Cyber Security

Introduction

Cyber attack is raising and threaten ubiquitous world on internet today. Industry and government need cyber security expert to counter and defend from this threaten. Cyber Security program offer dedicated degree in cyber security assurance and defend, giving students technical expertise they need to confident to enter cyber war. Cyber Security is designed specifically by Computer Science, BINUS UNIVERSITY to provide students with knowledge and expertise to penetration testing system and network, design and implementation of cyber defense architecture in the field of cyber security. Cyber Security program was found on 2015, under BINUS UNIVERSITY, it became one of the best programs under coordination of School of Computer Science and supported by government

Cyber Security program designed to adapt to changing cyber attack and defend landscape while ensuring a solid academic foundation and aligned to industry and government expectation. Cyber Security focuses on cyber security assurance and cyber defense. Course structure its program allow students to gain valuable concept and practical experience in conducting penetration test and also apply knowledge in building cyber defense architecture and technology. Cyber security program has a strong base in computer science foundation subject as well as offering theoretical and critical thinking behind current cyber technology. Students learn in a project-orientated environment that encourages collaboration with industries and government and helps them discover cyber threat challenge and build system defense. Students are encouraged to collaborate, work to deadlines, maintain attendance levels and develop strong communication skills. As a result, the graduates are internationally renowned for their expertise and confident to enter the workplace as entry-level skilled professionals rather than technicians.

Vision

A study program of choice in Computer Science which focuses on developing cyber security solution for industry, is recognized internationally, champions innovation and delivers graduates with international qualifications.

Mission

The mission of Cyber Security Program is to contribute to the global community through the provision of world-class education by:

1. To educate students fundamental to advance knowledge, skill and practice in software development specialized in ethical hacking, cyber defense, and cyber forensic by providing an excellent learning environment and promoting research and collaboration with global industry;
2. To provide IT professional services with emphasis in application of knowledge in terms of society development;
3. To share application of knowledge related to cyber security for Indonesian and international community quality of life improvement;
4. To promote students & lecturers to be creative and value-adding talents in cyber security by creating suitable environment in order to be able to compete in international level;
5. To prepare students for becoming smart and good ethical cyber security professionals, leaders and entrepreneurs in global market or for continuing in advanced studies.

Program Objective

The objectives of the program are:

1. To provide students with a solid foundation of mathematical, algorithm principles, computer science knowledge and ethical that will be needed in IT practice;
2. To provide students with skills to apply design and development principles in the construction of software system applied in database technology, intelligence system, networking and multimedia development;
3. To prepare students with abilities to keep up-to-date with the latest Cyber Security trends, developments and industries;
4. To prepare students with abilities in problem solving and good communication skills to be able to work as an individual or in a team in an IT environment.

Student Outcomes

After completing the study, graduates are:

1. Able to create software application design with the implementation of database system principal design to solve structured and semi-structured data;
2. Able to design software application solution based on problem analysis which can be solved with structured approach in informatics area;
3. Able to assess technology trend in informatics area to deliver alternative solution of software development;
4. Able to conduct penetration testing using appropriate method that suitable to targeted technology;
5. Able to evaluate system risk from identification result;
6. Able to make a guideline that optimize necessary improvement to close gaps;
7. Able to fix the weakness system by cyber defense approach and technique;
8. Able to implement secure system with secure software engineering methodology.

Prospective Career of the Graduates

After finishing the program, the graduate of Cyber Security Program could follow a career as:

1. Penetration Tester
2. Secure Software Developer
3. Network Security Administrator
4. Information Security Analyst
5. Computer Security Architect
6. Cyber Intelligence Officer
7. Academician in cyber security (Lecturer, Trainer, Researcher)

Curriculum

The present curriculum used in the Cyber Security program has been developed in line with the National Curriculum. Also, the local content has been developed in line with the Computer Science Curriculum standard of ACM (Association for Computing Machinery), several local and foreign universities, national and international game industry (developer, publisher), up-to-date cyber attack and threat trends, so that the graduates of the Cyber Security program are expected to be able to face cyber security challenge at both a national and international level. Generally, the subjects of the curriculum are divided into these following groups of subjects:

Core Computer Science Group

The objective of this group is to provide grounding in Cyber Security program through practice as well as applied theory which is required by business both now and in the future. The subjects that are included in this group are programming, algorithm design and analysis, software engineering, databases, computer graphs, interactive multimedia, computer and human interaction, operation system, Cyber Security Analysis, Secure Web Technology and Cyber Forensic.

Science

The objective of this group is to provide an understanding of mathematics as one of the principal foundations of computer science. Another objective is to give an understanding of scientific methodology (data collection, hypothesis, research methodology, analysis) in problem solving.

Character Building Group (Professional Practices)

The objective of this group is to develop the personal strengths of the student and to provide him or her with a professional character, professionalism in their field, management skills, oral and written communication skills, understanding of business ethic, ability to work as a team, and to develop a "Binusian" Character.

The Field of Cyber Security Subject

The objective of builds the field of subject in Cyber Security is to give the students a solid foundation of secure software development skills and to introduce the specific skills needed for cyber security assurance and cyber defense. The students are expected to develop their skills and master the techniques which will allow them to conduct research for both their thesis and/or to continue their studies.

The field of Cyber Security subjects:

1. Cyber Security Assurance: to explore the various methodologies and techniques of penetration testing and cyber forensic in the computer network and ubiquitous system.
2. Cyber Defense: to explore the various methodologies and techniques of secure software engineering, secure computer network, and operating system.

All students of Cyber Security program must follow these two fields to become Cyber Security graduates. The objective of these two fields is to provide the students with the knowledge and skills required by industry and government who want to defend their computer network and system.

Course Structure

Sem	Code	Course Name	SCU	Total
1	CHAR6013	Character Building: Pancasila	2	20
	MATH6025	Discrete Mathematics	4	
	MATH6030	Linear Algebra	2	
	COMP6047	Algorithm and Programming	4/2	
	COMP6179	Introduction to Information Security	4	
	English University Courses I			
	ENGL6128	English in Focus	2	
	ENGL6130	English for Business Presentation	2	
2	CHAR6014	Character Building: Kewarganegaraan	2	21
	MATH6031	Calculus	4	
	COMP6048	Data Structures	4/2	
	COMP6180	Computer Security Foundation*	2	
	CPEN6098	Computer Networks	2/2	
	LANG6061	Indonesian	1	
	English University Courses II			
	ENGL6129	English Savvy	2	
	ENGL6131	English for Written Business Communication	2	
3	CHAR6015	Character Building: Agama	2	24
	COMP6056	Program Design Methods	4	
	COMP6181	Cyber Security Analysis and Method*	2/2	
	COMP6120	Network Programming	2/2	
	COMP6062	Compilation Techniques	4	
	ENTR6003	Entrepreneurship I	2	
	COMP6049	Algorithm Design and Analysis	4	
4	CPEN6101	Advanced Network Programming	2/2	24
	CPEN6102	Network Security Administration**	2/2	
	ISYS6169	Database Systems	4/2	
	COMP6271	Software Engineering*	4	
	COMP6182	Security for Multimedia	2	
	COMP6183	Secure Web Programming**	2/2	
5	LAWS6110	Cyber Law	2	20
	COMP6153	Operating System	2/2	
	COMP6176	Human and Computer Interaction	2/2	
	ENTR6004	Entrepreneurship II	2	
	COMP6065	Artificial Intelligence	4	
	COMP6193	Cyber Forensic*/**	2/2	
6	**Enrichment Program I**		15	15
7	**Enrichment Program II**		16	16
8	COMP6192	Thesis	6	6
			TOTAL CREDIT 146 SCU	

*) This course is delivered in English

**) Entrepreneurship embedded

English University Courses:

-) *For 1st Semester: English University Courses I, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English in Focus, and student with score test greater than or equal to 500 will take English for Business Presentation*

-) *For 2nd Semester: English University Courses II, student with score BINUS UNIVERSITY English Proficiency Test less than 500 will take English Savvy, and student with score test greater than or equal to 500 will take English for Written Business Communication*

Enrichment Program I (6th Semester) & Enrichment Program II (7th Semester):

-) *Student will take one of enrichment program tracks (off campus).*

Enrichment Track Scheme

Track	Semester 6						Semester 7					
	IN	RS	EN	CD	SA	etc	IN	RS	EN	CD	SA	etc
1	v						v					
2		v						v				
3			v						v			
4				v			v					
5				v						v		
6				v							v	
7					v		v					
8					v					v		
9					v						v	

Notes:
I	: Internship	CD	: Community Development
RS	: Research	SA	: Study Abroad
EN	: Entrepreneurship	*etc	: Study Program Special Purposes

Notes:
Student will take one of enrichment program tracks

For students who choose Entrepreneurship track and fail in semester 6, when repeating the course may choose the Entrepreneurship track or change to 4 other tracks. It applies also to 4 other tracks. But for student who choose Entrepreneurship track and fail in semester 7, when repeating the course it is required to choose 4 other tracks except Entrepreneurship. For the other tracks, if fail in semester 7, students may choose to stay on the track or change to other tracks

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			
COMP6184	Internship I	8	15
COMP6185	Penetration Test Cyber Security in Industry	2	
COMP6187	Cyber Forensic in Industry	2	
COMP6333	EES in Cyber Security Professional I	3	
Enrichment Program II			
COMP6188	Internship II	8	16
COMP6189	Cyber Security Mechanism Design in Industry	2	
COMP6190	Cyber Security Programming in Industry	2	
COMP6191	EES in Cyber Security Professional II	4	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			
ENTR6293	Business Start Up	8	15
ENTR6225	Cyber Security Business Model & Validation	2	
ENTR6226	Launching New Cyber Security Venture	2	
ENTR6227	EES Cyber Security Professional in New Business	3	
Enrichment Program II			
ENTR6309	Growing a Business	8	16
ENTR6228	Lean Cyber Security Start Up & Business Plan	2	
ENTR6229	Venture Capital in Cyber Security	2	
ENTR6230	EES Cyber Security Professional in Business Experience	4	

Enrichment Research Track

Code	Course Name	SCU	Total
Enrichment Program I			
RSCH6212	Research Experience I	8	15
RSCH6168	Scientific Writing I in Cyber Security	4	
RSCH6169	Global EES I in Cyber Security Research Project Team	3	
Enrichment Program II			
RSCH6216	Research Experience II	8	16
RSCH6170	Scientific Writing II in Cyber Security	4	
RSCH6171	Global EES II in Cyber Security Research Project Team	4	

Enrichment Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			
CMDV6126	Community Outreach Project Implementation	8	15
CMDV6087	Community Outreach Cyber Security Project Design	4	
CMDV6088	Employability and Entrepreneurial Skills in Cyber Security Field	3	
Enrichment Program II			
CMDV6140	Community Development Project Implementation	8	16
CMDV6089	Community Development Cyber Security Project Design	4	
CMDV6090	Employability and Entreprenuerial Skills in Cyber Security Field	4	

Enrichment Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			
Enrichment Program I			
GLOB6005	Elective Course for Study Abroad 1	4	
GLOB6006	Elective Course for Study Abroad 2	4	
GLOB6007	Elective Course for Study Abroad 3	4	
GLOB6008	Elective Course for Study Abroad 4	4	
GLOB6009	Elective Course for Study Abroad 5	2	
GLOB6010	Elective Course for Study Abroad 6	2	
GLOB6011	Elective Course for Study Abroad 7	2	15
GLOB6012	Elective Course for Study Abroad 8	2	
GLOB6013	Elective Course for Study Abroad 9	2	
GLOB6014	Elective Course for Study Abroad 10	2	
GLOB6015	Elective Course for Study Abroad 11	2	
GLOB6016	Elective Course for Study Abroad 12	2	
GLOB6041	Elective Course for Study Abroad 25	3	
GLOB6042	Elective Course for Study Abroad 26	1	
Enrichment Program II			
GLOB6017	Elective Course for Study Abroad 13	4	
GLOB6018	Elective Course for Study Abroad 14	4	
GLOB6019	Elective Course for Study Abroad 15	4	
GLOB6020	Elective Course for Study Abroad 16	4	
GLOB6021	Elective Course for Study Abroad 17	2	
GLOB6022	Elective Course for Study Abroad 18	2	16
GLOB6023	Elective Course for Study Abroad 19	2	
GLOB6024	Elective Course for Study Abroad 20	2	
GLOB6025	Elective Course for Study Abroad 21	2	
GLOB6026	Elective Course for Study Abroad 22	2	
GLOB6027	Elective Course for Study Abroad 23	2	
GLOB6028	Elective Course for Study Abroad 24	2	

*)Transferred courses will be transferred based on credit transfer policies on study program with total of 15 credits for Enrichment Program I and 16 credits for Enrichment Program II.

Student should pass all of these quality controlled courses as listed below:

No	Code	Course Name	Minimum Grade
1.	CHAR6013	Character Building: Pancasila	B
2.	ENTR6004	Entrepreneurship II	C
3.	COMP6047	Algorithm and Programming*	C
4.	COMP6048	Data Structures*	C
5.	COMP6056	Program Design Methods*	C
6.	COMP6271	Software Engineering*	C
7.	COMP6120	Network programming	C
8.	COMP6181	Cyber Security Analysis and Method	C

*) Tutorial & Multipaper