Undergraduate Program

Bachelor of Computer Science in Information Systems

Curriculum Document

Prepared By

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Department of Information Systems
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sisfor 2018

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1 IDENTIFICATION OF STUDY PROGRAM

1	Name of University	INSTITUT TEKNOLOGI SEPULUH NOPEMBER
2	Faculty	Faculty of Intelligent Electrical and Informatics Technology
3	Department	Information Systems
4	Study Program	Bachelor of Computer Science in Information Systems
5	Accreditation Status	A
6	Number of Student	749
7	Number of Lecturer	34
8	Address	Ruang TU Gedung Departemen Sistem Informasi Lt.2 Kampus Institut Teknologi Sepuluh Nopember Surabaya
9	Telp	+62-31-5999944
10	Website of Study Program	https://www.its.ac.id/si/en/home/

2 CURRICULUM DEVELOPMENT PROCEDURE

2.1 Overview

The Information Systems Department is under the Faculty of Information and Communication Technology, Institut Teknologi Sepuluh Nopember (ITS). There are two degree programs offered by the Information Systems Department of ITS, i.e., Undergraduate Program (Bachelor of Computer Science in Information Systems) and Postgraduate Program (Master of Computer Science in Information Systems and Doctor of Computer Science in Information Systems). Information systems have a vision of becoming a center of excellence in education in the field of information systems, especially in the application and application design and development of information systems, decision support systems and business intelligence. Information Systems students are prepared to become skilled people in designing and analyzing information system requirements for organizations, designing project development in the context of information systems comprehensively incorporating aspects of IT infrastructure (information technology), such as hardware, software, networks, data, organizational hierarchy, processes and procedures, as well as human and cultural resources, and policies and regulations. Students are also provided with basic skills and advancements in the application and development of software, network infrastructure, maintenance of the organization's information management system.

2.2 Developing Graduate profiles

In 2018, the information systems study program has prepared a new curriculum. The curriculum of the information systems study program is updated every 4 years. The process of preparing the new curriculum can be seen in Figure 1. Starting from two major inputs, namely scientific vision and market signal. The scientific vision summarizes all the considerations obtained from the academic side related to the study program, while the market signal summarizes all input from outside the academic side. Scientific vision consists of university policies & study programs, conformity with international standards, and the concept of higher education curriculum and competencies. Input from market signals includes input from associations & stakeholders, agreement on similar study programs and descriptions of KKNI and BNSP standards. From the input of the two groups above, a graduate profile is compiled, from the graduate profile then it is lowered into a formulation of learning outcomes.

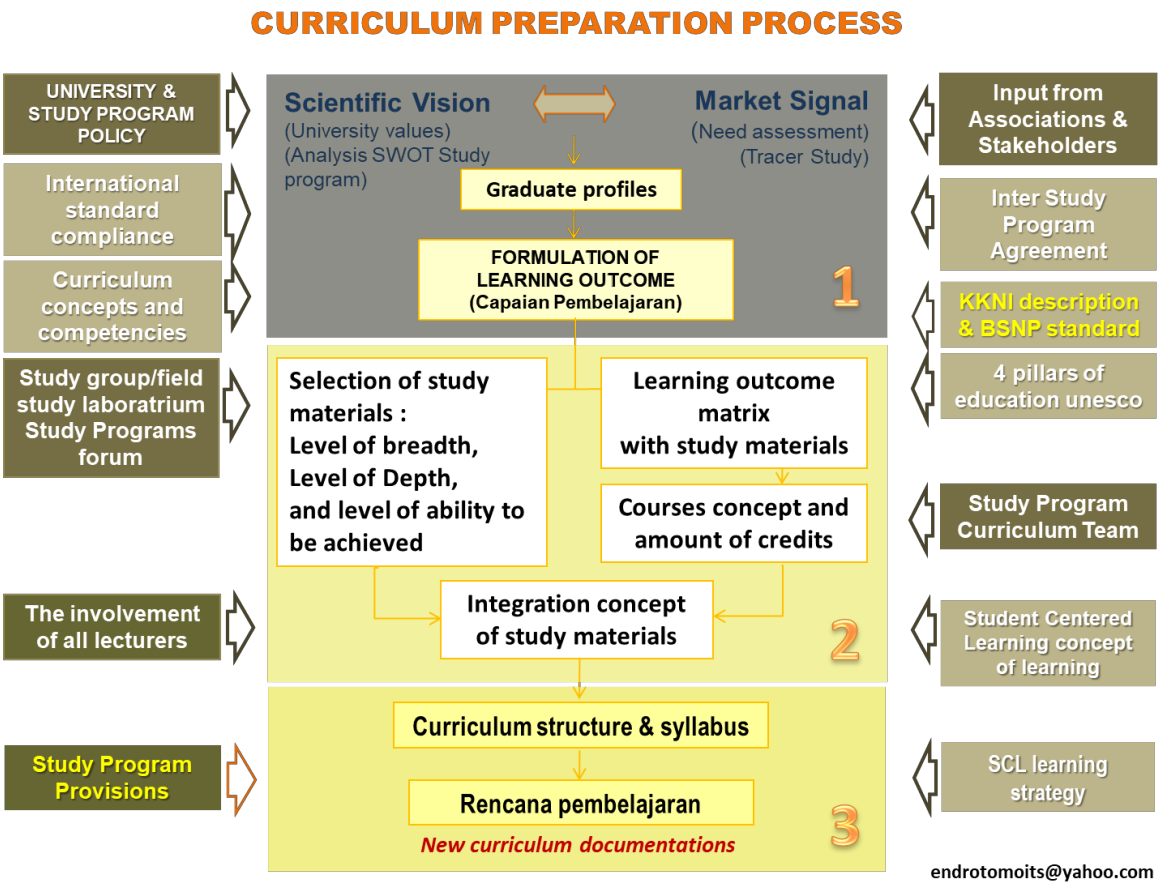

Figure 1. Undergraduate program department of Information Systems 2018 curriculum preparation process

In detail, market signals are obtained from expert input from various industries, such as: Banking (Mandiri, BI), Telecommunications (Telkom, Telkomsel), BUMN (Badak, Pertamina, PLN), National Private (Lintas Artha, Interactive Media Informatics), Bureaucrats (Kemen Polhukam, SEAMOLEC) and tracer alumni of the Information Systems study program. In addition, it also obtained from several international standards Accociation for Computing Machenery (ACM) & Association for Information System (AIS) on IS 2010: Curriculum Guidelines for Undergraduate Degree Programs in Information System, MSIS 2016, Taxonomy Aptikom 2011, SKKNI Information Technology, Occupational Technology Information.

From the industrial input, the competence of SI graduates who are expected to have the ability to make innovative works, especially in terms of developing & implementing IT solutions, Having expertise in planning, designing & developing IS using the latest ICT, skilled in technopreneurs & having a strong desire to become entrepreneurs , Critical thinking & analytical skills, mastery of theory in the implementation of IT development in an IS, Ability to work in teams, lead or be led, not rigid, able to communicate well, & adapt easily, Independent thinking & work, Sensitivity to the surrounding environmental conditions, Ability to communicate ideas, IT technical skills,

Professional responsibility, professional morals and ethics, Self-learning ability, Ability to implement basic IT knowledge, Understanding & implementing IT developments in an IS, Understanding the social & environmental impacts caused by IT & IS developments that have been developed, Communication in the form of effective discussions & presentations, Basic entrepreneurial development skills, Expertise in designing & implementing an experiment and being able to analyze & interpret experimental results, Expertise in developing IS that applies database processing, computer programming languages , & Web-based IS, Expertise in testing IS performance in the form of IS auditing, Morals, ethics & a sense of professional responsibility. The results of the alumni tracer obtained several personal abilities that are loved & still have expectations, namely Developing & building solutions, Understanding standard IT frameworks (COBIT, ITIL, PMBOK, etc.), Managing & securing IT infrastructure, Database management, Managing IT projects , Align IT & business organization, Carry out IS audits, Confidence & communication, Teamwork. From the ACM & AIS international standard: IS2010, 2 considerations were obtained, namely the main assumptions of the SI undergraduate profession and the basic concept of the expected achievements of the SI undergraduate. Basic assumptions of the Bachelor of SI in existing standards ensure that graduates can exist in all fields of work, to participate: Successful organizational performance, Reach & integrate all levels of organizations and functions, Understand work & technological knowledge that plays a role in the organization, and significantly improve organizational strategic Graduates are also expected to have the ability to think critically & analytically in a global & competitive environment, to: Solve problems, Apply system concepts to a specific problem scope, integrate traditional & new skills concepts, and understand that a system consists of people, procedures, hardware, software , & data in a global environment. In attitude, graduates must also have ethical, communication, interpersonal, & teamwork skills, to: Evaluate & follow up on ethical issues in the IS field, Collaborate with other professionals, Communicate orally, in writing & listen to skills and demonstrate persistence, flexibility, desire knowing, creative, taking risks, & tolerant. Technically, graduates must be good at designing & implementing IT solutions that improve organizational performance. For that we must: Skilled in understanding & modeling organizational processes & data, defining & implementing technical & process solutions, managing projects, and integrating existing systems in the organization, Ability to speak technical languages to acquire, change, transmit, & store data & information, including those related to data quality, Focus on IT applications that help individuals, groups, & organizations achieve goals, and win the competition in a global environment.

Figure 2 shows the formulation of graduates profiles extracted from all sources obtained from both the scientific vision and market signals. There are 6 profiles, namely business analyst, business information manager, project manager, system analyst, data & information engineer, and IT startup. Each of them supports the characteristics of the study program and higher education which is reflected in the vision, policies and other regulations.

PROFILE		STUDY PROGRAM CHARACTERISTICS	UNIV. CHARACTERISTICS	
1	BUSINESS ANALYST	Able to apply the concepts and processes of business continuity supported by IT	Having independence, persistence & portfolio	Internalization of academic values, norms & ethics
2	BUSINESS INFORMATION MANAGER	Able to align IT and business, including designing data and information requirements, information systems application and IT organizational infrastructure		
		Able to explore the potential use of IT in the current and future life	Responsible, hard work, teamwork, making decision	
		Able to implement friendly IT solutions and understand their impact on environment and social life.		
		Understand the concepts and processes of IT governance to monitor and control the organizations information system resources		
3	PROJECT MANAGER	Understand the creation of accountable IT staff performance by providing IS, services and the right IT infrastructure for effective, efficient, and increased productivity	Synergize, dedicated & honest at work	Able to create & present competitive works with IT support for the national and international recognition.
4	SYSTEM ANALYST	Understand the requirements of information system design by applying the suitable SDLC including human and computer interaction		
5	DATA & INFORMATION ENGINEER	Understand data processing characteristics and methods to transform them into manageable information	Able to think logically, critically, systematically, innovatively, and sustainably	
		Able to identify, evaluate, and recommend the best solution options (including smart solution)		
		Able to use mathematical and statistical techniques/ models to provide optimal solutions		
6	IT STARTUP	Have an innovative idea in the competitive IT market	Able to understand & apply entrepreneurship	
		Able to plan & start an IT Business		

Figure 2. Graduate profiles matrix with its corresponding developing sources.

2.3 Learning Outcomes (PLOs)

The Bachelor of Computer Science in Information Systems program have nine learning outcomes produced from the process mentioned above. The learning outcomes are:

1. KK11 - Use an IT solution and its alternatives that improve business performance & competitiveness
2. KK12 - Plan an improvement of the quality of business & IT integration that deliver competitiveness to the organization
3. KU21 - Use basic of logic & mathematics, statistics, physics, chemistry to solve various business problems
4. KU22 - Demonstrate intrapersonal & interpersonal skills in business environment
5. KU23 - Produce scientific papers & IT entrepreneurship that can solve actual problems
6. PE31 - Recognize basic concept of managing IT organizations, processes & artifacts for business continuity
7. PE32 - Recognize basic knowledge of business & IT
8. ST41 - Demonstrate all his expertise in the nation & country with integrity & ethics

9. ST42 - Demonstrate the spirit of entrepreneurship in accordance with his expertise in the latest times

The Bachelor of Information Systems program must be based on a first university degree qualifying for a profession and impart deeper competences in the field of Information Systems. The aim of the corresponding modules must be to enable students to derive and develop scientific methods of Information Systems for difficult and complex problems expecially when put it into practice. The program prepares graduates to face the realworld problem as well as equips them to conduct further accademic and research works when continue their studies in postgraduate level.

Below is the mapping of Bachelor of Information Systems' program learning outcomes (PLO) to subject-specific criteria for informatics & computer science (SSC-04).

Table 1. Mapping of PLO and SSC-04

PLO		SPECIALIST COMPETENCE				
PLO Code	PLO Area	Formal, Algorithmic, Mathematic Competence	Analysis, Design and Implementation Competence	Technological Competences	Methodological Competences	Interdisciplinary Competences
KK11	Specific skills			Can provide an appropriate IS solution to the identified problem using state-of-the-art technology		Able to identify important business performance of a specific case
KK12	Specific skills		Are capable analyzing problems and solving it using IT/IS Skill that has been developed	Capable to provide an IS solution for helping the Business to improve their process		Able to identify possible business improvement using IT
KU21	Generic skills	Have a fondation of mathematics and algorithm skill to support IT competences				
KU22	Generic skills					Able to identify and understand the business environment
KU23	Generic skills		Are capable analyzing problems and solving it using IT/IS Skill that has been developed		Can make contributions to the further development of Information Systems as a scientific discipline	
PE31	Knowledge	Have a fondation of mathematics and algorithm skill to support IT competences		Have obtained profound technical knowledge in a chosen field of informatics and have thereby reached the limits of today's knowledge and state-of-the-art technology		
PE32	Knowledge					Have a knowledge of the implementation of IT in the business context

ST41	Attitude					Are able to interpret and comply with legislative and regulatory requirements governing IS implementation and practices
ST42	Attitude					Are able to make a plan and design of business of IS implementation

2.4 Graduate Profiles of the program

The program has six graduate profiles.

1. Business Analyst

Business analyst help guide businesses in improving processes, products, services and software through data analysis. These agile workers straddle the line between IT and the business to help bridge the gap and improve efficiency.

2. Business Information Manager

A business information manager carries out the development and implementation of software applications within a company. The manager may also help to implement automated technologies to help the company become more efficient and effective. The manager should be able to design the infrastructure, process maps and workflow models in order to make sure that the infrastructure is laid out in an optimal manner and is functioning smoothly.

3. Project Manager

A project manager in any industry needs to be an organized, resourceful, inspiring leader. In the information technology world, project managers also must possess a unique combination of deep subject-matter knowledge and quick, on-their-feet thinking to ensure the industry's complex and frequently changing projects go off without a hitch.

4. System Analyst

A systems analyst is an information technology (IT) professional who specializes in analyzing, designing and implementing information systems. Systems analysts assess the suitability of information systems in terms of their intended outcomes and liaise with end users, software vendors and programmers in order to achieve these outcomes. A systems analyst is a person who uses analysis and design techniques to solve business problems using information technology. Systems analysts may serve as change agents who identify the organizational

improvements needed, design systems to implement those changes, and train and motivate others to use the systems.

5. Data & Information Engineer

Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks. They organize, install, and support an organization's computer systems, including local area networks (LANs), wide area networks (WANs), network segments, intranets, and other data communication systems.

The duties of a network and computer systems administrators typically do the following: Determine an organization's network and computer system needs before setting one up, Install all network hardware and software and make needed upgrades and repairs, Maintain network and computer system security and ensure that all systems are operating correctly, Collect data in order to evaluate and optimize network or system performance, Add users to a network and assign and update security permissions on the network, Train users in the proper use of hardware and software, Interpret and solve problems when a user or an automated monitoring system alerts them that one exists, Administrators manage an organization's servers and desktop and mobile equipment. They ensure that email and data storage networks work properly. They also make sure that employees' workstations are working efficiently and stay connected to the central computer network. Some administrators manage telecommunication networks.

In some cases, administrators help network architects design and analyze network models. They also participate in decisions about buying future hardware or software to upgrade their organization's network. Some administrators provide technical support to computer users, and they also may supervise computer support specialists who help solve users' problems.

6. Startup IT

The IT Startup profile enables Information Systems program graduates to have an innovative ideas in the field of IT / IS and find its competitiveness. They can deliver their solution to the market. Besides being able to find and develop innovative ideas, IS program graduates must also be able to plan and start an IT business. The graduates received IS basic, how to develop brands, how to market IT products and services, and how to do business creatively.

All graduate profiles is supported by the PLO that have been developed before. Table 2 shows the mapping of PLO supporting all graduates profile of BIS.

Table 2. Mapping of PLO supporting all Graduates profiles

PLO	Graduates Profiles					
	1. Business Analyst	2. Business Information Manager	3. Project Manager	4. System Analyst	5. Data & Information Engineer	6. Startup IT
PLO 1 - KK11	x	x	x			
PLO 2 - KK12	x	x	x			
PLO 3 - KU21				x	x	x
PLO 4 - KU22	x	x	x	x	x	x
PLO 5 - KU23					x	
PLO 6 - PE31			x			x
PLO 7 - PE32	x	x	x			x
PLO 8 - ST41	x	x	x	x	x	x
PLO 9 - ST42						x

2.5 Positioning of BIS over computer/IT related field/Study program in the Institution (ITS)

The study program was developed to enhance the field of IT that was previously taught in ITS. The institution have 4 related study programs of IT field, one of that is BIP. The curriculum of the BIS is refers to the ACM AIS document about the Information Study program guidelines. Figure 3 shows the competency that the Information System field graduate should poses. One of the predominate skill of IS graduate is organizational domain and skill of integration of IT and business. Those mentioned area should not offered in the BIP program.

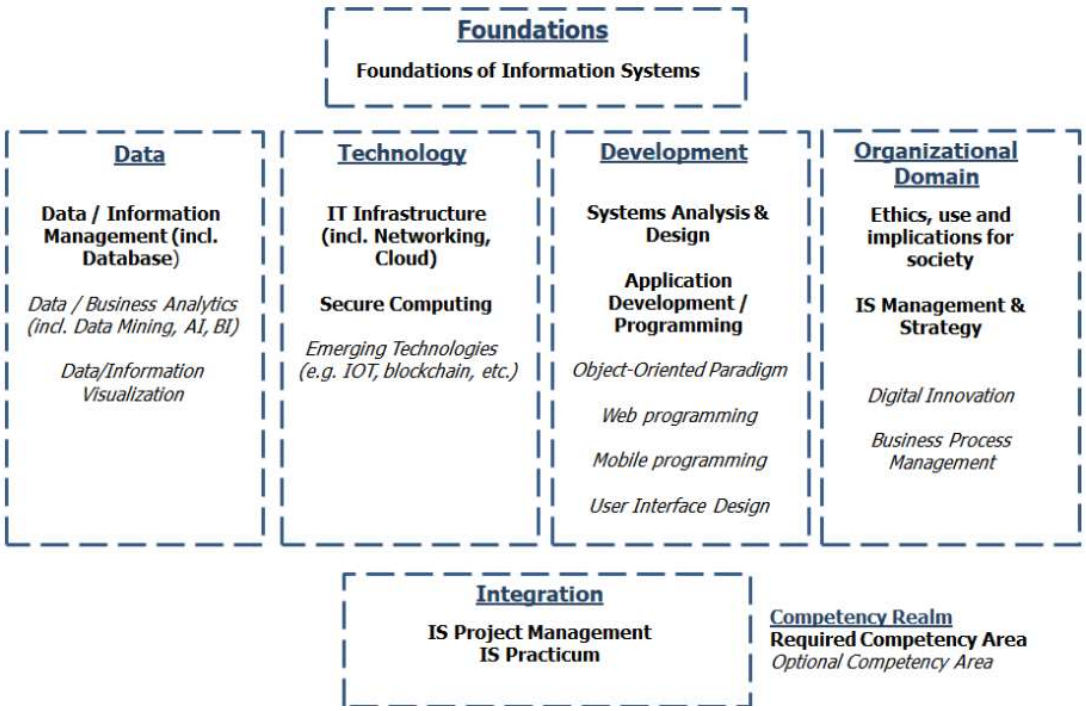

Figure 3 Information System Competency based on IS2020 document.

2.6 The Title of Degree Programme

The Information Systems Undergraduate Study Program of the Sepuluh Nopember Institute of Technology (ITS) has been established since 2001 and is now 15 years old. With the background of the results of the rearrangement of study programs in Information and Computer science in Indonesia by the Ministry of National Education in 1999 and ITS response to the increasingly rapid development of Information Technology entering 2000, as well as the momentum of support from the President of the Republic of Indonesia Abdurrahman Wahid (Gus Dur) delivered a state speech at the ITS 40th Anniversary, the ITS Information Technology Faculty (FTIf) was established with 2 (two) departments / study programs, namely the Informatics Engineering Department (which has been established since 1985) and the Information Systems Study Program. The existence of the FTIf Information Systems Study Program at ITS was then formally validated based on the ITS Chancellor's Decree No. 1155.1 / K03 / PP / 2001, dated June 14, 2001 and obtained permission to organize undergraduate study programs (S1) based on the Decree of the Director General of Higher Education No. 2825 / D / T / 2001 issued on August 30, 2001.

Employers did not really understand the name of the information system program at the beginning so that it was considered the same as similar study programs such as informatics engineering, information technology, computer engineering, computer science and industrial engineering. This is natural, as the first major in Indonesia using the name of the Information Systems study program, the graduate of the study program has a big role in educating the industry about the existence of the information system study program profile. Slowly the industrial anime towards information system study program changes because they increasingly understand the strength of information systems study program graduates compared to similar study programs with very strong IT content.

3 CURRICULUM OF THE PROGRAM

Undergraduate students are equipped with skills in designing and analyzing information system requirements for organizations, designing project development in the context of information systems in a comprehensive manner incorporating aspects of IT infrastructure (information technology), such as hardware, software, networks, data, organizational hierarchy, processes and procedures, resources human and cultural, and policies and regulations.

Graduates of the Undergraduate Department of Information Systems will provide knowledge about four roles, namely information systems developers (IS Developers), consultants and systems integrators, database specialists, and information systems academics. In addition, students will also be equipped with skills in designing and analyzing information system requirements for organizations, designing project development in the context of information systems in a comprehensive manner incorporating aspects of IT infrastructure (information technology), such as hardware, software, networks, data, organizational hierarchy, processes and procedures, human and cultural resources, and policies and regulations.

Figure 3 shows the relationship between the learning outcome and each existing course. With this matrix, each course / module in the study program can be examined for its contribution to form certain learning outcomes that indirectly support the achievement of a previously planned graduate profile. Matrix adjustments are made every time there is a curriculum reconstruction every 4 years. The last curriculum reconstruction were done in 2018.

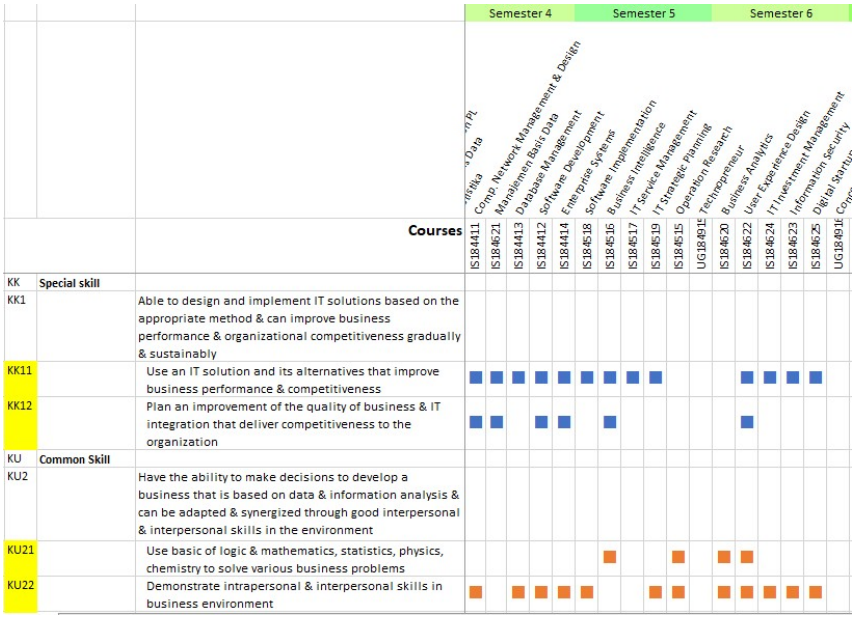

Figure 3. Excerp from learning outcome – course matrix showing all course with its corresponding learning outcome.

3.1 Structure of the curriculum

The curriculum structure presented by Figure 4 illustrates how the courses in the curriculum are logically structured, sequenced, and integrated. The figure also shows how the courses are divided into eight semesters and course clusters. Courses with red font are the common institutional courses regardless the study program.

There are also 24 elective courses that can be taken by students. To keep the curriculum up to date, the curriculum is reviewed every 5 years.

Minimum Credits for undergraduate level of Information Systems program is 144 SKS (credits). It is divided into 36 SKS in preparation Phase and 108 in Undergraduate level phase. It is also divided into 129 SKS for compulsory courses and 15 SKS for elective courses. In total there are 43 compulsory courses (14 offered by Institute and 29 offered by study program including Final Project) and 24 elective courses offered by study program. Student have to take 5 elective courses. All of the courses contain three main field interdisplinary of Information System Study Program i.e., Knowledge and skill support, IT availability, and Business solution. The content are marked with color dividing the courses mainly contain each of those main field. Some of them are in intersection, thus show combination of gradiant color. Each of course support the PLO mentioned in section **2.3**. All courses contribute in PLO building means that whenever the students pass the course, the progression of them toward study program profiles is working. Thus the study progression monitoring of each student can be carried out.

In order to fulfill the 15 SKS elective courses, student can choose 5 courses (each 3 SKS) out of 24 courses freely based on their preferences. This allow the student to define an individual focus on a specific study field or specifically a profile. Within 24 elective courses, there is a one an internship course that allows student to take an internship based work and considered as SKS equivalent work. The student are free to choose company and organization in which they carried out the internship program with specific predefined requirement. The internship course aims to apply critical, constructive and analytical skills as well as provide real work experience. Including combining competence and communication, professionalism, and career. This course is expected to be able to provide an overview of the challenges and steps that must be taken to achieve a career as expected. At the time of carrying out this course students will complete assignments / projects armed with experience and background knowledge and academic skills that they have professionally and intellectually.

In the process of developing and reviewing the curriculum, the study program establishes a PIC that will manage the creation of the curriculum every 5 years. The team will carry out the predetermined process as shown in Figure 1. Profiles, courses, and PLO are arranged in such a way that they are interrelated so that the construction of profiles, courses, and PLO is connected. This arrangement will be reviewed every 5 years to ensure that, for example, whether the profile is still relevant to be maintained, whether the PLO is still in accordance with market demand, regulations, etc. and whether courses, materials and study materials are still relevant to be delivered. At the end of each semester, a teaching evaluation meeting is held where in this activity all modules will be assessed both regarding the suitability of the course with the PLO, the material being taught, assignments and evaluations, and so on. In addition, at the end of each lecture, students are asked to fill out a questionnaire related to the subject being taught to be used as an evaluation material for both the course or the teaching method.

Elective courses as shown in Figure 4 support the competence profile. Although not rigid, elective courses are grouped into several focus competence profiles. This allows students who want to focus on a certain competence profile to also adjust the elective courses they take. This also has an impact on the topic of the final project that students want to do

INFORMATION SYSTEMS PROGRAM COURSES

CURRICULUM 2018

	Information Visualization	Cyber Security	Business Continuity Management	Combinatoric & Heuristic Optimization	Digital Business	Internship	
	3	3	3	3	3	3	
	Natural Language Processing	Digital Forensics	Organization Change Management	Data Mining	Model Driven DSS	Digital Brand Management	
elective courses	3	3	3	3	3	3	elective courses
	Web Technology	Internet of Things	IT Governance	Decision Support System	Customer Relationship Management	Digital Marketing	
	3	3	3	3	3	3	
	Database Technology	Mobile Technology	IT Risk & Quality Management	Forecasting Techniques	Supply Chain Management	Digital Creative	
	3	3	3	3	3	3	
Semester VIII 16 sks		Elective Course 4	Elective Course 5	Final Project	Enrichment Courses 1	Enrichment Courses 2	Comprehensi-ve capability assessment
		3	3	4	3	3	
Semester VII 18 sks	Elective Course 1	Elective Course 2	Elective Course 3	Pre Final Project	IT Evaluation & Audit	IT Professional Ethics	Explore the
	3	3	3	2	4	3	
Semester VI 19 sks	Business Analytics	Database Management	User Experience Design	Information Asset Protection	IT Investment Management	Digital Startup	es to capabiliti optimize the IT solutions
	4	3	3	3	3	3	
Semester V 18 sks	Operation Research	Business Intelligence	IT Service Management	Software Deployment	IT Strategic Planning	Techno-preneur-ship	
	3	4	3	3	3	2	
Semester IV 18 sks	Concept of Tech	Computer Network Management & Design	Software Development	IT Project Management	Enterprise Systems		Train the ability to provide IT solutions
	2	4	4	4	4		
Semester III 19 sks	Statistics	Database Systems	Web Program-ming	IT Process & Management	Software Requirement Engineering	Business Process Management	
	3	4	2	3	3	4	
Semester II 18 sks	Civics Educati on	Religion	athamatics I	Physics II	Algorithms & Programming	Business Functional	English	Laying down basic management skills & basic IT knowledge
	2	2	3	3	3	3	2
Semester I 18 sks	Pancasila	Mathematics I	Physics I	Chemistry I	Logic and Discret Organization	IS Concept s	Bahasa Indones ia	
	2	3	4	3	2	2	2

UNDERGRADUATEPHASE

PREPARATION PHASE

to

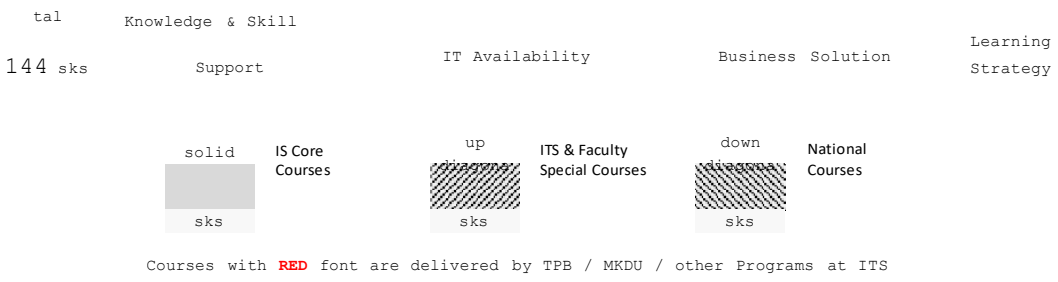

Figure 4. Course structure showing all course and its corresponding credits and semester

3.2 Course load and credits definition

The learning time charged to students per semester is in accordance with the ITS Regulations. The Semester Credit System is defined as an education administration system using semester credit units (credits) to state student load, lecturer workload, and program implementation load.

The duration of the SKS is:

1. 1 (one) credit/SKS on the form of lecture learning, responses and tutorials include:
   a. face-to-face learning activities 50 (fifty) minutes per week per semester
   b. learning activities with structured assignments of 60 (sixty) minutes per week per semester
   c. self-study activities 60 (sixty) minutes per week per semester
2. 1 (one) credit/SKS on the form of seminar learning or other similar forms of learning, including:
   a. face-to-face learning activities of 100 (one hundred) minutes per week per semester
   b. self study activity for 70 (seventy) minutes per week per semester
3. 1 (one) credit/SKS for practicum learning, studio practice, workshop practice, field practice, research, community service and / or other equivalent forms of learning is 170 (one hundred and sixty) minutes per week per semester.

If the student's study load is converted into the ECTS system, the study load is 28-30 ECTS per semester. The total in undergraduate study is 228 ECTS. This load is in accordance with the standard of the European Bachelor degree with a number of ECTS between 180-240.

The credits on each course are determined by the amount of study material and the PLO load that is charged in the course. This determination was made during the preparation of the course curriculum which was determined by the proximity of the study materials and the PLO in the mapping matrix of the PLO and study materials. The more study material that must be studied and the more PLO is charged, the greater the learning time required. This has an impact on the greater SKS that will be charged on the course. Figure 5 shows the process of forming courses from study materials that are interrelated and related to PLO supported by these study materials. The subjects were formed from the proximity of the study materials so that each course would find a supported PLO. The size of the number of study materials and the PLO determines the time needed for learning and has an impact on the amount of credits charged to the course.

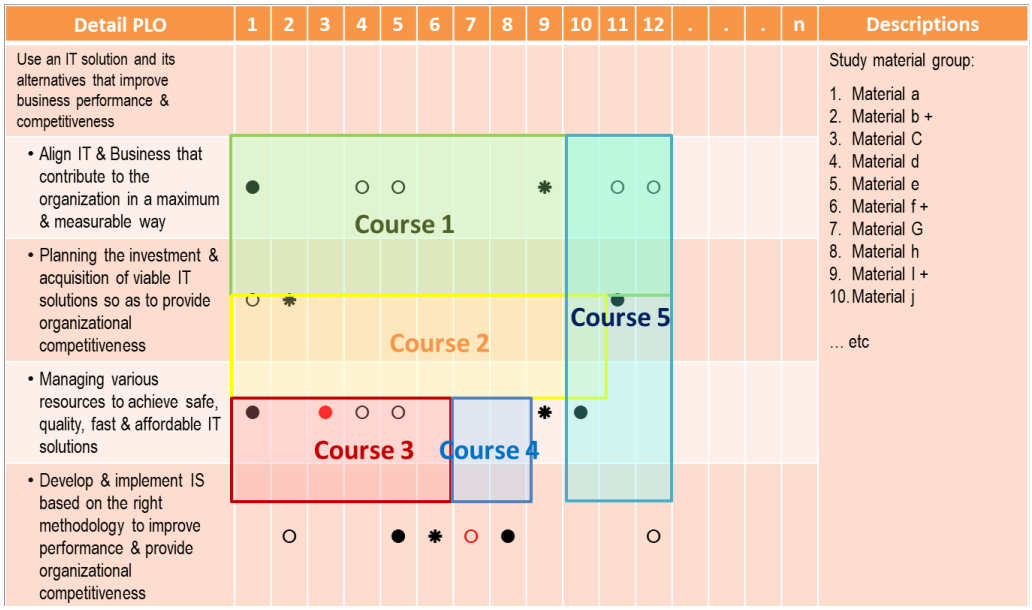

Figure 5. Course building process matching the correlated study materials and its PLO.

3.3 Course assessment

Students' academic performance in the study program is continually assessed in accordance to ITS' standards. There are three major milestones which determine whether a student could continue his/her studies at ITS. The first one is after the 2 nd semester, by which they are required to have passed at least 18 semester credits from the 1st and the 2nd semesters with a minimum GPA of 2.0. The second one is after the 4th semester, where in order to be able to continue their studies at ITS students are required to have passed all subjects taught in their first year of study. The total number of credits in this stage is minimum 36 semester credits, and the GPA requirement is at least 2.0. Lastly, the maximum allowed study period at ITS is 14 semesters, thus students must pass all their degree courses by that time with a minimal score of C for each subject.

In order for their study considered complete, a student need to have passed all the subjects in the Department of Information Systems undergraduate curriculum which is comprised of 144 semester credits with a minimum grade of C. Additionally, students need to pass a Final Project Examination. This examination serves as an explicit exit test, in addition to having passed all the subjects with a total of 144 semester credits, including the final project which is equivalent to six semester credits. After successful completion of Final Project Examination and fulfilment of the requirements for graduation, a student then undergoes an evaluation which escalates from

the department level to the university senate. The objective of this process is to ensure that the student has indeed met all administrative requirements, which in addition to passing a minimum of 144 semester credits including all compulsory courses with a minimum of C and a GPA of larger than 2.0, also requires the student to have a minimum TOEFL score of 477 on a paper-based test, and a minimum credit Student Extracurricular Activity of 1300, as required by ITS academic rules.

The student assessments for each modules/courses

At the beginning of semester, the specific Learning Plan of a subject is explained in detail to the students taking that subject. This Learning Plan includes spesific learning objective, course material that will be delivered, achievement indicators, student learning activities, as well as when and what assessment activities are to be performed along the course of the subject for each meeting. Included in this plan is the information of proportion of each assessment component towards the final grade.

Each subject in Department of Information Systems employs a different mix of student assessment methods to suit its respective learning outcomes. Among the methods used are written and oral examination, reports, discussions, essay-writing, mini-projects, and laboratory works. The method used depends on the aspect pertinent to the learning outcome. For example, if the learning outcome focuses on the student ability to design and write a computer program, then a project-based assessment is used. If the outcome is about understanding a concept, then essay writing or oral test will be used. The number of assessment are also adjusted to its purpose; for example, a quiz testing the cognitive understanding of students might be done after a series of 4-5 lectures discussing a subtopic in the subject. However, as regulated by ITS there can be no fewer than four assessments components comprising the final grade of a subject. The detailed assessment methods for each course can be found in course learning plan. An example of how the exam cover PLO can be found in an academic system provided by the ITS.

The general structure of assessment for each subject in UPIS-ITS is comprised of two major evaluations; the first one at the middle of a semester and the second one at the end of the semester. As these two evaluations are summative in nature, methods commonly used are written (essay) examination or presentation of projects as a culmination of what has previously been studied. However, besides these two assessments, each class incorporates other tests and assignments, which are more diagnostic and formative in nature. There are commonly multiple assessments of such nature; for example, short-quizzes are often used to test whether the

students have prepared themselves for class by studying the materials described in the Learning Plan. The purpose of such quiz is to gauge students' current level of understanding, and also to inform the students of the range of knowledge expected from them at the end of the class, since commonly a short quiz is administered at the beginning of a class and discussed right after the quiz. Other assignments such as homework, essay writing, and test prior and after laboratory works are also common for diagnostic and formative purposes. To make sure the marking is valid, reliable, and fair marking scheme and rubric are used.

The criteria for assessment is contained in the evaluation plan and assignment description part of the Learning Plan informed to the student at the beginning of semester. The Learning Plan also gives the weights given to the result of each assessment activity. As required by ITS Academic Regulations 2014, there could be no less than four assessments contributing towards the final grade. The weighted sum of the grades for each assessment is the numeric grade which then automatically determines the alphabetical grade awarded and recorded in the student transcript. The alphabetical grade determines the passing status of the student, since the minimum passing grade for each subject is C, and in time it also determines the graduation predicate of the student. Table 1 shows the conversion of numeric grade from the weighted assessment grades to alphabetical grade, according to ITS Academic Regulation 2018.

Table 1. Grading System

Numeric Grade	Alphabetical Grade	Numeric Value	Predicate
86-100	A	4.0	Excellent
76-85	AB	3.5	Very Good
66-75	B	3.0	Good
61-65	BC	2.5	Good Enough
56-60	C	2.0	Fair
41-55	D	1.0	Poor
0-40	E	0.0	Very Poor

Appeal procedure is very likely to be done by students who feel there is a score from his or her course taken for this semester is less appropriate. Students can appeal the score through the lecturer who teaches the course. If the lecturer approves the improvement of the score, the lecturer can fill out Form A as the initial document which will be submitted to the academic section of the Student Affairs which will be used as a reference to make a change on the score on the system.