



INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

COURSE OUTLINE

Kulliyyah / Institute	Engineering																							
Department / Centre	Electrical & Computer Engineering																							
Programme	B. Eng (Electronics – Computer and Information) (Honours)																							
Name of Course / Mode	Computer and Information Engineering Lab I / Full time																							
Course Code	ECIE 3101																							
Name (s) of Academic staff / Instructor(s)	Prof. Dr. Farhat Anwar, Dr. Rashidah Funke Olanrewaju																							
Rationale for the inclusion of the course / module in the programme	Required course for Electronics – Computer and Information Engineering Programme																							
Semester and Year Offered	Every Semester																							
Status	Core																							
Level	3																							
Proposed Start Date	Semester 1 2015/2016																							
Batch of Student to be Affected	Semester 1 2015/2016 onwards																							
Total Student Learning Time (SLT)	<table><tr><th colspan="3">Face to Face</th><th colspan="2">Assessments</th><th rowspan="3">Independent Learning</th><th rowspan="3">Total Student Learning Time</th></tr><tr><th>Lecture</th><th>Tutorial</th><th>Practical</th><th>Quizzes</th><th>Final</th></tr><tr><td>2</td><td>-</td><td>32</td><td>1</td><td>3</td></tr></table>							Face to Face			Assessments		Independent Learning	Total Student Learning Time	Lecture	Tutorial	Practical	Quizzes	Final	2	-	32	1	3
Face to Face			Assessments		Independent Learning	Total Student Learning Time																		
Lecture	Tutorial	Practical	Quizzes	Final																				
2	-	32	1	3																				
Credit Value / Hours	1/40																							
Pre-requisites (if any)	EECE 2101 Electrical and Computer Engineering Lab II																							
Co-requisites (if any)	EECE 3312 Data Structures and Algorithms Design EECE 3313 Data and Communication Systems																							
Course Objectives	<p>The objectives of this course are to:</p> <ul style="list-style-type: none">• Introduce the basic concepts of data structures algorithms using C++/ Python programming language including pointers.• Describe how to develop programs using efficient algorithms on various standard data structures.																							

	<ul style="list-style-type: none">• Write programs with advanced abstract data types in C++/python programming language.• Provide the students with the algorithm analysis skills using C++/python programming Language.• Provide hands-on experience of data communications through experimental work.• Expose students to diverse data communications techniques and their performance evaluation.															
Learning Outcomes	<p>Upon completion of this course, students should be able to:</p> <ol style="list-style-type: none">1. Apply design principles for writing good programming and algorithms that implement various abstract data types: List, Linked List, Stack, Queue, Tree, Hash Table and Graph on real world applications.2. Apply design principles to describe the way a computer allocates and represents these data structures in memory.3. Apply design principles to various sorting algorithms: Insertion, Quick, Merge, Shell, and Heap.4. Apply design principles to implement different search traverse algorithms.5. Apply design principles to develop algorithm with maximum amount of efficient based on the complexity analysis.6. Apply the concepts of data communications systems and realize merits and demerits of the studied systems.7. Set up and interface respective devices and links of data communications systems, conduct the experiment, observe the performance parameters of the networks, analyze the results and draw conclusions.															
Transferable Skills:	<div>Skills and how they are developed and assessed:</div> <table><tr><th>Skills</th><th>Development</th><th>Assessment</th></tr><tr><td>Technical</td><td>Lectures</td><td>Written Assessment</td></tr><tr><td>Analytical</td><td>Projects</td><td>Report</td></tr></table>	Skills	Development	Assessment	Technical	Lectures	Written Assessment	Analytical	Projects	Report						
Skills	Development	Assessment														
Technical	Lectures	Written Assessment														
Analytical	Projects	Report														
Teaching-Learning and assessment strategy	Lectures, Projects report and Quizzes															
Course Synopsis	Using C++/Python to write basic concepts of data structures programs. Estimated of the running time and memory space of coded algorithms. Using C++/ Python programming language to implements low level programming (pointers) such as linked lists, queues stack ADT. Write C++/ Python programs for Trees and their applications, graphs representation, traversal of graphs. Analysis of Sorting and searching algorithms. The second half of this course covers experiments related to data communications systems.															
Mode of Delivery	Lecture, Tutorial, Workshop, Seminar etc.															
Assessment Methods and Type/Course Assesement	<table><tr><th>LO</th><th>Method</th><th>%</th></tr><tr><td>1,2,</td><td>Assignments / lab exercise</td><td>20</td></tr><tr><td>3,4,5</td><td>Projects</td><td>30</td></tr><tr><td>3,4,5</td><td>Lab test / midterm Exams</td><td>20</td></tr><tr><td>1-5</td><td>Final lab test</td><td>30</td></tr></table>	LO	Method	%	1,2,	Assignments / lab exercise	20	3,4,5	Projects	30	3,4,5	Lab test / midterm Exams	20	1-5	Final lab test	30
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1-5	Final lab test	30														
State weightage of each type of assessment.																

Mapping of course / module to the Programme Learning Outcomes													
Learning Outcome of the course		Programme Outcomes											
		01	02	03	04	05	06	07	08	09	10	11	12
Apply design principles for writing good programming and algorithms that implement various abstract data types: List, Linked List, Stack, Queue, Tree, Dictionary & Hash Techniques and Graphs implementation on real world applications (A/D)		✓	✓		✓								✓
Apply design principles to describe the way a computer allocates and represents these data structures in memory (A/D).		✓	✓		✓								✓
Apply design principles to various sorting algorithms: Insertion, Selection, Quick, Merge, Shell, and Heap (A/D).		✓	✓		✓								✓
Apply design principles to implement different search traverse algorithms: linear search, binary search (A/D).		✓	✓		✓								✓
Apply design principles to develop algorithm with maximum amount of efficient based on the complexity analysis (A/D).		✓	✓		✓								✓
Apply the concepts of data communications systems and realize merits and demerits of the studied systems.		✓	✓		✓								
Set up and interface respective devices and links of data communications systems, conduct the experiment, observe the performance parameters of the networks, analyze the results and draw conclusions.		✓	✓		✓								
Content outline of the course / module and the SLT per topic													
Weeks	Topics						Learning Hours	Task/Reading					
1,2	Write C++/ Python basic concepts of data structures programs. Sequential Containers (Array and Linked List) Model						5	Course Notes					
3,4	Estimated of the running time and memory space of coded algorithms. Using C++/Python programming language to implements low level programming (pointers) such as array, List, linked lists, queues and stack ADT Stacks, Queues, Hash Tables Models						5	Course Notes					
5-6	Write C++/Python programs for Trees and their applications, graphs representation, traversal of graphs. Trees (in order post order and preorder) & Graphs (BSF and DFS) and dictionaries Models						6	Course Notes					
7	Analysis of Sorting and searching algorithms. Sorts and Searches Models						3	Course Notes					
8	Stop & Wait Protocol						3	Required 1 Course Notes					

9	Sliding Window (Go-back-N) Protocol	3	Required 1 Course Notes
10	Media Access Control (ALOHA) Protocol	3	Required 1 Course Notes
11	Carrier Sense Multiple Access (CSMA)	3	Required 1 Course Notes
12	CSMA with Collision Detection (CSMA/CD)	3	Required 1 Course Notes
13	Token-Passing Bus	3	Required 1 Course Notes
14	Token Ring	3	Required 1 Course Notes

Required references supporting the course

The reference lists shall be presented in accordance with APA bibliographic practices and in alphabetical order.

Micheal T. Goodrich and Roberto Tamassia (2015), Algorithm Design and Applications, John Wiley & Sons.

Michael T, Roberto Tamassia & David Mount (2013), Data Structures and Algorithms in Python

Forouzan, B. A., (2013). Data Communications and Networking, 5th Edition, McGraw-Hill

Recommended references supporting the course

Michael T, Roberto Tamassia & David Mount (2004), Data Structures and Algorithms in C++, John Wiley & Sons.

Allen, W. M. (2007). *Data Structures and Algorithm Analysis in C++*. Pearson Education India.

Preiss B.R. (2004), Data Structures and Algorithms with object-oriented design pattern in C++, John Wiley & Sons.

Prepared by:	Checked by:	Approved by:
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Kuliyah Programme Outcomes and the relation between KOE PO with outcomes from EAC, MQF domain, MOHE domain and Soft Skills.

At the end of the programme, students are able to:

KOE PO	EAC	MQF Domain	MOHE Domain	Soft Skills
1. Engineering Knowledge (T) - Apply knowledge of mathematics, sciences, engineering fundamentals and specialization to solve complex engineering problems.	1	1 & 6	1	-
2. Problem Analysis (T) – Identify, formulate, perform relevant literature review and analyze complex engineering problems , and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.	2	1 & 6	1	1
3. Design/Development of Solutions (A) – Design solutions whilst exhibiting innovativeness , for complex engineering problems and design systems, components or processes that meet specified needs; with appropriate consideration of cost, sustainability issues, environmental impact, public health and safety, engineering ethics as well as cultural and social needs.	3	2, 3 & 6	2	1
4. Investigation (D) - Conduct investigation on complex problems whilst displaying creativity , by using research-based knowledge and method, including design of experiments, analysis and interpretation of data , and synthesis of information to provide valid conclusions.	4	2 & 6	2, 3	1
5. Modern Tool Usage (A & D) - Create and apply appropriate techniques, resources and modern engineering/IT tools , which includes making prediction and modelling of the complex engineering activities with understanding of limitations.	5	6 & 7	7	
6. The Engineer and Society (ESSE) - Apply reasoning based on contextual knowledge to assess societal, health, safety, legal, cultural, contemporary issues , and the consequent responsibilities relevant to professional engineering practices.	6	3 & 4	5	4
7. Environment and Sustainability (ESSE) - Understand the impact of professional engineering solutions in societal, global, and environmental contexts and demonstrate knowledge of and need for sustainable development.	7	3 & 4	5	4
8. Ethics (ESSE) –Apply professional ethics with Islamic values and commit to responsibilities and norms of professional engineering code of practices.	8	3 & 4	6	4
9. Communication (S) - Communicate effectively within the engineering community and with the society at large, which include but not limited to writing effective reports and documentation, delivering effective presentation as well as giving and receiving clear instructions.	9	5 & 7	4, 7	2
10. Individual and Team Work (S) - Able to function effectively both as an individual or member of a team, or a leader in a diversified multi-disciplinary team settings.	10	5 & 8	5, 8	3
11. Life Long Learning (S) -Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	11	7	7	5

12. Project Management and Finance (S) - Demonstrate and apply engineering management and financial principles into one's work which include being an effective member/leader in projects with multidisciplinary settings and identify opportunities of entrepreneurship .	12	8	5, 8, 9	6, 7
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The program learning outcomes (PO) are grouped into 5 general areas to identify the nature of the skills and capability involved. These groups are:

1. Technical (T) – essential capabilities related to traditional scientific and engineering knowledge
2. Analysis (A) – creatively working with available data and engineering tools and fundamental knowledge to correctly solve basic problem
3. Design (D) – being able to perceive the best solution for both small scale and large scale project by involving all required basic problems
4. Ethics, Safety, Society and Environment (ESSE) - giving appropriate consideration to matters pertaining to professionalism and ethics, safety, local and global society and the environment
5. Work skills (S) – being an effective communicator and effective member of a team and to appreciate the need to continuously acquire skills and abilities.

LEARNING OUTCOMES OF OTHER DOMAINS

MQF learning outcomes domains:	MOHE Domain Learning Outcomes	
<ol style="list-style-type: none"> 1. knowledge 2. practical skills 3. social skills and responsibilities 4. values, attitudes and professionalism 5. communication, leadership and team skills, 6. problems solving and scientific skills 7. information management and lifelong learning skills; and 8. managerial and entrepreneurial skills 	MOHE learning outcomes domains: <ol style="list-style-type: none"> 1. Knowledge in Specific Area-Content 2. Practical Skills 3. Critical Thinking and Scientific Skills 4. Communication Skills 5. Social Skills, Teamwork and Responsibilities 6. Values, Ethics, Moral and Professionalism 7. Information Management and Life Long Learning 8. Management and Entrepreneurship 9. Leadership Skills 	Soft Skills Learning Outcomes : <ol style="list-style-type: none"> 1. Critical Thinking and Problem-solving Skills 2. Communication Skills 3. Teamwork Skills 4. Ethics & Moral Professionalism 5. Life-long Learning and Information Management 6. Entrepreneurial Skills 7. Leadership Skills