COURSE OUTLINE

| | | | |
|---|---|---|---|
| **Department/ Faculty:** | Computer Science/ Computing | **Page:** | 1 of 5 |
| **Course code:** | SECI 1013 | **Academic Session/Semester:** | 2019-2020/1 |
| **Course name:** | DISCRETE STRUCTURE | **Pre/co requisite:** | - |
| **Credit hours:** | 3 | | |

| | |
|---|---|
| **Course synopsis** | This course introduces students to the principles and applications of discrete structure in the field of computer science. The topics that are covered in this course are set theory, proof techniques, relations, functions, recurrence relations, counting methods, graph theory, trees and finite automata. At the end of the course, the students should be able to use set theory, relations and functions to solve computer science problems, analyze and solve problems using recurrence relations and counting methods, apply graph theory and trees in real world problems and use deterministic finite automata finite state machines to model electronic devices and problems. |
| **Course coordinator (if applicable)** | Dr Nor Haizan Mohamed Radzi |

| **Course lecturer(s)/ Section** | **Name** | **Office** | **Telephone (07) 55-** | **E-mail @utm.my** |
|---|---|---|---|---|
| 02 | Dr Noorfa Haszlinna Mustaffa | 438-04 | 013-7852095 | noorfa@utm.my |
| | | | | |

**Mapping of the Course Learning Outcomes (CLO) to the Programme Learning Outcomes (PLO), Teaching & Learning (T&L) methods and Assessment methods:**

| **No.** | **CLO** | **PLO (ICGPA CODE)** | **Weight (%)** | ***Taxonomies and **generic skills** | **T&L methods** | **Assessment methods*** ** |
|---|---|---|---|---|---|---|
| CLO1 | Analyse set theory, proof techniques, relations, functions and recurrence relation to solve computer science problems | PO1 (KW) PO2(CG) | 28 | C4 | | AS1, AS2, Q1, TE1, |
| CLO2 | Explain and solve the problem of counting using counting methods. | PO1 (KW) | 19 | C3 | | AS3, TE2 |
| CLO3 | Apply the graph theory and trees in real world problems. | PO1 (KW) PO7(CG) | 29 | C3 | | AS4, Q2, FE |
| CLO4 | Identify deterministic finite automata and finite state machines to model certain electronic devices | PO1 (KW) PO2 (CG) | 24 | C4 | | AS5, FE |

Refer *Taxonomies of Learning and **UTM's Graduate Attributes for measurement of outcomes achievement.
***T – Test; Q – Quiz; HW – Homework; L – Lab, GR – Group Project; PR – Personal Report; F – Final Exam etc.

**Details on Innovative T&L practices:**

| | |
|---|---|
| Prepared by:<br>Name: Dr Nor Haizan Mohamed Radzi (Course Owner)<br>Signature:<br>Date: 5 September 2019 | Certified by:<br>Name: PM. Dr. Norafida Ithnin (Head of Department)<br>Signature:<br>Date: |

# COURSE OUTLINE

| | | | |
|---|---|---|---|
| **Department/ Faculty:** | Computer Science/ Computing | **Page:** | 2 of 5 |
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| No. | Type | Implementation |
|---|---|---|
| 1. | | |
| 2. | | |

**Weekly Schedule:**

| | |
|---|---|
| W 1<br>8-12/9/19<br>(Agong's birthday 9/9) | **CHAPTER 1: SET THEORY & LOGIC**<br><br>1.1 Set Theory<br>• Set and Subset<br>• Operations on Sets<br>1.2 Propositions, Conditional Propositions and Logical Equivalences<br>1.3 Quantifiers<br>• Basic Quantifiers<br>• Nested Quantifiers<br>1.4 Proof Techniques<br>• Direct Proof<br>• Indirect Proof |
| W2<br>15-19/9/19<br>(Malaysia Day 16 Sep) | |
| W 3<br>22-26/9/19 | **CHAPTER 2: RELATIONS & FUNCTIONS**<br><br>2.1 Relations<br>• Digraph<br>• Matrices of Relations<br>• Characteristics of Relations<br>Equivalence Relations<br>Partial Orders<br>2.2 Functions<br>• One-to-one, Onto, Bijection, Inverse functions<br>• Composition<br>• Recursive Algorithm<br>2.4 Recurrence Relation<br>• Sequences<br>• Solving Recurrence Relation |
| W 4<br>29/9-3/10/19 | |
| W 5<br>6-10/9/19 | |
| W 6 - W7<br>13-24/10/19<br>Test 1<br>(W7- 18/10/2019) | **CHAPTER 3: COUNTING METHODS & PROBABILITY**<br><br>3.1 Basic Principles<br>3.2 Permutations<br>3.3 Combinations<br>3.4 Pigeonhole Principle (First, Second, third Form) |
| W 8<br>27-31/10/19 | **SEMESTER BREAK** |

# COURSE OUTLINE



| | |
|---|---|
| W9<br>3-7/11/19 | 3.5 Discrete Probability Theory<br>• Discrete Probability Theory<br>• Bayes' Theorem |
| W 10 – W12<br>10-28/11/19<br>Test 2<br>(W11- 18/11/2019) | **CHAPTER 4: GRAPH THEORY**<br><br>4.1 Graph Definition and Notations<br>4.2 Representation of Graphs<br>4.3 Isomorphism of Graphs<br>4.4 Path and Cycles<br>4.5 Euler Cycles<br>4.6 Hamiltonian Cycles<br>4.7 Dijkstra's Shortest Path Algorithm |
| W 13<br>1-5/12/19 | 4.8 Trees<br>• Terminology and Characterizations of Trees<br>• Rooted Trees<br>• Binary Trees<br>• Tree Traversals |
| W 14<br>8-12/12/19 | **CHAPTER 5: FINITE AUTOMATA**<br><br>5.1 Deterministic finite automata |
| W 15<br>15-19/12/19 | 5.2 Finite state machines |

**Transferable skills (generic skills learned in course of study which can be useful and utilised in other settings):**

| |
|---|
| Developing critical thinking |

**Student learning time (SLT) details:**

| Distribution of course content | Teaching and Learning Activities | | | | | | TOTAL SLT |
|---|---|---|---|---|---|---|---|
| | Guided Learning (Face to Face) | | | | Guided Learning Non-Face to Face | Independent Learning Non-Face to face | |
| **CLO** | **L** | **T** | **P** | **O** | | | |
| CLO 1 | 12 | 3 | | | | 16.5 | **31.5** |
| CLO 2 | 7 | 2 | | | | 11.6 | **20.6** |
| CLO 3 | 10 | 2 | | | | 20.8 | **32.8** |
| CLO 4 | 5 | 1 | | | | 21 | **27** |
| **Total SLT** | **34** | 8 | | | | **69.9** | **111.9h** |

# COURSE OUTLINE

| | | | |
|---|---|---|---|
| **Department/ Faculty:** | Computer Science/ Computing | **Page:** | 4 of 5 |
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| Continuous Assessment | | PLO | Percentage | Total SLT |
|---|---|---|---|---|
| 1 | Quiz 1 | KW | 5 | ½h |
| 2 | Quiz 2 | KW | 5 | ½ h |
| 3 | Test 1 (18 Oct 2019) | KW | 15 | 2h |
| 4 | Test 2 (18 Nov 2019) | KW | 15 | 2h |
| 5 | Assignment 1 (W1 &W2) | TH | 5 | As in CLO1(31.5h) |
| 6 | Assignment 2 (W5) | TH | 5 | As in CLO2 (31.5h) |
| 7 | Assignment 3 (W8) | TH | 5 | AS in CLO3 (37h) |
| 8 | Assignment 4 (W11) | TH | 5 | As in CLO4 (37h) |
| Final Assessment | | | Percentage | Total SLT |
| 1 | Final Exam | KW | 40 | **3h** |
| Grand Total SLT | | | | **120h** |

**Special requirement to deliver the course (e.g: software, nursery, computer lab, simulation room):**

-

**Learning resources:**

**Text book (if applicable)**

**Main references**

**Main references:**


i. *Discrete Structure Teaching Module*, Department of Computer Science, UTM, 2017/2018.
ii. Johnsonbaugh, R. *Discrete Mathematics*, 8th ed. Pearson Prentice Hall, 2017.
iii. Malik, D.S. & Sen, M.K. *Discrete Mathematical: Theory and Applications*. Cengage Learning, 2012.


**Additional references**


i. Kenneth H. R., *Discrete Mathematical And Its Application",* 7th ed. Mc Graw Hill, 2012.
ii. Kolman, B., Busby, R.C.& Ross, S.C. *Discrete Mathematical Structure*, 4th .Ed.Prentice Hall, New Jercy, 1996.


**Online**

http://elearning.utm.my

**Academic honesty and plagiarism:**

Assignments are group activities. Copying of work (texts, lab results etc.) from other students/groups or from other sources is not allowed. Brief quotations are allowed and then only if indicated as such. Existing texts should be reformulated with your own words used to explain what you have read. It is not acceptable to retype existing texts and just acknowledge the source as a reference. Be warned: students who submit copied work will obtain a mark of **zero** for the assignment and exams and disciplinary steps may be taken by the Faculty. It is also unacceptable to do somebody else's work, to lend your work to them or to make your work available to them to copy.

**Other additional information (Course policy, any specific instruction etc.):**

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| | | | |
|---|---|---|---|
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1. Attendance is compulsory and will be taken in every lecture session. Student with less than 80% of total attendance is not allowed to sit for final exam.
2. Students are required to behave and follow the University's dressing regulation and etiquette all the time.
3. Exercises and tutorial will be given in class and some may be taken for assessment. Students who do not do the exercise will lose the coursework marks for the exercise.
4. Assignments must be submitted on the due dates. Some points will be deducted for late submissions. Assignments submitted three days after the due date will not be accepted.
5. Make up exam will not be given, except to students who are sick and submit medical certificate confirmed by UTM panel doctors. Make up exam can only be given within one week of the initial date of exam..

| | | | PLO1(KW) | | | | PLO5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Assessment** | **% Total** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **Total** |
| **1** | **Quiz 1** | **5** | 5 | | | | | | | | **5** |
| **2** | **Quiz 2** | **5** | | | 5 | | | | | | **5** |
| **3** | **Assignment 1** | **5** | | | | | 5 | | | | **5** |
| **4** | **Assignment 2** | **5** | | | | | | 5 | | | **5** |
| **5** | **Assignment 3** | **5** | | | | | | | 5 | | **5** |
| **6** | **Assignment 4** | **5** | | | | | | | | 5 | **5** |
| **8** | **Test 1** | **15** | 15 | | | | | | | | **15** |
| **9** | **Test 2** | **15** | | 15 | | | | | | | **15** |
| **10** | **Final Exam** | **40** | | | 20 | 20 | | | | | **40** |
| **Overall Total** | | **100** | **20** | **15** | **25** | **20** | **5** | **5** | **5** | **5** | **100** |
| | | | **80** | | | | | **20** | | | |

**Disclaimer:**