities in academic and professional career by using research concept.</p>	<p>responsibility.</p>	
<p>5. Numerical Analysis, Communication and Information Technology Skills</p> <p>(1) Be able to apply numerical analysis in problem solving.</p> <p>(2) Have ability to use computer and IT for searching data base related to the research purposes.</p> <p>(3) Be able to use correct language in oral and written research presentation.</p>	<p>1. Use research-based learning and internet-based learning to analyze research results imply to mathematics class.</p> <p>2. Students work in small group. They plan to use technology to analyze data and present their report both in oral and written.</p>	<p>1. Individual portfolio</p> <p>2. Term papers</p> <p>3. Group report presentation</p>
<p>6. Learning Management Skills</p>	<p>Discussion and</p>	<p>1. Individual</p>

Learning Standards/Outcomes	Learning Activities	Learning Assessment
<p>(1) Be able to design research model for learner's development.</p> <p>(2) Be able to provide the learners with essential opportunities to enhance learning concepts and motivate active engagement in mathematical process for problem solving through research process.</p> <p>(3) Be able to use a variety of data base to solve problems in mathematics classroom.</p>	<p>presentation research theory, model and process on development of mathematical knowledge and process/skills in math class.</p>	<p>portfolio</p> <p>2. Term papers</p> <p>3. Group report presentation</p>

Section 5 Lesson Plan and Assessment

1. Lesson Plan

Week	Topic/Outline	Hours	Learning Activities and Medias
1-2	Unit 1 Introduction to Educational Research	6	<ol style="list-style-type: none"> 1. Introduce principles, concepts, and techniques in conducting educational research and research ethics. 2. Students work in small group to discuss about related topics in mathematics education.
3 - 5	Unit 2 Statistics for Research	9	<ol style="list-style-type: none"> 1. Introduce types of statistics: descriptive statistics, inferential statistics, types of data 2. Students work with a small group to discuss about the differences of types of statistics and types of data.
6 - 10	Unit 3 Research Methodology	15	<ol style="list-style-type: none"> 1. Introduce categories of research: qualitative research, quantitative research, synthesis research, classroom action research. 2. Students work with a small group to discuss about the difference of each category of research. 3. Students study the application of statistics used in

Week	Topic/Outline	Hours	Learning Activities and Medias
			research method by using hands-on / computer program for computation.
11 - 13	Unit 4 Preparing Research Proposals and Reports	9	1.Introduce the components of research proposals focus on using innovation and technology for learners to achieve good learning. 2.Students search and study on research for development of learning management process for preparing research proposals.
14 - 16	Unit 5 Research by Practitioners	9+	1. Introduce doing research in a mathematics classroom 2. Students review literature about action research and article writing.
17	Final Examination	3	Written and Oral Presentation
Total of Hours		48+	Extra hours for independent study

Remark: Reserve 1 – 2 weeks for searching related topics.

2. Learning Assessment Plan

Learning Outcomes	Assessment Activities	Time Schedule (Week)	Proportion for Assessment (%)
<p>1. Morals and Ethics</p> <p>(1) Have integrity, honesty, and teaching profession ethics.</p> <p>(2) Have discipline, self, and social responsibility.</p> <p>(3) Have knowledge and understanding of Regulation of Teachers Council of Thailand on Professional Standards and Ethics and Principles of research ethics.</p>	<p>1. Individual portfolio</p> <p>2. Group discussion</p>	<p>Throughout semester</p>	<p>5 %</p>
<p>2. Knowledge</p> <p>(1) Be able to use the core principles of research for the learning quality development.</p> <p>(2) Be able to describe research theory, model, design, and</p>	<p>1. Term papers</p> <p>2. Group report presentation</p>	<p>Throughout semester</p>	<p>40 %</p>

Learning Outcomes	Assessment Activities	Time Schedule (Week)	Proportion for Assessment (%)
<p>process.</p> <p>(3) Be able to identify statistics for research and classroom action research.</p>			
<p>3. Cognitive Skills</p> <p>(1) Have ability to search for knowledge: research on teaching and learning mathematics.</p> <p>(2) Have analytical thinking to select the research topics for development of learning mathematical process.</p> <p>(3) Be able to search information about related research for doing classroom action research.</p>	<p>1. Individual portfolio</p> <p>2. Term papers</p> <p>3. Group report presentation</p>	<p>Throughout semester</p>	<p>30 %</p>
<p>4. Interpersonal Skills and Responsibilities</p> <p>(1) Have responsibility</p>	<p>1. Checklists</p> <p>2. Interviews</p>	<p>Throughout semester</p>	<p>5 %</p>

Learning Outcomes	Assessment Activities	Time Schedule (Week)	Proportion for Assessment (%)
<p>for building positive attitude towards using educational research to develop teaching and learning mathematics.</p> <p>(2) Have ability to work in team both as leader and follower.</p> <p>(3) Be able to identify problems and seek best solutions to strengthen teachers' potentiality and capabilities in academic and professional career by using research concept.</p>			
<p>5. Numerical Analysis, Communication and Information Technology Skills</p> <p>(1) Be able to apply numerical analysis in problem solving.</p> <p>(2) Have ability to use</p>	<ol style="list-style-type: none"> 1. Individual portfolio 2. Term papers 3. Group report presentation 	<p>Throughout semester</p>	<p>10 %</p>

Learning Outcomes	Assessment Activities	Time Schedule (Week)	Proportion for Assessment (%)
<p>computer and IT for searching data base related to the research purposes.</p> <p>(3) Be able to use correct language in oral and written research presentation.</p>			
<p>6. Learning Management Skills</p> <p>(1) Be able to design research model for learner's development.</p> <p>(2) Be able to provide the learners with essential opportunities to enhance learning concepts and motivate active engagement in mathematical process for problem solving through research process.</p> <p>(3) Be able to use a variety of data base to</p>	<ol style="list-style-type: none"> 1. Individual portfolio 2. Term papers 3. Group report presentation 	<p>Throughout semester</p>	<p>10 %</p>

Learning Outcomes	Assessment Activities	Time Schedule (Week)	Proportion for Assessment (%)
solve problems in mathematics classroom.			

Remark: Each student will be assigned the research advisor for writing the research proposal.

Section 6 Learning and Teaching Resources

1. Textbook and Main Documents

Isaac, S. & Michael, W.(2003). *Handbook in Research and Evaluation* (3rd Edition). San Diego, CA: Edits Publishing.

2. Important Documents for Extra Study

Creswell, J. (2003). *Research Design Qualitative, Quantitative, and Mixed Methods Approach*. CA: Sage Publication.

3. Suggestion Information (Printing Materials/Website/CD/ Others)

Ary, D., Jacobs, L.C.& Sorensen, C. (2006). Introduction to Research in Education (Eight Edition). Retrieved from the web <http://repository.unmas.ac.id/medias/journal/EBK-00124.pdf> Dec, 2022.

Gorski, P.C. (2006). Teacher Action Research. Retrieved from the web <http://www.exchange.org/multicultural/tar/illustration.html>. Feb.

2008.

Segal, S.U. (2009). Action Research in Mathematics Education: A Study of Master's Program for Teachers. Retrieved from the web. <http://arexpenditions Montana.edu/index.php>. Jan. 2008.

Section 7 Course Evaluation and Revising

1. Strategies for Course Evaluation by Students

Using survey questions to collect information from the students' opinions to improve the course and enhance the curriculum. Examples of questions:

- (1) Content objectives were made clear to the students.
 - (2) The content was organized around the objectives.
 - (3) Content was sufficiently integrated.
 - (4) Content was sufficiently integrated with the rest of the first-year curriculum.
 - (5) The instructional materials used were effectively.
 - (6) The learning methods appropriate assessed the students' understanding of the content.
 - (7) Overall, Students are satisfied with the quality of this course
- etc.

2. Strategies for Course Evaluation by Lecturer

2.1 Lecturers team observe the class and discuss the results as

follow:

- (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.

1.2 The director / head of program construct assessment items to evaluate four dimensions of lecturer's competencies: teaching skills, organization and presentation of materials, management of the learning environment, and teaching attitudes.

3. Teaching Revision

Lecturer revises teaching / learning process based on the results from the students' survey questions, the lecturer team's observation, and classroom research.

4. Feedback for Achievement Standards

College of Hospitality Industry Management Administrator Committee monitor to 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 teach this course to enhance students'

performance.

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— Teaching Profession Course	● Major Responsibility									○ Minor Responsibility								
Course Code: EDM2102 Course Title: Research for Learning Development	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	●	○	○	●	○	○	○	○	●	○	●	○	●	○	○	●	○	○

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.