

Master of Science Program in Innovative Physics
(International Program)
New Program in 2021

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Name of Institution Mahidol University
Campus/Faculty/Department Faculty of Science, Department of Physics

Section 1 General Information

1. Program Title

Thai : หลักสูตรวิทยาศาสตรมหาบัณฑิต สาขาวิชาฟิสิกส์เชิงนวัตกรรม
(หลักสูตรนานาชาติ)
English : Master of Science Program in Innovative Physics
(International Program)

2. Name of Degree and Major

Full Title Thai : วิทยาศาสตรมหาบัณฑิต (ฟิสิกส์เชิงนวัตกรรม)
Abbreviation Thai : วท.ม. (ฟิสิกส์เชิงนวัตกรรม)
Full Title English : Master of Science (Innovative Physics)
Abbreviation English : M.Sc. (Innovative Physics)

3. Major Subject : None

4. Required Credits : not less than 36 credits

5. Curriculum Characteristics

- 5.1 **Curriculum type/model** : Master's Degree
- 5.2 **Language** : English
- 5.3 **Recruitment** : Both Thai and International students
- 5.4 **Collaboration with Other Universities** : None
- 5.5 **Graduate Degrees Offered to the Graduates** : one degree with one major

6. Curriculum Status and Curriculum Approval

- 6.1 New Program in 2021
- 6.2 Starting in second semester, academic year 2021 onwards
- 6.3 Approval in Principle by Mahidol University Council in its meeting 548/2019 on
September 18, 2019

6.4 Curriculum screening committee approved the program in its meeting 11/2021
on May 24, 2021

6.5 The Mahidol University council approved the program in its meeting/.....
on

7. Readiness to Implement / Promote the Curriculum

The curriculum from the program is readily implemented and will be promoted to achieve its quality and standards according to criteria set by Thai Qualification Framework for Higher Education by academic year 2023 (2 years after implementation)

8. Career Opportunities of the Graduates

The Innovative Physics graduates may have careers as

8.1 researchers and developers who create innovations in public and private research agencies such as the National Science and Technology Development Agency, hard disk drive industry, National Institute of Metrology, PTT Company Limited, Geophysical Survey Industry, Department of Mineral Resources Meteorological Department, Royal Irrigation Department, Department of Alternative Energy, National Astronomical Research Institute, Department of Disease Control;

8.2 startup businessmen;

8.3 data scientists;

8.4 specialists in physics/innovation in educational institutions;

8.5 professional innovators in educational institutions.

9. Name, ID Number, Title and Degree of the Faculty in Charge of the Program

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	xxxxxxxxxxxxx Assistant Professor Dr. Suraphong Yuma	D.Sc. (Physics and Astronomy) Kyoto University, Japan : 2011 M.Sc. (Physics and Astronomy) Kyoto University, Japan : 2008 B.Sc. (Physics) Chulalongkorn University : 2005	Department of Physics, Faculty of science Mahidol University

No.	Identification Card Number Academic position - Name – Surname	Degree (Field of Study) University: Year of graduate	Department
2.	xxxxxxxxxxxxx Assistant Professor Dr. Kritsanu Tivakornsasithorn	Ph.D. (Physics) University of Notre Dame, USA.: 2012 M.Sc. (Physics) Mahidol University: 2004 B.Sc. (Physics) Kasetsart University: 2000	Department of Physics, Faculty of Science Mahidol University
3.	xxxxxxxxxxxxx Lecturer Dr. Chaiwoot Boonyasirawat	Ph.D. (Computing) University of Utah, USA. : 2009 M.Sc. (Geophysics) University of Utah, USA. : 2009 M.Sc. (Computational Engineering & Science) University of Utah, USA. : 2004 B.Sc. (Physics) Mahidol University: 2002	Department of Physics, Faculty of Science Mahidol University

10. Venue for Instruction

Faculty of Science, Mahidol University

11. External Factors to Be Considered in Curriculum Planning

11.1 Economic Situation/Development

Thailand has been in a middle income trap for a long time. The economic growth rate of Thailand has been quite low (3-4%), and the population of Thailand is declining, leading to a possible shortage of working-age population in the future. The Thai government has tried to accelerate the country's development by launching the national strategy called "Thailand 4.0" to promote innovation, creativity, research and development, and technologies. To drive the country according to this national strategy, there needs a change in educational management practices to enhance the quality of graduates with innovative skills. This is because the country's labor market in the future requires talents and innovations to drive the country's economy.

11.2 Social and Cultural Situation/Development

The 12th Economic Development Plan, Strategy 1: Strengthening and Developing Human Capital Capabilities to support the changing situation in the economy showed that the social and cultural situation is in a condition that needs to be maintained by all sectors of society. Country personnel must have practical knowledge and capabilities, and must possess skills of the 21st century, consisting of four sub-skills which are [1] critical thinking and problem solving skills, [2] group process skills (collaboration), [3] innovation skills (creation) and [4] communication skills. (communication) which corresponds to the needs of the labor market and necessity for the development of the country according to the strategy for developing science, technology, research and innovation to invention or invention of new technology. It represents the need to increase the number of research and development personnel of the country as well.

12. Effects Mentioned in No.11.1 and 11.2 on Curriculum Development and Relevance to the Missions of the University/Institution

12.1 Curriculum Development

The Department of Physics, Faculty of Science, Mahidol University recognizes the importance of increasing scientific and technological personnel. Therefore, the curriculum has been developed to produce personnel with knowledge and expertise in physics. By offering courses in "Master of Science Program in Innovative Physics (International Program)," the Department at least partially fulfills the mission of economic situation and development.

12.2 Relevance to the Missions of the University/Institution

Mahidol University has a mission, which can be stated as "To create excellence in health, science, art, and innovation based on virtues for the Thai society and to benefit humanity."Therefore, the curriculum development of Master of Science Program in Innovative Physics (International Program) to "produce Master's with knowledge, advanced expertise in physics, have merit and academic and professional ethics, have the desire to know and have research skills, be able to integrate and apply knowledge (both in physics and/ or other disciplines) to significantly expand the existing knowledge" is in line with the University's mission.

13. Collaboration with Other Curricula of the University

13.1 Course(s) offered by other faculties/departments/ programs:

None

13.2 Course(s) offered to other programs:

The Program does not offer any compulsory courses for students of other faculties

13.3 Coordination :

The Master of Science Program in Innovative Physics has relationship with the Bachelor of Science programs, and the Bioscience Program. The Bioscience courses focus on innovative research processes and methods in the field of biological and environmental. The Innovative Physics courses focus on applying theories and research methods in physics to create innovation.

Section 2 Information of the Program

1. Philosophy, rationale, and objectives of the program

1.1 Philosophy of the program

The Program aims to produce Master's degree graduates with knowledge and skills in Innovative Physics, academic and professional ethics, knowledge and research skills, ability to integrate and apply knowledge in physics to significantly expand existing knowledge and create innovation.

1.2 Rationale of the Program

Physics is a branch of fundamental science that studies natural phenomena ranging from an extremely small scale, such as sub-atomic particles, to an exceedingly large scale like the Universe. Physics includes understanding and predicting behaviors of various physical systems using scientific methods. The knowledge in physics is fundamental to other branches of science such as chemistry, geology, engineering, biology and medical science. For the Innovative Physics program, the main goal is to have well-rounded graduates with ability to apply fundamental knowledge to innovate new technology for the advancement and benefit of our society.

1.3 Objectives of the Program

At the end of the study, the program's graduates will have qualifications according to Thai Qualifications Framework for Higher Education as shown below:

1.3.1 possess moral standards and professional ethics;

1.3.2 understand the principles and theories related to the fields of physics and innovations and conduct self-directed learning and follow the advance of academic and technology in innovative physics;

1.3.3 analyze and criticize research and conduct research of innovative physics based on the professional moral and right procedure of research;

1.3.4 work cooperatively as a leader and a member of the group, and have high responsibility for assigned work;

1.3.5 effectively utilize the information technology, mathematical skill and statistical skill for searching, collecting, processing, analyzing research data, and efficiently presenting research results in a coherent and comprehensible way.

1.4 Program Learning Outcomes (PLOs)

The graduates of the program must have the following:

1.4.1 Moral and ethics in accordance with professional ethical standards.

1.4.2 Competency to keep up with academic progress and acquire new knowledge

1.4.3 Ability to create innovation based on knowledge and principles in physics with correct research process

1.4.4 Teamwork spirit, leadership skills, good interpersonal skills and responsibility for assigned duties.

1.4.5 Ability to utilize information technology to create, present, and communicate effectively with a range of audiences

2. Plan for Development and Improvement

Improvement/Modification Plan	Strategy	Evidence/Indicators
The curriculum is to be revised every five years based on the policy of Thai Commission of Higher Education.	1. Follow and evaluate the proceeding of the program every 5 years using the data from the five-year satisfaction of employer/entrepreneur /or those who hire	1. Satisfactory evaluation report. 2. Program proceeding report.

Improvement/Modification Plan	Strategy	Evidence/Indicators
	graduate students.	

Section 3 Educational Management System, Curriculum Implementation and Structure

1. Educational Management System

1.1 System : Two-semester credit system; one academic year consists of two regular semesters, each with not less than 15 weeks of study.

1.2 Summer Session : None

1.3 Credit Equivalence Ratio : None

2. Curriculum Implementation

2.1 Teaching Schedule weekday from Monday to Friday (08.00 A.M. – 4.00 P.M)

- Semester 1 : August – December

- Semester 2 : January - May

2.2 Qualifications of Prospective Students

2.2.1 holding a Bachelor's degree in science, engineering or related fields accredited by the Office of the Higher Education Commission

2.2.2 having cumulative GPA not less than 2.50

2.2.3 having and English Proficiency Examination score as the requirement of Faculty of Graduate Studies, Mahidol University.

2.2.4 Admissions of the prospective students missing any qualifications under 2.2.2-2.2.3 may be granted under the discretion of the Program Committee and the Dean of the Faculty of Graduate Studies, Mahidol University.

2.3 Problems Encountered by New Students

The Program accepts both domestic and international students and provides instruction in English which may cause problems to some students. In addition to the normal adjustment in the subject content, entering students also need to adapt to the language used in teaching. However, teaching and learning in English is one of the strengths of the curriculum that students may use as a reason for choosing to study in this curriculum.

2.4 Strategies for Problem Solving/Limited Requirement in No. 2.3

Students' Limitations	Strategies to Resolve Students' Limitations
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English language problems	Both academic and extra activities within the program will be encouraged to conduct in English. If necessary, students will be encouraged to take English classes offered by the Faculty of Graduate Studies.
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2.5 A Five-year Plan for Admission and Graduation

Year	2021	2022	2023	2024	2025
1 st	5	10	10	10	10
2 nd		10	10	10	10
Cumulative numbers	5	20	20	20	20
Expected number of students graduated	-	5	10	10	10

2.6 Budget Plan

The budget is from the Innovative Physics Program, Faculty of Science, Mahidol University.

(1) Estimated income per student

Registration fee	credits	per credits (baht)	total (baht)
credits	xx	xxxx	xxxxxx
thesis	xx	xxxx	xxxxxx
bench fee			xxxxxx
Total income per student			xxxxxx

(2) Estimated expenses

Variable expenses per student

Faculty/university allocation	xxxxx
Position allowance of thesis advisor and committee	xxxxxx
Total variable expenses per student	xxxxxx

(3) Fixed expenses (2 years)

Director payment	xxxxxx
Teaching payment	xxxxxx
Utility fee	xxxxxx
Supply fee	xxxxxx
Equipment fee	xxxxxx
Total fixed expenses	xxxxxx

(4) Number of students at break-even point 3 persons

- | | |
|--|-------------|
| (5) Cost of students at break-even point | xxxxxx Baht |
| (6) Expenses per student per academic year | xxxxxx Baht |

2.7 Educational System : In class mode

2.8 Transfer of Credits and Cross University Registration (If any)

Credits transferring must be in compliance with Mahidol University's regulations on Graduate Studies. Additional information can be found at www.grad.mahidol.ac.th.

3. Curriculum and Faculty Members

3.1 Curriculum

3.1.1 Number of Credits : not less than 36 credits

3.1.2 Curriculum Structure

The curriculum structure is set in compliance with Announcement of Ministry of Education on the subject of Criteria and Standards of Graduate Studies 2015, Master's Degree, Plan A2 as below:

(1) Required courses	12	credits
(2) Elective courses not less than	12	credits
(3) Thesis	12	credits
Total not less than	36	credits

3.1.3 Course in the curriculum

(1) Required courses 12 credits

	credits (Lecture – Practice– self-study)
SCIP 501 Contemporary Physics วทพณ ๕๐๑ ฟิสิกส์ร่วมสมัย	3 (3-0-6)
SCIP 502 Roles of Physics in Innovation วทพณ ๕๐๒ บทบาทของฟิสิกส์ในนวัตกรรม	3 (3-0-6)
SCIP 503 Research and Seminar in Innovative Physics วทพณ ๕๐๓ การวิจัยและสัมมนาทางฟิสิกส์เชิงนวัตกรรม	3 (3-0-6)
SCIP 504 Integrated Skills for Innovative Physics วทพณ ๕๐๔ ทักษะบูรณาการสำหรับฟิสิกส์เชิงนวัตกรรม	3 (3-0-6)

(2) Elective courses not less than 12 credits

	credits (Lecture – Practice– self-study)
SCIP 511 Introduction to Data Science วทพณ ๕๑๑ วิทยาการข้อมูลขั้นพื้นฐาน	3 (3-0-6)

SCIP	512	Artificial Intelligence	3 (3-0-6)
วทพน	๕๑๒	ปัญญาประดิษฐ์	
SCIP	513	Deep Learning	3 (3-0-6)
วทพน	๕๑๓	การเรียนรู้เชิงลึก	
SCIP	514	Application Development	3 (3-0-6)
วทพน	๕๑๔	การพัฒนาแอปพลิเคชัน	
SCIP	515	Internet of Things	3 (3-0-6)
วทพน	๕๑๕	อินเทอร์เน็ตของสิ่งของ	
SCIP	516	Innovations in Physics Education	3 (3-0-6)
วทพน	๕๑๖	นวัตกรรมด้านฟิสิกส์ศึกษา	
SCPY	516	Electronic Devices and Circuits	3 (3-0-6)
วทพส	๕๑๖	อุปกรณ์และวงจรอิเล็กทรอนิกส์	
SCPY	525	Photonics	3 (3-0-6)
วทพส	๕๒๕	โฟโตนิกส์	
SCPY	526	Quantum Optics	3 (3-0-6)
วทพส	๕๒๖	ทัศนศาสตร์ควอนตัม	
SCPY	543	Surface and Interface Physics	3 (3-0-6)
วทพส	๕๔๓	ฟิสิกส์ของพื้นผิวและรอยต่อ	
SCPY	583	Geophysical Prospecting: Seismic Methods	3 (3-0-6)
วทพส	๕๘๓	การสำรวจทางธรณีฟิสิกส์ด้วยวิธีคลื่นไหวสะเทือน	
SCPY	636	Optoelectronics	3 (3-0-6)
วทพส	๖๓๖	อิเล็กทรอนิกส์เชิงแสง	
SCPY	650	Plasma Technologies and Applications	3 (3-0-6)
วทพส	๖๕๐	เทคโนโลยีและการประยุกต์พลาสมา	
SCPY	651	Semiconductor Devices	3 (3-0-6)
วทพส	๖๕๑	อุปกรณ์สารกึ่งตัวนำ	
SCPY	668	Contemporary Biophysics	3 (3-0-6)
วทพส	๖๖๘	ชีวฟิสิกส์ร่วมสมัย	

Students may take courses offered in the Master's degree and Doctor of Philosophy degree in Physics as electives. In addition to elective courses mentioned above, students may register other courses in international programs offered by other Faculties equivalent to the Faculty of Graduate Studies, Mahidol University or by other universities according to the student's interest with the approval of the curriculum committee or the academic advisor.

(3) Thesis 12 credits

SCIP 698 Thesis

12 (0-36-0)

วทพณ ๖๙๘ วิทยานิพนธ์

3.1.4 Research project of the program

Students of the Innovative Physics program are encouraged to choose research topics aligned with the research groups of the Department of Physics. Potential thesis topics include, but not limited to,

- (1) Innovations in medical devices
- (2) Innovations in sensors
- (3) Physics-based innovations in education
- (4) Innovations based on data science and machine learning
- (5) Innovations for energy

3.1.5 Meaning of the course code

3.1.5.1 The first two letters are the initials of the Faculty/Institution in charge, namely

SC (วท) indicates Faculty of Science

3.1.5.2 The last two letters are the initials of the department/project in charge of teaching management

IP (พณ) indicates the Innovative Physics program

PY (ฟศ) indicates the Physics program

3.1.5.3 The three digits 5xx and 6xx indicates course in the graduate level

3.1.6 Study Plan

Year	Semester 1	Semester 2
1	SCIP 501 Contemporary Physics 3 (3-0-6)	SCIP 502 Roles of Physics in 3 (3-0-6)
	SCIP 503 Research and Seminar in 3 (3-0-6)	Innovation
	Innovative Physics	SCIP 504 Integrated Skills for 3 (3-0-6)
	Elective 3 credits	Innovative Physics
		Electives 6 credits
	Total 9 credits	total 12 credits

2	SCIP 698 Thesis	3 (0-9-0)	SCIP 698 Thesis	9 (0-27-0)
	Elective	3 credits		
	total 6 credits		total 9 credits	

3.1.7 Course Description

Please see appendix A

3.2 Name, I.D. Number, Title and Degree of Instructors

3.2.1 Full time instructors of the curriculum (Please see Appendix B)

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	xxxxxxxxxxxxx Professor Dr. David John Ruffolo	Ph.D. (Physics) University of Chicago, USA.: 1991 B.S. (Physics) University of Cincinnati, USA.: 1985 B.A. (Mathematics) University of Cincinnati, USA.: 1985	Department of Physics
2.	xxxxxxxxxxxxx Associate Professor Dr. Kittiwit Matan	Ph.D. (Physics) Massachusetts Institute of Technology, USA.: 2008 B.A. (Physics) The University of Chicago, USA.: 2001	Department of Physics
3.	xxxxxxxxxxxxx Associate Professor Dr. Charin Modchang	Ph.D. (Physics) Mahidol University: 2009 B.Sc. (Physics) Mahidol University: 2005	Department of Physics
4.	xxxxxxxxxxxxx Associate Professor Dr.	Ph.D. (Physics) Virginia Polytechnic Institute	Department

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
	Wannapong Triampo	and State University, USA.: 2001 M.Sc. (Physics) Virginia Polytechnic Institute and State University, USA.: 1996 M.Sc. (Applied Mathematics) Mahidol University: 1995 B.Sc. (Physics) Mahidol University: 1993	of Physics
5.	xxxxxxxxxxxxx Associate Professor Dr. Weerachai Siripunvaraporn	Ph.D. (Geophysics) Oregon State University, USA.: 1999 B.Sc. (Physics) Mahidol University: 1992	Department of Physics
6.	xxxxxxxxxxxxx Associate Professor Dr. Michael A. Allen	Ph.D. (Physics) Warwick University, UK.: 1994 B.A. (Physics) Oxford University, UK.: 1990	Department of Physics
7.	xxxxxxxxxxxxx Assistant Professor Dr. Kwan Arayathanitkul	Ph.D. (Physics) University of Pennsylvania, USA.: 1996 B.Sc. (Physics) Mahidol University: 1991	Department of Physics
8.	xxxxxxxxxxxxx Associate Professor Dr. Toemsak Srihirin	Ph.D. (Polymer Science and Engineering) Case Western Reserve University, USA.: 1998 M.S. (Polymer Science and Engineering) Case Western Reserve University, USA.: 1995 B.Sc. (Chemistry) King Mongkut Institute of Technology Thonburi: 1991	Department of Physics
9.	xxxxxxxxxxxxx Assistant Professor Dr. Tanakorn Osotchan	Ph.D. (Physics) Macquarie University, Australia: 1995 M.Sc. (Physics) Chulalongkorn University: 1989 B.Sc. (Physics) Kasetsart University: 1986	Department of Physics

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
10.	xxxxxxxxxxxxx Assistant Professor Dr. Teerakiat Kerdcharoen	Dr rer nat (Physical Chemistry) University of Innsbruck, Austria: 1995 M.Sc. (Physical Chemistry) Chulalongkorn University: 1992 B.Sc. (Chemistry) Chulalongkorn University: 1990	Department of Physics
11.	xxxxxxxxxxxxx Assistant Professor Dr. Narumon Emarat	Ph.D. (Applied Physics) The University of Edinburgh, UK.: 2000 B.Sc. (Physics) Mahidol University: 1995	Department of Physics
12.	xxxxxxxxxxxxx Assistant Professor Dr. Malliga Suewattana	Ph.D. (Physics) College of William and Mary, USA.: 2005 M.S. (Physics) College of William and Mary, USA.: 2001 B.S. (Physics) Lehigh University, USA.: 1999	Department of Physics
13.	xxxxxxxxxxxxx Assistant Professor Dr. Ratchapak Chitaree	Ph.D. (Measurement & instrumentation) City University, UK.: 1994 B.Sc. (Physics) Mahidol University: 1990	Department of Physics
14.	xxxxxxxxxxxxx Assistant Professor Dr. Warit Mitthumsiri	Ph.D. (Physics) Stanford University, USA.: 2013 B.A. (Physics) Columbia University, USA.: 2007	Department of Physics
15.	xxxxxxxxxxxxx Assistant Professor Dr. Sujin Suwanna	Ph.D. (Mathematics) The University of Virginia, USA.: 2007 M.S. (Mathematics) The University of Virginia, USA.: 2003 B.A. (Physics) Lehigh University, USA.: 2001 B.S. (Mathematics) Lehigh University, USA.: 2000	Department of Physics

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
16.	xxxxxxxxxxxxx Assistant Professor Dr. Suraphong Yuma	Ph.D. (Physics and Astronomy) Kyoto University, Japan: 2011 M.Sc. (Physics and Astronomy) Kyoto University, Japan: 2008 B.Sc. (Physics) Chulalongkorn University: 2005	Department of Physics
17.	xxxxxxxxxxxxx Assistant Professor Dr. Kritsanu Tivakornsasithorn	Ph.D. (Physics) University of Notre Dame, USA.: 2012 M.Sc. (Physics) Mahidol University: 2004 B.Sc. (Physics) Kasetsart University: 2000	Department of Physics
18.	xxxxxxxxxxxxx Assistant Professor Dr. Tawinan Cheiwchanchamnangij	Ph.D. (Physics) Case Western Reserve University, USA.: 2014 B.Sc. (Physics) Mahidol University: 2008	Department of Physics
19.	xxxxxxxxxxxxx Lecturer Dr. Chaiwoot Boonyasiriwat	Ph.D. (Computing) University of Utah, USA.: 2009 M.Sc. (Geophysics) University of Utah, USA.: 2009 M.Sc. (Computational Engineering & Science) University of Utah, USA.: 2004 B.Sc. (Physics) Mahidol University: 2002	Department of Physics
20.	xxxxxxxxxxxxx Lecturer Dr. Petchara Pattarakijwanich	Ph.D. (Astrophysical Sciences) Princeton University, USA.: 2015 MPhys. (Physics) University of Oxford, UK.: 2010	Department of Physics
21.	xxxxxxxxxxxxx Lecturer Dr. Puwis Amatyakul	Ph.D. (Physics) Mahidol University: 2015 M.Sc. (Physics) Mahidol University: 2010 B.Sc. (Physics) Mahidol University: 2007	Department of Physics
22.	xxxxxxxxxxxxx		

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
	Lecturer Dr. Sutthipong Noisagool	Ph.D. (Physics) Mahidol University: 2016 B.Sc. (Physics) Mahidol University: 2010	Department of Physics
23.	xxxxxxxxxxxxx Lecturer Dr. Asawin Sinsarp	Ph.D. (Applied Physics) University of Tsukuba, Japan: 2005 M.Sc. (Applied Physics) University of Tsukuba, Japan: 2002 B.Sc. (Physics) Mahidol University: 1999	Department of Physics
24.	xxxxxxxxxxxxx Lecturer Dr. Alejandro Saiz Rivera	Ph.D. (Physics) Universidad Autónoma de Madrid, Spain: 2003 B.S. (Physics) Universidad Autónoma de Madrid, Spain: 1996	Department of Physics
25.	xxxxxxxxxxxxx Lecturer Dr. Areeya Chantasri	Ph.D. (Physics) University of Rochester, USA: 2016 M.A. (Physics) University of Rochester, USA: 2011 M.Sc. (Physics) Mahidol University: 2009 B.Sc. (Physics) Mahidol University: 2007	Department of Physics

3.2.2 Full time instructors (Please see Appendix B)

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
1.	xxxxxxxxxxxxx Assistant Professor Dr. Phichet Kittara	Ph.D. (Astrophysics) University of Cambridge, UK.: 2003 M.Sc. (Theoretical Physics) University of Cambridge, UK.: 1998 B.Sc. University of Cambridge, UK.: 1997	Department of Physics
2.	xxxxxxxxxxxxx		

No.	Identification Card Number Academic position - Name - Surname	Degree (Field of Study) University: Year of graduate	Department
	Lecturer Dr. Udom Robkob	Ph.D. (Physics) Chulalongkorn University: 1996 M.Sc. (Physics) Chulalongkorn University: 1986 B.Sc. (Radiological Technology) Mahidol University: 1983	Department of Physics
3.	xxxxxxxxxxxxx Lecturer Dr. Withoon Chunwachirasiri	Ph.D. (Condensed Matter Physics) University of Wisconsin-Madison, USA.: 2005 B.Sc. (Physics) Mahidol University: 1997	Department of Physics

3.2.3 Part time instructors

None

4. Details and Practicum

None

5. Thesis requirements

5.1 Short Description

Thesis must be research work on a topic related to the development of knowledge of physics or application of knowledge in physics or applying knowledge from various sub-branches as stated in article 3.1.4. The thesis work must reflect a significant expansion of the original knowledge and must be submitted in accordance with the format and duration specified by the curriculum.

5.2 Standard Learning Outcomes

5.2.1 Moral and ethics in accordance with professional ethical standards.

5.2.2 Competency to keep up with academic progress and acquire new knowledge

5.2.3 Ability to create innovation based on knowledge and principles in physics with correct research process

5.2.4 Teamwork spirit, leadership skills, good interpersonal skills and responsibility for assigned duties.

5.2.5 Ability to utilize information technology to create, present, and communicate effectively with a range of audiences

5.3 Time Frame

From the first semester of the 2nd academic year onwards

5.4 Number of Credits

12 credits

5.5 Preparation

Student orientation is organized to introduce students to the program's research groups with which the students can carry out a research topic. Academic advisors are assigned to mentor entering students until the students choose research advisors. The progress of thesis is regularly monitored every semester. When students have registered for thesis, they are required to attend a seminar every semester to present the research progress.

5.6 Evaluation Procedure

(1) Evaluate the suitability of the thesis topic by the thesis proposal examination committee

(2) Evaluate the progress of thesis by thesis advisory committee

(3) Evaluate the achievement of thesis by thesis examination committee

Students are required to present their thesis in accordance with the standards of Faculty of Graduate Studies, Mahidol University, and a part of the thesis work must be published or accepted for publication in a journal with peer-review or presented to a conference with peer-review and have a proceeding as announced by the Faculty of Graduate Studies, Mahidol University.

Section 4 Program-level Learning Outcomes, Teaching Methods, and Evaluation

1. Development of Student's Specific Qualifications

Special Characteristics	Teaching Strategies and Student Activities
Mahidol University Core Values M – Mastery A – Altruism H – Harmony I – Integrity D – Determination	Students are encouraged to participate in at least one of the following activities per academic year. Examples of activities: 1. Physics Orientation Camp 2. Physics for Community Camp

Special Characteristics	Teaching Strategies and Student Activities
<ul style="list-style-type: none"> O – Originality L – Leadership 	<ul style="list-style-type: none"> 3. Thailand Children's University Programs 4. Mahidol University Open House
Research skills at the national and international levels	<ul style="list-style-type: none"> 1. Students are encouraged to join <ul style="list-style-type: none"> 1.1 Journal Club 1.2 Colloquium talk or similar events at least one event per semester. 2. The Innovative Physics Program will provide partial support to its students to attend national and/or international conferences.

2. Development of Learning Outcome in Each Objective

Expected Outcome	Teaching Strategies	Evaluation Strategies
1. Morality and Ethics 1.1 Be honest in academic work and innovations 1.2 Possess enhanced sense of morality and ethics	<ul style="list-style-type: none"> 1) Discuss 2) Individual Assignment and group assignment 3) Case Studies 	<ul style="list-style-type: none"> 1) Behavioral observation for group discussion including honesty, root for other success and tolerance for the differences 2) Evaluate morality and ethical conduct during for the class and assignment
2. Knowledge 2.1 Understand principles and contents of physics in innovations 2.2 Realize the current development of innovations and industrial development	<ul style="list-style-type: none"> 1) Lecture 2) Case studies 3) Group and individual assignment and presentation 4) Site visitation 	<ul style="list-style-type: none"> 1) Test 2) Quality of assignment 3) Analysis of the thesis 4) Presentation
3. Intellectual Development 3.1 Be able to create innovation	<ul style="list-style-type: none"> 1) Group discussion 	<ul style="list-style-type: none"> 1) Behavioral observation

Expected Outcome	Teaching Strategies	Evaluation Strategies
based on physics knowledge, process and skills 3.2 Develop the skills of self-learning	2) Project assignment and presentation 3) Analysis of case studies	2) Quality of assignment 3) Quality of thesis
4. Interpersonal Relationship and Responsibility 4.1 Be extrovert and cooperatively work with others as a team 4.2 Be responsible for assigned work.	1) Group participation 2) Group discussion 3) Group assignment	1) Behavioral observation 2) Peers evaluation 3) Summary from discussion
5. Mathematical Analytical Thinking, Communication Skills, and Information Technology Skills 5.1 Be able to search, collect, analyze data, and present knowledge systematically and effectively using information technology 5.2 Be able to assess, evaluate, and feedback presented data, effectively using information technology	1 Assignments for students to search and present topics of interests 2. Research presentation	1) Utilization of media for presentation 2) Quality of report 3) Research progress and research quality

3. Curriculum Mapping

Please refer to Appendix C

Section 5 Criteria for Student Evaluation

1. Grading System

Grading system and graduation requirement shall be complied with the criteria stated in Regulations of the Faculty of Graduate Studies, Mahidol University.

2. Standard Verification Process for Student Achievement

2.1 Provide the evaluating process from both students and board of curriculum committee towards each course based on the learning outcomes.

2.2 Provide students' learning outcome from overall curriculum evaluation from alumni, employers and experts in the fields of physics, materials science and engineering.

3. Graduation Requirement

3.1 Total time of study should not exceed the study plan (two years).

3.2 Students must complete courses as stated in the curriculum at least 24 credits including thesis 12 credits and 36 credits in total with a minimum CUM-GPA of 3.00.

3.3 Students must meet the English Competence Standard of Graduate Students, Mahidol University defined by the Faculty of Graduate Studies, Mahidol University.

3.4 Students must participate in skills development activities of the Faculty of Graduate Studies, Mahidol University

3.5 Students must submit theses and pass the thesis defense examination by following Regulations of Mahidol University on Graduate Studies. The thesis examination must be an examination open to a general audience.

3.6 Thesis or a part of the thesis is required to be published or accepted for publication in a national or international peer-reviewed academic journal in compliance with the regulations of the Higher Education Commission on the subject of Criteria and Regulation of Publishing or presented at an academic conference that has peer review proceedings as approved by the Faculty of Graduate Studies, Mahidol University.

Section 6 Faculty Development

1. The Orientation for New Faculty Members

1.1 New faculty members have to attend an orientation that aims to provide knowledge and understanding about the policies of Mahidol University and the faculty/institute/college.

1.2 New full-time and jointly appointed members are trained to acknowledge and understand the curriculum, including divisional activities.

1.3 The head of the program is required to explain concerned disciplines, curriculum, process of teaching, and assignments to the new faculty members.

2. Skill and Knowledge Development for Faculty Members

2.1 Skills Development in Teaching and Evaluation

2.1.1 Provide workshops to develop skills on teaching and learning methods by supporting to do research with the support of the University for both national and international levels.

2.1.2 Allow instructors to participate in the evaluation and revision of the curriculum, courses, and research implemented by the University or other organizations to participate in the international conferences.

2.2 Other Academic and Professional Skill Development

2.2.1 Support instructors to do research, produce and present academic projects and continue their studies.

2.2.2 Support instructors to publish research work as proceedings at national and international conferences.

2.2.3 Support instructors to attend meetings, training sessions, seminars and studies at other institutes and organizations.

Section 7 Quality Assurance

1. Regulatory Standard

1.1 Program management

Program committee is responsible for planning and executing the program evaluation every five years for quality assurance. Key performance indexes (KPIs) for quality assurance are in compliance with the standards of the Faculty of Graduate Studies.

1.2 Teaching Resources

Teaching will be conducted at the Faculty of Science, Mahidol University. The facilities are well equipped to serve both teaching and research activities, including research collaboration, training for equipment and laboratory services. Registered student can have an access to the Mahidol University library network.

1.3 Student Advice and Supports

Students are eligible to apply for a scholarship from the Faculty of Graduate Studies, Faculty of Science or any outside agencies depending upon qualification.

1.4 Job opportunity and Employer satisfaction

Records will be kept and analyzed for graduates regarding their career advancement and employer satisfaction which will be served as the KPIs for program evaluation.

2. Graduates

2.1 The success of the program management will be evaluated based on (1) graduates' characters whether they comply with the program objectives, (2) the demand for graduates after their graduation, or (3) their success in continuing education

2.2 Follow-up survey from both graduates and their employer satisfaction will be conducted

3. Students

3.1 Academic advising and counseling

3.1.1 The orientation will be provided regarding course objectives, study plan, class schedule, and academic counseling by a faculty member.

3.1.2 Academic advisor is assigned to advise and assist students on all aspects.

3.1.3 Students are encouraged to participate in a field trip and national/ international conferences to advance their academic skills.

3.2 student appeal

Student appeal can be made directly to the Dean of Graduate Studies both verbally or filing the document. The Dean will consider and proceed with the appeal.

4. Instructors

4.1 New Faculty Member

Searching for a new faculty member is handled by the Faculty of Science and the Department of Physics for joint appointment. Full time appointment will be handled by a search committee approved by the Department of Physics and the Faculty of Science.

4.2 Participation of faculty members in planning, following up and reviewing the curriculum

Curriculum meeting is arranged every semester to plan, consult and exchange opinions on learning and teaching of each course in order to review and follow up the curriculum quality and progress of students. Suggestions from course assessment are evaluated and used as inputs for updating curriculum.

4.3 Appointment of special instructors

Course coordinator can select special instructors based on qualification and experience suitable for course content and distinguish from regular faculty members in order to provide students with specific theoretical and practical knowledge. The selected instructor must be approved by the program director before giving instruction.

5. Program, Study and Student Assessment

5.1 Supporting staff

Qualification of supporting staff is based on standards of academic service officer and general administration officer which have to comply with Mahidol University recruitment instruction.

5.2 Human resource development (HRD)

HRD will be consistent with the University policy; supporting personnel is encouraged to improve knowledge related to professionalism, techniques and ethics of the position, for examples, mentoring system, knowledge management and training at specific external organizations.

6. Learning Support

6.1 Budget management

The Faculty of Graduate Studies and Faculty of Science allocate annual budget to acquire textbooks, teaching facilities, computers and other materials which creates environments suitable for self- learning of students. The budget is also used for developing lecturers and supporting personnel.

6.2 Existing learning/teaching resources

6.2.1 Library and e-library facility and resources to support student for searching and access to both domestic and international database

6.2.2 Computer facility to support student learning

6.2.3 Sufficient scientific laboratories and instruments for teaching/learning

6.2.4 Sufficient lecture rooms and teaching/learning facilities

6.2.5 Appropriate environments and atmosphere for effective learning and studying

6.3 Learning and teaching resource

Working committee select books and journals, plan for learning and teaching resources, books, references, journals, learning and teaching equipment including other electronic media that meet students' requirements, and properly manage these resources for consistent learning and teaching.

6.4 Resource management and evaluation

Committee is appointed to review the sufficiency of books, textbooks, journals, learning support and teaching equipment and other necessary resources. By reviewing results of satisfactory and requirement surveys from students and faculty members, learning resources such as books, textbooks, journals, learning and teaching equipment, are properly improved.

7. Key Performance Indicators

The Master of Science Program in Innovative Physics (International Program) divides key performance indicators into two categories based on the curriculum that meets the standards of Thai Qualifications Framework following conditions: (1) the compulsory performance indicators (numbers 1-5) must achieve the goal for at least two consecutive years, and (2) the total number of performance indicators must reach their goal by no less than 80 percent each year. The key performance indicators are as follows:

Key Performance Indicators	Academic Year				
	2021	2022	2023	2024	2025
1. At least 80% of all faculty members in charge of the program have to participate in meetings that set up plans to evaluate and revise the curriculum.	✓	✓	✓	✓	✓
2. The program must have the details of the curriculum according to TQF2 which is associated with the Thai Qualifications Framework or the standards of the program	✓	✓	✓	✓	✓
3. The program must have course specifications and field experience specifications according to TQF3 before the beginning of each semester	✓	✓	✓	✓	✓
4. Instructors must produce course reports and file experience reports according to TQF5 within 30 days after the end of the semester.	✓	✓	✓	✓	✓
5. Instructors must produce program reports according to		✓	✓	✓	✓

Key Performance Indicators	Academic Year				
	2021	2022	2023	2024	2025
TQF7 within 60 days after the end of the academic year	✓				
6. Instructors must revise the grading of students according to learning standards indicated in TQF3 for at least 25 percent of courses that are offered each academic year.	✓	✓	✓	✓	✓
7. Instructors must assess the development and/or improvement of teaching methods, teaching techniques or the grading system from the evaluation results in TQF 7 of the previous year.	-	✓	✓	✓	✓
8. Every new instructor has to participate in the orientation and receive adequate information on the college's teaching requirements.	✓	✓	✓	✓	✓
9. Full-time instructors must demonstrate academic and/or profession improvement at least once a year.	✓	✓	✓	✓	✓
10. The number of supporting staff who demonstrate academic and/or professional improvement by at least 50 percent each year.	✓	✓	✓	✓	✓
11. The level of satisfaction from the previous year's students and new graduates toward curriculum quality, with an average score of at least 3.5 out of 5	-	✓	✓	✓	✓
12. The level of satisfaction from employers of new graduates with an average score of at least 3.5 out of 5	-	-	✓	✓	✓

Section 8 Evaluation and Improvement of the curriculum Implementation

1. Assessment of Teaching Effectiveness

1.1 Assessment of Teaching Strategy

1.1.1 Analysis from students' evaluation towards courses and instructors

1.1.2 Analysis from the faculty meeting to exchange ideas or comments

1.1.3 Questionnaires from students

1.2 Assessment of the Teacher's Skills in Applying Teaching Strategies

1.2.1 Analysis students' evaluation towards courses and instructors

1.2.2 Evaluation from instructors themselves and colleagues.

2. Overall Evaluation of the Program

2.1 Survey instructors' opinions toward students and vice versa 2.2 Survey on jobs of graduates

2.3 Curriculum evaluation from external expertise

2.4 Survey on employers' satisfaction with graduates

3. Assessment of the Program Implementation Based on the Program Specification

Evaluation is made annually by the program director and instructors according to the key performance indicators of section 7, item 7.

4. Review of Evaluation Results and Plans for Improvement

4 .1 Review from information, advices, and evaluations of graduates, graduate users stakeholders, and experts

4 .2 Review and analyze the above information by the faculty member in-charge of the program

4.3 Presenting the improvement plan for the program

Appendix A

Course Description

1. Required courses

		credits (lecture - lab- self-study)
SCIP 501	Contemporary Physics	3 (3-0-6)
วทพน ๕๐๑	ฟิสิกส์ร่วมสมัย	
	Contemporary topics in various fields of physics research; advanced optics; astrophysics; biophysics; computational physics; condensed matter physics; mathematical modeling of nonlinear physical systems; molecular modeling	
	หัวข้อร่วมสมัยในงานวิจัยทางฟิสิกส์สาขาต่าง ๆ ทัศนศาสตร์ขั้นสูง ฟิสิกส์ดาราศาสตร์ ชีวฟิสิกส์ ฟิสิกส์เชิงคำนวณ ฟิสิกส์ของสสารควบแน่น การจำลองทางคณิตศาสตร์ของระบบฟิสิกส์ไม่เชิงเส้น การจำลองโมเลกุล	
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
วทพน ๕๐๒	บทบาทของฟิสิกส์ในนวัตกรรม	
	Overview of roles of physics in innovation from past to present; Physics principles behind various types of innovations; advanced technology instruments; health-care devices; medical devices; energy-saving devices; physics and safety; physics and environmental issues; presenting new ideas about developing innovation based on physics through team working and communicating to other topics	
	ภาพรวมของบทบาทของฟิสิกส์ต่อการพัฒนานวัตกรรมตั้งแต่อดีตถึงปัจจุบัน หลักการฟิสิกส์เบื้องหลังนวัตกรรมแบบต่าง ๆ อุปกรณ์เทคโนโลยีขั้นสูง อุปกรณ์การดูแลสุขภาพ อุปกรณ์การแพทย์ อุปกรณ์ประหยัดพลังงาน ฟิสิกส์กับความปลอดภัย ฟิสิกส์และประเด็นสิ่งแวดล้อม การนำเสนอแนวคิดใหม่เกี่ยวกับการพัฒนานวัตกรรมที่อาศัยความรู้หลักการทางฟิสิกส์ผ่านการทำงานเป็นทีมและการสื่อสารถึงประเด็นอื่น ๆ	
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
วทพน ๕๐๓	การวิจัยและสัมมนาทางด้านฟิสิกส์เชิงนวัตกรรม	
	Exploration of research with great potential for innovation, and bridging the advances in research and innovation; emerging physics-based technology and their principles; model building; journal metrics; research ethics; intellectual property rights; safety in physics-based experiments and device operation	

การค้นหงานวิจัยที่มีศักยภาพสูงในการสร้างนวัตกรรมและเชื่อมโยงความก้าวหน้าของงานวิจัยกับนวัตกรรม เทคโนโลยีเกิดใหม่บนรากฐานของฟิสิกส์และหลักการ การสร้างแบบจำลอง การใช้ตัวชี้วัดของงานวิจัย จริยธรรมในการทำวิจัย สิทธิทางทรัพย์สินทางปัญญา ความปลอดภัยในการทดลองทางฟิสิกส์และการใช้เครื่องมือ

SCIP 504 Integrated Skills for Innovative Physics 3 (3-0-6)

วทพน ๕๐๔ ทักษะบูรณาการสำหรับฟิสิกส์เชิงนวัตกรรม

Data analysis; regulations and protocols for patent applications; proposal writing; presentation of scientific principles for product development; techniques for pitching ideas of innovation; technological foresight evaluation; turning ideas to products. case studies of successful research to innovation products.

การวิเคราะห์ข้อมูล ระเบียบ กฎเกณฑ์ และขั้นตอนการขอสิทธิบัตร การเขียนข้อเสนอโครงการ การนำเสนอหลักการทางวิทยาศาสตร์เพื่อสร้างชิ้นงาน เทคนิคการนำเสนอแนวคิดใหม่ทางนวัตกรรม การคาดการณ์ผลของเทคโนโลยีล่วงหน้า การแปลงแนวคิดเป็นชิ้นงาน กรณีศึกษาของงานวิจัยที่ก่อให้เกิดนวัตกรรมได้สำเร็จ

2. Elective Courses

SCIP 511 Introduction to Data Science 3 (3-0-6)

วทพน ๕๑๑ วิทยาการข้อมูลขั้นพื้นฐาน

statistical inference, data analysis and visualization; machine learning algorithms for classification, clustering, and regression

การอนุมานทางสถิติ การวิเคราะห์และแสดงผลข้อมูล อัลกอริทึมต่างๆ สำหรับการเรียนรู้ของเครื่อง สำหรับงานด้านการแบ่งประเภท การแบ่งกลุ่ม และการถดถอย

SCIP 512 Artificial Intelligence 3 (3-0-6)

วทพน ๕๑๒ ปัญญาประดิษฐ์

Artificial intelligence; searching and planning; knowledge representation and reasoning; machine learning; computer vision; robotics; artificial neural networks

ปัญญาประดิษฐ์ การค้นหาและการวางแผน ตัวแทนองค์ความรู้และเหตุผล การเรียนรู้ของเครื่องจักร การมองเห็นของคอมพิวเตอร์ หุ่นยนต์ ระบบประสาทเทียม

- SCIP 513 Deep Learning 3 (3-0-6)**
วทพ ๕๑๓ การเรียนรู้เชิงลึก
 Artificial neural networks; feed-forward neural networks, network training; convolutional neural networks; autoencoders, generative adversarial networks; recurrent neural networks
 ระบบประสาทเทียม ระบบประสาทแบบส่งไปข้างหน้า การฝึกระบบประสาท ระบบประสาทแบบคอนโวลูชัน ระบบประสาทแบบเข้ารหัส-ถอดรหัส ระบบประสาทแบบปฏิบัติที่ก่อกำเนิด ระบบประสาทแบบวนซ้ำ
- SCIP 514 Application Development 3 (3-0-6)**
วทพ ๕๑๔ การพัฒนาแอปพลิเคชัน
 Desktop app development, web app development, mobile app development
 การพัฒนาโปรแกรมสำหรับคอมพิวเตอร์ตั้งโต๊ะ การพัฒนาโปรแกรมสำหรับเว็บ การพัฒนาโปรแกรมสำหรับโทรศัพท์มือถือ
- SCIP 515 Internet of Things 3 (3-0-6)**
วทพ ๕๑๕ อินเทอร์เน็ตของสิ่งของ
 Internet of things, architectures, designs; sensors and actuators; microcontroller programming; cloud services
 อินเทอร์เน็ตของสิ่งของ สถาปัตยกรรม การออกแบบ เซนเซอร์ ชิ้นส่วนจักรกล การเขียนโปรแกรมควบคุมไมโครคอนโทรลเลอร์ ระบบบริการคลาวด์
- SCIP 516 Innovations in Physics Education 3 (3-0-6)**
วทพ ๕๑๖ นวัตกรรมด้านฟิสิกส์ศึกษา
 Physics-related innovations in teaching tools, experiment demonstration, assessment tools, and teaching methods; the propagation of innovations in Physics education; the assessment of innovations in physics education; new trends of innovations in physics education
 นวัตกรรมที่เกี่ยวข้องกับฟิสิกส์ในด้านสื่อการสอน สื่อการทดลอง เครื่องมือการประเมิน และวิธีการสอน การเผยแพร่ นวัตกรรมด้านฟิสิกส์ศึกษา การประเมินนวัตกรรมในฟิสิกส์ศึกษา แนวโน้ม นวัตกรรมด้านฟิสิกส์ศึกษาในปัจจุบัน

SCPY 516 Electronic Devices and Circuits**3 (3-0-6)****บทพส ๕๑๖ อุปกรณ์และวงจรอิเล็กทรอนิกส์**

อุปกรณ์อิเล็กทรอนิกส์ เครื่องแปลงไฟฟ้ากระแสสลับ กระแสตรง วงจรแบบอนุกรม ฟลิป-ฟลอป การจำลองเชิงเส้นของอุปกรณ์ต่างๆ และการประยุกต์เพื่อการวิเคราะห์และออกแบบวงจรขยายสัญญาณ ทฤษฎีของตัวสั่นแบบความถี่ต่ำและความถี่สูง วงจรกัลป์สัญญาณ

Electronic devices, AC/DC converters, sequential circuits, Flip-Flops, linear modeling of devices and their applications to analysis and design of amplifiers, theory of low and high frequency oscillators, modulation circuits

SCPY 525 Photonics**3 (3-0-6)****บทพส ๕๒๕ โฟโตนิกส์**

ความรู้พื้นฐานของคลื่นแสง ท่อนำคลื่นแสงแบบระนาบ เส้นใยนำแสงแบบต่างๆ การคัปปลิงของโหมดแสง อันตรกิริยาระหว่างแสงกับวัสดุภายใต้สนามไฟฟ้า สนามแม่เหล็กและคลื่นเสียง ปรากฏการณ์แสงแบบไม่เชิงเส้น หลักการของเลเซอร์ อุปกรณ์สารกึ่งตัวนำสำหรับกำเนิดแสงและตรวจวัดแสง วงจรรวมเชิงแสง ทัศนศาสตร์ฟูรีเยร์ ผลึกโฟโตนิกส์ หัวข้อคัดสรรเกี่ยวกับอุปกรณ์โฟโตนิกส์และการประยุกต์

Fundamentals of light wave, planar waveguides, optical fibers, coupling of light waves and modes, interaction between light wave and matters under the influences of electric field, magnetic field and acoustic wave, nonlinear effects, principles of lasers, semiconductor light sources, semiconductor photodetectors, optical integrated circuits, Fourier optics, photonic crystals, selected topics in the photonic devices and their applications

SCPY 526 Quantum Optics**3 (3-0-6)****บทพส ๕๒๖ ทัศนศาสตร์ควอนตัม**

Quantum coherence functions, beam splitters and interferometers, quadrature squeezing, number squeezed states, photo detection techniques, photon statistics, spontaneous parametric down-conversion, Hong-Ou-Mandel interferometer, quantum eraser, induced coherence, superluminal tunneling of photons, entanglement, quantum noise, quantum non-demolition (QND) measurements, fundamental tests of quantum mechanics, photons as qubits, heralded single photons, characterizing photonic qubits

ฟังก์ชันโคฮีเรนซ์แบบควอนตัม ตัวแยกลำแสงและมาตรแทรกสอด การบีบอัดแบบจตุภาค สถานะบีบอัดเชิงจำนวน เทคนิคการวัดโฟตอน สถิติของโฟตอน การแปลงลดลงแบบอิงพารามิเตอร์ชนิดเกิดเอง มาตรแทรกสอดแบบฮอง-อู-แมนเดล การลบล้างแบบควอนตัม โคฮีเรนซ์แบบเหนี่ยวนำ การพันเนลแบบซูเปอร์ลามินอลของโฟตอน ความพัวพัน สัญญาณรบกวนเชิงควอนตัม การทดลองการไม่ถูกทำลายเชิงควอนตัม

การทดสอบพื้นฐานของกลศาสตร์ควอนตัม การใช้โฟตอนเป็นคิวบิตส์ โฟตอนเดี่ยวแบบรู้งวงหน้า การตรวจสอบคุณสมบัติเฉพาะของคิวบิตส์โฟตอนิก

SCPY 543 Surface and Interface Physics

3 (3-0-6)

วทพส ๕๔๓ ฟิสิกส์ของพื้นผิวและรอยต่อ

Atomic structure of surfaces, electronic structure of surface, thermodynamics of surfaces, adsorption phenomenon at surface, surface wetting and contact angle phenomena, surface processes in adsorption, properties and processes at metal surfaces, properties and processes at semiconductor surfaces, surface analysis and characterizations, surface modifications, physical properties of interface; space-charge layers at semi-conductor interfaces, metal-semiconductor junction, semiconductor heterostructures

โครงสร้างทางอะตอมของพื้นผิว โครงสร้างทางอิเล็กทรอนิกส์ของพื้นผิว อุณหพลศาสตร์ของพื้นผิว ปรากฏการณ์การยึดจับบนพื้นผิว ปรากฏการณ์การเปียกและมุมสัมผัสของพื้นผิว กระบวนการบนพื้นผิวของการยึดจับ สมบัติและกระบวนการบนพื้นผิวของโลหะ สมบัติและกระบวนการบนพื้นผิวของวัสดุกึ่งตัวนำ การวิเคราะห์และตรวจสอบพื้นผิว การปรับสภาพพื้นผิว สมบัติเชิงกายภาพของรอยต่อ ชั้นประจุที่รอยต่อของสารกึ่งตัวนำ รอยต่อระหว่างโลหะและวัสดุกึ่งตัวนำ โครงสร้างหลายชั้นในอุปกรณ์สารกึ่งตัวนำ

SCPY 583 Geophysical Prospecting: Seismic Methods

3 (3-0-6)

วทพส ๕๘๓ การสำรวจทางธรณีฟิสิกส์ด้วยวิธีคลื่นไหวสะเทือน

Elastic theory, seismic wave, seismic data acquisition, seismic data processing, seismic imaging

ทฤษฎีสภาพยืดหยุ่น คลื่นไหวสะเทือน การเก็บข้อมูลคลื่นไหวสะเทือน การประมวลผลข้อมูลคลื่นไหวสะเทือน การหาโครงสร้างของโลกด้วยคลื่นไหวสะเทือน

SCPY 636 Optoelectronics

3 (3-0-6)

วทพส ๖๓๖ อิเล็กทรอนิกส์เชิงแสง

Maxwell's equation, optical reflection, refraction and diffraction, principles of laser, principles of optical fibers and integrated optics

สมการแมกเวลล์ หลักการสะท้อน หักเห และการเลี้ยวเบนของแสง หลักการของเลเซอร์ หลักการของเส้นใยแก้วนำแสง วงจรรวมทางแสง

SCPY 650 Plasma Technologies and Applications 3 (3-0-6)

วทพส ๖๕๐ เทคโนโลยีและการประยุกต์พลาสมา

Plasma generation, technologies for plasma generation, collisions in plasma, plasma modeling, transport of particles in plasma, interactions of plasma with matters, plasma applications

การผลิตพลาสมา เทคโนโลยีการผลิตพลาสมา การชนกันของอนุภาคในพลาสมา แบบจำลองพลาสมา การขนส่งอนุภาคชนิดต่างๆ ในพลาสมา อันตรกิริยาของพลาสมากับวัสดุ การประยุกต์พลาสมา

SCPY 651 Semiconductor Devices 3 (3-0-6)

วทพส ๖๕๑ อุปกรณ์สารกึ่งตัวนำ

Physics of semiconductors and P-N junction devices, metal-semiconductor contact, bipolar junction transistor, metal-oxide-semiconductor (MOS) capacitor, device fabrication process, physical principles and models that are useful in the analysis and design of integrated circuits

ฟิสิกส์ของอุปกรณ์สารกึ่งตัวนำและไดโอดรอยต่อ พี-เอ็น รอยต่อระหว่างโลหะและสารกึ่งตัวนำ ทรานซิสเตอร์ชนิดรอยต่อไบโพลาร์ ตัวเก็บประจุชนิดมอส กระบวนการสร้างอุปกรณ์ หลักการทางกายภาพ และแบบจำลองที่เป็นประโยชน์ในการวิเคราะห์และออกแบบวงจรรวม

SCPY 668 Contemporary Biophysics 3 (3-0-6)

วทพส ๖๖๘ ชีวฟิสิกส์ร่วมสมัย

Overview of biophysics theories and applications, research trend in biophysics, current research topics in biophysics, biophysics and medicine, biophysics and nanotechnology

ภาพรวมของทฤษฎีทางชีวฟิสิกส์และการประยุกต์ แนวโน้มงานวิจัยทางด้านชีวฟิสิกส์ หัวข้องานวิจัยทางด้านชีวฟิสิกส์ในปัจจุบัน ชีวฟิสิกส์และการแพทย์ ชีวฟิสิกส์และนาโนเทคโนโลยี

3.Thesis

credits (lecture - lab- self-study)

SCIP 698 Thesis 12 (0-36-0)

วทพน ๖๙๘ วิทยานิพนธ์

Identifying research proposals in innovative physics, conducting research according to research ethics, Writing research findings, presenting, and publishing research in standard journals or conferences' proceedings, ethics for presenting and publishing research findings

การกำหนดหัวข้อวิจัยทางฟิสิกส์เชิงนวัตกรรม การดำเนินการวิจัยตามหลักคุณธรรม จริยธรรม และ จรรยาบรรณของการวิจัย การเขียนผลงานวิจัย การนำเสนอรายงานวิจัย การตีพิมพ์ผลงานวิจัยในวารสารมาตรฐาน หรือสิ่งพิมพ์ทางประชุมวิชาการ จริยธรรมสำหรับการนำเสนอและการตีพิมพ์ผลงานวิจัย

Appendix B

Curriculum Vitae of the Faculty in Charge of the Program

1. Professor Dr. David John Ruffolo

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	University of Chicago, USA	1991
B.S.	Physics	University of Cincinnati, USA	1985
B.A.	Mathematics	University of Cincinnati, USA	1985

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Cosmic rays
3. Astrophysics
4. Solar physics
5. Turbulence

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Eungwanichayapant, A., Luangtip, W., Maithong, W., Ruffolo, D. , 2019, X-rays from e^\pm pair halos, <i>Astrophysical Journal</i> , 880(2), 124.	12/1	2019
Published research work	Chian, A.C.-L., Abalde, J.R., Miranda, R.A., (...), Rempel, E.L., Ruffolo, D. , 2018, Multi-spectral optical imaging of the spatiotemporal dynamics of ionospheric intermittent turbulence, <i>Scientific Reports</i> , 8(1), 10568.	12/1	2018
Published research	Colón, K.D., Zhou, G., Shporer, A., (...), Ruffolo, D. , (...), Wannawichian, S., Yuma, S., 2018, A large ground-	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	based observing campaign of the disintegrating planet K2-22b, <i>Astronomical Journal</i> , 156(5), 227.		
Published research work	Nuntiyakul, W., Sáiz, A., Ruffolo, D. , (...), Duldig, M.L., Humble, J.E., 2018, Bare neutron counter and neutron monitor response to cosmic rays during a 1995 latitude survey, <i>Journal of Geophysical Research: Space Physics</i> , 123(9), 7181-7195.	12/1	2018
Published research work	Bartoli, B., Bernardini, P., Bi, X.J., (...), Ruffolo, D. , (...), Zhu, F.R., Zhu, Q.Q., 2018, Galactic cosmic-ray anisotropy in the northern hemisphere from the ARGO-YBJ experiment during 2008-2012, <i>Astrophysical Journal</i> , 861(2), 93.	12/1	2018
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Ruffolo, D. , (...), Sáiz, A., Nutaro, T., 2018, Distinct Pattern of Solar Modulation of Galactic Cosmic Rays above a High Geomagnetic Cutoff Rigidity, <i>Astrophysical Journal</i> , 858(1), 43.	12/1	2018
Published research work	Pongkitiwanchakul, P., Makwana, K.D., Ruffolo, D. , 2018, Driving reconnection in sheared magnetic configurations with forced fluctuations, <i>Physics of Plasmas</i> , 25(2), 022114.	12/1	2018
Published research work	Tortempun, U., Ruffolo, D. , Bieber, J.W., 2018, Galactic cosmic-ray anisotropy during the Forbush decrease starting 2013 April 13, <i>Astrophysical Journal Letters</i> , 852(2), L26.	12/1	2018
Published research work	Ek-In, S., Malakit, K., Ruffolo, D. , Shay, M.A., Cassak, P.A., 2017, Effects of a guide field on the Larmor electric field and upstream electron temperature anisotropy in collisionless asymmetric magnetic reconnection, <i>Astrophysical Journal</i> , 845(2), 113.	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Mitthumsiri, W., Seripienlert, A., Tortempun, U., (...), Ruffolo, D. , Macatangay, R., 2017, Modeling polar region atmospheric ionization induced by the giant solar storm on 20 January 2005, Journal of Geophysical Research: Space Physics, 122(8), 7946-7955.	12/1	2017
Published research work	Rappazzo, A.F., Matthaeus, W.H., Ruffolo, D. , Velli, M., Servidio, S., 2017, Coronal heating topology: The interplay of current sheets and magnetic field lines, Astrophysical Journal, 844(1), 87.	12/1	2017
Published research work	Chhiber, R., Subedi, P., Usmanov, A.V., (...), Ruffolo, D. , (...), Goldstein, M.L., Parashar, T.N., 2017, Cosmic-ray diffusion coefficients throughout the inner heliosphere from a global solar wind simulation, Astrophysical Journal, Supplement Series, 230(2), 21.	12/1	2017
Published research work	Subedi, P., Sonsrtee, W., Blasi, P., (...), Parashar, T.N., Chhiber, R., 2017, Charged particle diffusion in isotropic random magnetic fields, Astrophysical Journal, 837(2), 140.	12/1	2017
Published research work	Ruffolo, D. , 2017, Solar-heliospheric physics, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Banglieng, C., Ruffolo, D. , Sáiz, A., Evenson, P., Nutarod, T., 2017, Tracking cosmic-ray spectral variations with neutron monitor time-delay measurements at high cutoff rigidity during 2007-2017, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tooprakai, P., Seripienlert, A., Ruffolo, D. , Chuychai, P., Matthaeus, W.H., 2017, Simulations of lateral transport and dropout structure of energetic particles from impulsive solar flares, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Mangeard, P.-S., Muangha, P., Pyle, R., Ruffolo, D. , Sáiz, A., 2017, GeV solar energetic particle observation and search by IceTop from 2011 to 2016, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Mangeard, P.-S., Muangha, P., Pyle, R., Ruffolo, D. , Sáiz, A., 2017, Impulsive increase of galactic cosmic ray flux observed by IceTop, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Sáiz, A., Mitthumsiri, W., Ruffolo, D. , Evenson, P., Nutaro, T., 2017, Measurement of cross-counter leader fractions in an 18NM64: Detecting single and multiple atmospheric secondaries, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Ruffolo, D. , (...), Sáiz, A., Nutarod, T., 2017, Cosmic ray modulation observed by the Princess Sirindhorn neutron monitor at high rigidity cutoff, 35th International Cosmic Ray	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.		
Published research work	Suzuki, S., Sakurai, H., Tokanai, F., (...), Ruffolo, D. , (...), Kikuchi, S., Kurebayashi, Y., 2017, Observation of cosmogenic nuclide Be-7 concentrations in the air at Bangkok and trajectory analysis of global air-mass motion, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017

Current Teaching Load

SCPY 502 Classical Mechanics	3 (3-0-6)
SCPY 391 Seminar1	1 (1-0-2)
SCPY 698 Thesis	12 (0-36-0)

Assigned Teaching Load for the proposed Program

SCIP 501 Contemporary Physics	3 (3-0-6)
SCIP 698 Thesis	12 (0-36-0)

2. Associate Professor Dr. Kittiwit Matan

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Massachusetts Institute of Technology, USA.	2008
B.A.	Physics	University of Chicago, USA.	2001

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Static and dynamics spin correlation in low-dimensional magnets and geometrically frustrated spin system
2. Neutron scattering technique
3. Strongly correlated electron systems

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Matan, K. , Ono, T., Gitgeatpong, G., (...), Sato, T.J., Tanaka, H., 2019, Magnetic structure and high-field magnetization of the distorted kagome lattice antiferromagnet $\text{Cs}_2\text{Cu}_3\text{SnF}_{12}$, Physical Review B, 99(22), 224404.	12/1	2019
Published research work	Sato, T.J., Matan, K. , 2019, Nonreciprocal magnons in noncentrosymmetric magnets, Journal of the Physical Society of Japan, 88(8), 081007.	12/1	2019
Published research work	Shiomi, Y., Takashima, R., Okuyama, D., (...), Matan, K. , (...), Sato, T.J., Saitoh, E., 2017, Spin Seebeck effect in the polar antiferromagnet $\alpha\text{-Cu}_2\text{V}_2\text{O}_7$, Physical Review B, 96(18), 180414.	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Gitgeatpong, G., Zhao, Y., Piyawongwatthana, P., (...), Sato, T.J., Matan, K. , 2017, Nonreciprocal magnons and symmetry-breaking in the noncentrosymmetric antiferromagnet, Physical Review Letters, 119(4), 047201.	12/1	2017
Published research work	Gitgeatpong, G., Suewattana, M., Zhang, S., (...), Zhao, Y., Matan, K. , 2017, High-field magnetization and magnetic phase diagram of α -Cu ₂ V ₂ O ₇ , Physical Review B, 95(24), 245119.	12/1	2017
Published research work	Karna, S.K., Zhao, Y., Sankar, R., (...), Matan, K. , (...), Guo, G.Y., Chou, F.C., 2017, Sodium layer chiral distribution and spin structure of Na ₂ Ni ₂ TeO ₆ with a Ni honeycomb lattice, Physical Review B, 95(10), 104408.	12/1	2017
Published research work	Matan, K. , Ono, T., Gitgeatpong, G., (...), Sato, T.J., Tanaka, H., 2019, Magnetic structure and high-field magnetization of the distorted kagome lattice antiferromagnet Cs ₂ Cu ₃ SnF ₁₂ , Physical Review B, 99(22), 224404.	12/1	2019

Current Teaching Load

SCPY 503	Quantum Mechanics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 651	Semiconductor Devices	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

3. Associate Professor Dr. Charin Modchang

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Mahidol University	2009
B.Sc.	Physics	Mahidol University	2005

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Computational Biophysics
2. Evolutionary dynamics
3. Computational and theoretical epidemiology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Bunditvorapoom, D., Kochakarn, T., Kotanan, N., Modchang, C. , Kümpornsin, K., Loesbanluechai, D., Krasae, T., Cui, L., Chotivanich, K., White, N.J., Wilairat, P., Miotto, O., Chookajorn, T., 2018, Fitness Loss under Amino Acid Starvation in Artemisinin-Resistant Plasmodium falciparum Isolates from Cambodia, Scientific Reports, 8(1), 12622.	12/1	2018
Published research work	Pipatsart, N., Modchang, C. , Triampo, W., Amornsamankul, S., 2018, Network based model of infectious disease transmission in Macroalgae, International Journal of Simulation: Systems, Science and Technology, 19(5), 11.1-11.8.	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Suparit, P., Wiratsudakul, A., Modchang, C. , 2018, A mathematical model for Zika virus transmission dynamics with a time-dependent mosquito biting rate, Theoretical Biology and Medical Modelling, 15(1), 11.	12/1	2018
Published research work	Wiratsudakul, A., Suparit, P., Modchang, C. , 2018, Dynamics of Zika virus outbreaks: An overview of mathematical modeling approaches, PeerJ, 2018(3), e4526.	12/1	2018
Published research work	Nokkaew, A., Modchang, C. , Amornsamankul, S., (...), Pimpunchat, B., Triampo, W., 2017, Mathematical modeling of infectious disease transmission in macroalgae, Advances in Difference Equations, 2017(1), 288.	12/1	2017
Published research work	Sornbundit, K., Triampo, W., Modchang, C. , 2017, Mathematical modeling of diphtheria transmission in Thailand, Computers in Biology and Medicine, 87, 162-168.	12/1	2017
Published research work	Chadsuthi, S., Bicout, D.J., Wiratsudakul, A., Suwancharoen, D., Petkanchanapong, W., Modchang, C. , Triampo, W., Ratanakorn, P., Chalvet-Monfray, K., 2017, Investigation on predominant Leptospira serovars and its distribution in humans and livestock in Thailand, 2010-2015, PLoS Neglected Tropical Diseases, 11(2), e0005228.	12/1	2017

Current Teaching Load

SCPY 508	Contemporary Physics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 668	Contemporary Biophysics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

4. Associate Professor Dr. Wannapong Triampo

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Virginia Polytechnic Institute and State University, USA.	2001
M.Sc.	Physics	Virginia Polytechnic Institute and State University, USA.	1996
M.Sc.	Applied Mathematics	Mahidol University	1995
B.Sc.	Physics	Mahidol University	1993

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Biophysics
2. STEM Education
3. Theoretical Condensed Matter Physics
4. Computational Physics
5. Physics in Biological and Medical Systems

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Satthong, S., Saego, K., Kitrunloadjanaporn, P., (...), Amornsamankul, S., Triampo, W. , 2019, Modeling the effects of light sources on the growth of algae, <i>Advances in Difference Equations</i> , 2019(1), 170.	12/1	2019
Published research work	Pipatsart, N., Modchang, C., Triampo, W. , Amornsamankul, S., 2018, Network based model of infectious disease transmission in Macroalgae, <i>International Journal of Simulation: Systems, Science</i>	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	and Technology, 19(5), 11.1-11.8.		
Published research work	Chadsuthi, S., Althouse, B.M., Iamsirithaworn, S., (...), Triampo, W. , (...), Grantz, K.H., Cummings, D.A.T., 2018, Travel distance and human movement predict paths of emergence and spatial spread of chikungunya in Thailand, <i>Epidemiology and Infection</i> , 146(13), 1654-1662.	12/1	2018
Published research work	Thongthaisong, P., Triampo, W. , Amornsamankul, S., 2018, A novel droop-logistic model for microorganism population studies, <i>International Journal of Simulation: Systems, Science and Technology</i> , 19(4), 15.1-15.6.	12/1	2018
Published research work	Sirimangkhalak, K., Pimpunchat, B., Amornsamankul, S., Triampo, W. , 2018, Modelling greenhouse gas generation for landfill, <i>International Journal of Simulation: Systems, Science and Technology</i> , 19(4), 16.1-16.7.	12/1	2018
Published research work	Sornnery, A., Pimpunchat, B., Tuntiwarakul, D., (...), Amornsamankul, S., Triampo, W. , 2018, Using ANOVA to evaluate the effects of swine slaughterhouse wastewater conditions on algae growth, <i>International Journal of Simulation: Systems, Science and Technology</i> , 19(4), 14.1-14.8.	12/1	2018
Published research work	Punyaratabandhu, N., Kongoup, P., Dechadilok, P., Katavetin, P., Triampo, W. , 2017, Transport of spherical particles through fibrous media and a row of parallel cylinders: applications to glomerular filtration, <i>Journal of Biomechanical Engineering</i> , 139(12), 121005.	12/1	2017
Published research work	Nokkaew, A., Modchang, C., Amornsamankul, S., (...), Pimpunchat, B., Triampo, W. , 2017, Mathematical modeling of infectious disease transmission in	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	macroalgae, <i>Advances in Difference Equations</i> , 2017(1), 288.		
Published research work	Sornbundit, K., Triampo, W. , Modchang, C., 2017, Mathematical modeling of diphtheria transmission in Thailand, <i>Computers in Biology and Medicine</i> , 87, 162-168.	12/1	2017
Published research work	Chadsuthi, S., Bicout, D.J., Wiratsudakul, A., Suwanchaoen, D., Petkanchanapong, W., Modchang, C., Triampo, W. , Ratanakorn, P., Chalvet-Monfray, K., 2017, Investigation on predominant <i>Leptospira</i> serovars and its distribution in humans and livestock in Thailand, 2010-2015, <i>PLoS Neglected Tropical Diseases</i> , 11(2), e0005228.	12/1	2017
Published research work	Schreier, S., Sawaisorn, P., Udomsangpetch, R., Triampo, W., 2017, Advances in rare cell isolation: An optimization and evaluation study, <i>Journal of Translational Medicine</i> , 15(1), 6.	12/1	2017
Published research work	Pipatsart, N., Triampo, W. , Modchang, C., 2017, Stochastic Models of Emerging Infectious Disease Transmission on Adaptive Random Networks, <i>Computational and Mathematical Methods in Medicine</i> , 2017, 2403851.	12/1	2017

Current Teaching Load

SCPY 698 Thesis

12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP	501	Contemporary Physics	3 (3-0-6)
SCIP	502	Roles of Physics in Innovation	3 (3-0-6)
SCIP	503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP	504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY	668	Contemporary Biophysics	3 (3-0-6)
SCIP	698	Thesis	12 (0-36-0)

5. Associate Professor Dr. Weerachai Siripunvaraporn

Education

Degree	Field of Study	Institution	Year
Ph.D.	Geophysics	Oregon State University, USA.	1999
B.Sc.	Physics	Mahidol University	1992

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Exploration Geophysics
2. Magnetotelluric
3. Earthquake Seismology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rung-Arunwan, T., Siripunvaraporn, W. , Utada, H., 2017, Use of ssq rotational invariant of magnetotelluric impedances for estimating informative properties for galvanic distortion 1. <i>Geomagnetism, Earth, Planets and Space</i> , 69(1), 80.	12/1	2017
Published research work	Boonchaisuk, S., Noisagool, S., Amatyakul, P., (...), Vachiratiengchai, C., Siripunvaraporn, W. , 2017, 3-D magnetotelluric imaging of the Phayao Fault Zone, Northern Thailand: Evidence for saline fluid in the source region of the 2014 Chiang Rai earthquake, <i>Journal of Asian Earth Sciences</i> , 147, 210-221.	12/1	2017
Published research work	Amatyakul, P., Vachiratiengchai, C., Siripunvaraporn, W. , 2017, WSJointInv2D-MT-DCR: An efficient joint two-dimensional magnetotelluric and direct current resistivity inversion, <i>Computers and Geosciences</i> , 102, 100-108.	12/1	2017

Current Teaching Load

SCPY 698	Thesis	12 (0-36-0)
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Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 583	Geophysical Prospecting: Seismic Methods	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

6. Associate Professor Dr. Michael A. Allen

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Warwick University, UK.	1994
B.A.	Physics	Oxford University, UK.	1990

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

Nonlinear Systems: Solitons, Nonlinear waves, Fractals, Chaos, Complex Systems, Self-organization, Traffic, Pattern Formation, Ecological Modelling, Cell Separation, Climate Change Science; Combinatorial Number Theory

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Edwards, K., Allen, M.A. , 2020, A new combinatorial interpretation of the fibonacci numbers cubed, <i>Fibonacci Quarterly</i> , Volume 58, Issue 5, December 2020, Pages 128-134	12/1	2020
Published research work	Edwards K, Allen MA* , 2019, A new combinatorial interpretation of the Fibonacci numbers squared, <i>Fibonacci Q</i> , Volume 57, Issue 5, 2019, 48-53.	12/1	2019
Published research work	Allen, M.A. , 2018, Automated checking and editing of LATEX manuscripts, <i>ScienceAsia</i> , 44, 7-10.	12/1	2018

Current Teaching Load

SCPY 698 Thesis

12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

7. Assistant Professor Dr. Kwan Arayathanitkul

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	University of Pennsylvania, USA.	1996
B.Sc.	Physics	Mahidol University	1991

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Physics Education
2. Laser Applications

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Eambaipreuk, A., Arayathanitkul, K. , Emarat, N., Sharma, M., 2020, Ways of incorporating active learning experiences: An exploration of worksheets over five years in a first year Thai Physics courses., European Journal of Physics. 10., 1088/1361-6404/abcdde.	12/1	2020
Published research work	Unyapoti, T., Arayathanitkul, K. , Emarat, N., 2020, Momentum Vector Diagrams, The Physics Teacher: 58(9), 637-641	12/1	2020
Published research work	Jiwalak, A., Emarat, N., Arayathanitkul, K. , 2018, An activity sheet for teaching double-slit interference, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1), 012020.	12/1	2018

Current Teaching Load

SCPY 698 Thesis

12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 516	Innovations in Physics Education	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

8. Associate Professor Dr. Toemsak Sriksirin

Education

Degree	Field of Study	Institution	Year
Ph.D.	Polymer Science and Engineering	Case Western Reserve University, USA.	1998
M.S.	Polymer Science and Engineering	Case Western Reserve University, USA.	1995
B.Sc.	Chemistry	King Mongkut's Institute of Technology Thonburi	1991

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Polymer
2. Nanotechnology
3. Biosensor

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Lohmaneeratana K, Champreda V, Sriksirin T , Thamchaipenet A*. 2020, Poly (L-lactic acid)-degrading activity from endophytic Micromonospora spp. and catalytic analysis using surface plasmon resonance. Agric Nat Resour 2020 Nov-Dec;54(6):673-80.	12/1	2020
Published research work	Naikaew, A., Kumnorkaew, P., Supasai, T., (...), Sriksirin, T. , Kanjanaboos, P., 2019, Enhancing High Humidity Stability of Quasi-2D Perovskite Thin Films through Mixed Cation Doping and Solvent Engineering, ChemNanoMat, 5(10), 1280-1288.	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Juagwon, T., Lertvachirapaiboon, C., Shinbo, K., Kato, K., Srikhirin, T. , Osotchan, T., Baba, A., 2019, Detection of human immunoglobulin G by transmission surface plasmon resonance using the in situ gold nanoparticle growth method, IEICE Transactions on Electronics, E102C(2), pp. 125-131.	12/1	2019
Published research work	Pipatpanukul, C., Kataphiniharn, C., Wangkam, T., (...), Kunakorn, M., Srikhirin, T. , 2018, Polymethyl methacrylate (PMMA) point of care for ABO-Rh(D) blood typing, Sensors and Actuators, B: Chemical, 273, pp. 703-709.	12/1	2018
Published research work	Boonthum, C., Pinsuwan, K., Ponchai, J., Srikhirin, T. , Kanjanaboos, P., 2018, Reconditioning perovskite films in vapor environments through repeated cation doping, Applied Physics Express, 11(6), 065503.	12/1	2018
Published research work	Pipatpanukul, C., Takeya, S., Baba, A., (...), Kunakorn, M., Srikhirin, T. , 2018, Rh blood phenotyping (D, E, e, C, c) microarrays using multichannel surface plasmon resonance imaging, Biosensors and Bioelectronics, 102, 267-275.	12/1	2018
Published research work	Saen-Isara, T., Dechkunakorn, S., Anuwongnukroh, N., Srikhirin, T. , (...), Tanodekaew, S., Wichai, W., 2017, Influence of the cross-linking agent on mechanical properties of PMMA powder with compromised particle morphology, International Orthodontics, 15(2), pp. 151-164.	12/1	2017
Published research work	Peungthum, P., Sudprasert, K., Amarit, R., (...), Kunakorn, M., Srikhirin, T. , 2017, Surface plasmon resonance imaging for ABH antigen detection on red blood cells and in saliva: Secretor status-related ABO subgroup	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	identification, Analyst, 142(9), 1471-1481.		
Published research work	Santiketa, N., Pipatpanukul, C., Srikhirin, T. , (...), Uttayarat, P., Puttharugsa, C., 2017, Reuse of surface plasmon resonance (SPR) chip using UV ozone technique for SPR imager in blood groups typing, Sensor Letters, 15(3), 253-260.	12/1	2017
Published research work	Akhadejdamrong, T., Rojanapitayakorn, P., Kumnorkaew, P., (...), Rojanapitayakorn, P., Srikhirin, T. , 2017, Study the effect of coating thickness from silica nanocomposite deposited on poly(Methyl methacrylate) sheets via spray coating technique, Materials Science Forum, 895 MSF, 79-82.	12/1	2017
Published research work	Supanitayanon, L., Dechkunakorn, S., Anuwongnukroh, N., (...), Srikhirin, T. , (...), Roongrujimek, P., Tua-Ngam, P., 2017, Mechanical and physical properties of various types of dental floss, Key Engineering Materials, 730 KEM, 155-160.	12/1	2017
Published research work	Kamonwanon, P., Hirose, N., Yamaguchi, S., (...), Srikhirin, T. , Imazato, S., 2017, SiO ₂ -nanocomposite film coating of cad/cam composite resin blocks improves surface hardness and reduces susceptibility to bacterial adhesion, Dental Materials Journal, 36(1),dmj/2016-135, 88-94.	12/1	2017
Published research work	Kanjai, S., Techasukkul, K., Nawattanapaiboon, K., (...), Srikhirin, T. , (...), Sirithammajak, S., Wangkam, T., 2017, Multiplexed nanoparticle for DNA detection, Materials Today: Proceedings, 4(5), 6188-6193.	12/1	2017

Current Teaching Load

SCPY 643

Thin Film Physics and Technology

3 (3-0-6)

SCPY 698 Thesis

12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 543	Surface and Interface Physics	3 (3-0-6)
SCPY 650	Plasma Technologies and Applications	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

9. Assistant Professor Dr. Tanakorn Osotchan

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Macquarie University, Australia	1995
M.Sc.	Physics	Chulalongkorn University	1989
B.Sc.	Physics	Kasetsart University	1986

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Semiconductor Physics
2. Nanotechnology
3. Biosensor

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Somdee, A., Osotchan, T. , 2019, Effect of precipitating agent NaOH on the synThesis of SrTiO ₃ /TiO ₂ heterostructure for dye-sensitized solar cells, Materials Chemistry and Physics, 229, 210-214.	12/1	2019
Published research work	Juagwon, T., Lertvachirapaiboon, C., Shinbo, K., (...), Osotchan, T. , Baba, A., 2019, Detection of human immunoglobulin G by transmission surface plasmon resonance using the in situ gold nanoparticle growth method, IEICE Transactions on Electronics, E102C(2), 125-131.	12/1	2019
Published research work	Boonyopakorn, N., Rangkupan, R., Osotchan, T. , 2018, Preparation of aluminum doped zinc oxide targets and RF magnetron sputter thin films with various aluminum	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	doping concentrations, Songklanakarin Journal of Science and Technology, 40(4), 824-830.		
Published research work	Boonniyom, S., Osotchan, T. , Subannajui, K., 2018, Hot embossing of anodic aluminium oxide on high-density polyethylene: A deeper understanding based on hard surface coating, Micro and Nano Letters, 13(3), 357-362.	12/1	2018
Published research work	Rerkhajornnamkul, T., Osotchan, T. , 2018, Atomic structures of graphene-like nanomaterials including SiC and BP, Materials Today: Proceedings, 5(5), 11004-11010.	12/1	2018
Published research work	Udomrat, S., Kumkate, S., Puntheeranurak, T., Osotchan, T. , 2018, Poly-L-lysine modified ITO surface for enhanced cell growth, Materials Today: Proceedings, 5(5), 11083-11088.	12/1	2018
Published research work	Sitpathom, N., Kumnorkaew, P., Muangnapoh, T., Osotchan, T. , 2018, Optical diffraction of binary-nanoparticle film prepared by convective deposition with vibration assistance, Materials Today: Proceedings, 5(5), 11101-11105.	12/1	2018
Published research work	Jityen, A., Juagwon, T., Jaisuthi, R., Osotchan, T. , 2018, Carbon nanotube mixed with several metal phthalocyanine compounds for electronic tongue applications by principal components analysis, Materials Today: Proceedings, 5(5), 11135-11139.	12/1	2018
Published research work	Lhosupasirirat, S., Jirathampradhab, T., Niamsiri, N., Osotchan, T. , 2018, Improved hardness of nanocomposite films on PMMA sheet using beadmilled-SiO ₂ nanoparticle in dowanol PM, Materials Science Forum, 911 MSF, 61-65.	12/1	2018
Published research	Kongkaew, T., Sinsarp, A., Osotchan, T. , Limphirat, W., Subannajui, K., 2018, Magnetic properties and chemical	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	state of nickel doped CuFeO ₂ delafossite oxide powders prepared by sol-gel method, Materials Today: Proceedings, 5(5), 10932-10939.		
Published research work	Somdee, A., Suewattana, M., Chunwachirasiri, W., Osotchan, T. , Sinsarp, A., 2018, Adsorption of metal-phthalocyanine molecule on aluminum (100) surface: The DFT study, Science and Technology Asia, 23(1), 67-76.	12/1	2018
Published research work	Limphirat, W., Inprasit, W., Juagwon, T., (...), Tivakornsasithorn, K., Osotchan, T. , 2018, In-situ monitoring of electro-deposition for iron-nickle thin film by time-resolved X-ray absorption spectroscopy, Materials Today: Proceedings, 5(5), 10997-11003.	12/1	2018
Published research work	Sangtrirutnugul, P., Chaiprasert, T., Hunsiri, W., (...), Osotchan, T. , Ervithayasuporn, V., 2017, Tunable Porosity of Cross-Linked-Polyhedral Oligomeric Silsesquioxane Supports for Palladium-Catalyzed Aerobic Alcohol Oxidation in Water, ACS Applied Materials and Interfaces, 9(14), 12812-12822.	12/1	2017

Current Teaching Load

SCPY 507	Classical Electrodynamics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)

SCPY 516	Electronic Devices and Circuits	3 (3-0-6)
SCPY 636	Optoelectronics	3 (3-0-6)
SCPY 651	Semiconductor Devices	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

10. Assistant Professor Dr. Teerakiat Kerdcharoen

Education

Degree	Field of Study	Institution	Year
Dr rer nat	Physical Chemistry	University of Innsbruck, Austria	1995
M.Sc.	Physical Chemistry	Chulalongkorn University	1992
B.Sc.	Chemistry	Chulalongkorn University	1990

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Molecular modeling and Simulation
2. Nanoscale Theory
3. Computational Nanotechnology

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Saranrom N, Sintiam T, Panyathip R, Hongsith K, Sucharitakul S, Ngamjarurojana A, Boonyawan D, Kumnorkaew P, Kerdcharoen T , Choopun S*, 2021, Growth of black TiO ₂ quantum dots by solution-based electrochemical process. Phys Status Solidi A Appl Mater Sci 2021 Jan;218(1):2000239.	12/1	2021
Published research work	Seesaard T, Thippakorn C, Kerdcharoen T , Kladsomboon S*, 2020, A hybrid electronic nose system for discrimination of pathogenic bacterial volatile compounds. Anal Methods 2020 Dec;12(47):5671-83.	12/1	2020
Published research work	Namgyel, T., Khunarak, C., Siyang, S., (...), Norbu, J., Kerdcharoen, T. , 2018, Effects of supplementary LED light on the growth of lettuce in a smart hydroponic	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	system, 2018 10th International Conference on Knowledge and Smart Technology: Cybernetics in the Next Decades, KST 2018, 8426202, 216-220.		
Published research work	Thepudom, T., Lertvachirapaiboon, C., Shinbo, K., (...), Kerdcharoen, T. , Baba, A., 2018, Surface plasmon resonance-enhanced photoelectrochemical sensor for detection of an organophosphate pesticide chlorpyrifos, MRS Communications, 8(1), 107-112.	12/1	2018
Published research work	Sripa, P., Tongraar, A., Kerdcharoen, T. , 2017, Characterization of the F ⁻ -water and Cl ⁻ -water hydrogen bonds in aqueous solution: From “interior” (I) to “surface” (S) states, Journal of Molecular Liquids, 248, 271-277.	12/1	2017
Published research work	Chaiyasit, P., Tongraar, A., Kerdcharoen, T. , 2017, Characteristics of methylammonium ion (CH ₃ NH ₃ ⁺) in aqueous electrolyte solution: An ONIOM-XS MD simulation study, Chemical Physics, 493, 91-101.	12/1	2017

Current Teaching Load

SCPY 637	Molecular Simulation	3 (3-0-6)
SCPY 638	Molecular Quantum Mechanics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 512	Artificial Intelligence	3 (3-0-6)

SCIP	514	Application Development	3 (3-0-6)
SCIP	515	Internet of Things	3 (3-0-6)
SCIP	698	Thesis	12 (0-36-0)

11. Assistant Professor Dr. Narumon Emarat

Education

Degree	Field of Study	Institution	Year
Ph.D.	Applied Physics	The University of Edinburgh, UK.	2000
B.Sc.	Physics	Mahidol University	1995

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Physics Education
2. Laser Applications in Fluids

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Unyapoti, T., Arayathanitkul, K., Emarat, N. , 2020, Momentum Vector Diagrams, The Physics Teacher: 58(9), 637-641	12/1	2020
Published research work	Wutchana, U., Emarat, N. , Bunrangsri, K., 2019, Paper pop-ups demonstrating 3D vectors in Cartesian coordinates, Physics Education, 54(5), 053004.	12/1	2019
Published research work	Jiwalak, A., Emarat, N. , Arayathanitkul, K., 2018, An activity sheet for teaching double-slit interference, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1), 012020.	12/1	2018
Published research work	Wutchana, U., Emarat, N. , 2017, A Worksheet to Enhance Students' Conceptual Understanding in Vector Components, Siam Physics Congress 2017 (SPC2017), 24–26 May 2017, Rayong, Thailand, Journal of Physics:	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Conference Series, 901(1), 012127.		

Current Teaching Load

SCPY 517	Fluid Mechanics	3 (3-0-6)
SCPY 626	Physics Education	3 (3-0-6)
SCPY 627	Data Analysis in Physics Education	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 516	Innovations in Physics Education	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

12. Assistant Professor Dr. Malliga Suewattana

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	College of William and Mary, USA.	2005
M.S.	Physics	College of William and Mary, USA.	2001
B.S.	Physics	Lehigh University, USA.	1999

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Computational physics using ab initio method for electronic structures
2. Lead-free ferroelectric materials using density functional calculations
3. Magnetic and lattice structures of multiferroic materials

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Thammada, W., Suewattana, M. , 2018, First-principle study of local and electronic structures of yttrium-doped Ba (Zr xTi 1-x) O3, Applied Physics A: Materials Science and Processing, 124(9),644.	12/1	2018
Published research work	Somdee, A., Suewattana, M. , Chunwachirasiri, W., Osotchan, T., Sinsarp, A., 2018, Adsorption of metal-phthalocyanine molecule on aluminum (100) surface: The DFT study, Science and Technology Asia, 23(1), 67-76.	12/1	2018
Published research work	Gitgeatpong G, Suewattana M , Zhang SW, Miyake A, Tokunaga M, Chanlert P, Kurita N, Tanaka H, Sato TJ, Zhao Y, Matan K*. High-field magnetization and magnetic phase diagram of α -Cu ₂ V ₂ O ₇ . Phys Rev B 2017	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Jun;95(24):245119.		

Current Teaching Load

SCPY 503	Quantum Mechanics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

13. Assistant Professor Dr. Ratchapak Chitaree

Education

Degree	Field of Study	Institution	Year
Ph.D.	Measurement & instrumentation	City University, UK.	1994
B.Sc.	Physics	Mahidol University	1990

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Applied optics
2. Forensic Physics
3. Physics Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Rattananupong, P., Chitaree, R. , 2018, The design and development of a foot plantar pressure measurement based on the mechanically induced long period fiber grating, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1), 012068.	12/1	2018
Published research work	Khaing, S.W., Nopparatjamjomras, S., Nopparatjamjomras, T.R., Chitaree, R. , 2018, Development of Arduino-based logic gate training kit, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1), 012134.	12/1	2018
Published research work	Bubparenu, N., Laemsak, N., Chitaree, R. , Sihabut, T., 2018, Effect of density and surface finishing on sound absorption of oil palm frond, Asia-Pacific Journal of	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Science and Technology, 23(4), APST-23-04-02.		
Published research work	Kaewon, R., Pawong, C., Chitaree, R. , Bhatranand, A., 2018, Polarization phase-shifting technique for the determination of a transparent thin film's thickness using a modified sagnac interferometer, Current Optics and Photonics, 2(5), 474-481.	12/1	2018

Current Teaching Load

SCPY 636	Optical Electronics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 525	Photonics	3 (3-0-6)
SCPY 526	Quantum Optics	3 (3-0-6)
SCPY 636	Optoelectronics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

14. Assistant Professor Dr. Warit Mitthumsiri

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Stanford University, USA.	2013
B.A.	Physics	Columbia University, USA.	2007

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Cosmic rays
2. Gamma rays astrophysics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Fermi-Lat Collaboration, T., Ajello, M., Baldini, L., (...), Mitthumsiri, W. , (...), Yassine, M., Zimmer, S., 2019, A Search for Cosmic-Ray Proton Anisotropy with the Fermi Large Area Telescope, <i>Astrophysical Journal</i> , 883(1), 33.	12/1	2019
Published research work	Ajello, M., Arimoto, M., Axelsson, M., (...), Mitthumsiri, W. , (...), Zhu, S., Zimmer, S., 2019, A Decade of Gamma-Ray Bursts Observed by Fermi-LAT: The Second GRB Catalog, <i>Astrophysical Journal</i> , 878(1), 52.	12/1	2019
Published research work	Ackermann, M., Ajello, M., Baldini, L., (...), Mitthumsiri, W. , (...), Fornengo, N., Regis, M., 2018, Unresolved Gamma-Ray Sky through its Angular Power Spectrum, <i>Physical review letters</i> , 121(24), 241101.	12/1	2018
Published research work	Abeysekara, A.U., Archer, A., Benbow, W., (...), Mitthumsiri, W. , (...), Zepeda, A., Zhou, H., 2018, VERITAS and Fermi-LAT Observations of TeV Gamma-Ray Sources Discovered by HAWC in the 2HWC Catalog,	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Astrophysical Journal, 866(1), 24.		
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Mitthumsiri, W. , (...), Sáiz, A., Nutaro, T., 2018, Distinct Pattern of Solar Modulation of Galactic Cosmic Rays above a High Geomagnetic Cutoff Rigidity, Astrophysical Journal, 858(1), 43.	12/1	2018
Published research work	Ackermann, M., Atwood, W.B., Baldini, L., (...), Mitthumsiri, W. , (...), Wood, M., Zaharijas, G., 2018, Search for Gamma-Ray Emission from Local Primordial Black Holes with the Fermi Large Area Telescope, Astrophysical Journal, 857(1),49.	12/1	2018
Published research work	Clark, C.J., Pletsch, H.J., Wu, J., (...), Mitthumsiri, W. , (...), Wood, K., Wood, M., 2018, Einstein@Home discovers a radio-quiet gamma-ray millisecond pulsar, Science Advances, 4(2),eaao7228.	12/1	2018
Published research work	Ajello, M., Atwood, W.B., Baldini, L., (...), Mitthumsiri, W. , (...), Wood, K., Wood, M., 2017, 3FHL: The Third Catalog of Hard Fermi-LAT Sources, Astrophysical Journal, Supplement Series, 232(2),18.	12/1	2017
Published research work	Abdollahi, S., Ackermann, M., Ajello, M., (...), Mitthumsiri, W. , (...), Vianello, G., Wood, K.S., 2017, The Second Catalog of Flaring Gamma-Ray Sources from the Fermi All-sky Variability Analysis, Astrophysical Journal, 846(1),34.	12/1	2017
Published research work	Mitthumsiri, W. , Seripienlert, A., Tortempun, U., (...), Ruffolo, D., Macatangay, R., 2017, Modeling polar region atmospheric ionization induced by the giant solar storm on 20 January 2005, Journal of Geophysical Research: Space Physics, 122(8), 7946-7955	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Ackermann, M., Ajello, M., Baldini, L., (...), Mitthumsiri, W. , (...), Wood, K.S., Wood, M., 2017, Search for Extended Sources in the Galactic Plane Using Six Years of Fermi-Large Area Telescope Pass 8 Data above 10 GeV, <i>Astrophysical Journal</i> , 843(2),139.	12/1	2017
Published research work	Ackermann, M., Ajello, M., Albert, A., (...), Mitthumsiri, W. , (...), Zaharijas, G., Zimmer, S., 2017, The Fermi Galactic Center GeV Excess and Implications for Dark Matter, <i>Astrophysical Journal</i> , 840(1),43.	12/1	2017
Published research work	Abdollahi, S., Ackermann, M., Ajello, M., (...), Mitthumsiri, W. , (...), Zaharijas, G., Zimmer, S., 2017, Cosmic-ray electron-positron spectrum from 7 GeV to 2 TeV with the Fermi Large Area Telescope, <i>Physical Review D</i> , 95(8),082007.	12/1	2017
Published research work	Abdollahi, S., Ackermann, M., Ajello, M., (...), Mitthumsiri, W. , (...), Zaharijas, G., Zimmer, S., 2017, Search for Cosmic-Ray Electron and Positron Anisotropies with Seven Years of Fermi Large Area Telescope Data, <i>Physical Review Letters</i> , 118(9),091103.	12/1	2017
Published research work	Ackermann, M., Ajello, M., Albert, A., (...), Mitthumsiri, W. , (...), Zaharijas, G., Zhou, M., 2017, Observations of M31 and M33 with the Fermi Large Area Telescope: A Galactic Center Excess in Andromeda?, <i>Astrophysical Journal</i> , 836(2),208.	12/1	2017
Published research work	Ackermann, M., Allafort, A., Baldini, L., (...), Mitthumsiri, W. , (...), Troja, E., Vianello, G., 2017, Fermi-LAT Observations of High-energy Behind-the-limb Solar Flares, <i>Astrophysical Journal</i> , 835(2),219.	12/1	2017
Published research work	Sáiz, A., Mitthumsiri, W. , Ruffolo, D., Evenson, P., Nutaro, T., 2017, Measurement of cross-counter leader	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	fractions in an 18NM64: Detecting single and multiple atmospheric secondaries, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.		
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Mitthumsiri, W. , (...), Sáiz, A., Nutarod, T., 2017, Cosmic ray modulation observed by the Princess Sirindhorn neutron monitor at high rigidity cutoff, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Suzuki, S., Sakurai, H., Tokanai, F., (...), Mitthumsiri, W. , (...), Kikuchi, S., Kurebayashi, Y., 2017, Observation of cosmogenic nuclide Be-7 concentrations in the air at Bangkok and trajectory analysis of global air-mass motion, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.1.	12/1	2017

Current Teaching Load

SCPY 591	Seminar	1 (1-0-2)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

15. Assistant Professor Dr. Sujin Suwanna

Education

Degree	Field of Study	Institution	Year
Ph.D.	Mathematics	The University of Virginia, USA.	2007
M.S.	Mathematics	The University of Virginia, USA.	2003
B.A. (Highest Honors)	Physics	Lehigh University, USA.	2001
B.S. (Highest Honors)	Mathematics	Lehigh University, USA.	2000

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Mathematical Quantum Physics: Foundation of Quantum Mechanics, Quantum Information, Quantum Open Systems, Random Schrodinger Operators
2. Statistical Mechanics, Econophysics
3. Mathematical Modeling, Stochastic Processes
4. Mathematics & Physics Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Naikaew, A., Kumnorkaew, P., Supasai, T., (...), Suwanna, S. , (...), Sriksirin, T., Kanjanaboos, P., 2019, Enhancing High Humidity Stability of Quasi-2D Perovskite Thin Films through Mixed Cation Doping and Solvent Engineering, ChemNanoMat, 5(10), 1280-1288.	12/1	2019
Published research work	Jaroonchokanan, N., Suwanna, S. , 2018, Inverted anhamonic oscillator model for distribution of financial returns, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1), 012101.	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sakuldee, F., Suwanna, S. , 2018, Unitary–scaling decomposition and dissipative behaviour in finite-dimensional unital Lindblad dynamics, Physica A: Statistical Mechanics and its Applications, 506, 736-748.	12/1	2018

Current Teaching Load

SCPY 505	Mathematical Methods for Physicists	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 512	Artificial Intelligence	3 (3-0-6)
SCIP 513	Deep Learning	3 (3-0-6)
SCPY 526	Quantum Optics	3 (3-0-6)
SCPY 636	Optoelectronics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

16. Assistant Professor Dr. Suraphong Yuma

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics and Astronomy	Kyoto University, Japan	2011
M.Sc.	Physics and Astronomy	Kyoto University, Japan	2008
B.Sc.	Physics	Chulalongkorn University	2005

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Astrophysics
2. Observational Astronomy
3. Formation and evolution of galaxies
4. Computer programming and data analysis

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Yuma, S. , Ouchi, M., Fujimoto, S., Kojima, T., Sugahara, Y., 2019, A Giant Green Pea Identified in the Spectroscopy of Spatially Extended [O iii] Sources, <i>Astrophysical Journal</i> , 882(1),17.	12/1	2019
Published research work	Colón, K.D., Zhou, G., Shporer, A., (...), Wannawichian, S., Yuma, S. , 2018, A Large Ground-based Observing Campaign of the Disintegrating Planet K2-22b, <i>Astronomical Journal</i> , 156(5),227.	12/1	2018
Published research work	Shibuya, T., Ouchi, M., Konno, A., (...), Wang, S.-Y., Yuma, S. , 2018, SILVERRUSH. II. First catalogs and properties of ~ 2000 Ly α emitters and blobs at $z \sim 6-7$ identified over the 14-21 deg ² sky, <i>Publications of the</i>	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Astronomical Society of Japan, 70(Special Issue 1),S14.		
Published research work	Shibuya, T., Ouchi, M., Harikane, Y., (...), Yuma, S. , (...), Tanaka, M., Wang, S.-Y., 2018, SILVERRUSH. III. Deep optical and near-infrared spectroscopy for Ly α and UV-nebular lines of bright Ly α emitters at $z = 6-7$, Publications of the Astronomical Society of Japan, 70(Special Issue 1),S15.	12/1	2018
Published research work	Ono, Y., Ouchi, M., Harikane, Y., (...), Yuma, S. , (...), Taniguchi, Y., Wang, S.-Y., 2018, Great Optically Luminous Dropout Research Using Subaru HSC (GOLDRUSH). I. UV luminosity functions at $z \sim 4-7$ derived with the half-million dropouts on the 100 deg ² sky, Publications of the Astronomical Society of Japan, 70(Special Issue 1),S10.	12/1	2018
Published research work	Aihara, H., Armstrong, R., Bickerton, S., (...), Yeh, S., Yuma, S. , 2018, First data release of the Hyper Suprime-Cam Subaru Strategic Program, Publications of the Astronomical Society of Japan, 70(Special Issue 1),S8.	12/1	2018
Published research work	Aihara, H., Arimoto, N., Armstrong, R., (...), Yonehara, A., Yuma, S. , 2018, The Hyper Suprime-Cam SSP survey: Overview and survey design, Publications of the Astronomical Society of Japan, 70(Special Issue 1),S4.	12/1	2018
Published research work	Yuma, S., Ouchi, M., Drake, A.B., (...), Yuma, S. , (...), Kojima, T., Sugahara, Y., 2017, Systematic Survey for [O II], [O III], and H α Blobs at $z = 0.1-1.5$: The Implication for Evolution of Galactic-scale Outflow, Astrophysical Journal, 841(2),93.	12/1	2017

Current Teaching Load

SCPY 591	Seminar	1 (1-0-2)
SCPY 532	Galactic Astronomy	3 (3-0-6)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

17. Assistant Professor Dr. Kritsanu Tivakornsasithorn

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	University of Notre Dame, USA.	2012
M.Sc.	Physics	Mahidol University	2004
B.Sc.	Physics	Kasetsart University	2000

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Magnetic Semiconductors
2. Magnetic Heterostructures
3. Magnetic Anisotropy
4. Exchange Bias
5. Interlayer Exchange Coupling

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tivakornsasithorn, K. , Lee, S., Bac, S.-K., (...), Dobrowolska, M., Furdyna, J.K., 2019, Interlayer exchange coupling between fe and gamnas ferromagnetic semiconductor, IEEE Transactions on Magnetism, 55(2),8439082.	12/1	2019
Published research work	Tivakornsasithorn, K. , Yoo, T., Lee, H., (...), Dobrowolska, M., Furdyna, J.K., 2018, Magnetization reversal and interlayer exchange coupling in ferromagnetic metal/semiconductor Fe/GaMnAs hybrid bilayers, Scientific Reports, 8(1),10570.	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Tivakornsasithorn, K., Yoo, T., Lee, H., (...), Dobrowolska, M., Furdyna, J.K., 2017, Spacer-thickness dependence of interlayer exchange coupling in GaMnAs/InGaAs/GaMnAs trilayers grown on ZnCdSe buffers, Solid State Communications, 253, 37-41.	12/1	2017

Current Teaching Load

SCPY 504	Thermodynamics and Statistical Physics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 516	Electronic Devices and Circuits	3 (3-0-6)
SCPY 651	Semiconductor Devices	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

18. Assistant Professor Dr. Tawinan Cheiwchamnanjij

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Case Western Reserve University, USA.	2014
B.Sc.	Physics	Mahidol University	2008

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Computational Condensed Matter Physics
2. Physics Education

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Cheiwchamnanjij, T. , Lambrecht, W. R. L., 2020, Quasiparticle self-consistent GW band structure of CrN. <i>Phys. Rev. B</i> 101 , 085103.	12/1	2020
Published research work	Pramchu, S., Cheiwchamnanjij, T. , Laosiritaworn, Y., Jaroenjittichai, A.P., 2019, Enhancing surface stabilization of CH ₃ NH ₃ PbI ₃ perovskite by Cl and Br doping: First-principles study, <i>Journal of Applied Physics</i> , 125(11),115302.	12/1	2019
Published research work	Kanchiang, K., Cheiwchamnanjij, T. , Laosiritaworn, Y., Pramchu, S., Jaroenjittichai, A.P., 2018, Structural and electronic properties of MgGe x Sn (1-x) N ₂ semiconductors: The density functional theory investigation, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, <i>Journal of Physics: Conference Series</i> , 1144(1),012149.	12/1	2018

Current Teaching Load

SCPY 698	Thesis	12 (0-36-0)
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Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 514	Application Development	3 (3-0-6)
SCIP 515	Internet of Things	3 (3-0-6)
SCIP 516	Innovations in Physics Education	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

19. Lecturer Dr. Chaiwoot Boonyasiriwat

Education

Degree	Field of Study	Institution	Year
Ph.D.	Computing	University of Utah, USA.	2009
M.Sc.	Geophysics	University of Utah, USA.	2009
M.Sc.	Computational Engineering & Science	University of Utah, USA.	2004
B.Sc.	Physics	Mahidol University	2002

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Scientific computing
2. High performance computing
3. Seismic imaging
4. Machine learning

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Boonthanawat C, Boonyasiriwat C. , 2021, Finding optimal hyperparameters of feedforward neural networks for solving differential equations using a genetic algorithm., Siam Physics Congress 2020 (SPC2020), 4–5 June 2020, Thailand, J Phys Conf Ser 2021, 1719, 012033.	12/1	2021
Published research work	Chanthanasaro T, Boonyasiriwat C. , 2021, Numerical study on characteristics of sound and wake generated by flow past triangular cylinder at various incident angles., Siam Physics Congress 2020 (SPC2020), 4–5 June 2020, Thailand, J Phys Conf Ser 2021, 1719, 012034.	12/1	2021

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Pukhamwong P, Boonyasiriwat C. , 2021, An implementation of a recurrent neural network for 1D acoustic waveform inversion, Siam Physics Congress 2020 (SPC2020), 4–5 June 2020, Thailand, J Phys Conf Ser 2021, 1719, 012035.	12/1	2021
Published research work	Sombutsirinun P, Boonyasiriwat C. , 2021, A GPU implementation of least-squares reverse time migration, Siam Physics Congress 2020 (SPC2020), 4–5 June 2020, Thailand, J Phys Conf Ser 2021, 1719, 012030.	12/1	2021
Published research work	Suttirat P, Leelawattanachai J, Boonyasiriwat C. , Modchang C., 2019, Finite element modeling of vaccine delivery using microneedles: roles of microneedle shape and antigen diffusion rate., 2019, 23rd International Annual Symposium on Computational Science and Engineering (ANSCSE) June 27-29, 2019, Chiangmai Thailand, 36-46.	12/1	2019
Published research work	Sutthasathuchana, P., Boonyasiriwat, C. , 2018, High-frequency simulation of acoustic lenses based on Fresnel zone plate, Siam Physics Congress 2018 (SPC2018), 21–23 May 2018, Pitsanulok, Thailand, Journal of Physics: Conference Series, 1144(1),012032.	12/1	2018
Published research work	Sutthasathuchana, P., Boonyasiriwat, C. , 2017, Numerical simulation of acoustic lenses based on fresnel zone plate, 20th International Computer Science and Engineering Conference: Smart Ubiquitos Computing and Knowledge, ICSEC 2016, 14 - 17 December 2016, Chiangmai, Thailand, 7859957,1-4	12/1	2017

Current Teaching Load

SCPY 670 Inverse Theory and Applications

3 (3-0-6)

SCPY 698	Thesis	12 (0-36-0)
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Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 512	Artificial Intelligence	3 (3-0-6)
SCIP 513	Deep Learning	3 (3-0-6)
SCIP 514	Application Development	3 (3-0-6)
SCIP 515	Internet of Things	3 (3-0-6)
SCPY 583	Geophysical Prospecting: Seismic Methods	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

20. Lecturer Dr.Petchara Pattarakijwanich

Education

Degree	Field of Study	Institution	Year
Ph.D.	Astrophysical Sciences	Princeton University, USA.	2558
MPhys	Physics	University of Oxford, UK.	2010

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Galaxy Formation and Evolution
2. Extragalactic Astronomy
3. Observational Cosmology
4. Galaxy Survey
5. Statistics, Data Analysis and Machine Learning
6. Data Sciences

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Aharonian F, Alekseenko V, (...), Pattarakijwanich P. , (...), 2020, Prospects for a multi-TeV gamma-ray sky survey with the LHAASO water Cherenkov detector array. Chin Phys C 2020 Jun, 44(6):065001.	12/1	2020
Published research work	Benkortem S, Tanakul N, Suwannajak C, Pattarakijwanich P , Yuma S., 2019, Physical properties of RR Lyrae variables in Galactic globular clusters and dwarf spheroidal galaxies., Siam Physics Congress 2019 (SPC2019), 6-7 June 2019, Songkla Thailand, J Phys Conf Ser 2019, 1380, 012120.	12/1	2019
Published	Colón, K.D., Zhou, G., Shporer, A., (...), Pattarakijwanich ,	12/1	2018

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
research work	P., (...), Wannawichian, S., Yuma, S., 2018, A Large Ground-based Observing Campaign of the Disintegrating Planet K2-22b, <i>Astronomical Journal</i> , 156(5), 227.		
Published research work	Hunt, Q., Bezanson, R., Greene, J.E., (...), Van Der Wel, A., Pattarakijwanich, P. , 2018, Stellar and Molecular Gas Rotation in a Recently Quenched Massive Galaxy at $z \sim 0.7$, <i>Astrophysical Journal Letters</i> , 860(2),L18.	12/1	2018

Current Teaching Load

SCPY 532	Galactic Astronomy	3 (3-0-6)
SCPY 533	Astronomy and Astrophysics	3 (3-0-6)
SCPY 570	Signal and Image Processing	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 512	Artificial Intelligence	3 (3-0-6)
SCIP 513	Deep Learning	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

21. Lecturer Dr. Puwis Amatyakul

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Mahidol University	2558
M.Sc.	Physics	Mahidol University	2010
B.Sc.	Physics	Mahidol University	2007

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Exploration and computational geophysics
2. Electromagnetic and magnetotelluric surveys
3. Geophysical data processing, modeling and inversion
4. Geothermal exploration
5. Integrated geophysical surveys for near surface applications

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Amatyakul P , Phueak-Im K, Morhrasi P, Suklim T., 2020, A preliminary result of Lamtakong embankment dam safety assessment using integrated subsurface electrical resistivity and shear wave velocity model., 3rd Asia Pacific Meeting on Near Surface Geoscience & Engineering 2020, Nov 2-5 Chiang Mai, Thailand, p.1 - 3.	12/1	2020
Published research work	Amatyakul P , Rung-arunwan T, Vachiratienchai C, Siripunvaraporn W., 2020, 2-D joint inversion of magnetotelluric data and direct-current resistivity data to delineate shallow geothermal reservoir and fluid	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	pathway beneath Mae Chan Hot Springs, Chiang Rai, Thailand. 3rd Asia Pacific Meeting on Near Surface Geoscience & Engineering 2020 Nov 2-5, Chiang Mai, Thailand, p.1 - 3.		
Published research work	Trinakoon S, Vachiratianchai C, Amatyakul P , Siripunvaraporn W, Noisagool S., 2019, Comparing performance of multi-frequency bands Occam's receiver function inversion to standard linearized receiver function inversion., Siam Physics Congress 2019 (SPC2019), 6-7 June 2019, Songkla Thailand, J Phys Conf Ser 2019, 1380, 012061.	12/1	2019
Published research work	Nornin N, Noisagool S, Siripunvaraporn W, Amatyakul P. , 2019, Crustal density structure across Thailand delineated from 2D density modelling using gravity data and receiver function, Siam Physics Congress 2019 (SPC2019), 6-7 June 2019, Songkla Thailand, J Phys Conf Ser 2019, 1380, 012158.	12/1	2019
Published research work	Boonchaisuk, S., Noisagool, S., Amatyakul, P. , Rung-Arunwan, T., Vachiratianchai, C., Siripunvaraporn, W., 2017, 3-D magnetotelluric imaging of the Phayao Fault Zone, Northern Thailand: Evidence for saline fluid in the source region of the 2014 Chiang Rai earthquake, Journal of Asian Earth Sciences, 147, 210-221.	12/1	2017
Published research work	Amatyakul, P. , Vachiratianchai, C., Siripunvaraporn, W., 2017, WSJointInv2D-MT-DCR: An efficient joint two-dimensional magnetotelluric and direct current resistivity inversion, Computers and Geosciences, 102, 100-108.	12/1	2017

Current Teaching Load

SCPY 582 Geophysical Prospecting: Electromagnetic Methods 3 (3-0-6)

SCPY 630	Physics of the Solid Earth	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCIP 512	Artificial Intelligence	3 (3-0-6)
SCIP 513	Deep Learning	3 (3-0-6)
SCIP 514	Application Development	3 (3-0-6)
SCIP 515	Internet of Things	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

22. Lecturer Dr.Sutthipong Noisagool

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Mahidol University	2016
B.Sc.	Physics	Mahidol University	2010

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Earth imaging using seismological methods
2. Regional earthquake source, rupture process, stress and seismo-tectonic implication
3. Tectonic evolution of Thailand and adjacent area
4. Geophysical exploration for shallow and deep earth structure

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Ohtaki, T., Tanaka, S., Kaneshima, S., Siripunvaraporn, W., Boonchaisuk, S., Noisagool, S. , Kawai, K., Kim, T., Suzuki, Y., Ishihara, Y., Miyakawa, K., Takeuchi, N. Seismic velocity structure of the upper inner core in the north polar region <i>Physics of the Earth and Planetary Interiors</i> Volume 311, February 2021, Article number 106636	12/1	2021
Published research work	Saengduean, P., Noisagool, S. , Chamchod, F. Topological data analysis for identifying critical transitions in cryptocurrency time series <i>IEEE International Conference on Industrial Engineering and Engineering Management</i> Volume 2020-December, 14 December 2020, Article number 9309855, Pages 933-938 2020 IEEE International Conference on Industrial	12/1	2020

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Engineering and Engineering Management, IEEM 2020; Virtual, Singapore; Singapore; 14 December 2020 through 17 December 2020; Category number CFP20IEI-ART; Code 166486		
Published research work	Suzuki, Y., Kawai, K., Geller, R.J., Tanaka, S., Siripunvaraporn, W., Boonchaisuk, S., Noisagool, S. , Ishihara, Y., Kim, T. High-resolution 3-D S-velocity structure in the D" region at the western margin of the Pacific LLSVP: Evidence for small-scale plumes and paleoslabs <i>Physics of the Earth and Planetary Interiors</i> Volume 307, October 2020, Article number 106544	12/1	2020
Published research work	Nornin, N., Noisagool, S. , Siripunvaraporn, W., Amatyakul, P. Crustal density structure across Thailand delineated from 2D density modelling using gravity data and receiver function <i>Journal of Physics: Conference Series</i> Volume 1380, Issue 1, 16 December 2019, Article number 012158 Siam Physics Congress 2019: Physics Beyond Disruption Society, SPC 2019; Hansa JB Hotel Hat Yai, Songkhla; Thailand; 6 June 2019 through 7 June 2019; Code 156343	12/1	2019
Published research work	Boonchaisuk, S.a, Noisagool, S. b,e, Amatyakul, P.b, Rung-Arunwan, T.c, Vachiratienchai, C.c, Siripunvaraporn, W. 3-D magnetotelluric imaging of the Phayao Fault Zone, Northern Thailand: Evidence for saline fluid in the source region of the 2014 Chiang Rai earthquake <i>Journal of Asian Earth Sciences</i> Volume 147, 01 October 2017, Pages 210-221	12/1	2017

Current Teaching Load

SCIP	585	Introductory Seismology	3 (3-0-6)
SCIP	586	Applied Modern Seismology	3 (3-0-6)
SCIP	587	Earthquake Source Theory	3 (3-0-6)
SCIP	630	Physics of the Solid Earth	3 (3-0-6)
SCPY	698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP	501	Contemporary Physics	3 (3-0-6)
SCIP	502	Roles of Physics in Innovation	3 (3-0-6)
SCIP	503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP	504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP	511	Introduction to Data Science	3 (3-0-6)
SCPY	583	Geophysical Prospecting: Seismic Methods	3 (3-0-6)
SCIP	698	Thesis	12 (0-36-0)

23. Lecturer Dr.Asawin Sinsarp

Education

Degree	Field of Study	Institution	Year
Ph.D.	Applied Physics	University of Tsukuba, Japan	2005
M.Sc.	Applied Physics	University of Tsukuba, Japan	2002
B.Sc.	Physics	Mahidol University	1999

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

- 1 Condensed Matters
- 2 Surface Physics
- 3 Quantum Optics
- 4 Magnetic Materials

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Soe T*, Jityen A, Kongkaew T, Subannajui K, Sinsarp A , Osotchan T., 2020, X-ray photoelectron spectroscopy study of chromium and magnesium doped copper ferrite thin film., AIP Conf Proc 2020 Oct, 2279(1):140002.	12/1	2020
Published research work	Sitpathom N, Dawes JM, Muangnapoh T, Kumnorkaew P, Suwanna S, Sinsarp A , Osotchan T., 2020, Optical spectra of periodically patterned dielectric surface simulated by finite-different time-domain method., J Phys Conf Ser 2019, 1380:012151.	12/1	2020
Published research work	Sitpathom N, Dawes JM, Muangnapoh T, Kumnorkaew P, Suwanna S, Sinsarp A , Osotchan T., 2020, Optical	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	spectra of periodically patterned dielectric surface simulated by finite-different time-domain method., Siam Physics Congress 2019 (SPC2019), 6-7 June 2019, Songkla Thailand, J Phys Conf Ser 2019, 1380, 012151.		
Published research work	Somdee, A., Suewattana, M., Chunwachirasiri, W., Osothchan, T., Sinsarp, A. , 2018, Adsorption of metal-phthalocyanine molecule on aluminum (100) surface: The DFT study, Science and Technology Asia, 23(1), 67-76.	12/1	2018

Current Teaching Load

SCPY 504	Thermodynamics and Statistical Physics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 516	Electronic Devices and Circuits	3 (3-0-6)
SCPY 526	Quantum Optics	3 (3-0-6)
SCPY 543	Surface and Interface Physics	3 (3-0-6)
SCPY 651	Semiconductor Devices	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

24. Lecturer Dr.Alejandro Saiz Rivera

Education

Degree	สาขาวิชา	Institution	Year
Ph.D.	Physics	Universidad Autónoma de Madrid, Spain	2003
B.S.	Physics	Universidad Autónoma de Madrid, Spain	1996

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

Space Physics and Energetic Particles

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Nuntiyakul, W., Sáiz, A. , Ruffolo, D., (...), Duldig, M.L., Humble, J.E., 2018, Bare Neutron Counter and Neutron Monitor Response to Cosmic Rays During a 1995 Latitude Survey, Journal of Geophysical Research: Space Physics, 123(9), 7181-7195.	12/1	2018
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Sáiz, A. , Nutaro, T., 2018, Distinct Pattern of Solar Modulation of Galactic Cosmic Rays above a High Geomagnetic Cutoff Rigidity, Astrophysical Journal, 858(1),43.	12/1	2018
Published research work	Mitthumsiri, W., Seripienlert, A., Tortempun, U., (...), Ruffolo, D., Macatangay, R., 2017, Modeling polar region atmospheric ionization induced by the giant solar storm on 20 January 2005, Journal of Geophysical Research: Space Physics, 122(8), 7946-7955.	12/1	2017
Published research work	Banglieng, C., Ruffolo, D., Sáiz, A. , Evenson, P., Nutarod, T., 2017, Tracking cosmic-ray spectral variations with	12/1	2017

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
work	neutron monitor time-delay measurements at high cutoff rigidity during 2007-2017, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.		
Published research work	Mangeard, P.-S., Muangha, P., Pyle, R., Ruffolo, D., Sáiz, A. , 2017, GeV solar energetic particle observation and search by IceTop from 2011 to 2016, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Mangeard, P.-S., Muangha, P., Pyle, R., Ruffolo, D., Sáiz, A. , 2017, Impulsive increase of galactic cosmic ray flux observed by IceTop, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Sáiz, A. , Mitthumsiri, W., Ruffolo, D., Evenson, P., Nutaro, T., 2017, Measurement of cross-counter leader fractions in an 18NM64: Detecting single and multiple atmospheric secondaries, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017
Published research work	Mangeard, P.-S., Clem, J., Evenson, P., (...), Sáiz, A. , Nutarod, T., 2017, Cosmic ray modulation observed by the Princess Sirindhorn neutron monitor at high rigidity cutoff, 35th International Cosmic Ray Conference, ICRC 2017; Bexco, Busan; South Korea; 10 July 2017 through 20 July 2017; Code 135186.	12/1	2017

Current Teaching Load

SCPY 505	Mathematical Methods for Physicists	3 (3-0-6)
SCPY 531	Cosmic Rays	3 (3-0-6)

SCPY 533	Astronomy and Astrophysics	3 (3-0-6)
SCPY 534	Solar Physics	3 (3-0-6)
SCPY 535	General Relativity	3 (3-0-6)
SCPY 649	Plasma Physics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCPY 650	Plasma Technologies and Applications	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

25. Lecturer Dr. Areeya Chantasri

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	University of Rochester, USA	2016
M.A.	Physics	University of Rochester, USA	2011
M.Sc.	Physics	Mahidol University	2009
B.Sc.	Physics	Mahidol University	2007

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

Quantum Optics

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Laverick K., Chantasri A. , and Wiseman H. M., “General criteria for quantum state smoothing with necessary and sufficient criteria for linear Gaussian quantum systems,” Quantum Studies: Mathematics and Foundations – April 2020. doi:10.1007/s40509-020-00225-7	12/1	2020
Published research work	Chantasri A. , Guevara I., and Wiseman H. M., “Quantum state smoothing: Why the types of observed and unobserved measurements matter,” New Journal of Physics, 21, 083039 – August 2019. doi:10.1088/1367-2630/ab396e	12/1	2019
Published research work	Laverick K., Chantasri A. , and Wiseman H. M.,, “Quantum State Smoothing for Linear Gaussian Systems,” Physical Review Letter, 122, 190402 – May 2019. doi:10.1103/PhysRevLett.122.190402	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Chantasri A , Pang S., Chalermputitarak T., and Jordan A. N., “Quantum state tomography with time-continuous measurements: reconstruction with resource limitations,” <i>Quantum Studies: Mathematics and Foundations</i> , 7, 23 (2020) – May 2019. doi:10.1007/s40509-019-00198-2	12/1	2019
Published research work	Chantasri A , Atalaya J., Hacothen-Gourgy S., Martin L. S., Siddiqi I., and Jordan A. N., “Simultaneous continuous measurement of non-commuting observables: quantum state correlations,” <i>Physical Review A</i> , 97, 012118 – January 2018. doi:10.1103/PhysRevA.97.012118	12/1	2018

Current Teaching Load

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Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCPY 526	Quantum Optics	3 (3-0-6)
SCIP 698	Thesis	12 (0-36-0)

Full time instructors

1. Assistant Professor Dr. Phichet Kittara

Education

Degree	Field of Study	Institution	Year
Ph.D.	Astrophysics	University of Cambridge, UK.	2003
M.Sc.	Theoretical Physics	University of Cambridge, UK.	1998
B.Sc.	Physics	University of Cambridge, UK.	1997

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. radio & terahertz receivers
2. astronomical receivers
3. SIS mixers
4. horn antennas
5. superconductor detectors

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Hayes, J.J.C., Kerins, E., Awiphan, S., McDonald, I., Morgan, J.S., Chuanraksasat, P., Komonjinda, S., Sanguansak, N., Kittara, P. Optimizing exoplanet atmosphere retrieval using unsupervised machine-learning classification <i>Monthly Notices of the Royal Astronomical Society</i> Volume 494, Issue 3, 2021, Pages 4492-4508	12/1	2021

Current Teaching Load

SCPY 507	Classical Electrodynamics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)
SCIP 511	Introduction to Data Science	3 (3-0-6)
SCPY 516	Electronic Devices and Circuits	3 (3-0-6)

2. Lecturer Dr. Withoon Chunwachirasiri

Education

Degree	Field of Study	Institution	Year
Ph.D.	Condensed Matter Physics	University of Wisconsin-Madison, USA.	2005
B.Sc.	Physics	Mahidol University	1997

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Structure-physical properties relationship in linear structure
2. Applied spectroscopy in material studies

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Somdee, A., Suewattana, M., Chunwachirasiri, W. , Osotchan, T., Sinsarp, A., 2018, Adsorption of metal-phthalocyanine molecule on aluminum (100) surface: The DFT study, Science and Technology Asia, 23(1), 67-76.	12/1	2018

Current Teaching Load

SCPY 698 Thesis 12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501 Contemporary Physics 3 (3-0-6)
 SCIP 502 Roles of Physics in Innovation 3 (3-0-6)
 SCIP 503 Research and Seminar in Innovative Physics 3 (3-0-6)
 SCIP 504 Integrated Skills in Innovative Physics 3 (3-0-6)
 SCPY 651 Semiconductor Devices 3 (3-0-6)
 SCIP 698 Thesis 12 (0-36-0)

3. Lecturer Dr. Udom Robkob

Education

Degree	Field of Study	Institution	Year
Ph.D.	Physics	Chulalongkorn University	1996
M.Sc.	Physics	Chulalongkorn University	1986
B.Sc.	Radiological Technology	Mahidol University	1983

Affiliation Department of Physics Faculty of Science Mahidol University

Research Interests

1. Physics Quantum Theory
2. Quantum Field/String theory
3. Mathematical Physics
4. Condensed Matter Theories

Academic work as not part of the study for degree certificate and published and disseminated in accordance with the stipulated criteria regarding academic rank appointment in five retrospective years

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
Published research work	Sukrakarn, S., Robkob, U. Photon signal from non-interacting scalar dark matter annihilation <i>J Journal of Physics: Conference Series</i> Volume 1380, Issue 1, 16 December 2019, Article number 012040 Siam Physics Congress 2019: Physics Beyond Disruption Society, SPC 2019; Hansa JB HotelHat Yai, Songkhla; Thailand; 6 June 2019 through 7 June 2019; Code 156343.	12/1	2019
Published research work	Supanyo, S., Robkob, U. Exploring one loop amplitude at four-points vertices by the OPP method <i>Journal of Physics: Conference Series</i> Volume 1144, Issue 1, 19 December 2018, Article number 012036 Siam Physics Congress 2018: A Creative Path to Sustainable	12/1	2019

Types of Academic Work	Title	Standard Criteria and Weights	Year of Publication
	Innovation, SPC 2018; Topland HotelPitsanulok; Thailand; 21 May 2018 through 23 May 2018; Code 143545.		

Current Teaching Load

SCPY 507	Classical Electrodynamics	3 (3-0-6)
SCPY 698	Thesis	12 (0-36-0)

Assigned Teaching Load for the Proposed Program

SCIP 501	Contemporary Physics	3 (3-0-6)
SCIP 502	Roles of Physics in Innovation	3 (3-0-6)
SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)
SCIP 504	Integrated Skills in Innovative Physics	3 (3-0-6)

Table of Relationship between Learning Outcomes of the Program and Core Value of Mahidol University

Learning Outcomes	Core Values of Mahidol University
1. Morality and Ethics: 1.1 Be honest in academic work and innovations 1.2 Possess enhanced sense of morality and ethics	Integrity, Mastery, Altruism
2. Knowledge 2.1 Understand principles and contents of physics in innovations 2.2 Realize the current development of innovations and industrial development	Mastery, Harmony, Determination, Originality
3. Intellectual skills: 3.1 Be able to create innovation based on physics knowledge, process and skills 3.2 Develop the skills of self-learning	Mastery, Harmony, Determination, Originality
4. Interpersonal relationship and responsibility: 4.1 Be extrovert and cooperatively work with others as a team 4.2 Be responsible for assigned work	Altruism, Leadership, Harmony, Originality
5. Mathematical analytical thinking, communication skills, and information 5.1 Be able to search, collect, analyze data, and present knowledge systematically and effectively using information technology 5.2 Be able to assess, evaluate, and feedback presented data, effectively using information technology	Mastery, Altruism, Harmony, Integrity, Determination, Originality, Leadership

Appendix D
AUN-QA Documents

Table 1: Comparison between before and after revised objective of the program

Objective of the Program	Revised Objective of the Program
1. possess moral standards and professional ethics	-
2. understand the principles and theories related to the fields of physics and innovations and conduct self-directed learning and follow the advance of academic and technology in innovative physics	
3. analyze and criticize research and conduct research of innovative physics based on the professional moral and right procedure of research	
4. work cooperatively as a leader and a member of the group, and have high responsibility for assigned work	
5. effectively utilize the information technology, mathematical skill and statistical skill for searching, collecting, processing, analyzing research data, and efficiently presenting research results in a coherent and comprehensible way	

Table 2 Relationship between objective of the program and program learning outcome

Objective of the Program	PLO				
	1	2	3	4	5
1. possess moral standards and professional ethics	✓				
2. understand the principles and theories related to the fields of physics and innovations and conduct self-directed learning and follow the advance of academic and technology in innovative physics		✓	✓		
3. analyze and criticize research and conduct research of innovative physics based on the professional moral and right procedure of research		✓	✓		
4. work cooperatively as a leader and a member of the group, and have high responsibility for assigned work				✓	
5. effectively utilize the information technology, mathematical skill and statistical skill for searching, collecting, processing, analyzing research data, and efficiently presenting research results in a coherent and comprehensible way					✓

Program Learning Outcomes, PLO

1 Moral and ethics in accordance with professional ethical standards.

2 Competency to keep up with academic progress and acquire new knowledge

3 Ability to create innovation based on knowledge and principles in physics with correct research process

4 Teamwork spirit, leadership skills, good interpersonal skills and responsibility for assigned duties.

5 Ability to utilize information technology to create, present, and communicate effectively with a range of audiences

Table 3: Standard domains of learning outcome and Program Learning Outcomes

Domain	Standard Learning Outcome (TQF)	Program Learning Outcomes				
		PLO1	PLO2	PLO3	PLO4	PLO5
Morality and Ethics	1.1 Be honest in academic work and innovations	✓				
	1.2 Possess enhanced sense of morality and ethics	✓				
Knowledge	2.1 Understand principles and contents of physics in innovations		✓	✓		
	2.2 Realization the current development of innovations and industrial development		✓	✓		
Intellectual Skills	3.1 Be able to create innovation based on physics knowledge, process and skills			✓		
	3.2 Develop the skill of self-learning		✓			
Interpersonal Relationship Skills and Responsibility	4.1 Be extrovert and cooperatively work with others as a team.				✓	
	4.2 Be responsible for assigned work.				✓	
Mathematical Skills, Analytical Thinking, Communication Skills and Information Technology	5.1 Be able to search, collect, analyze data, and present knowledge systematically and effectively using information technology					✓
	5.2 Be able to assess, evaluate, and feedback presented data, effectively using information technology					✓

Table 4: Learning and Assessment Strategies for Program Learning Outcomes Evaluation

PLO	Learning Method	Assessment
1. Moral and ethics in accordance with professional ethical standards.	<ol style="list-style-type: none"> 1. Case studies 2. Group assignment 3. Individual assignment 	<ol style="list-style-type: none"> 1. Behavior in class 2. Moral ethics in the assignments and thesis
2. Competency to keep up with academic progress and acquire new knowledge as needed	<ol style="list-style-type: none"> 1. Assignment 2. Research techniques coaching 	<ol style="list-style-type: none"> 1. Observe the participation during the presentation 2. Quality of the assignment 3. Thesis progress report and examination
3. Ability to create innovation based on knowledge and principles in physics with correct research process	<ol style="list-style-type: none"> 1. Interactive lecture 2. Class discussion 3. Group assignment 4. Thesis writing 	<ol style="list-style-type: none"> 1. Examination 2. Observe the participation in the discussion 3. Thesis progress report and Thesis examination
4 Teamwork spirit, leadership skills, good interpersonal skill and responsibility for assigned duties	<ol style="list-style-type: none"> 1. Class discussion 2. Group assignment 	<ol style="list-style-type: none"> 1. Observe the participation in the discussion 2. Thesis progress report and Thesis examination
5. Ability to utilize information technology to create, present, and communicate effectively with a range of audiences	<ol style="list-style-type: none"> 1. Seminar 2. Class presentation 3. Thesis writing 	<ol style="list-style-type: none"> 1. Presentation of the assignment 2. Thesis examination

Table 5: Relationship between Courses of the Program and Program Learning Outcomes

No.	Code	Name	credits (lecture - lab- self- study)	PLO				
				1	2	3	4	5
(1) Required courses								
1	SCIP 501	Contemporary Physics	3 (3-0-6)	R	I	I	I	I
2	SCIP 502	Role of Physics in Innovation	3 (3-0-6)	R	R	R	R	R
3	SCIP 503	Research and Seminar in Innovative Physics	3 (3-0-6)	R	M	R	M	M
4	SCIP 504	Integrated Skills for Innovative Physics	3 (3-0-6)	M	M	M	R	R
(2) Elective courses								
5	SCIP 511	Introduction to Data Science	3 (3-0-6)	R	R	R	R	R
6	SCIP 512	Artificial Intelligence	3 (3-0-6)	R	R	R	R	R
7	SCIP 513	Deep Learning	3 (3-0-6)	R	R	R	R	R
8	SCIP 514	Application Development	3 (3-0-6)	R	R	R	R	R
9	SCIP 515	Internet of Things	3 (3-0-6)	R	R	R	R	R
10	SCIP 516	Innovations in Physics Education	3 (3-0-6)	R	R	R	R	R
11	SCPY 516	Electronic Devices and Circuits	3 (3-0-6)	R	R	R	R	R
12	SCPY 525	Photonics	3 (3-0-6)	R	R	R	R	R
13	SCPY 526	Quantum Optics	3 (3-0-6)	R	R	R	R	R
14	SCPY 543	Surface and Interface Physics	3 (3-0-6)	R	R	R	R	R
15	SCPY 583	Geophysical Prospecting: Seismic Methods	3 (3-0-6)	R	R	R	R	R
16	SCPY 636	Optoelectronics	3 (3-0-6)	R	R	R	R	R
17	SCPY 650	Plasma Technologies and Applications	3 (3-0-6)	R	R	R	R	R
18	SCPY 651	Semiconductor Devices	3 (3-0-6)	R	R	R	R	R
19	SCPY 668	Contemporary Biophysics	3 (3-0-6)	R	R	R	R	R
(3) thesis								
20	SCIP 698	Thesis	12 (0-36-0)	M	M	M	M	M

I = ELO is introduced & assessed

R = ELO is reinforced & assessed

P = ELO is practiced & assessed

M = Level of Mastery is assessed

Table 6: The expectation of learning outcomes at the end of the academic year

Year of study	Knowledge, skills, and any other expected learning outcomes
First	<p>Able to keep up with academic progress and acquire new knowledge</p> <p>Having teamwork spirit, leadership skills, good interpersonal skill and responsibility for assigned duties.</p> <p>Able to utilize information technology to create, present, and communicate effectively with a range of audiences</p>
Second	<p>Having a moral and ethics in accordance with professional ethical standards</p> <p>Able to create innovation based on knowledge and principles in physics with correct research process</p>