

**THAI NGUYEN UNIVERSITY**  
**UNIVERSITY OF INFORMATION AND COMMUNICATION TECHNOLOGY**



**PROGRAMME SPECIFICATION**  
**FOR SOFTWARE ENGINEERING EDUCATION PROGRAMME**

**THAI NGUYEN - 2017**

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**PROGRAMME SPECIFICATION  
OF SOFTWARE ENGINEERING EDUCATION PROGRAMME**

*Decision No 809/QĐ-ĐHCNTT&TT dated on August 11<sup>th</sup>, 2017 by the Rector  
of TNU - University of Information and Communication Technology*

**I. BASIC INFORMATION ABOUT THE TRAINING PROGRAM**

**1. Name of training:**

- + Vietnamese name: Kỹ thuật phần mềm.
- + English name: Software Engineering.

**2. Course code: 7480103.**

**3. Type of training: formal.**

**4. Diploma name: Software Engineering Engineer.**

**5. Training and degree places: University of Information and Communication Technology - Thai Nguyen University.**

**II. DESCRIPTION OF TRAINING PROGRAM**

**1. Training Objectives**

**1.1. General objectives**

To train software engineering engineers with solid political qualities, a sense of discipline and professional ethics; master the basic and intensive knowledge of Software Engineering, meet the social demand for research, development and application in the field of Software Engineering.

**2.2. Detail objectives**

By the end of the course, graduates have the knowledge, skills and qualities:

- Have basic and intensive knowledge of Software Development Process; Knowledge and skills in using programming languages and techniques for software development; Knowledge and skills in software testing and quality assurance.
- Have good health, ensure the ability to work with high intensity;

- Have full knowledge of politics, security and defense, law as required by the Ministry of Education & Training;
- Have the ability to use foreign languages for work;
- Have the necessary soft skills for the job.

## 2. Program learning outcomes

The output standards of the Software Engineering training program promulgated under Decision No. 690/QĐ-ĐHCNTT&TT are shown through the following contents (encoded: L1 ÷ L14):

Notation	PLOs of SE programme
<i>L1</i>	Apply knowledge of natural sciences in order to solve scientific and technical problems in Software Engineering and have the ability to study at high levels
<i>L2</i>	Understand general educational knowledge on Theory of Marxism-Leninism and Ho Chi Minh Thought, the revolutionary line of the Communist Party of Vietnam, the Party's policy and the State's laws, and national security.
<i>L3</i>	Approach foreign language ability (English), level 3/6 of Vietnam's Foreign Language Competency Framework; specialized English skills.
<i>L4</i>	Apply data structure models and programming techniques to build computer software
<i>L5</i>	Understand the fundamentals of computer operating systems, computer networks, and programming platforms for software development.
<i>L6</i>	Apply basic knowledge of databases and database management systems in software development
<i>L7</i>	Understand the knowledge related to systems design analysis methods and tools in the software development process.
<i>L8</i>	Apply application programming skills in developing software on windows, web applications, open source applications and mobile applications.
<i>L9</i>	Apply knowledge of software requirements specification, modern software architecture to provide solutions in software development.
<i>L10</i>	Apply knowledge of software testing and software quality assessment in system testing
<i>L11</i>	Apply software project management skills in the software development process
<i>L12</i>	Be aware of the context of businesses and organizations to deploy software applications that are suitable for practice
<i>L13</i>	Apply knowledge of software life cycle to predict problems arising during software operation.
<i>L14</i>	Apply communication skills in presenting ideas, giving presentations, giving criticism in software system implementation and deployment.

## 3. Matching matrix between the modules with the output standards of the training program

No.	Courses	Output standards of training programs													
		<i>L1</i>	<i>L2</i>	<i>L3</i>	<i>L4</i>	<i>L5</i>	<i>L6</i>	<i>L7</i>	<i>L8</i>	<i>L9</i>	<i>L10</i>	<i>L11</i>	<i>L12</i>	<i>L13</i>	<i>L14</i>

No.	Courses	Output standards of training programs													
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
<b>General education knowledge block</b>															
1	English 1			x											
2	Linear algebra	x													
3	Marxist-Leninist Philosophy 1		x												
4	Physics	x													
5	English 2			x											
6	Analytics	x													
7	Ho Chi Minh's Ideology		x												
8	Marxist-Leninist Philosophy 2		x												
9	English 3			x											
10	Statistics-Probability	x													
11	General law		x												
12	English 4			x											
13	Revolutionary line of the Communist Party of Vietnam		x												
14	General Informatics					x									x
15	Soft skills												x		x
<b>Basic knowledge block</b>															
16	Introduction to programming					x			x						
17	Advanced programming					x			x						
18	Computer network					x			x						
19	Database						x		x						
20	Object oriented programming					x			x						

No.	Courses	Output standards of training programs													
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
21	Operating system					x									x
22	System design analysis						x	x							
23	Discrete Mathematics				x				x						
24	Computer architecture					x									
25	Data structures and algorithms				x				x						
26	Programming methodology							x						x	
27	Algorithm application				x			x							
28	Software technology							x		x		x		x	
29	Information Safety and Security									x					x
30	Java programming				x				x						
31	Developing object-oriented software with UML							x		x					
32	Mobile programming				x				x						
<b>Specialized knowledge block</b>															
<b>Required Courses/Modules</b>															
33	Requirements analysis and management							x		x					
34	Formal methods							x		x					
35	.Net technology					x			x						x
36	Software Testing										x			x	
37	Advanced Java Programming				x				x						
38	Information technology project management											x	x		

No.	Courses	Output standards of training programs													
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
39	Software architecture and design							x			x				
40	Software Quality Assurance										x			x	
41	Software operation and maintenance												x	x	
<b><i>Elective Courses/Modules</i></b>															
42, 43	<b><i>Specialization elective courses 1, 2</i></b>														
	Open-source software development				x				x						
	XML and application							x		x					
	J2EE technology				x				x						
	Cloud computing					x								x	
	Embedded System Application Development				x				x						
44	<b><i>Specialization elective courses 3</i></b>														
	Software interface design							x		x					
	Some modern problems in software engineering							x		x					
	Multimedia systems							x		x					
	Service Oriented Architecture							x		x					
45	<b><i>Specialization elective courses 4</i></b>														
	Ecommerce												x		x
	Facebook marketing												x		x
	Some medical informatics standards												x		x

No.	Courses	Output standards of training programs													
		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14
	and applications														
<b>Internship / Graduation Project</b>															
	<i>Mandatory module</i>														
46	Basic internship					x	x	x							
47	Graduation internship							x	x	x	x				
48	Graduation project										x		x	x	x

#### 4. Training time

4.5 years

#### 5. The volume of knowledge of the whole course

- The amount of knowledge of the whole course: 140 credits (*excluding the subjects of Physical Education, Defense - Security* ).

Structure of the training program:

TT	Knowledge group	Number of credits
<b>1</b>	<b>General knowledge</b>	<b>40</b>
1.1	Political Course: 10	
1.2	Natural/social sciences, informatics: + Mandatory: 18 + Optional: 0	
1.3	Foreign language: 12	
<b>2</b>	<b>Basic faculty knowledge</b> + Mandatory: 47 + Optional: 0	<b>47</b>
<b>3</b>	<b>Specialized faculty knowledge</b> + Mandatory: 22 + Optional: 11	<b>33</b>
<b>4</b>	<b>Internship, Graduation Project</b>	<b>20</b>
	+ Mandatory: 20 + Optional: 0	



<b>Total</b>	<b>140</b>
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## **6. Admission Criteria**

According to the general regulations of the Ministry of Education and Training, Thai Nguyen University and the University of Information and Communication Technology.

## **7. Training process, graduation conditions**

### **7.1. Training method**

According to the credit system (specified by the Board of Education and Training).

### **7.2. Organize classes**

According to the current credit training regulations of the Department of Education and Training, Thai Nguyen University, University of Information and Communication Technology.

### **7.3. Graduation conditions**

Applying university training regulations according to the credit system of the Ministry of Education and Training, Thai Nguyen University, and University of Information and Communication Technology.

## **8. Scoring**

Evaluation according to the training scale according to the credit system, prescribed by the Board of Education and Training.

## **9. Career prospects**

### ***Job positions:***

- Application development programming.
- Engineer: Software production process; Software system; Software Testing; Software quality;
- Administrator: Software and IT project manager; Database systems.
- Expert: Business Analyst; Analysis and design of information systems; Data analysis and design.
- Lecturers and researchers specializing in software engineering and information technology; can continue to study intensively at the graduate level.

### ***Job positions are available at:***

- Field: Software industry; Digital content industry; Game Industry.
- Consulting companies and system building solutions.
- Companies dealing in software and IT products.
- Software and IT Services.

## **10. Teaching, learning and assessment methods**

- Approach and orientation of the training program:
  - + Taking learners as the center; Teachers are guides, providing students with references, theoretical bases and problem-solving thinking methods. Exploiting and using modern means to improve the quality of teaching and learning, vivid and intuitive teaching and learning.
  - + Learning and teaching in a positive, proactive way, associated with reality, high applicability.
  - + Guide students to think logically and scientifically in developing study plans and solving problems.

- Specify the blocks of knowledge that students need to master, including:
  - + General knowledge of math and natural sciences: Linear algebra, analysis, statistical probability.
  - + General knowledge of industry and industry fundamentals: data structures and algorithms; Internet; computer architecture; operating system;
  - + Basic and in-depth knowledge of Software development process: Software engineering; Requirements analysis and management; Software architecture and design; Software operation and maintenance.
  - + Basic and in-depth knowledge of Software Quality Assurance and Testing: Formal Methods; Software Testing; Information technology project management; Software quality assurance.
  - + Basic and in-depth knowledge of Programming techniques and technologies: Programming methodology; Java programming; Object-oriented software development; Programming for mobile devices; Advanced Java Programming; DotNet Technology; XML and applications.
- Linking partners, business cooperation to bring students closer to the reality of social needs; looking for many job opportunities to ensure output for students; at the same time as a basis to adjust and standardize the training program towards high quality, close to the actual needs of enterprises and society.

## 11. Course abstract

No.	Course code	Courses	Number of credits	Description
<b>1. General knowledge block</b>				
1	ENG131	English 1	3	The course consists of 7 lessons with 7 basic grammar and vocabulary topics at the beginner level. Grammar topics in this module include: verb to be, article a, an, quantifier some, pronouns, countable and uncountable nouns, singular, plural, present simple, simple past, present continuous. These contents are associated with familiar vocabulary topics in daily life to help students have basic language knowledge and necessary vocabulary. In addition, students are trained to evenly develop four skills of listening, speaking, reading and writing, especially basic communication skills. At the end of the module, students can communicate at a simple level with the vocabulary and grammar materials provided in this module.
2	ENG132	English 2	3	The course consists of 7 lessons with 7 basic grammar and vocabulary topics at the beginner level. Grammar topics in this module include: present continuous, present perfect, near future, comparative level, article. These contents are associated with familiar vocabulary topics in daily life to help students have basic language knowledge and necessary vocabulary. In addition, students are trained to evenly develop the four skills of listening, speaking, reading and writing, especially basic communication skills. At the end of the module, students

No.	Course code	Courses	Number of credits	Description
				can communicate at a simple level with the vocabulary and grammar materials provided in this module.
3	ENG136	English 3	3	The course consists of 5 lessons with 5 basic grammar and vocabulary topics at intermediate level. Grammar topics in this module include: Present simple, simple past, present continuous, present perfect, past continuous, have to, can. These contents are associated with familiar vocabulary topics in daily life to help students have basic language knowledge and necessary vocabulary. In addition, students are trained to evenly develop the four skills of listening, speaking, reading and writing, especially basic communication skills. At the end of the module, students can communicate at a simple level with the vocabulary and grammar materials provided in this module.
4	ENG135	English 4	3	The course consists of 5 lessons with 5 basic grammar and vocabulary topics at the Pre-intermediate level. Grammar topics in this module include: comparative level, will, might, may, real conditional, some, any, passive voice, present perfect tense, near future tense. These contents are associated with familiar vocabulary topics in daily life to help students have basic language knowledge and necessary vocabulary. In addition, students are trained to evenly develop the four skills of listening, speaking, reading and writing, especially basic communication skills. At the end of the module, students can communicate at a simple level with the vocabulary and grammar materials provided in this module.
5	DST131	Linear algebra	3	Provides basic knowledge of linear algebra such as: Sets, maps and complex numbers, Matrix and determinant, System of linear equations, Vector space, Linear mapping and quadratic form
6	VCP131	Revolutionary lines of Vietnamese Communist Party	3	To provide students with the basic contents of the Communist Party of Vietnam's revolutionary line, which mainly focuses on the Party's line in the renovation period on a number of basic fields of social life, service for life and work.
7	GTT141	Analytics	4	Equip basic knowledge of analysis such as: Functions and limits of functions of one variable, Differential Calculus of functions of one variable, Calculus of integral of functions of one variable, Series of numbers and series of functions; multi variable Functions, partial derivatives, full differentials and extremes of them.

No.	Course code	Courses	Number of credits	Description
8	PML121	The Basic Principles of Marxism 1	2	Briefly introduce Marxism-Leninism and some general problems of the subject; Dialectical materialism; Historical materialism.
9	PML132	The Basic Principles of Marxism 2	3	The central content of the economic theory of Marxism-Leninism on the capitalist mode of production: Chapter I: Theory of value; Chapter II: Theory of Surplus Value; Chapter III: Economic theory of monopoly capitalism and state monopoly capitalism. The basic content belongs to the theory of Marxism-Leninism on socialism; overview of real and prospective socialism; The historical mission of the working class and the socialist revolution; The socio-political issues of regularity in the process of socialist revolution; Realistic and prospective socialism
10	FOL121	General law	2	Equip with basic and important contents about the state and law as well as mention some basic branches of law in Vietnam today.
11	GIS131	General Informatics	3	Equip students with the most basic knowledge in computer science. Instruct students in the application of manipulation and proficient use of computers. Specific contents include: Windows operating system; Word editing system; Electronic spreadsheet Excel; Build Powerpoint presentations.
12	HCM121	Ho Chi Minh Thought	2	Provide systematic insights into Ho Chi Minh's ideology, morality and cultural values; Basic knowledge of Marxism-Leninism.
13	PHY121	Physics	2	Equip with basic knowledge of General Physics of electricity and magnetism; understand physical phenomena in nature, practice calculation skills and solve basic physics problems.
14	PRS221	Probability statistics	2	Equip students with knowledge about: Basic concepts of probability, Probability formulas and its applications, Random quantity and its probability distribution laws, Sample theory and the problem of parameter estimation, Statistical hypothesis testing.

No.	Course code	Courses	Number of credits	Description
15	SSK221	soft skills	2	The course aims to equip students with basic knowledge of soft skills. Train learners' communication ability, form and develop self-awareness skills, critical thinking skills, teamwork skills, presentation skills and job interviewing skills. Students can stand on their own to present clearly, effectively and accurately in technical work, in business work, in conferences, scientific seminars, etc
<b>2. Basic knowledge of software engineering</b>				
16	NML352	Introduce to Programming	3	Equipping students with basic knowledge of programming. Facilitate students to get acquainted and use the C programming language. Specific content includes: Introduction to programming; C programming language; Data types in C; Commands in C.
17	HDH121	Operating system	2	Providing students with basic knowledge of the organization and operating principles of computer operating systems. Learn how to choose Windows and Linux operating systems for experimentation. The main contents include: - Operating system organization and operating principle: General organization of operating systems; Scheduler; Manage processes; Synchronize and share system resources. Windows operating system: Use system tool applications; Account management and Remote service; Manage applications, services, folders, system libraries, and devices; Network configuration and data sharing techniques; Maintain and upgrade operating system; Data backup and recovery techniques - Linux operating system: Organize data on the system; Manage user accounts; Manage and share system data; Techniques using the bash shell.

No.	Course code	Courses	Number of credits	Description
18	COA221	Computer architecture	2	<p>To provide students with the most basic knowledge about the architecture and functions of the basic components of a computer system, the organization of hardware and software, techniques for installing and optimizing computer operating systems. The main contents include:</p> <ul style="list-style-type: none"> <li>- Basic components of a computer system</li> <li>- Architecture and function of CPU internal components</li> <li>- Organize MainBoar</li> <li>- Organize memory in the computer</li> <li>- Technical hard disk partitioning according to FAT and NTFS standards</li> <li>- Maintain, fix and handle some common errors on computer systems.</li> </ul>
19	ADP321	Advanced Programming	2	<p>Equipping students with advanced programming knowledge. Facilitate students to use C programming language fluently. Specific content includes: Dynamic data and pointers in C; Structured data types in C; File Type File in C; Graphics in C.</p>
20	BAD131	Database	3	<p>Relational databases, relational operations, relational data normalization, and data manipulation languages. Practice on SQL</p>
21	OOP231	Object Oriented Programming	3	<p>Equipping students with basic knowledge of object-oriented programming. Facilitate students to use C++ programming language fluently in object-oriented programming. Specific contents include: Overview of object-oriented programming; Functions in C++; Class, constructor, destructor, derived, inheritance; File manipulation; Direct access to memory; Streams.</p>
22	DEM231	Discrete mathematics	3	<p>The course is equipped with mathematical methods of thinking, logical reasoning &amp; proof; basic knowledge of algorithms, algorithms, and discrete structures &amp; processing techniques on those structures; algorithms, algorithm design techniques; advanced counting principles and techniques.</p>

No.	Course code	Courses	Number of credits	Description
23	DAS231	Data structures and algorithms	3	Equipping knowledge from general to in-depth knowledge of common data models (lists, stacks, queues, trees, graphs, sets, dictionaries, ...) as well as operations on each element of the model. On that basis, it is possible to apply the knowledge learned to programmatically solve problems using specific programming languages.
24	CON231	Computer network	3	Overview of computer network systems: network architecture, protocols, devices, technology
25	ASD232	System analysis and design	3	The module provides learners with survey, analysis, design and installation of information management systems and at the same time trains students in object-oriented analysis and design skills based on UML language and Rational Rose.
26	PRM321	Programming methodology	2	Providing basic programming principles, level program implementation methods. From there, creating a foundation for writing good programs, clarifying the basic problem posed for programming theory is "how to master the complexity of programming operations".
27	APA331	Algorithm application	3	Understanding the methods of representation, manipulation, and applications of data structures. Understand and master algorithms built on data structures. Mastering analytical methods, designing algorithms to solve specific problems in practice.
28	SOE232	Software technology	3	Equipping students with an overview of software engineering: fundamentals of software specification, development, evaluation, operation and maintenance processes, project management and organization principles
29	CCS231	Information safety and security	3	The module provides the contents of information safety and security, how to solve such content with cryptography, grasp the theoretical basis of modern cryptographic algorithms being widely used today, application of cryptosystems used
30	PJA241	Java programming	3	The module provides students with knowledge about object-oriented methods (OPP) and how to apply them to Java programming; Java language syntax and usage; creating objects and adding behaviors, working with collections, handling errors; tips for writing better code

No.	Course code	Courses	Number of credits	Description
31	UML333	Developing object-oriented software with UML	3	The course introduces software requirements and discusses the processes involved in requirements definition and software design, the role of software requirements analysis and software design in software engineering and in the system. Documenting the requirements in order to learners understand the concept of user requirements and system requirements, the notation of requirements representation; the difference between functional and non-functional requirements; classification and documentation of requirements; engineering activities that primarily require inference, analysis, design, and validation as well as the relationship between these activities; requirements management; software evolution management and software design.
32	LTT332	Mobile programming	3	The course will provide students basic knowledges of programming platforms on mobile devices such as: Android, iOS, Windows Phone,... The course will also focus on the Android open source mobile operating system and equip students to understand how to program and build applications on the Android operating system.
<b>3. Specialized Knowledge Block</b>				
33	AMS431	Need analysis and management	2	The course provides students knowledges and skills of inference, how to organize, document, and track all requirements. Requirements management helps to verify and validate the software system, manage any changes so that the state of the system can be analyzed effectively, especially for large and complicated software systems
34	PPH222	Programming methodology	2	After studying this course, students will understand the role, meaning and importance of specification activities in software development, catch the concept of formal specification, informal specification of specific methods describe, use some of the specification languages used in the software specification



No.	Course code	Courses	Number of credits	Description
35	DOT331	Dot Net Technology	3	This course provides basic knowledge of C# programming language, develops object-oriented programming capabilities on the basis of .NET programming libraries, progresses to building complete applications. Most of the course time is devoted to content on object-oriented programming, manipulating databases with the ADO.NET library, and building web applications using MVC architecture. The course also introduces some advanced technologies such as WPF, LINQ, Entity Framework...
36	TNS431	Software testing	3	This course provides students with an overview of the software testing phase; understand the rules affecting the testing process; testing support tools; test status, test acceptance.
37	AJP331	Advanced Java programming	3	The course provides students with in-depth knowledge of Java programming such as: Graphical interface components, I/O, multithreaded programming, network programming, remote object access, basics, fundamental connectivity database, web application building, javabeen
38	ITP331	IT project management	2	The course provides basic knowledges of IT project management and skills related to project planning, time estimation, cost estimation, product quality management, risk management, project personnel selection, and IT project integration management
39	KTV332	Software architect and design	3	The course provides basic knowledge about software high layer structure, data representation, algorithms, application of interaction rules, constraints in business context, system modeling
40	SQA421	Software quality assurance	2	The course provides in-depth knowledge of software quality control in the software life cycle; Current software standards apply in the software life cycle.
41	BTP325	Software operation and maintenance	2	This course provides students with an overview of software maintenance, software will change through evolution, types of maintenance, factors affecting maintenance costs
<b>5. Selective Course/Modules:</b>				
42,43	<i>Selective courses for speciality 1,2</i>			

No.	Course code	Courses	Number of credits	Description
	OSD331	Open source software development	3	This course will help students understand the basics of open source software. Licenses in the open source community, the benefits of using open source software in developing applications.
	XTA331	XML and application	3	The course is intended to provide an overview of XML, XML document structure and content specification. Parsing of XML. Query XML data. Transform XML documents with XSLT. XML in semantic web technology.
	JEE333	J2EE technology	3	The course provides and equips modern Java technologies to deploy large-scale enterprise applications.
	CCP431	Cloud computing	3	The course presents the basic and fundamental concepts of cloud computing (EIA) firstly, its important technical characteristics and possible application capabilities. Then, the course presents knowledge about basic models of cloud computing, algorithms and large solutions to control virtual server systems, current cloud systems such as Azure, GAE, IBM, Amazon, etc.
	PMN333	Embedded application development	3	Understand what an embedded system is. Operating principles and methods for developing embedded systems.
44	<b><i>Selective courses for speciality 3</i></b>			
	IDS321	Software interface design	2	Introduce the stages in the software interface design process, the components of the UI interface, the factors to evaluate the quality of user interface design and also present some sample interfaces in practice
	SPS433	Modern problems in software engineering	2	This subject provides students with an in-depth look at Software Engineering, topics, and cutting-edge technological aspects from which students can apply to solve complex problems in real life, software research and production
	DPT231	Multimedia systems	2	This course equips students with an overview of multimedia documents, tools used to create multimedia products and skills to build a multimedia product... Through this, students can build multimedia products on demand as well as know how to apply multimedia devices and products to agencies.
	HDV222	Service oriented architecture	2	This course provides students with the overall process of designing and implementing systems according to service architecture and providing enterprise services on cloud computing, building service infrastructure, and virtualization.

No.	Course code	Courses	Number of credits	Description
45	<i>Selective courses for speciality 4</i>			
	ELC331	E-commerce	3	This course provides students with the basics of e-commerce, e-marketplaces as well as the scope, functions and benefits of e-commerce for businesses. Besides it, the course also helps students to be able to grasp some core elements when applying e-commerce to businesses such as: infrastructure in e-commerce, business models, law e-commerce, transaction systems, payment methods and safe management of e-commerce, etc. Based on the research on opportunities and challenges in business through electronic means, students will minimize the risks encountered when working with any e-commerce system.
	ADV333	Facebook marketing	3	Equip students with basic knowledges of Digital Marketing and use Facebook to launch online marketing campaigns. At the end of the course, students have an overview of online marketing and marketing. In which, it is necessary to have a clear understanding of strategies, customers, content characteristics, implementation plans and monitoring.
	CTH333	Medical informatics standards and applications	3	This course is intended to provide students with knowledge of computer standards used in healthcare. After finishing the course, students understand the concepts of standards such as: document standards, international standards on the list of diseases used in information exchange and information processing in health insurance, HL7 messaging and CDA clinical documentation standards. These are standards that are commonly used in countries with advanced medicine and will also be widely used in Vietnam in the coming years. After completing the course, students have basic knowledge about standards, understand technical characteristics, features and how to apply a standard in building software in the medical field. Based on the knowledge gained, graduates can work as maintenance engineers for information systems currently used in hospitals.
<b>6. Internship/Graduation Project</b>				
46	BAP441	Internship	4	
47	PRT461	Vocational internship	6	

No.	Course code	Courses	Number of credits	Description
48	GRA905	Graduation project	10	
<b>Total</b>			<b>140</b>	

**12. Output standards, curriculum framework and detailed course outline:**

- Output standards of the training program:

(link: .....).

- Detailed training program framework:

(link: .....).

- Detailed course outline:

( link : .....).

**RECTOR**

**Ph.D Nguyen Van Tao**

**HEAD OF IT FACULTY**

**Ph.D Nguyen Hai Minh**