

MASTER OF SCIENCE PROGRAM IN SCIENCE AND TECHNOLOGY EDUCATION (INTERNATIONAL PROGRAM)

Courses Description - Prerequisite Courses

ILSE603 : BASIC KNOWLEDGE IN EDUCATION (2 Credits)

National Education Act; National Education Plan; educational curriculum; educational system; learning standards; content; learning in the 21st century; transformative education; contemplative education; extra-curricular activity; educational technology; learning community

ILSE607 : BASIC KNOWLEDGE FOR EDUCATIONAL RESEARCH (2 Credits)

Components of educational research; database for educational research; information retrieval for research; literature review; basic statistics for educational research; citation and reference

SCID500 : CELL AND MOLECULAR BIOLOGY (3 Credits)

Cell structure and function; life and information flow in cell, energy flow in biosystem; cell signaling; cell division; cellular differentiation; cell death and development

Courses Description - Required Courses

ILSE600 INSTRUCTIONAL SCIENCE (3 Credits)

How students learn; learning theory; pedagogical content knowledge; effective teaching and learning approaches; instructional design theory and model; learner analysis; learning level and assessment; classroom management; principle, concept, and guidelines for constructing lesson plan; ethics in teaching and professional ethics; micro-teaching

ILSE608 EVOLUTION OF SCIENCE, MATHEMATICS, AND TECHNOLOGY (2 Credits)

Nature, role, relationship, and methodology of science, mathematics, and technology; origin and evolution of knowledge in science, mathematics, and technology; relationship between nature of science and learning science; self-evaluation of in-depth understanding in science,

mathematics, and technology; morals and ethics in the construction of knowledge in science, mathematics, and technology; nature of mathematics, physics, chemistry, biology, and computer science

ILSE613 INNOVATIONS IN SCIENCE AND TECHNOLOGY EDUCATION (3 Credits)

Principle, concept, design, application, adaptation and evaluation of innovation for learning science, mathematics, and technology; morals and ethics in the development of Innovations in science and technology education; morals and ethics in using innovation to improve learning in science, mathematics, and technology

ILSE616 RESEARCH IN SCIENCE AND TECHNOLOGY EDUCATION (3 Credits)

Research paradigms and methodology; quantitative research; qualitative research; mixed methods research; research question; research design; research instruments; data analysis; ethics in science and technology education research; analysis of science and technology education research; classroom action research

ILSE623 SEMINAR IN SCIENCE AND TECHNOLOGY EDUCATION (1 Credit)

Current issue in science and technology education; morals of science and technology educator; research for promoting science, mathematics, and technology learning; ethics in using and publishing academic work

ILSE624 SEMINAR IN INNOVATIVE LEARNING (1 Credit)

Current issue in innovative learning and country development; special topic concerning innovative instructional learning media; special topic concerning innovative learning in Thai society context; ethics in using and publishing learning innovation; organizing academic seminar

ILSE655 MEASUREMENT AND EVALUATION IN EDUCATION (2 Credits)

Principle of measurement and evaluation for improving learner; formative assessment; summative assessment; authentic assessment; principle and practice in measurement and

evaluation of cognitive, affective, and psychomotor domains; quality of measurement and evaluation tool; ethics in measurement and evaluation

Courses Description - Elective Courses

ILSE606 MINI PROJECT RESEARCH IN SCIENCE, MATHEMATICS, AND TECHNOLOGY EDUCATION (3 Credits)

Analysis of research in science and technology education; designing of mini research project in science and technology education; components in research development; data collection and analysis; ethics in educational research; writing and presenting research work; teaching an interdisciplinary project

ILSE615 DEVELOPING LEARNING MEDIA USING MODERN INFORMATION TECHNOLOGY (3 Credits)

Information and communication technology and learning in the 21st century; concept of using modern information technology (IT) in learning and teaching; analysis of case study on using modern IT in learning activity; learning media design; application for authoring learning media; learning media development and evaluation

ILSE617 EMERGING TECHNOLOGY FOR LEARNING (2 Credits)

Relationship between technology and educational reform; relationship between technology, specific content, and pedagogy; role of technology in the development of learning process; using emerging technology in learning and teaching; technology for context-aware learning; ethics in using educational technology for learning; technology for measurement and evaluation in education

ILSE625 CHEMISTRY EDUCATION (3 Credits)

Nature of learning chemistry; misconceptions in learning chemistry; pedagogical content knowledge for teaching chemical bonding, chemical reactions and stoichiometry, chemical

thermodynamics, chemical kinetics, chemical equilibrium, electrochemistry, nanochemistry, green chemistry, biocatalyst, solar cell, spectroscopy techniques

ILSE631 BIOLOGY EDUCATION (3 Credits)

Nature of learning biology; misconception in biology; pedagogical content knowledge for teaching cell biology, biodiversity, evolution, biochemistry, modern genetics, bionanotechnology, biomass and bioenergy, plant biology, and biomedicine; emerging fields of biological sciences; professional ethics and ethics in biology teaching

ILSE642 PHYSICS EDUCATION (3 Credits)

Nature of learning physics; misconceptions in physics; pedagogical content knowledge for teaching mathematics for physics, mechanics, thermodynamics, electricity and magnetism, light and optics, nuclear physics, relativity

ILSE652 MATHEMATICAL EDUCATION (3 Credits)

Nature of learning mathematics; misconceptions in mathematics; pedagogical content knowledge for teaching probability and statistics, logic and mathematical proof, real and complex numbers, geometry, algebra, calculus

ILSE653 COMPUTER SCIENCE EDUCATION (3 Credits)

Nature of learning computer education; transformation of computer education and development of today's computer education curriculum; misconceptions in computer education; pedagogical content knowledge for teaching algorithm, programming, data structure, simulation, artificial intelligence, microcontroller

ILSE660 PSYCHOLOGY AND PHILOSOPHY FOR EDUCATION (2 Credits)

Fundamental psychology; developmental psychology; educational psychology; cognitive psychology; individual differences; inclusive education; multiple intelligences; educational guidance; counselling; philosophy, concept and theory in education, religion, economy, society and culture; educational concept and strategy for sustainable development

Courses Description – Dissertation

ILSE698 THESIS (12 Credits)

Identifying science and technology educational research proposal; conducting research with ethics; analyzing research findings; presenting and publishing research in academic journals or conference proceedings; ethics for presenting and publishing research findings