MULTIMEDIA UNIVERSITY®

COURSE INFORMATION

1.	**Name of Course**	Theory of Computation
2.	**Course Code**	TIC2151
3.	**Type of Course** **(e.g. : Core, major, elective etc.)**	Specialization Elective for Software Engineering specialization; Elective for Information Systems and Game Development specializations.
4.	**Synopsis**	The course aims to provide an understanding of abstract computation models with focus on the diversity of design through the analysis of its computability and efficiency.
5.	**Version** **(State the date of theSenate's approval - previous and the current approval date)**	Current: January 2018 Previous: June 2016
6.	**Name(s) of Academic Staff**	Ho Chin Kuan Nbhan D. Salih Bau Yoon Tek
7.	**Semester and Year Offered**	Trimester 1, Delta Year
8.	**Credit Value**	4
9.	**Pre-Requisite**	TMA 1201 – Discrete Structures and Probability

10. **Objective of the course in the programme:**

To provide an introduction to the concept of computability through the study of abstract computation models. These models cover the following classes of languages: regular, context-free, context-sensitive, and languages decidable or recognizable by Turing machines.

11. **Justification for including the course in the programme:**

This elective provides an opportunity for students to learn the fundamental abstract computation models and their applications in modern computer science

12.

Course Learning Outcomes (CLO)		**Domain**	**Level**
CLO1:	Construct an appropriate computation model given a language.	Cognitive	3
CLO2:	Convert a given model to another equivalent model within the same class of language	Cognitive	4
CLO3:	Develop proofs for undecidable problems.	Cognitive	4
CLO4:			

13. **Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment:**

Course Learning Outcomes (CLO) (Must tally with CLOs in item 12)	**Programme Learning Outcomes (PLO)**												**Teaching Methods**	**Assessment Method**
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12		
CLO1							✓						Lecture/Tutorial	Assignment/Quizzes/Test/Final Exam
CLO2								✓					Lecture/Tutorial	Assignment/Quizzes/Test/Final Exam
CLO3							✓						Lecture/Tutorial	Quizzes/Final Exam
CLO4														
Total							**2**	**1**					*Indicate the relevancy between the CLO and PLO by ticking "✓" the appropriate relevant box (This description must be read together with standards 2.1.2, 2.2.1, and 2.2.2 in Area 2 – pages 16 & 18 of COPPA 2.0)*	

14. **Transferable Skills:**

Critical thinking, problems solving and time management
developed Trough discussion on the computation models , preparation and completing the assignment and presentation, final exam and test. Assessment: Presentation, written report, final exam Quizzes and test.

15. **Distribution of Student Learning Time (SLT)**

	Course Content Outline	****CLO**	**Teaching and Learning Activities**				**Guided Learning (NF2F)***	**Independent Learning (NF2F)***	**Total SLT**
			Guided Learning (F2F)*						
			***L**	***T**	***P**	***O**			
1	**Mathematical background** **Set theory; Functions and relations; Types of proofs.**	**1**	2	2				4	8
2	**Finite Automata (FA)** **Deterministic FA (DFA); Non-Deterministic FA (NFA); FA with epsilon transitions (epsilon-NFA); Regular Expressions (RE); Converting NFA to DFA; Converting epsilon-NFA to NFA; Converting RE to epsilon-NFA; Minimisation**	**1**	6	6				12	24
3	**Properties of regular languages** **Pumping lemma for regular languages; Closure properties**	**1**	2	2				4	8
4	**Context-Free Grammars (CFGs)** **Derivations and parse trees; Ambiguity in CFGs.**	**2**	4	4				8	16
5	**Pushdown Automata (PDA)** **Deterrministic PDA; Acceptance by final state; Acceptance by empty stack; From grammars to PDA.**	**2**	4	4				8	16
6	**Properties of Context-Free Languages (CFLs)** **Chomsky normal form; Pumping lemma for context-free languages; Closure properties.**	**2**	4	4				8	16

7	**Turing machines (TMs) and undecidability Turing machines; Variants of Turing machines; Recursive and recursively enumerable languages; Church-Turing thesis; Halting problem.**	**3**	4	4			8	8	24
								Total SLT	**112**

SUMMATIVE ASSESSMENT

1. Continuous Assessment	**Percentage %**	**Total SLT**
Quizzes	15%	4
Assignment	20%	18
Test	15%	4
	Total SLT for Continuous Assessment	**26**

2. Final Assessment	**Percentage %**	**Total SLT**	
		F2F	**ILT**
Final Exam	50%	2	20
	Total SLT for Final Assessment (F2F + NF2F)	**22**	
Grand Total	**100%**	**160**	

****Indicate the CLO based on the CLO's numbering in Item 12.**
***L= Lecture, *T= Tutorial, *P= Practical, *O= Others, F2F*= Face to Face, NF2F*= Non Face to Face**

16 . **Identify Special Requirement to Deliver the Course (e.g., software, nursery, computer lab, simulation room):**

17 . **Main References:**

Sipser, M. (2012). Introduction to the Theory of Computation (Third Edition). Cengage Learning.

18 . **Additional References:**

Hopcroft, J. E., Motwani, R. & Ullman, J. D. (2007). Introduction to Automata Theory, Languages, and Computation. Third Edition. Addison-Wesley.

Note:

Cells shaded light grey contain formulas / fixed values. Edit these formulas only if needed.