CHONRADSADORNUMRUNG SCHOOL
English Program and Mini English Program
215 หมู่ 3 ถนนพระยาสัจจา ตำบลบ้านสวน
อำเภอเมืองชลบุรี จังหวัดชลบุรี 20000

SYLLABUS

COURSE DESCRIPTION: TECHNOLOGY (Computational Science)

Science and Technology Learning Area　　　　**Course Code: 23213**
Grade Level: Grade 9 (M3)　　　　　　　　　　**Duration: 40 hours, 1.0 credit**

Study the steps in developing Internet of Things (IoT) applications, programming to develop applications, primary and secondary data, data processing, decision-making pathways, and evaluating software or internet services used for data management. Assess the reliability of data, trace the source of information, evolutionary reasoning, the impact of misinformation, media literacy, computer-related laws, and the lawful use of others' copyrights.

Collect primary or secondary data, process it, create options, and present decisions effectively. Design and write programs to develop applications that integrate with other subjects creatively, use information technology responsibly and with media literacy, and act in a socially responsible manner.

Indicators
Standard 4.2: Technology (Computing Science)

1. Develop Internet of Things (IoT) applications that integrate with other subjects creatively.
2. Collect, process, assess, and present data and information according to objectives using various software or internet services.
3. Evaluate the reliability of data, analyze media, and assess the impact of misinformation for informed use.
4. Use information technology safely and responsibly, comply with computer laws, and lawfully use others' copyrights.

Total Indicators Covered: 4

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COURSE DESCRIPTION: TECHNOLOGY (Computational Science)

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Science and Technology Learning Area
Grade Level: Grade 9 (M3)

Course Code: 23213
Duration: 40 hours, 1.0 credit

Topics	Indicator	Contents	Duration (hours)	Assessment		
				CP	MT	F
Introduction to Algorithm and Abstraction	1	- What are algorithms - The concept of abstraction - Examples of abstraction in daily life				
Representing Algorithm	1	- Flowcharts and pseudocode basics - Symbols used in flowcharts				
Problem-Solving through Abstraction	1	- Breaking down complex problems into simpler steps - Identifying key details and ignoring irrelevant information				
Real-life Applications	1	- Using abstraction to model systems - Designing algorithms for automated systems				
Algorithm Efficiency	1	- Evaluating the efficiency of an algorithm - Identifying redundant steps in a process				
Debugging and Testing Algorithms	1	- Common errors in algorithms - Strategies for debugging				
Collaborative Problem-Solving	1	- Working in teams to solve problems. - Using abstraction collaboratively.				
Algorithm Design Challenge	1	- Integrating abstraction and algorithm design in complex problems.				
Presenting and Explaining Algorithms	1	- Communicating algorithms effectively. - Explaining the abstraction used in a process.				
Midterm Project	1	- Applying all learned concepts to a real-life scenario.				
Introduction to Programming	2	- What is programming? - The role of programming in solving problems. - Introduction to Python (or Scratch for beginners).				

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Topics	Indicator	Contents	Duration (hours)	Assessment		
				CP	MT	F
Variables and Data Types	2	- What are variables? - Different data types (integer, float, string). - Assigning and using variables.				
Input and Output	2	- Taking user input. - Displaying output to the user. - Combining inputs and outputs in simple calculations.				
Conditional Statements	2	- If-else statements. - Logical operators (>, <, ==, !=). - Solving problems with decision-making.				
Loops	2	- introduction to loops (for and while). - Iterating through a range of numbers. - Using loops in problem-solving.				
Solving Mathematical Problems	2	- Writing programs for arithmetic sequences and geometric sequences. - Solving equations using programming.				
Solving Scientific Problems	2	- Writing programs to calculate speed, distance, and time. - Simulating simple scientific experiments (e.g., free fall).				
Data Processing and Visualization	2	- Using lists to store data. - Basic data analysis. - Plotting graphs using Python libraries (optional: matplotlib).				
Project Work	2	- Combining learned concepts to solve a real-world problem.				
Presentation and Assessment	2	- Presenting projects to the class. - Reviewing key concepts.				
TOTAL			40	80	10	10

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Science and Technology Learning Area   **Course Code: 23213**
Grade Level: Grade 9 (M3)   **Duration: 40 hours, 1.0 credit**

Course Objectives

By the end of this course, students will be able to:

1. Design and write simple programs to solve mathematical and scientific problems.
2. Understand fundamental programming concepts such as variables, loops, and conditionals.
3. Apply logical thinking to solve real-world mathematical and scientific challenges.
4. Test and debug programs effectively.

WEEKLY TOPICS

A. Introduction to Programming
    a. What is programming?
    b. The role of programming in solving problems.
    c. Introduction to Python (or Scratch for beginners).
    d. Activity
        i.   Write a "Hello World" program.
        ii. Discuss mathematical/scientific problems that can be solved using programming.

B. Variables and Data Types
    a. What are variables?
    b. Different data types (integer, float, string).
    c. Assigning and using variables.
    d. Activity
        i.   Create a program to calculate the area of a rectangle.

C. Input and Output
    a. Taking user input.
    b. Displaying output to the user.
    c. Combining inputs and outputs in simple calculations.
    d. Activity
        i.   Write a program to calculate the volume of a cylinder using user input.

D. Conditional Statements
    a. If-else statements.
    b. Logical operators (>, <, ==, !=).
    c. Solving problems with decision-making.
    d. Activity
        i.   Write a program to determine if a number is odd or even.

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E. Loops
   a. introduction to loops (for and while).
   b. Iterating through a range of numbers.
   c. Using loops in problem-solving.
   d. Activity
      i. Write a program to calculate the factorial of a number.
F. Solving Mathematical Problems
   a. Writing programs for arithmetic sequences and geometric sequences.
   b. Solving equations using programming.
   c. Activity
      i. Write a program to find the nth term of an arithmetic sequence.
G. Solving Scientific Problems
   a. Writing programs to calculate speed, distance, and time.
   b. Simulating simple scientific experiments (e.g., free fall).
   c. Activity
      i. Write a program to calculate the speed of an object given distance and time.
H. Data Processing and Visualization
   a. Using lists to store data.
   b. Basic data analysis.
   c. Plotting graphs using Python libraries (optional: matplotlib).
   d. Activity:
      i. Write a program to find the average of a dataset and create a simple graph.
I. Project Work
   a. Combining learned concepts to solve a real-world problem.
   b. Activity
      i. Students design and write a program to solve a selected problem (e.g., calculating BMI, tracking rainfall).
J. Presentation and Assessment
   a. Presenting projects to the class.
   b. Reviewing key concepts.
   c. Activity
      i. Students showcase their projects and receive peer feedback.
      ii. Summative assessment of programming skills.

COURSE TITLE	BASIC SCIENCE	COURSE CODE	
LEARNING AREA	TECHNOLOGY (BASIC SCIENCE)	LEVEL	MATHAYOM 1

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COURSE DESCRIPTION: TECHNOLOGY (Computational Science)

Science and Technology Learning Area   **Course Code: 23213**
Grade Level: Grade 9 (M3)   **Duration: 40 hours, 1.0 credit**
Technology (Computing Science)
Science and Technology Learning Area
Grade 8, 40 Hours, 1 Credit

This course explores computational thinking and problem-solving using computational concepts, programming with logic and functions, and understanding the components and functioning of computer systems. Topics also include communication technology, responsible practices for encountering inappropriate content, responsible information technology use, and methods for creating and assigning ownership rights.

Students will apply computational thinking in programming or solving real-life problems, set data access permissions, and recognize the impacts of data sharing.

Indicators
Standard 4.2: Technology (Computing Science)

1. Design algorithms using computational thinking to solve problems or perform real-life tasks.
2. Design and write programs using logic and functions to solve problems.
3. Discuss the components and principles of computer systems and communication technology to apply them in basic tasks or problem-solving.
4. Use information technology safely and responsibly, establishing and demonstrating ownership rights when publishing work.

Total Indicators Covered: 4

SYLLABUS

COURSE DESCRIPTION: TECHNOLOGY (Computational Science)

Science and Technology Learning Area   **Course Code: 23213**
Grade Level: Grade 9 (M3)   **Duration: 40 hours, 1.0 credit**

| COURSE TITLE | BASIC SCIENCE | COURSE CODE | |
| LEARNING AREA | TECHNOLOGY (BASIC SCIENCE) | LEVEL | MATHAYOM 3 |

Technology (Computing Science)
Science and Technology Learning Area
Grade 9, 40 Hours, 1 Credit

This course introduces the steps for developing Internet of Things (IoT) applications and programming for application development. Students will learn about primary and secondary data, data processing, creating options, and evaluating outcomes using various software or internet services for data management. Topics also include evaluating data reliability, tracing data sources, understanding the impact of misinformation, media literacy, and computer-related laws, including fair use of others' copyrighted material.

Students will collect and process primary or secondary data, create options, and make informed decisions. They will design and program applications creatively with interdisciplinary integration, use information technology responsibly, stay informed about media, and uphold social responsibility.

Indicators
Standard 4.2: Technology (Computing Science)

1. Develop applications with interdisciplinary integration in a creative manner.
2. Collect, process, evaluate, and present information effectively using a variety of software or internet services.
3. Evaluate the reliability of data, analyze media, and understand the impact of misinformation for informed use.
4. Use information technology safely and responsibly, comply with computer laws, and adhere to fair use of copyrighted materials.

Total Indicators Covered: 4

COURSE DESCRIPTION: TECHNOLOGY (Computational Science)

Science and Technology Learning Area
Grade Level: Grade 9 (M3)

Course Code: 23213
Duration: 40 hours, 1.0 credit

COURSE TITLE   BASIC SCIENCE   COURSE CODE
LEARNING AREA   TECHNOLOGY (BASIC SCIENCE) LEVEL   MATHAYOM 1

Technology (Computing Science)
Science and Technology Learning Area
Grade 10, 40 Hours, 1 Credit

This course studies the principles of computational thinking, including decomposition of components and problem simplification, pattern recognition, and the abstraction of concepts. Students will learn about the examples and benefits of computational thinking in solving everyday problems and apply these concepts to design algorithms for problem-solving. The course will cover computer-based problem-solving, identifying input and output data, and understanding problem conditions, algorithm design, iteration, sorting, and searching of data.

Students will explore examples of algorithm design for computer problem-solving and engage in projects in information technology. They will identify problems, conduct research, plan, execute, summarize results, and disseminate findings in developing projects that integrate other subjects and connect to real life.

Indicator
Standard 4.2: Technology (Computing Science)
Students will creatively apply computational thinking to develop projects that integrate other subjects and relate to real life.

Total Indicators Covered: 1

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Science and Technology Learning Area   **Course Code: 23213**
Grade Level: Grade 9 (M3)   **Duration: 40 hours, 1.0 credit**

| COURSE TITLE | BASIC SCIENCE | COURSE CODE | |
| LEARNING AREA | TECHNOLOGY (BASIC SCIENCE) | LEVEL | MATHAYOM 1 |

Technology (Computing Science)
Science and Technology Learning Area
Grade 11, 40 Hours, 1 Credit

This course explores the principles of data science and design thinking to enhance the value of services or products. Students will learn methods for data collection and preparation, data analysis, and data processing. The course will cover the information technology tools used in data processing, data storage, data presentation, and converting data into visual formats. Students will also study how to select data from large databases, leverage data effectively, and examine case studies.

Indicator
Standard 4.2: Technology (Computing Science)
Students will gather and analyze data, using knowledge of computer science and digital media technology to creatively solve problems or enhance the value of services or products in real life.

Total Indicators Covered: 1

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Science and Technology Learning Area
Grade Level: Grade 9 (M3)

Course Code: 23213
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COURSE TITLE	BASIC SCIENCE	COURSE CODE	
LEARNING AREA	TECHNOLOGY (BASIC SCIENCE)	LEVEL	MATHAYOM 1

Technology (Computing Science)
Science and Technology Learning Area
Grade 12, 40 Hours, 1 Credit

This course focuses on the ethical and safe use of technology for presenting and sharing information. Students will learn how to create and disseminate works through various media while considering ethics, copyright, intellectual property, and legal issues. The course will also cover the principles of artificial intelligence and future technologies, along with case studies related to innovations or technologies impacting daily life. Additionally, students will explore careers associated with information technology and examine the effects of information technology on society.

Indicator
Standard 4.2: Technology (Computing Science)
Students will use information technology to safely and ethically present and share information and analyze the impact of changes in information technology on daily life, careers, society, and culture.

Total Indicators Covered: 1