Academic degree level ☒ Bachelor ☐ Master ☐ Doctor

# TQF3 Course Specification

## DTI3302 Computer Programing and Developing Applications for Education

## Faculty of Education, Suan Sunandha Rajabhat University

## Semester 2 Academic Year 2025

## Section 1 General Information

**1. Course Code and Title**

| | |
|---|---|
| **Code** | DTI3302 |
| **In Thai** | การเขียนโปรแกรมและพัฒนาแอปพลิเคชันเพื่อการศึกษา |
| **In English** | Computer Programing and Developing Applications for Education |

**2. Number of Credits** 3(2-2-5)

| | |
|---|---|
| Theory | 2 hrs./week |
| Practice | 2. hrs./week |
| Self-Study | 5 hrs./week |

**3. Curriculum and Course Type**

3.1 Curriculum Bachelor of Education (Digital Technology for Education) (Thai)

3.2 Course Type ☒ Compulsory Course ☐ Electives

**4. Course Coordinator and Lecturer**

4.1 Course Responsible Lecturers **Pasawut Cheerapakorn**

4.2 Lecturers **Pasawut Cheerapakorn**

**Officer ID:** 083852

**email:** pasawut.ch@ssru.ac.th

**Website:** https://ssrudlp.ssru.ac.th/teacher/pasawut_chee

**5. Place of contact** Department of Digital Technology for Education, Faculty of Education

**6. Semester/year of study**

6.1 Semester 2 Academic Year 2025

6.2 Number of Students Allowed Approximately 60 Students (Third-year Student)

**6. Pre-requisite** nil

**7. Co-requisites** nil

**8. Study Site Location**

Computer Laboratory 1122 2nd Floor, Faculty of Education, Suan Sunandha Rajabhat University

**9. Date of Preparation/Latest Revision of the Course Specifications** nil

## Section 2 Aims and Objectives

**1. Course Goals**

Upon completion of this course the student will be able to:

1. Understand about Algorithm and Flow Chart, Python Integrated Development Environment (IDE), Control Flow Programming, Fundamental to Advance in Python Programming Language, Application Design and Development by using Python Programming Language, Black-Box Testing, Assessment and Evaluation.

2. Utilize the Python Programming Language for developing learning and teaching materials by taking a role of a teacher to deliver computational thinking process to students.

**2. Objectives of course development/improvement**

**2.1 Course Objectives**

(1) Able to understand about Algorithm and Flow Chart, Python Integrated Development Environment (IDE), Control Flow Programming, Fundamental to Advance in Python Programming Language, Application Design and Development by using Python Programming Language, Black-Box Testing, Assessment and Evaluation.

(2) To enable learners to have computational thinking skills about Decomposition, Abstraction, Pattern recognition, and Algorithm design for application design and development by using Python Programming Language.

(3) To enable learners to seek, design, develop, create, evaluate, and improve applications with Python programming language.

(4) To utilize the Python Programming Language for developing learning and teaching materials by taking a role of a teacher to deliver computational thinking process to students.

**2.2 Course-level Learning Outcomes: CLOs**

At the end of the course, students who have completed the course can:

(1) CLO1: Able to use computational thinking process in designing and developing at least one application.

(2) CLO2: Able to write flowcharts to show algorithms for controlling 3 types of programs, consisting of Sequential Control Flow Statement, Decision Control Flow Statement, and Iteration Control Flow Statement.

(3) CLO3: Able to install integrated development environments (IDE) and tools for use in Python programming language.

(4) CLO4: Able to create variables and can define the type of variable in Python programming language.

(5) CLO5: Able to create functions and modules in Python programming language to solve problems as specified.

(6) CLO6: Able to use Tuples, Lists, Sets and Dictionaries variables to solve the problem as specified.

(7) CLO7: Able to program in Python programming language with object-oriented (OO) concepts.

(8) CLO8: Able to present teaching/lesson plan to transfer the computational thinking process to students.

## Section 3 Course Description and Implementation

**1. Course Description**

(Thai) แนวคิด ทฤษฎี ที่เกี่ยวข้องการเขียนโปรแกรมและพัฒนาแอปพลิเคชัน หลักการพัฒนาโปรแกรมคอมพิวเตอร์ คุณสมบัติของโปรแกรมภาษาชนิดต่าง ๆ หลักการเบื้องต้นเกี่ยวกับองค์ประกอบ ลักษณะคำสั่ง การเขียนโปรแกรม ขั้นตอนวิธี การวิเคราะห์การออกแบบ แอปพลิเคชันเพื่อการศึกษา การประเมินซอฟต์แวร์ ครูสามารถพัฒนาแอปพลิเคชันเพื่อการศึกษา

(English) Principles theories associated with computer programing and development applications. Computer Programming Principles, computer language, elements of computer language, Syntax, computer programing, algorithms, analysis and design application for education, software evaluation, Candidate teachers able to develop applications for education

**2. Number of hours per trimester**

3(2-2-5)

| Theory (hours) | Individual Advice (hours) | Practice (hours) | Self-study (hours) |
|---|---|---|---|
| 30<br>2 Hrs. x 15 Weeks | according to the needs of specific students | 30<br>2 Hrs. x 15 Weeks | 75<br>5 Hrs. x 15 Weeks |

**3. Number of Hours per Week for Individual Advice**

Students can counsel and academic advice for 2 hours per week. It could be an individual or a group depending on the case, which can be consulted from 4 channels** as follows:

(1) Self-consultation at the lecturer's room: 2nd Floor, Faculty of Education.

(2) Consult via work phone / mobile phone number: 0860272072

(3) Consult via electronic mail (E-Mail): pasawut.ch@ssru.ac.th

(4) Consult via teleconference (Google Meet, ZOOM)

**By making an appointment via email nutthapat.ke@ssru.ac.th or send messages via chat program (LINE App)

## Section 4: Development of the expected learning outcomes

**1. Morality, Ethics**

●1) Morality, ethics, discipline, punctuality, responsibility, public mind, 5 precepts, 4 Brahma Viharn

○2) Academic ethics, teaching profession and teacher profession, educational technology, and computers. that corresponds to the teaching professional organization both verbally commenting, and actions can be managed and thoughtfully solved with moral and ethical problems Relative teacher professional ethics using discretion in values feelings of others and benefits of society as a whole have virtues that promote sustainable development have moral courage Having understanding of others, understanding the world, having a public mind, making sacrifices, and being a good role model.

**2. Knowledge**

●1) Have a comprehensive and systematic knowledge of concepts, theories and principles related to education and the teaching profession. and well-versed in knowledge content in educational technology and computers related to the design and development of instructional media and educational technology activities design of educational computer work system and programming Design and development of electronic media for education, teaching philosophy and teaching profession. For teachers of educational technology and computer psychology used to teach educational technology and computers. for learning management at the elementary level and secondary education, design, and development of specific subject curriculum for learning management that relates and links educational technology and computer content in each grade level. Class management for each educational level in educational technology and computers.

●2) be able to integrate knowledge in the sciences of education and the teaching profession to use in life and practice professionally effectively as well as having knowledge and understanding about the advancement of knowledge related to education science able to process knowledge collect research Present research results with awareness of the importance of research and research in knowledge extension.

●3) Able to think analytically, synthesize, evaluate, and apply knowledge about concepts, theories and principles related to teacher psychology. curriculum development learning management class arrangement Innovation in Information Technology and Communication in Education Measurement and evaluation, research, educational management of educational technology and computers at the primary and

secondary levels and used in curriculum development. Educational innovation design in the subject of educational technology and computers Educational Measurement and Evaluation for Teachers of Educational Technology and Computing Educational research in educational technology and computers education administration and laws related to education to be appropriately and efficiently applied to the practice of teaching professions.

●4) Recognize the value of applying relevant educational and professional knowledge to learning management and student development. and can think analytically, synthesize and evaluate knowledge and can be applied in teaching professional practice effectively.

**3. Cognitive Skills**

○1) Be able to search for facts, understand, think analytically, synthesize, and evaluate information from a variety of sources. To be used in teaching and learning management, solving problems, teaching, and developing students. including the diagnosis of learner research to develop learners and research to expand the body of knowledge

●2) able to use theoretical knowledge and practical experience Let's analyze the problems caused by complex learning management. to lead to a solution and problem solving and able to think and solve problems in learning management of educational technology and computer subjects that are complex, presenting solutions and leading to creatively solving problems in learning technology of education and computer subjects

○3) Be able to summarize the problems arising from learning management to be used as guidelines for developing creative learning management.

○4) He is an intellectual leader in creative thinking and development of learning management in the subject of educational technology and computers and has a vision to develop instruction in educational technology and computers.

**4. Interpersonal Skills and Responsibilities**

○1) Emotional maturity by showing appropriate behavior in teacher practice Sensitive to the senses of learners of educational technology and computers. elementary school and secondary with understanding and positive feelings have emotional and social maturity.

●2) Have a good relationship with learners by empathizing with learners and taking into account individual differences. Including having interpersonal skills and developing responsible interpersonal relationships. Caring, helpful and conducive to constructively solving group and inter-group problems and achieving objectives.

○3.) Have good leadership and follower in working together with teachers and stakeholders and have good leadership and follower ability to manage leadership Have responsibility for oneself and the public have intergroup relationships and can work with others.

**5. Numerical Analysis, Communication and Information Technology Skills**

○1) Be able to study, understand, select, and apply relevant statistical or mathematical techniques appropriately.

●2) Able to study, research and suggest ways to solve problems Use information technology to collect information. and use good discretion to process, interpret, and present information on a regular basis and choose to use information about educational technology and computer subjects at the elementary and secondary levels and teachers who are responsible for using information technology well.

○3) Able to communicate effectively in speaking and writing. Able to choose appropriate presentation styles for different groups of people. able to communicate with elementary and secondary learners in the subject of educational technology and computers Effectively, both speaking, writing and presenting in a format suitable for the group of learners.

○4) Have the ability to analyze, summarize concepts and understand information about educational technology and computers. received by elementary and secondary learners quickly, either statistically or mathematically spoken or written language education.

**6. Learning Management Skills**

○1) proficient in learning management by model Diversified, student-centered approach Able to design and create curriculum in the classroom Planning and designing content and learning management activities class management use media and communication technology and digital technology and assessment to develop learners appropriately and creatively.

○2)Have the ability to apply psychological knowledge to individual learner analysis. to be designed content class administration and organized various activities to help Correct and promote the development of learners according to their interests and aptitudes in a variety of ways according to individual differences. Both normal learners and learners with special needs.

○3) Organize activities and design learning management for learners to learn from experience. Learn through hands-on practice and working in real-life situations. Promote the development of thinking, work, management, coping with situations Practicing being able to think, to do by integrating work with learning and ethics. Able to apply knowledge to prevent, solve problems and develop with honesty Discipline and responsibility to learners by taking the learners as the most important.

●4) Atmosphere and provide an environment, learning media, sources of science, technology, culture, and wisdom both inside and outside the educational institute for learning. Can coordinate and build

cooperation with parents, guardians and people in all parties in the community. To facilitate and cooperate to develop learners to be well-rounded. have wisdom and continual pursuit of knowledge to their full potential.

O 5) Bring 21 st century skills and technology to use in learning management to develop students and develop themselves, such as learning skills. knowledge skills and life skills Collaborative skills and live according to the philosophy of sufficiency economy

**note**

The symbol ● means primary responsibility.

The symbol O means secondary responsibility.

Blank means not responsible.

This will appear on the map showing the distribution of responsibility, standard learning outcomes from curriculum mapping.

## Section 5 Lesson Plan and Evaluation

### 1. Lesson Plan

**Lecturer: Asst.Prof.Dr.Nutthapat Kaewrattanapat**

3(2-2-5): Theory 2 hrs./week, Practice 2 hrs./week, Self-Study 5 hrs./week

Teaching activities each week consist of mini-lectures interspersed with activities.

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| 1 | Interacting with Python and Basic Functions:<br>- Installing and Using Python<br>- The Interactive Environment (Integrated Development Environment: IDE)<br>- Basic Interactions<br>- Edit and Run<br>- Sequential control flow statement | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Students also analyze the programming structure and flowchart with ClassPoint (Slide Drawing)<br>3. Access to Google Colab for Python programming. (https://colab.research.google.com/)<br>4. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Observe the responses and class participation.<br>2. Assignment 1: Introduction to Python Programming Language (Google Classroom Assignment) | | |

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| 2 | Data Types and Variables:<br>- Variables<br>- Data Types<br>- Mathematical Expressions<br>- Operands and Order of Operations (PEMDAS) | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Students work together to answer missing command questions, such as missing mathematical expressions and results by using ClassPoint (Multiple Choice)<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Observe the responses and class participation.<br>2. Assignment 2: Order of Operation (Google Classroom Assignment) | | |
| 3 | Control Flow Statement:<br>- Grouping and Indentation<br>- Decision Statement/ Condition Statement<br>- if, if-else, if-elif-else, short hand if..else, And logic, Or logic, Nested if, the pass statement | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Learners work together to answer questions about missing terms and results by using ClassPoint (Multiple Choice, Short Answer และ Slide Drawing)<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Observe the responses and class participation.<br>2. Assignment 3: Condition Statement (Google Classroom Assignment) | | |
| 4 | Control Flow Statement:<br>- Iteration Statement/ Looping Statement<br>- For Loops, While Loops, Iterator<br>- Break and Continue | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Learners work together to answer questions about missing terms and results in Iteration control flow statement by using ClassPoint (Multiple Choice, Short Answer และ Slide Drawing)<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation** | | |

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| | | | 1. Observe the responses and class participation.<br>2. Assignment 4: Iteration Statement (Google Classroom Assignment) | | |
| 5 | Container Data Types:<br>- Tuples<br>- Lists<br>- Sets<br>- Dictionaries | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Learners work together to answer questions about missing terms and results in container data types by using ClassPoint (Multiple Choice, Short Answer และ Slide Drawing)<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Observe the responses and class participation.<br>2. Assignment 5: Container Data Types (Google Classroom Assignment) | | |
| 6 | Subroutines and Modules:<br>- Simple Functions<br>- Functions That Return Values<br>- Functions That Take Arguments<br>- Recursive and Lambda Functions<br>- Modules<br>- Writing Your Own Modules<br>- Docstrings and Modules | 2-2 | | Students can choose to consult in the classroom or consult via teleconference system (Google Meet). | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Interacting with the learning materials assigned<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Assignment 6: Create and use functions (Google Classroom Assignment) |
| 7 | Text Manipulation:<br>- string Manipulation Is Costly<br>- Manipulating Text Regular Expressions:<br>- Matching<br>- Patterns | 2-2 | | Students can choose to consult in the classroom or consult via teleconference system (Google Meet). | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Interacting with the learning materials assigned<br>3. Program Python commands in a step-by-step order and observe the |

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| | - Backreferences | | | | results.<br>(https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Assignment 7: Text Manipulation (Google Classroom Assignment) |
| 8 | Midterm Examination | 4 | Students can choose to take the exam in the classroom or take the exam through the teleconference (Google Meet) by taking the exam via Google Form (Quiz). | | |
| 9 | Object-Oriented Programming | 2-2 | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Learners work together to answer questions about missing terms and results in OOP by using ClassPoint (Multiple Choice, Short Answer และ Slide Drawing)<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Observe the responses and class participation.<br>2. Assignment 8: OOP (Google Classroom Assignment) | | |
| 10 | Python Library in Scientific Area | 2-2 | | Students can choose to consult in the classroom or consult via teleconference system (Google Meet). | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Interacting with the learning materials assigned<br>3. Program Python commands in a step-by-step order and observe the results.<br>(https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Assignment 9: Using Python Library in Scientific Area (Google Classroom Assignment) |
| 11 | GUIs:<br>- The General Logic<br>- Some Simple Examples | 2-2 | | Students can choose to consult in the classroom or consult via teleconference | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Interacting with the learning materials assigned |

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| | - Widget Options<br>- Packing Options<br>- Tkinter and Desktop Application | | | system (Google Meet). | 3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Assignment 10: Create GUI with Tkinter (Google Classroom Assignment) |
| 12 | System Development Life Cycle<br>- System Analysis<br>- System Design<br>- System Implementation<br>- System Testing<br>- System Maintenance | 2-2 | | Students can choose to consult in the classroom or consult via teleconference system (Google Meet). | **Activities**<br>1. Pre-test with Google Form (Quiz)<br>2. Interacting with the learning materials assigned<br>3. Program Python commands in a step-by-step order and observe the results. (https://colab.research.google.com/)<br>**Assessment and Evaluation**<br>1. Assignment 11: Students report system design and development plans. (Google Classroom Assignment) |
| 13 | Project 1 | 4 | **Activities**<br>Students can choose to consult in the classroom or consult via teleconference (Google Meet) | | |
| 14 | Project 1 Presentation | 4 | **Activities**<br>Students can choose to present in the classroom or present via teleconference (Google Meet)<br>**Assessment and Evaluation**<br>Project Evaluation Criteria by using Rubric Scores with Google Classroom (Assignment) | | |
| 15 | Project 2 | 4 | **Activities**<br>Students can choose to consult in the classroom or consult via teleconference (Google Meet) | | |
| 16 | Project 2 Presentation | 4 | **Activities** | | |

| Teaching Period | Topics/Details | Number of hours | Methods: Teaching Media | | |
|---|---|---|---|---|---|
| | | | Hybrid | | On-Demand |
| | | | On-Site | Online | |
| | | | Students can choose to present in the classroom or present via teleconference (Google Meet)<br>**Assessment and Evaluation**<br>Project Evaluation Criteria by using Rubric Scores with Google Classroom (Assignment) | | |
| 17 | Final Examination | 4 | Students can choose to take the exam in the classroom or take the exam through the teleconference (Google Meet) by taking the exam via Google Form (Quiz). | | |

**2. Learning Evaluation Plan**

| Activities | Evaluate | Week | The proportion of Evaluate |
|---|---|---|---|
| 1.1 | Observe and inspect from class attendance, deliver work on time, group cooperation. | Throughout the semester study | 40% |
| 2.1 | Midterm Examination<br>Final Examination | 8<br>17 | 20%<br>20% |
| 3.1 | Individual Project 1 | Throughout the semester study | 20% |
| 4.1 | Individual Project 2 | Throughout the semester study | 20% |

## Section 6 Teaching Resources

**1. Required Texts**

1) Lee Vaughan. (2023). Python Tools for Scientists. Publisher William Poolock, ISBN: 978-1-7185-0267-3

2) Michael Hammond. (2020). Python for Linguists. Cambridge University Press, United Kingdom. ISBN 978-1-108-73707-4

2) https://www.w3schools.com/python

4) https://pythontutor.com/python-debugger.html#mode=edit

5) https://www.py4e.com/book

**2. Suggested Materials**

-

**3. Other Resources (if any)**

1) https://ssrudlp.ssru.ac.th/teacher/pasawut_chee
2) https://colab.research.google.com/
3) https://www.python.org/

## Section 7 Assessment and Improvement of Course Operations

**1. Strategies for Evaluation of Course Effectiveness by Students**

- Student teacher assessment forms are assessed via the Internet under the supervision of the Service Center. University education
- Ask questions and observe student interactions during instruction.

**2. Teaching Evaluation**

- Exam results/Learning
- The result of the student's creative work

**3. Teaching improvements.**

- Review and improve teaching methods Considering the learning outcomes in each unit of study.

**4. Verification of student achievement standards in the course.**

- The process used to verify student achievement standards according to the course learning outcome standards are as follows:
- Verify the end-of-semester exam scores against the specified learning objectives.
- Review the results of student creativity in relation to the specified learning objectives.

**5. Implementation of review and planning to improve course effectiveness.**

- Based on the evaluation and verification of course achievement and effectiveness Provide a teaching improvement plan and subject details. In order to increase the quality is
- Update courses every 4 years or according to suggestions.

**********

Academic degree level ☒ Bachelor ☐ Master ☐ Doctor

## Curriculum Mapping

● Primary Responsibilities ○ Secondary Responsibilities

| Course | | Graduate attributes | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1..Moral and ethics | | | | 2. Knowledge | | | | | 3. Cognitive Skills | | | 4. Interpersonal Skills and Responsibilities | | | 5. Numerical Analysis, Communication and Information Technology Skills | | | 6. Learning Management Skills | | | | |
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 |
| DTC3304 | Computer Programing and Developing Applications for Education | ○ | ● | ○ | ○ | ● | ● | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ○ | ● | ● | ○ | ● | ● | ○ | ● | ○ |