

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 threat. Cyber Security Program offer dedicated degree in cyber security assurance and defence by giving students technical expertise they need to confidently enter cyber war. Cyber Security is designed specifically by Computer Science, BINUS UNIVERSITY to provide students with knowledge and expertise to penetrate testing system and network, design and implementation of cyber defense architecture in the field of cyber security. Cyber Security Program was found in 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 structures its program to allow students to gain valuable concept and practical experience in conducting penetration test and also to 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 the current cyber technology. Students learn in a project-orientated environment that encourages collaboration with industries and government and helps them to 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 confidence 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;
9. Able to apply interdisciplinary knowledge and skills in developing alternative solutions for problem-solving.

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 building 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. Network Security: to explore the various methodologies and techniques of penetration testing and defense in network technology.
2. System 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: <i>Pancasila</i>	2	20	
	MATH6025	Discrete Mathematics	4		
	MATH6030	Linear Algebra	2		
	COMP6047	Algorithm and Programming	4/2		
	COMP6542	Computer Security Fundamental**	2		
	STAT6171	Basic Statistics	2		
	English University Courses I				
	ENGL6128	English in Focus	2		
	ENGL6130	English for Business Presentation	2		
2	CHAR6014	Character Building: <i>Kewarganegaraan</i>	2	20	

Sem	Code	Course Name	SCU	Total	
	MATH6031	Calculus	4		
	COMP6048	Data Structures*	4/2		
	ENTR6509	Entrepreneurship: Ideation	2		
	CPEN6098	Computer Networks	2/2		
	English University Courses II				
	ENGL6129	English Savvy	2		
	ENGL6131	English for Written Business Communication	2		
3	CHAR6015	Character Building: <i>Agama</i>	2	23	
	COMP6639	Artificial Intelligence* ^{***}	5		
	COMP6544	Network Penetration Testing**	2/2		
	COMP6056	Program Design Methods	4		
	COMP6062	Compilation Techniques	4		
	COMP6049	Algorithm Design and Analysis*	4		
4	LANG6027	Indonesian	2	23	
	COMP6693	Network Administration*&**	2		
	ISYS6169	Database Systems	4/2		
	COMP6645	Software Engineering*&***	5		
	COMP6549	Software Security*&**	2		
	LAWS6110	Cyber Law	2		
	Free Electives				4
5	COMP6697	Operating System	2	14	
	COMP6176	Human and Computer Interaction	2/2		
	COMP6696	Research Methodology in Computer Science	2		
	ENTR6511	Entrepreneurship: Market Validation	2		
	COMP6695	Secure Programming*&**	2		
	COMP6646	Computer Forensic*&**	2		
6	Enrichment Program I		20	20	
7	Enrichment Program II		20	20	
8	COMP6749	Pre-Thesis	2	6	
	COMP6750	Thesis	4		
TOTAL CREDITS 146 SCU					

*) This course is delivered in English

**) Global Learning Systems Course

***) Entrepreneurship Embedded

English University Courses:

-) For 1st Semester: English University Courses I, students with Binus University English Proficiency Test score less than 500 will take English in Focus, and student with test score greater than or equal to 500 will take English for Business Presentation.
-) For 2nd Semester: English University Courses II, students with Binus University English Proficiency Test score less than 500 will take English Savvy, and students with test score greater than or equal to 500 will take English for Written Business Communication.
-) Students must pass English Savvy with a minimum Grade of C.

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

-) Student will take one of enrichment program tracks (off campus). See enrichment appendix for the tracks detail.

Appendix: Free Electives (4th Semester)

No	Course Owner Department	Course Code	Course Name	SCU	Semester
1	Business Creation	ENTR6580	Digital Business Transformation	2	4
2	Business Creation	ENTR6582	Business Strategy	2	4
3	Business Management	MGMT6399	Fundamentals of Supply Chain Management	2	4
4	Business Management	MGMT6401	Digital Supply Chain Management	2	4
5	Business Management	MKTG6298	Service Marketing Management	2	4
6	Global Business Management	MKTG6237	Global Strategic Marketing: Asia Pacific Perspective	4	4
7	International Business Management	BUSS6162	Market Entry Strategy	2	4
8	International Business Management	BUSS6191	Export-Import Management	2	4
9	International Business Management	MGMT6369	Corporate Strategy in International Business	2	4
10	Management	BUSS6088	Current Issue in Business and Technology	2	4
11	Management	BUSS6109	Business Development	4	4
12	Management	BUSS6171	Business Sustainability	4	4
13	Management	BUSS6173	Managing Innovation and Knowledge	4	4
14	Management	ISYS6079	E-Business System	4	4
15	Management	MGMT6196	Project Management	4	4
16	Management	MGMT6276	Leadership & Managing Human Capital in Organization	4	4
17	Management	MGMT6371	Human Resources Analytics	4	4
18	Management	MGMT6374	Analysis on E-Business Investment	4	4
19	Management	MGMT6375	Organizational Learning	4	4
20	Accounting	ACCT6353	Management Information System	2	4
21	Accounting	ACCT6358	Management Audit	4	4
22	Accounting	ACCT7141	Accounting Information System and Internal Control	2/2	4
23	Accounting	TAXN6050	Sales Tax and Customs	2	4
24	Accounting Bekasi	ACCT6382	Business Process Analysis and Solution	2	4
25	Accounting Bekasi	ACCT6397	ERP Fundamental	2/2	4
26	Marketing Communication	COMM6435	Global Consumer Behavior	2	4
27	Marketing Communication	COMM6510	Reportage & Interview Technique	2/2	4
28	Marketing Communication	COMM6533	Creative Program Design	2/2	4
29	Marketing Communication	COMM6540	Communication & Public Affairs	2	4
30	Tourism	TRSM6142	Event Management	4	4
31	Tourism	TRSM6204	Heritage Tourism	4	4
32	Architecture	ARCH6054	Interior Design Principles	2	4
33	Architecture	ARCH6059	Building Material Knowledge	2	4

No	Course Owner Department	Course Code	Course Name	SCU	Semester
34	Food Tech	FOOD6073	Current Issues in Food Technology	2	4
35	Industrial Engineering	ISYE6041	Engineering Economy	2	4
36	Industrial Engineering	ISYE6113	Leadership & Organizational Behavior	2	4
37	Industrial Engineering	ISYE6181	System Engineering & Analysis	2	4
38	Business Law	LAWS6017	Intellectual Property Rights	4	4
39	Business Law	LAWS6159	Legal Aspect in Business	2	4
40	Business Law	LAWS6168	Banking-Financial Law & Islamic Business Law	4	4
41	Business Law	LAWS6169	Capital Market, Legal Audit, & Due Diligence	4	4
42	Business Law	LAWS6170	Investment Law	2	4
43	Business Law	LAWS6171	Business Competition & Consumer Protection Law	2	4
44	Business Law	LAWS6181	Industrial Relations & Alternative Dispute Resolution	2	4
45	Chinese Literature	CHIN6157	Chinese Business for Etiquette (Beginner)	4	4
46	Chinese Literature	CHIN6158	Chinese Business in Daily Communication	4	4
47	Chinese Literature	CHIN6159	Chinese Character Writing	2	4
48	English Literature	ENGL6169	English for Professionals	2	4
49	International Relations	INTR6143	ASEAN Community: Security, Economic, and Socio Cultural Aspects	4	4
50	International Relations	INTR6144	Contemporary Issues in European Society	2	4
51	International Relations	INTR6145	Contemporary Issues in American Society	2	4
52	International Relations	INTR6146	Contemporary Issues in East Asian Society	2	4
53	International Relations	INTR6147	Contemporary Issues in African and Middle Eastern Societies	2	4
54	International Relations	INTR6148	Multinational Corporations Global Strategy and Social Responsibility	2/2	4
55	International Relations	INTR8043	International Media and State Role	4	4
56	Primary Teacher Education	EDUC6015	Educational Research Methodology	4	4
57	Primary Teacher Education	EDUC6018	Micro Teaching	4	4
58	Primary Teacher Education	EDUC6063	English for Academic Purposes	2	4
59	Psychology	PSYC6124	Psychology of Early Childhood Education	4	4
60	Psychology	PSYC6125	Psychology of Special Needs Education	4	4
61	Psychology	PSYC6130	Human Performance Technology	4	4
62	Psychology	PSYC6145	Urban Psychology	4	4
63	Game Application & Technology	GAME6082	Game Animation	2	4
64	Computer Science	COMP6231	Human and Computer Interaction	2/2	4
65	Computer Science	COMP6745	Machine Learning	2	4

No	Course Owner Department	Course Code	Course Name	SCU	Semester
66	Computer Science	COMP7084	Multimedia Systems	2/1	4
67	Computer Science	ISYS6211	Web Based Application Development	2/2	4
68	Animation	DSGN6692	Character Animation	4	4
69	Animation	DSGN6693	Motion Graphic	4	4
70	Animation	DSGN6694	Visual Effect (VFX)	4	4
71	Animation	DSGN6695	Asset Creation	4	4
72	Creative Advertising	DSGN6671	Creative Writing for Commercials	4	4
73	Creative Advertising	MDIA6046	Audio Visual (Pre Production and Production)	4	4
74	Creative Advertising	DSGN6661	Photography	4	4
75	Creative Advertising	DSGN6732	Photography	4	4
76	Creative Advertising	DSGN6651	Photography	4	4
77	Film	FILM6026	History of Indonesian Cinema	2	4
78	Film	FILM6027	Film Theories	4	4
79	Film	FILM6080	Southeast Asian Cinema & Popular Culture	4	4
80	New Media	DSGN6743	Digital Graphic Reproduction	4	4
81	Interior Design	DSGN6608	Interior Design and culture	2	4
82	Interior Design	DSGN6611	Business in Interior Design	2	4
83	Interior Design	DSGN6886	Rendering and Presentation Techniques	2	4
84	Business Information Technology	ISYS6574	Information Retrieval	4	4
85	Business Information Technology	ISYS6577	Machine Learning & Foundations	2	4
86	Business Information Technology	ISYS6606	Smart Application	2	4
87	Information Systems	BUSS6043	Introduction to E-Business	4	4
88	Information Systems	ISYS6016	Social Media Fundamental	2	4
89	Information Systems	ISYS6084	Database	2/2	4
90	Information Systems	ISYS6203	Mobile Application Development	2/2	4
91	Information Systems	ISYS6210	Data Visualization	2	4
92	Information Systems	ISYS6280	Database Systems	4/2	4
93	Information Systems	ISYS6284	Analytical Information System	4	4
94	Information Systems	ISYS6285	Digital and New Media	2	4
95	Information Systems	ISYS6442	Applied ERP: Fundamental	4	4
96	Information Systems	ISYS6478	Research Methods in Information Systems	2	4
97	Information Systems	ISYS6567	Applied Database: Database Programming With SQL and PL/SQL	4	4
98	Information Systems	ISYS6594	Coding for Finance	2	4

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	
10						v	v					
11						v				v		
12						v					v	

Notes:

IN	: 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

Students who failed in Enrichment Program I can retake with the same track or change into another track. As for Enrichment Program II, student who failed with Internship, Research, Community Development, and Study Abroad track on Enrichment Program II, can retake with the same track or change into another track. However students who take **Entrepreneurship** track on Enrichment Program II, should **retake with another track**.

Enrichment Internship Track

Code	Course Name	SCU	Total
Enrichment Program I			
COMP6561	Industrial Experience in Cyber Security Domain	8	20
COMP6758	Cyber Security Practice in Industrial Experience	8	
COMP6698	EES in Cyber Security Industry	4	
Enrichment Program II			
COMP6564	Professional Experience in Cyber Security Domain	8	20
COMP6759	Cyber Security Practice in Professional Experience	8	
COMP6566	Professional Development in Cyber Security Industry	4	

Enrichment Entrepreneurship Track

Code	Course Name	SCU	Total
Enrichment Program I			
ENTR6649	New Venture Initiation in Cyber Security	8	20
ENTR6650	Product Development Process in Cyber Security	8	
ENTR6540	EES Cyber Security Professional in New Business	4	
Enrichment Program II			
ENTR6651	Product Launching in Cyber Security	8	20
ENTR6652	Business Development in Cyber Security	8	
ENTR6540	EES Cyber Security Professional in New Business	4	

Enrichment Research Track

Code	Course Name	SCU	Total
Enrichment Program I			20
RSCH6212	Research Experience I	8	
RSCH6528	Scientific Writing I in Cyber Security	8	
RSCH6458	Global EES I in Cyber Security Research Project Team	4	
Enrichment Program II			20
RSCH6216	Research Experience II	8	
RSCH6529	Scientific Writing II in Cyber Security	8	
RSCH6171	Global EES II in Cyber Security Research Project Team	4	

Enrichment Community Development Track

Code	Course Name	SCU	Total
Enrichment Program I			20
CMDV6126	Community Outreach Project Implementation	8	
CMDV6310	Community Outreach Cyber Security Project Design	8	
CMDV6257	Employability and Entrepreneurial Skills in Cyber Security Field	4	
Enrichment Program II			20
CMDV6140	Community Development Project Implementation	8	
CMDV6311	Community Development Cyber Security Project Design	8	
CMDV6090	Employability and Entrepreneurial Skills in Cyber Security Field	4	

Enrichment Study Abroad Track

Code	Course Name	SCU	Total
Elective courses list for study abroad*			20
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	
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	
GLOB6251	Elective Course for Study Abroad 29	4	
Enrichment Program II			

Code	Course Name	SCU	Total
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	
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	
GLOB6253	Elective Course for Study Abroad 31	4	

*) Transferred courses will be transferred based on credit transfer policies on study program with total of 20 credits.

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

No.	Course Code	Course Name	Minimal Grade
1.	CHAR6013	Character Building: <i>Pancasila</i>	B
2.	ENTR6511	Entrepreneurship: Market Validation	C
3.	COMP6047	Algorithm and Programming*	C
4.	COMP6048	Data Structures*	C
5.	COMP6056	Program Design Methods*	C
6.	COMP6645	Software Engineering*	C
7.	COMP6544	Network Penetration Testing	C
8.	COMP6695	Secure Programming	C

*) Tutorial & Multipaper