

Bachelor of Science Program in Information Technology

**(International Program)
Revised Program 2017**

Program Structure

Curriculum Structure and Course Credits

To be eligible for the degree of Bachelor of Science Program in Information Technology, a student must earn at least 120 credits distributed as follows and maintain a minimum grade point average of 2.0.

1. General Education Courses	30 Credits
1.1 Humanities and Social Science	9 Credits
1.2 Science and Mathematics	9 Credits
1.3 Language Competency	9 Credits
2. Major Courses	at least 84 Credits
2.1 Core Courses	18 Credits
2.2 Major Required Courses	54 Credits
2.3 Major Elective Courses	12 Credits
3. Free Elective Courses	at least 6 Credits

Total Number of Credits 120 Credits

Note:

1. The numbers after each course (e.g., 3 (3-0-6)) represent the credits, lecture hours, laboratory/practice hours, and self-study hours, respectively.
2. It is the responsibility of the student to meet all prerequisite requirements. Students may not be allowed to take a course if its prerequisites have not been satisfactorily passed.

1. General Education Courses 30 Credits

Students are required to take 30 credits to complete courses in the following three areas of study: there are 9 credits of Humanities and Social Sciences, 6 credits of Science and Mathematics, and 15 credits of Language Competency.

1.1 Social Science and Humanities 9 Credits

Students are required to take 9 credits from the Social Sciences and Humanities courses as follows:

GE 111 TRUTH AND SERVICE 3 (3-0-6)

History of Payap University. Examining one's inner self for truthfulness. Exercising character development for service consciousness. Being conscious to morally and ethically serve other people, your country and society. Practicing life skills based on a sufficiency economy and apply them to daily life.

GE 113 A PATH TO WISDOM 3 (2-2-5)

Methods of learning and acquiring knowledge morally and responsibly by oneself from a variety of sources or information technology. Having holistic thinking skills pertaining to social, economic, political, culture, ethical, moral, and environmental issues of Thai, ASEAN, and global communities.

GE 114 CITIZENSHIP, GOOD GOVERNANCE AND PEACE 3 (3-0-6)

Creating awareness of responsibility for being a valued citizen for Thai as well as global community. Exploring human rights with respect to human value. Learning about dishonesty and corruption in Thai community. Learning about measurements and mechanisms for preventing and solving corruption problems. Employing good governance in life, coupled with living together in harmony.

1.2 Mathematics, Science and Technology Courses 9 Credits

Students are required to take 9 credits from the Mathematics, Sciences and Technology courses as follows:

GE 141 MATHEMATICS FOR DAILY LIFE 3 (3-0-6)

Fundamental mathematics and mathematics for everyday life, probability, analysis of fundamental mathematical and statistical data.

GE 142 HEALTH MYTHS 3 (3-0-6)

General knowledge of wellness, health development in everyday life, food consumption, physical exercise, emotional management, prevention and treatment of common health problems.

GE 143 SCIENCE AND INFORMATION TECHNOLOGY FOR THE QUALITY OF LIFE 3 (3-0-6)

Learning scientific and information technology processes for daily life. Computer safety and ethics, wise judgment in selection of IT, including impacts of technology on humans and society.

1.3 Language Competency for Communication Courses 12 Credits

Students are required to take 12 credits from Language Competency for Communication courses. Three credits for an English course and 9 credits for another language (not first language or native language).

1.3.1 English Language Course 3 Credits

GE 137 WRITING SKILLS AND ACADEMIC PRESENTATIONS 3 (3-0-6)

Essential skills needed for academic writing and presentations. Interpretation of works assigned. Usage of vocabulary and language structure. Writing essays or report papers. Practice and present academic writing formally and informally.

1.3.2 Other Language Options Courses (not first language or native language) 9 Credits

GE 128 THAI FOR CROSS-CULTURAL COMMUNICATION 3 (3-0-6)

Thai communication for multicultural comprehension, expressing opinions for proper cross-cultural communication.

GE 129 THAI THROUGH MEDIA FOR LIFELONG LEARNING 3 (3-0-6)

Learning Thai from printed material and electronic media and being able to understand, respond, and express opinions.

GE 421 THAI IN THE WORKPLACE 3 (3-0-6)

Thai in the work place and conversation in different working situations.

GE 151 CHINESE FOR CROSS-CULTURAL COMMUNICATION 3 (3-0-6)

Chinese communication for multicultural comprehension, expressing opinions for proper cross-cultural communication.

GE 152 CHINESE THROUGH MEDIA FOR LIFELONG LEARNING 3 (3-0-6)

Learning Chinese from printed material and electronic media and being able to understand, respond, and express opinions.

GE 451 CHINESE IN THE WORKPLACE 3 (3-0-6)

Chinese in the work place and conversation in different working situations.

GE 161 JAPANESE FOR CROSS-CULTURAL COMMUNICATION 3 (3-0-6)

Japanese communication for multicultural comprehension, expressing opinions for proper cross-cultural communication

GE 162 JAPANESE THROUGH MEDIA FOR LIFELONG LEARNING 3 (3-0-6)

Learning Japanese from printed material and electronic media and being able to understand, respond, and express opinions.

GE 461 JAPANESE IN THE WORKPLACE 3 (3-0-6)

Japanese communication for multicultural comprehension, expressing opinions for proper cross-cultural communication.

GE 171 GERMAN FOR CROSS-CULTURAL COMMUNICATION 3 (3-0-6)

German communication for multicultural comprehension, expressing opinions for proper cross-cultural communication.

GE 172 GERMAN THROUGH MEDIA FOR LIFELONG LEARNING 3 (3-0-6)

Learning German from printed material and electronic media and being able to understand, respond, and express opinions.

GE 471 GERMAN IN THE WORKPLACE 3 (3-0-6)

German in the work place and conversation in different working situations.

2. Major Courses at least 84 Credits

A student must maintain a minimum grade point average of 2.0 in the following specialized subjects.

2.1 Core Courses 18 Credits

Students must complete at least 18 credits from the following courses:

IT 100 FOUNDATION MATHEMATICS 3 (3-0-6)

The real number system, operations and properties, simple arithmetic, algebraic expressions and equations, properties of exponentials, functions, linear/quadratic/polynomial/exponential equations, graphs and their properties, and systems of linear equations.

IT 101 INFORMATION TECHNOLOGY FUNDAMENTALS 3 (2-2-5)

Information and Communication Technology, hardware and software, the Internet, World Wide Web, networks, Information systems, security and ethics.

IT 102 INTRODUCTION TO COMPUTING 3 (3-0-6)

Base 2, octal and Hex representations, binary arithmetic, AND/OR operations, logic gates, simple computer block diagrams, interfaces, types of memory, primitive data structures, linear data structures (arrays, lists, queues), non-linear data structures (graphs), simple algorithms, flowcharts, process definition.

IT 103 ALGEBRA 3 (3-0-6)
(Prerequisite: IT 100)

Properties of the real number system, algebraic operations and properties, equations and solution methods, functions, linear models and functions, polynomial models and functions, rational functions, exponential and logarithmic functions, graph properties, asymptotes and end behavior, definition of the limit, limit properties, and the definition of the derivative.

IT 204 CALCULUS 3 (3-0-6)
(Prerequisite: IT 103)

Definition and properties of the limit, rate-of-change and the derivative, differentiation laws, development of the definite integral as area under the curve, the indefinite integral and the Fundamental Theorem of Calculus, integrals of standard functions, techniques of integration, applications of integration, simple differential equations, introduction to partial differentiation and multi-variable integration.

IT 305 STATISTICS FOR INFORMATION TECHNOLOGY 3 (3-0-6)
(Prerequisite: IT 103)

Populations, sampling, descriptive statistics, random variables and probability distributions, parameter estimation, hypothesis testing, Chi-square test, linear regression and multi-variable regression, and logistic regression for categorical variables.

2.2 Major Required Courses 54 Credits

Students must complete at least 54 credits from the following courses:

2.2.1 Basic Structure of Systems 9 Credits

Students must complete at least 9 credits from the following courses:

IT 110 PROGRAMMING FUNDAMENTALS 3 (2-2-5)

Basic syntax and semantics of a higher-level language, variables and constants, data types, expressions and assignment, conditional and iterative control structures, simple I/O, functions and parameter passing, structured decomposition and recursion.

IT 130 COMPUTER ARCHITECTURE 3 (3-0-6)

Machine-level representation of data, assembly-level machine organization, memory system organization and architecture, interfacing and communication, functional organization, multiprocessing and alternative architectures, and performance enhancements.

IT 212 DATA STRUCTURES 3 (2-2-5)
(Prerequisite: IT 211)

Primitive types, arrays, records, string and string processing, data representation in memory, pointers and references, linked structures, knowledge of hashing function, use of stacks and queues, use of graphs and trees, and strategies for choosing the right data structure.

2.2.2 Technology and Software Method 15 Credits

Students must complete at least 15 credits from the following courses:

IT 211 OBJECT-ORIENTED PROGRAMMING 3 (2-2-5)
(Prerequisite: IT 110)

Object-oriented design, encapsulation and information hiding, separation of behavior and implementation, inheritance, polymorphism (subtype polymorphism vs. inheritance), class hierarchies, collection classes and iteration protocols, event-handling methods, event propagation, and exception handling.

IT 313 ALGORITHMS AND PROBLEM SOLVING 3 (2-2-5)
(Prerequisite: IT 212)

Problem solving strategies, the role of algorithms in the problem-solving process, implementation strategies for algorithms, debugging strategies, and the concept and properties of algorithms.

IT 340 SYSTEMS ANALYSIS AND DESIGN 3 (3-0-6)
(Prerequisite: IT 222)

Analysis and specification of system requirements, different approaches to implementing information systems to support business requirements, specifying implementation alternatives for a specific system, and different approaches to systems analysis and design.

IT 343 SYSTEM INTEGRATION AND ARCHITECTURE 3 (3-0-6)
(Prerequisite: IT 231)

Gathering requirements, acquisition and sourcing, integration and deployment, project management, testing and quality assurance, organizational context, and architecture.

IT 443 HUMAN-COMPUTER INTERACTION 3 (3-0-6)
(Prerequisite: IT 101)

Human factors, HCI aspects of application domains, human-centered evaluation, developing effective interfaces, accessibility, emerging technologies, and human-centered computing.

2.2.3 Organization Issues and Information Systems 9 Credits

Students must complete at least 9 credits from the following courses:

IT 222 INFORMATION MANAGEMENT 3 (2-2-5)
(Prerequisite: IT 110)

Information management concepts and fundamentals, database query languages, data organization architecture, data modeling, managing the database environment and special purpose databases.

IT 423 INFORMATION TECHNOLOGY PROJECT MANAGEMENT 3 (3-0-6)
(Prerequisite: IT 222)

Cost benefit analysis, roles, responsibilities, accountability, finance, estimation, budgeting, planning, risk management, scheduling, tracking, and lessons learned.

IT 424 INFORMATION TECHNOLOGY AND PROFESSIONAL ETHICS 3 (3-0-6)
(Prerequisite: IT 101)

Professional communications, legal issues in computing, teamwork concepts and issues, organizational context, service management, professional & ethics issues & responsibilities, social context of computing, history of computing, intellectual property, privacy and civil liberties.

2.2.4 Applied Technology 21 Credits

Students must complete at least 21 credits from the following courses:

IT 221 DISCRETE MATHEMATICS 3 (3-0-6)
(Prerequisite: IT 103)

Propositional logic, quantifiers, sets and set theory, induction and recursion, relations and functions, counting methods and discrete probability, graph structures including trees, Boolean algebra, simple logic circuits, the basic concepts of modeling computation, and the basics of finite state machines.

IT 231 OPERATING SYSTEMS 3 (2-2-5)
(Prerequisite: IT 130)

An overview of operating systems, operating system principles, concurrency, scheduling and dispatch, memory management, device management, security and protection, file systems, real-time and embedded systems, fault tolerance, scripting, and virtualization.

IT 325 WEB SYSTEMS AND TECHNOLOGIES 3 (2-2-5)
(Prerequisite: IT 222)

HTTP protocol, presentation abstractions, Web-markup and display languages, client-side programming, server-side programming, Web services, Web servers, standard and standards bodies, Web interfaces, Web site implementation and integration, and database integration.

IT 360 COMPUTER NETWORKS 3 (2-2-5)
(Prerequisite: IT 231)

Foundations of networking, routing and switching, physical layer, security, network management, and application areas.

IT 361 SYSTEMS ADMINISTRATION AND MAINTENANCE 3 (2-2-5)
(Prerequisite: IT 231)

Aspects of work on the maintenance and management of information systems, operating systems, applications, administrative activities, and administrative domains.

IT 362 INFORMATION ASSURANCE AND SECURITY 3 (3-0-6)
(Prerequisite: IT 360)

Fundamental aspects, security mechanism and countermeasures, operational issues, policy, attacks, and security domains.

IT 499 SENIOR PROJECT IN INFORMATION TECHNOLOGY 3 (0-6-3)
(Prerequisite: IT 340)

Project proposal, schedule management, professional communications (reports and presentations), design, implementation, and testing.

2.3 Major Elective Courses 12 Credits

Students must complete at least 12 credits from the following courses:

IT 307 ADVANCED CALCULUS 3 (3-0-6)
(Prerequisite: IT 204)

Differentiation methods, optimization and Lagrange multipliers, integration applications, partial fractions and trigonometric substitution, parametric equations, polar coordinates, sequences and series, introduction to vector calculus, and multi-variable calculus.

IT 314 OBJECT-ORIENTED ANALYSIS AND DESIGN 3 (2-2-5)
(Prerequisite: IT 211)

An overview of the object-oriented paradigm, object modeling, design patterns, refactoring, and object-oriented methodologies.

IT 315 MOBILE APPLICATION DEVELOPMENT 3 (2-2-5)
(Prerequisite: IT 211)

Mobile software development, mobile applications, mobile platforms, mobile user interface, the specific hardware and software constraints, persistence, networking and Web service, location-based service, and security.

IT 330 PLATFORM TECHNOLOGIES 3 (2-2-5)
(Prerequisite: IT 231)

Operating systems, architecture and organization, computing infrastructures, enterprise deployment software, firmware and hardware.

IT 331 THE INTERNET OF THINGS 3 (2-2-5)
(Prerequisite: IT 231)

An overview of the Internet of Things and embedded systems, the importance of IoT in society, IoT devices and trends for the future, programming for the Internet of Things.

IT 341 SOFTWARE ENGINEERING 3 (3-0-6)
(Prerequisite: IT 340)

Software design, using APIs, tools and environments, software processes, requirements specifications, software verification and validation, software evolution, software project management, and software reliability.

IT 350 MANAGEMENT INFORMATION SYSTEMS 3 (3-0-6)
(Prerequisite: IT 101)

Information Technology function, IT strategic alignment, strategic use of information, impact of IT on organizational structure and processes, IT planning, role of IT in defining and shaping competition, managing the information systems function, using IS/IT governance frameworks, and IT risk management.

IT 351 E-COMMERCE 3 (3-0-6)
(Prerequisite: IT 101)

E-commerce business models and concepts, e-commerce infrastructure, e-commerce security and payment systems, e-commerce marketing and advertising, social networking, mobile commerce and ubiquitous computing, ethical, social, and political issues in e-commerce.

IT 363 DISTRIBUTED SYSTEMS 3 (2-2-5)
(Prerequisite: IT 360)

Network computing and distributed multimedia, mobile and wireless computing, streams and datagrams, internetworking, data security and integrity, and advanced topics in computer networks.

IT 370 COMPUTER GRAPHICS 3 (2-2-5)
(Prerequisite: IT 221)

The design and construction of models that represent information in ways that support the creation and viewing of images, the design of devices and techniques through which the person may interact with the model or the view, the creation of techniques for rendering the model, and the design of ways the images may be preserved.

IT 371 MULTIMEDIA SYSTEMS 3 (2-2-5)
(Prerequisite: IT 370)

Sound and audio, image and graphics, animation and video, multimedia standards, capacity planning and performance issues, input and output devices, MIDI keyboards, synthesizers, storage standards, multimedia servers and file systems, and tools to support multimedia development.

IT 393 SELECTED TOPIC IN INFORMATION TECHNOLOGY I 3 (3-0-6)
(Prerequisite: IT 340)

A relevant topic(s) in the field of IT to offer the opportunity for special study in interesting areas concerning information technologies and systems.

IT 426 INFORMATION TECHNOLOGY ENTREPRENEURSHIP 3 (3-0-6)
(Prerequisite: IT 340)

An entrepreneurial perspective with particular emphasis on IT-related activities, business and technology fundamentals, opportunity assessment, team formation, financing and venture capital, dynamics of globalization, and intellectual property.

IT 464 VIRTUALIZED COMPUTING 3 (2-2-5)
(Prerequisite: IT 360)

History and definition, business perspective, server virtualization, storage virtualization, database virtualization, virtualization and cloud computing

IT 465 CLOUD COMPUTING 3 (2-2-5)
(Prerequisite: IT 360)

Evolution of cloud computing, service offerings, public cloud, private cloud, implementation factors, business considerations, advantages, drawbacks, cloud computing and virtualization.

IT 480 ARTIFICIAL INTELLIGENCE 3 (3-0-6)
(Prerequisite: IT 313)

An introduction to Artificial Intelligence, problem solving, game playing, natural language understanding, knowledge bases and expert systems, and intelligent searching.

IT 481 MOBILE ROBOTICS 3 (2-2-5)
(Prerequisite: IT 313)

An overview of state-of-the-art robot systems, planning versus reactive control, uncertainty in control, sensing, world models, configuration space, robot programming, navigation and control, and robotic software and its architecture.

IT 491 INDEPENDENT STUDY IN INFORMATION TECHNOLOGY 3 (0-6-3)
(Prerequisite: IT 340)

Specialized independent study with project writing and presentation on information technology and systems under the supervision of a member of faculty.

IT 492 SEMINAR IN INFORMATION TECHNOLOGY 3 (3-0-6)
(Prerequisite: IT 340)

Topics in the area of Information Technology, seminar discussions, report writing and presentations with particular attention given to the development of analytical skills and reasoning capabilities.

IT 493 SELECTED TOPIC IN INFORMATION TECHNOLOGY II 3 (3-0-6)
(Prerequisite: IT 340)

A relevant advanced topic(s) in the field of IT to offer the opportunity for special study in emerging areas concerning information technologies and systems.

IT 494 SERVICE LEARNING IN INFORMATION TECHNOLOGY 3 (1-4-4)
(Prerequisite: IT 340)

Information Technology related services and expertises, and problem solving and solutions using IT to non-profit organizations.

IT 495 PRACTICUM IN INFORMATION TECHNOLOGY 6 (0-18-9)
(Prerequisite: IT 340)

IT internship in an organization to expand students' knowledge and gain practical experience, weekly reports during the training period of at least two months, and oral presentations under the supervision of both the department and the organization.

IT 496 CO-OPERATIVE EDUCATION IN INFORMATION TECHNOLOGY 9 (0-40-20)
(Prerequisite: IT 340)

Work full-time during the work term, perform all duties and tasks to the employer's satisfaction, earn a "satisfactory" or better attendance rating, weekly contact with assigned faculty advisor required, complete all co-operative assignments by the due date.

3. Free Elective Courses at least 6 Credits

Students must select additional 6 credits hours from among the courses offered by other departments in the International Programs.

Study Plan

Suggested study program for students who do not want to take IT 496 Cooperative Education in Information Technology and IT 495 Practicum in Information Technology.

Semester 1, Year 1	credits	Semester 2, Year 1	credits
GE xxx xxx	3 (x-x-x)	GE xxx xxx	3 (x-x-x)
GE xxx xxx	3 (x-x-x)	GE xxx xxx	3 (x-x-x)
IT 100 FOUNDATION MATHEMATICS	3 (3-0-6)	IT 103 ALGEBRA (Prerequisite: IT 100)	3 (3-0-6)
IT 101 INFORMATION TECHNOLOGY FUNDAMENTALS	3 (2-2-5)	IT 110 PROGRAMMING FUNDAMENTALS	3 (2-2-5)
IT 102 INTRODUCTION TO COMPUTING	3 (3-0-6)	IT 130 COMPUTER ARCHITECTURE	3 (2-2-5)
Subtotal	15	Subtotal	15
Semester 1, Year 2	credits	Semester 2, Year 2	credits
GE xxx xxx	3 (x-x-x)	GE xxx xxx	3 (x-x-x)
GE xxx xxx	3 (x-x-x)	GE xxx xxx	3 (x-x-x)
IT 204 CALCULUS (Prerequisite: IT 103)	3 (3-0-6)	IT 212 DATA STRUCTURES (Prerequisite: IT 211)	3 (2-2-5)
IT 211 OBJECT-ORIENTED PROGRAMMING (Prerequisite: IT 110)	3 (2-2-5)	IT 221 DISCRETE MATHEMATICS (Prerequisite: IT 103)	3 (3-0-6)
IT 231 OPERATING SYSTEMS (Prerequisite: IT 130)	3 (2-2-5)	IT 222 INFORMATION MANAGEMENT (Prerequisite: IT 110)	3 (2-2-5)
Subtotal	15	Subtotal	15

Semester 1, Year 3	credits	Semester 2, Year 3	credits
GE xxx xxx	3 (x-x-x)	GE xxx xxx	3 (x-x-6)
IT 313 ALGORITHMS AND PROBLEM SOLVING (Prerequisite: IT 212)	3 (2-2-5)	IT 305 STATISTICS FOR INFORMATION TECHNOLOGY (Prerequisite: IT 103)	3 (3-0-6)
IT 340 SYSTEMS ANALYSIS AND DESIGN (Prerequisite: IT 222)	3 (3-0-6)	IT 325 WEB SYSTEMS AND TECHNOLOGIES (Prerequisite: IT 222)	3 (2-2-5)
IT 360 COMPUTER NETWORKS (Prerequisite: IT231)	3 (2-2-5)	IT 342 SYSTEM INTEGRATION AND ARCHITECTURE (Prerequisite: IT 231)	3 (3-0-6)
IT 361 SYSTEM ADMINISTRATION AND MAINTENANCE (Prerequisite: IT 231)	3 (2-2-5)	IT 362 INFORMATION ASSURANCE AND SECURITY (Prerequisite: IT 360)	3 (3-0-6)
Subtotal	15	Subtotal	15
Semester 1, Year 4	credits	Semester 2, Year 4	credits
IT 423 INFORMATION TECHNOLOGY PROJECT MANAGEMENT (Prerequisite: IT 222)	3 (3-0-6)	IT 424 INFORMATION TECHNOLOGY AND PROFESSIONAL ETHICS (Prerequisite: IT 101)	3 (3-0-6)
IT 443 HUMAN-COMPUTER INTERACTION (Prerequisite: IT 101)	3 (3-0-6)	IT 499 SENIOR PROJECT IN INFORMATION TECHNOLOGY (Prerequisite: IT 340)	3 (0-6-3)
MAJOR ELECTIVE	3 (x-x-x)	MAJOR ELECTIVE	3 (x-x-x)
MAJOR ELECTIVE	3 (x-x-x)	MAJOR ELECTIVE	3 (x-x-x)
FREE ELECTIVE	3 (x-x-x)	FREE ELECTIVE	3 (x-x-x)
Subtotal	15	Subtotal	15
TOTAL		120	