Faculty of Science
Department of Physics

Curriculum Title: Doctor of Philosophy Program in Geophysics

Curriculum Description (briefly introduce an overview of the curriculum offered)

Doctor of Philosophy Program in Geophysics aim to create advanced capability graduates who are able to explain and apply the principles of geophysical methods, intensive analyze and synthesize solutions to an original and contemporary geophysics problem and innovation. The graduates are able to integrate and apply the geophysical knowledge to societally relevant problems, including natural hazards, resource exploration and management, and environmental issues with practical experiences and by this create intellectual wisdom, virtue, competency and international world-view vision. Moreover, they can understand the place of geophysics in the larger picture of the intellectual landscape of inquiry, including connections between science and history, philosophy, ethics and the formulation of public policy.

Type of Program

- Regular Program (Monday- Friday)
- Regular Program (Monday- Friday) and International Program
- Special Program (Saturday-Sunday)

Dissertation Themes (provide the areas of research for thesis)

Researchers have focused on the understanding the earth’s structure and its processes, especially in southern Thailand, on geological hazards (e.g. earthquakes, tsunami, sinkholes, landslides), on the explorations for hydrocarbons, minerals and groundwater, and on solving environmental and engineering problems using a broad spectrum of geophysical and geological methods (e.g. gravity, magnetic, seismic, electric, seismology, paleo-magnetism, geological mapping). The research area are listed below:

Active fault studies
- Seismological investigations of the Andaman Sea and Southern Thailand
- Understanding active fault zones by integrated geophysical studies
- Paleoseismological studies of active fault zones
- Radon as a potential earthquake precursor
- Understanding and locating active fault zones by palaeomagnetic studies
- Radioactive fingerprint of hot spring waters in active fault zones

Geohazard assessment
- Understanding the sinkhole hazard and detection of potential sinkholes
- Understanding landslide mechanisms
Investigation of the occurrence of recent landslides
Risk assessment of geological hazards

Natural resources and environmental studies
- Mapping contaminant salt water intrusion into groundwater aquifers
- Locating leaks in dams and dikes
- Groundwater exploration
- Geophysical investigations of potential mineral deposits

Energy studies
- Carbon dioxide capture and storage technology (CCS)
- Geothermal systems and exploration in Southern Thailand
- Geothermal energy studies
- Formation evaluation in petroleum exploration
- Fusion Energy

Global geophysics and plate tectonic study
- Seismotectonics of the Sunda Subduction Zone
- Paleomagnetic studies of past plate motion in SE Asia

Prospective students (provide the background and previous education of the student who wants to study e.g. the Bachelor degree gained.)

Plan 1.1
1. A student who hold Master of Science in Geophysics, Physics, Geology or relevant programs or Master of Engineering. The student who has experience in geophysical research with published paper and depend on the consideration of curriculum committee.
2. The other qualification follows the regulation of university.

Plan 1.2
1. A student who hold Bachelor of Science in Geophysics, Physics, Geology or relevant programs or Bachelor of Engineering. The honor student who has GPA of higher than 3.00 and has experience in geophysical research with published paper and depend on the consideration of curriculum committee.
2. The other qualification follows the regulation of university.
Prospective advisors... (provide the names of the potential advisors as well as their CV/research of interest. If possible, also provide e-mail addresses and other means to contact the prospective advisors.)

1. Asst.Prof.Dr.Helmut Dürrast

Research Interest

Physical and Mechanical Properties of Rocks and Sediments, Geophysical Logging,
Groundwater Investigations, Tsunamis, Earthquakes and Tectonics, Geohazards,
Geothermic, Geology of Southern Thailand.

Publication

- Crustal structures, geothermal sources and pathways beneath Northern Thailand revealed by local earthquake tomography 2018; Chiang Mai Journal of Science; Saetang, K. | Srisawat, W. | Dürrast, H.
- Saline hot spring in Krabi, Thailand: A unique geothermal system 2016; SEG Technical Program Expanded Abstracts; Ngansom, W. | Dürrast, H.
- Physical and mechanical properties of rocks 2014; Stone in Architecture: Properties, Durability: Fifth Edition; Siegesmund, S. | Dürrast, H.
- Geophysical logging for groundwater investigations in Southern Thailand 2012; Songklanakarin Journal of Science and Technology; Klinmanee, P. | Dürrast, H.
- Geological structure and origin of the Kaochaison hot spring in Phattalung, Southern Thailand 2012; Songklanakarin Journal of Science and Technology; Jonjana, S. | Lohawijarn, W. | Dürrast, H.
- Physical and mechanical properties of rocks 2011; Stone in Architecture: Properties, Durability; Siegesmund, S. | Dürrast, H.
- Result of alpha track detection of radon in soil gas in the Khlong Marui Fault Zone, Southern Thailand: A possible earthquake precursor 2011; Songklanakarin Journal of Science and Technology; Bhongsuwan, T. | Pisapak, P. | Dürrast, H.
- Characterization of reservoir fractures using conventional geophysical logging 2011; Songklanakarin Journal of Science and Technology; Laongsakul, P. | Dürrast, H.
- The uniqueness of adjacent beaches for tsunami mitigation efforts: A case study from Phuket, Thailand 2010; Proceedings - 2nd International Conference on Computational Intelligence, Modelling and Simulation, CICSim 2010; Zobel, R. | Tandayya, P. | Dürrast, H.
2. **Asst.Prof.Dr. Kamhaeng Wattanasen**

**Research Interest**

Hydrogeophysics/Groundwater geophysics, Environmental and Engineering geophysics and Structural geophysics.

**Publication**

- Determining water quality parameters of aquifers in the Vientiane Basin, Laos, using geophysical and water chemistry data 2011; *Near Surface Geophysics*.
- An integrated geophysical study of arsenic contaminated area in the peninsular Thailand 2006; *Environmental Geology*.

**Contact**

Telephone: +66-0-7428-8763, Facsimile: +66-0-7455-8849
E-mail: kamhaeng.w@psu.ac.th, kwattanasen@hotmail.com

3. **Assoc. Prof. Dr. Tripob Bhongsuwan**

**Research Interests**

Rock magnetism and palaeomagnetism, archaeomagnetism of ancient bricks, environmental magnetism, anisotropy of magnetic susceptibility, Earth’s gravity, magnetic field, electrical resistivity and natural radioactivity.

**Publication**

- Effect of calcination temperature on the magnetic characteristics of synthetic iron oxide magnetic nanoparticles for arsenic adsorption 2018; *Chiang Mai Journal of Science*; Chomchoey, N. | Bhongsuwan, D. | Bhongsuwan, T.
- Deformation in Jurassic-Cretaceous red beds from Champasak and Khammouane, Lao PDR, revealed by anisotropy of magnetic susceptibility 2018; *Chiang Mai Journal of Science*; Singsoupho, S. | Bhongsuwan, T. | Elming, S.-Å.
- A survey of natural terrestrial and airborne radionuclides in moss samples from the peninsular Thailand 2017; *Journal of Environmental Radioactivity*; Wattanavatee, K. | Krmar, M. | Bhongsuwan, T.
• Monte carlo simulation of 6 MV flattening filter free photon beam of truebeam STX LINAC at songklanagarind hospital 2017; Sains Malaysiana; Efendi, M.A. | Funsian, A. | Chittrakarn, T. | Bhongsuwan, T.

• Radon concentration in well water from Namom district (Southern Thailand): a factor influencing cancer risk 2017; Journal of Radioanalytical and Nuclear Chemistry; Pisapak, P. | Bhongsuwan, T.

• The $^7$Be profiles in the undisturbed soil used for reference site to estimate the soil erosion 2017; Journal of Physics: Conference Series; Raksawong, S. | Krmar, M. | Bhongsuwan, T.

• Correlation between radon and radium concentrations in soil and estimation of natural radiation hazards in Namom district, Songkhla province (Southern Thailand) 2017; Environmental Earth Sciences; Pisapak, P. | Todorovic, N. | Bhongsuwan, T.

• Measurement of $^7$Be inventory in the outer Songkhla lagoon, Thailand 2016; Journal of Radioanalytical and Nuclear Chemistry; Raksawong, S. | Krmar, M. | Bhongsuwan, T.

• Measurements of indoor radon concentrations in the phanom and Ko Pha-ngan districts of Surat Thani province, Thailand 2016; Chiang Mai Journal of Science; Titipornpun, K. | Sriorapanon, S. | Titipornpun, A. | Gimsa, J. | Bhongsuwan, T. | ...

• A high natural radiation area in Khao-Than hot spring, Southern Thailand 2015; Radiation Protection Dosimetry; Bhongsuwan, T. | Auisui, S.A.

Contact
Telephone: +66-0-7428-8761, Facsimile:+66-0-7455-8849
E-mail: tripop.b@psu.ac.th

4. Assoc.Prof.Dr.Sawasdee Yordkayhun

Research Interests
Environmental and engineering geophysics, seismic exploration and tomography.

Publication
• Characterization of Khlong Marui fault zone using seismic reflection and shear-wave velocity profiles: Case study in Khiriratnikhom District, Surat Thani Province, Southern Thailand 2016; Chiang Mai Journal of Science; Vol.43; Page:1279-1291. Yordkayhun, S. | Sreesuwan, P. | Wattanasen, K.

- Joint analysis of shear wave velocity from SH-wave refraction and MASW techniques for SPT-N estimation 2014; Songklanakarin Journal of Science and Technology; Vol.36; Page:333-344. Yordkayhun, S. | Sujitapan, C. | Chalermyanont, T.

- Detection of hidden faults beneath Khlong Marui fault zone using seismic reflection and 2-D electrical imaging 2014; ScienceAsia; Vol.40; Page:436-443. Saetang, K. | Yordkayhun, S. | Wattanasen, K.

- A university-developed seismic source for shallow seismic surveys 2012; Journal of Applied Geophysics; Vol.82; Page:110-118. Yordkayhun, S. | Nasuwan, J.

- Detecting near-surface objects with seismic traveltome tomography: Experimentation at a test site 2011; Songklanakarin Journal of Science and Technology; Vol.33; Page:477-485. Yordkayhun, S.

Contact
Telephone: +66-0-7428-8765, Facsimile:+66-0-7455-8849
E-mail: sawasdee.y@psu.ac.th

Contact Information (provide the person who is in charged for the curriculum as well as his/her-mail and affiliation)
Assoc.Prof.Dr.Sawasdee Yordkayhun
Department of Physics, Faculty of Science, Prince of Songkla University
Hatayai, Songkhla 90112. Thailand
Tel : 074-28-8765
Fax : 074-55-8849
Email :sawasdee.y@psu.ac.th