



หลักสูตรประกาศนียบัตรการศึกษาชั้นสูงทางฟิสิกส์ทฤษฎี  
(หลักสูตรนานาชาติ)

Certificate of Advanced Studies  
in Theoretical Physics  
(International Program)

ศึกษาเพื่อการค้นคว้าขั้นก้าวหน้า  
ศูนย์ฟิสิกส์ทฤษฎีและปรัชญาธรรมชาตินครสวรรค์

พ.ศ. 2566

**Certificate of Advanced Studies in Theoretical Physics  
(International Program B.E. 2566)**

NAS, Centre for Theoretical Physics and Natural Philosophy

**1. Curriculum Name**

**English** Certificate of Advanced Studies in Theoretical Physics (International Program)

**Thai** ประกาศนียบัตรการศึกษาชั้นสูงทางฟิสิกส์ทฤษฎี (หลักสูตรนานาชาติ)

**2. Names of Qualification and Majors**

2.1 Full Title English: **Certificate of Advanced Studies in Theoretical Physics**

Abbreviation English: **Cert. Adv. St. (Theoretical Physics)**

Full Title Thai: **ประกาศนียบัตรการศึกษาชั้นสูงทางฟิสิกส์ทฤษฎี**

Abbreviation Thai: **ไม่มี**

**3. Major Subjects (if any)**

none

**4. Required Credits**

none

**5. Curriculum Characteristics**

5.1 **Curriculum type/model:** Certificate of Advanced Studies

5.2 **Language:** English

5.3 **Recruitment:** Both Thai and international students

**6. Curriculum Status and Curriculum Approval**

6.1 Program new B.E. 2566

6.2 Starting in semester 1, academic year 2023 onwards

6.3 Approval by NAS faculty meeting on **October 4, 2023** (retroactive validation from 1 August 2023)

**7. Venue for Instruction**

Centre for Theoretical Physics and Natural Philosophy, Mahidol University, Nakhonsawan Campus

**8. Fee:** There is no fee for the qualification. Students, if they wish, may contribute by donation for supporting NAS operation works.

### 9. Curriculum and Graduation Requirements

Students are required to take and receive not lower than B grade in each selected subject for at least 15 credits of NWTP 7xx-and 8xx-level taught courses of Mahidol University's "current" Doctor of Philosophy curriculum in Theoretical Physics and Natural Philosophy. These have to be in high energy physics or gravitational theory and cosmology subject groups. Also, these below 6xx-level taught courses are allowed but not more than one of these five courses can contribute to the requirement:

NWTP 601	Integrable System	2 (2-0-4)
NWTP 611	Classical Field Theory	2 (2-0-4)
NWTP 612	Relativistic Quantum Mechanics	2 (2-0-4)
NWTP 613	Quantum Mechanics and Path Integrals	2 (2-0-4)
NWTP 614	Particles and Fields	2 (2-0-4)

The certificate is conferred upon a person only once.

The graduation requirement is to be judged by NAS faculty meeting which also has full right to withdraw the qualifications awarded.

## Courses (PhD 2566) eligible for the certificate

NWTP 702	Symmetries and Lie Algebra in Physics	2 (2-0-4)
NWTP 711	Relativistic Quantum Fields I	3 (3-0-6)
NWTP 712	Relativistic Quantum Fields II	3 (3-0-6)
NWTP 713	Soliton and Instanton	3 (3-0-6)
NWTP 714	Quantum Fields in Curved Spacetime	3 (3-0-6)
NWTP 715	Finite Temperature Field Theory	3 (3-0-6)
NWTP 801	Geometry and Topology in Physics	3 (3-0-6)
NWTP 811	Supersymmetry and Supergravity	3 (3-0-6)
NWTP 812	String Theory	3 (3-0-6)
NWTP 813	Statistical Field Theory	3 (3-0-6)
NWTP 814	Loop Quantum Gravity	3 (3-0-6)
NWTP 815	Advanced Quantum Field Theory	3 (3-0-6)
NWTP 816	Topological Gauge Theory and Geometrical Phases	3 (3-0-6)
NWTP 751	General Relativity	4 (4-0-8)
NWTP 761	Cosmology	3 (3-0-6)
NWTP 762	The Early Universe	3 (3-0-6)
NWTP 763	Observational Cosmology	3 (3-0-6)
NWTP 851	Advanced General Relativity	3 (3-0-6)
NWTP 852	Scalar-Tensor Theory of Gravitation	3 (3-0-6)
NWTP 853	Dark Energy and Modifications of Gravity	3 (3-0-6)
NWTP 854	Gauge Symmetries in Gravitation	3 (3-0-6)
NWTP 855	Physics of Black Holes	3 (3-0-6)
NWTP 856	Theoretical Foundations of Cosmology	3 (3-0-6)
NWTP 861	Cosmic Microwave Background Radiation	3 (3-0-6)
NWTP 862	Quantum Cosmology	3 (3-0-6)

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 (Professor Burin Gumjudpai, Ph.D.)

NAS Acting Director

On behalf of the NAS Faculty Meeting on the 4<sup>th</sup> October 2023