

Course Specification

Name of institution Mahidol University

Campus/faculty/department Salaya Campus/International College/Science Division

Section 1 General Information

1. Course code and course title

Thai ICMA 350 ความน่าจะเป็น

English ICMA 350 Probability

2. Number of credit 4(4-0-8)

(Lecture 4 hours/laboratory 0 hour/self study 8 hours/week)

3. Curriculum and type of subject

3.1 Curriculum Offered in Bachelor of Science Program in Applied
Mathematics

3.2 Type of subject Elective Major Course

4. Responsible faculty member Dr.Chatchawan Panraksa

5. Trimester / year of study

5.1 Trimester

5.2 Number of students 5-30 students

6. Pre-requisites ICMA 212 General Mathematics II or ICMA 219 Calculus
of Several Variables

7. Co-requisites -

8. Venue of study Mahidol University, Salaya campus

Section 2 Goals and Objectives

1. Goals

After successful completion of this course, students will be able to solve some partial differential equations by using numerical methods.

2. Objectives of development/revision

To revise course in order to be up-to-date and relevant to the current situation

Section 3 Course Management

1 Course descriptions

ปริภูมิตัวอย่าง กฎความน่าจะเป็น ความน่าจะเป็นแบบมีเงื่อนไขและการเป็นอิสระต่อกัน ตัวแปรสุ่ม การคาดหมายและฟังก์ชันก่อกำเนิดโมเมนต์ การแจกแจงความน่าจะเป็นแบบวิยุตและแบบต่อเนื่อง การแจกแจงหลายตัวแปรและการเปลี่ยนรูป ทฤษฎีลิมิตส่วนกลาง ทฤษฎีการแจกแจงการสุ่ม

Sample spaces; basic axioms of probability; conditional probability and independence. Random variables, expectation and moment-generating functions. Discrete and continuous distributions. Multidimensional distributions and transformations. Central limit theorem. Sampling distribution theory.

2 Credit hours / trimester

Lecture	Additional class	Laboratory / field trip/ internship	Self study
48 hours (4 hours x 12 weeks)	-	-	96 hours (8 hours x 12 weeks)

3 Number of hours that the lecture provides individual counseling and guidance

2 hours/week

Section 4 Development of Students' Learning Outcome

1. Expected outcome on students' skill and knowledge

- The ability to solve some partial differential equations by using numerical methods.

2. Teaching methods

- Lecture
- Worksheets
- Homework
- Self-study

3. Evaluation methods

1.Morality and Ethics

1.1 Expected outcome on morality and ethics

- - To possess morality and ethics.
- - To have self-discipline, honesty, kindness, self-responsible and social

responsibility

- - To demonstrate academic ethical behavior
- - To respect others' rights and be a good listener
- - To respect rules and regulations
- - To have good attitude toward professors/career
- - To demonstrate Leadership, team player

1.2 Teaching methods

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

- Lecture
- Case studies with past experiences and current events
- Emphasis on morality and ethics
- Group discussion
- Group assignment

1.3 Evaluation methods

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

4. Knowledge development

4.1 Expected outcome on knowledge development

- (1) Knowledge of theories and concepts in evolution of art and sciences in the Thai and global communities
- (2) Analysis of causes and consequences of events/situations/problems and solutions to current case studies
- (3) Analyze impact of work and problems
- (4) Keep up on academic progress and situations occurring in everyday's life and global society

4.2 Teaching methods

Learning Centered Education: Emphasis on knowledge development, important skills in career development and living, encourage students to use their full potentials

- Lecture
- Group discussion
- Group assignment

4.3 Evaluation methods

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

3. Intellectual development

3.1 Expected outcome on intellectual development

- - To have systematic and analytical thinking

- - To be able to search, consolidate and evaluate ideas and evidence for problem solving

- - To be able to apply knowledge and experience to analyze and creatively solve problems both in general and academic

3.2 Teaching methods

- Real experience teaching and encourage on skill development besides the professional skill
- Project assignment and presentation
- Analysis of case studies

3.3 Evaluation methods

- Presentation of knowledge synthesis
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignment and their quality

4. Interpersonal relationship and responsibility

4.1 Expected outcome on Interpersonal relationship and responsibility

- - To possess good interpersonal relationship skills (self esteem and dignity) and have respect for the rights and value of others

- - To possess leadership and initiative in problem solving

- - To be constructive team member (in various roles) and be responsible for assignment tasks, professional and society

4.2 Teaching methods

- Group participation in case studies
- Assignment of group and individual reports
- Encourage real-life experience and current events in teaching

4.3 Evaluation methods

- Written examination
- Presentation
- Class attendance, class participation and behavior in class
- On-time submission of reports and assignments and their quality

5. Mathematical analytical thinking, communication skills, and information technology skills

5.1 Expected outcome on mathematical analytical thinking, communication skills, and information technology skills

- -To be able to select and apply appropriate statistical and mathematical methods to research problems

- - To be able to apply information technology for data gathering, processing,

interpreting and presenting information/results

- - To have the ability to communicate effectively and select appropriate methods of presentation

5.2 Teaching methods

- Lecture and group discussion of cases studies
- Activity in class
- Assignment for searching from website, e-learning and report with emphasis on mathematical numbers and statistics from reliable source

5.3 Evaluation methods

- Group discussion
- Practical presentation in class
- Reports and presentation using information technology
- Practical in group discussion

Section 5 Teaching and Evaluation Plans

1. Teaching plan

Week	Topic	Hours	Teaching methods/ multimedia	Instructor
1	Properties of probability; Conditional probability; Independent events.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
2	Random variables of discrete type; Mathematical expectation; Moment-generating functions.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
3	Binomial distribution; Poisson distribution; Random variables of Continuous type.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
4	Uniform and exponential distributions; Gamma and chi-square distributions.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
5	Normal distribution; Distributions of Functions of a random variable.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
6	Distributions of two random	4	Lecturing and	Dr.Chatchawan

	variables; Correlation coefficient. Midterm Examination		problem solving	Panraksa
7	Conditional distributions; Bivariate normal distribution.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
8	Transformations of random variables	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
9	Independent random variable; Distributions of Sums of Independent random variable.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
10-11	Random functions associated with normal distribution; Central limit theorem.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
12	The t and F distributions.	4	Lecturing and problem solving	Dr.Chatchawan Panraksa
13	Final Examination			Dr.Chatchawan Panraksa

2. Evaluation plan

Expected outcomes	Methods / activities	Week	Percentage
(1) to (4)	Attendance	1-12	10
(1) to (5)	Group assignment	1-12	10
(2) to (3)	Examination	13	80 (Midterm: 40; Final: 40)

Section 6 Teaching Materials and Resources

1. Texts and main documents

A First Course in Probability, Sheldon Ross, Prentice Hall, 8th edition.

2. Documents and important information

Handouts

3. Documents and recommended information

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Section 7 Evaluation and Improvement of Course Management

1 Strategies for effective course evaluation by students

1.1 Evaluation of peers by students

1.2 Student evaluation

- Course content
- Course management
- Suggestions
- Overall opinion

2 Evaluation strategies in teaching methods

2.1 Student evaluation

2.2 Presentation

3 Improvement of teaching methods

Workshop on course improvement with the participation of all lecturers in this course.

4 Evaluation of students' learning outcome

Analysis of students' learning outcomes using scores from class attendance, group activity and presentation of project and poster presentation including quiz and examination.

5 Review and improvement for better outcome

Meeting of lecturers to review the course before semester starts and before each period of teaching.