

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Computer Security
2.	Course Code	TCS 2251
3.	Status of Course [Applies to (cohort)]	Specialisation Core for B.IT Security Technology
4.	MQF Level/Stage Note : <i>Certificate – MQF Level 3</i> <i>Diploma – MQF Level 4</i> <i>Bachelor – MQF Level 6</i> <i>Masters – MQF Level 7</i> <i>Doctoral – MQF Level 8</i>	Bachelor – MQF Level 6
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version: June 2014 Date of current version: March 2016
6.	Pre-Requisite	TCP1121 Computer Programming
7.	Name(s) of academic/teaching staff	Ho Yean Li Ong Thian Song Tan Syh Yuan
8.	Semester and Year offered	Trimester 2, Year 2
9.	Objective of the course in the programme : This course introduces students to the different security threats in computing environment and the solutions.	
10.	Justification for including the course in the programme : Computer security study is the main domain of Security Technology. The major area of this course includes but not limited to: potential threats such as viruses, worms, basic of cryptography, encryption algorithms, network security, database security and legal issues.	

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11.	Course Learning Outcomes :		Domain	Level						
	LO1 Describe the fundamental concepts of computer and network security.		Cognitive	1						
	LO2 Explain the potential threats and security issues in network and database computing environment..		Cognitive	2						
	LO3 Apply security measures, physical protection, access control, and cryptography techniques in computer security.		Cognitive	3						
	LO4 Identify legal and ethical issues on computer security, software violation, and computer-based security standards.		Cognitive	1						
12.	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1							X	X	
	LO2	X						X	X	
	LO3	X							X	
	LO4	X						X	X	
13.	Assessment Methods and Types :									
	Method and Type		Description/Details					Percentage		
	Mid Test		Written test					20%		
	Laboratory		Practical work and report					10%		
	Quizzes		Written quizzes					10%		
	Final Examination		Written examination					60%		

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14.	Mapping of assessment components to learning outcomes (LOs)				
	Assessment Components	LO1	LO2	LO3	LO4
	Mid Test	22.2	22.2	25	
	Laboratory				14.3
	Quizzes	11.1	11.1		
	Final Examination	66.7	66.7	75	85.7
15.	Details of Course				
	Topics	Mode of Delivery (eg : Lecture, Tutorial, Workshop, Seminar, etc.) Indicate allocation of SLT (lecture, tutorial, lab) for each subtopic			
		Lecture	Tutorial	Lab	
	1.Introduction <ul style="list-style-type: none"> • Definitions of Security, Computer Security, Threat, Vulnerability, Controls • Security Goals • Computer Criminals • Defense Methods • Common Controls 	2	1	0	
	2.Program Security <ul style="list-style-type: none"> • Secure Programs • Non-Malicious Program Errors • Malicious Code (Virus, etc.) • Targeted Malicious Code • Controls Against Program Threats 	2	1	2	
3.Introduction to Cryptography <ul style="list-style-type: none"> • Terminology and Background • Substitution Ciphers • Transposition Ciphers • Digrams and Trigrams 	2	1	0		

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<ul style="list-style-type: none"> • Stream and Block Ciphers 			
<p>4.Elementary Cryptography</p> <ul style="list-style-type: none"> • Concepts of Cryptography • Symmetric Cryptography <ul style="list-style-type: none"> – Data Encryption Standard (DES) – Triple DES – Advance Encryption Standard (AES) • Public Key Encryption <ul style="list-style-type: none"> – RSA • Uses of Encryption 	2	1	1
<p>5.Operating System Security</p> <ul style="list-style-type: none"> • System Security <ul style="list-style-type: none"> – Protecting the Operating System <ul style="list-style-type: none"> • History • Memory Protection • OS Object Access – Operating Systems Access Security <ul style="list-style-type: none"> • File Access • User Authentication 	4	1	3
<p>6. Database Security</p> <ul style="list-style-type: none"> • Introduction to Database • Database Security Requirements • Inference Attacks • Securing Databases 	2	1	0
<p>7. Network Security</p> <ul style="list-style-type: none"> • Introduction • Network Security Issues <ul style="list-style-type: none"> – Reconnaissance – Threats in Transit – Impersonation – Message Confidentiality Threats – Message Integrity Threats – Denial of Service • Network Security Controls <ul style="list-style-type: none"> – Link and End-to-end Encryption – VPN – PKI 	4	1	2

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	<ul style="list-style-type: none"> - SSH & SSL - IPsec - PGP - S/MIME - Firewalls - Intrusion Detection System 			
	8. Security Administration <ul style="list-style-type: none"> • Introduction • Security Planning • Risk Analysis • Security Policies • Physical Security 	2	1	0
	9. Quantitative Security Valuation <ul style="list-style-type: none"> • Economic Case for Security • Quantifying the Economic Value 	2	1	0
	10. Legal Issue and Current Legislation <ul style="list-style-type: none"> • Introduction • Intellectual Property <ul style="list-style-type: none"> • Copyrights • Patents • Trademarks • Trade Secrets • Industrial Design • Information and Law • Ethical Issues 	2	1	0
	Total	24	10	8
	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning	
	Lecture	24	24	
	Tutorials	10	10	
	Laboratory/Practical	8	4	
	Presentation	0	0	

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	Assignment	0	12		
	Mid Term Test	1	5		
	Final Exam	2	18		
	Quizzes	2 times	2		
	Sub Total	45	75		
	Total SLT	120			
16.	Credit Value	120/40 = 3			
17.	Reading Materials :				
	Textbooks				
	Charles P. Pfleeger (2015). Security in Computing, 5 th Edition Prentice-Hall Inc.				
	Reference Material (including 'Statutes' for Law)				
	William Stallings and Lawrie Brown (2015). Computer Security: Principles and Practice, 3 rd Edition, Pearson Education.				
	Appendix (to be compiled when submitting the complete syllabus for the programme) :				
	<ol style="list-style-type: none"> 1. Mission and Vision of the University and Faculty 2. Programme Objectives or Programme Educational Objectives 3. Programme Outcomes (POs) 4. Mapping of POs to the 8 MQF domain 5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below : 				
		Bloom's Taxonomy Domain			
	Subject	Learning Outcomes (please state the learning Outcomes)	Affective	Cognitive	Psychomotor
	ABC1234	Learning Outcome 1			
		Learning Outcome 2			
		Learning Outcome 3			
		Learning Outcome 4			
	DEF5678	Learning Outcome 1			
		Learning Outcome 2			
		Learning Outcome 3			

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	Learning Outcome 4			
	6. Summary of LO to PO measurement 7. Measurement and Tabulation of result for LO achievement 8. Measurement Tabulation of result for PO achievement			