

SUMMARY OF INFORMATION ON EACH COURSE

1.	Name of Course	Real-Time Systems
2.	Course Code	TRT3241
3.	Status of Course [Applies to (cohort)]	Specialisation Core for B.IT (Hons) Data Communications and Networking
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version : June 2012 Date of current version : June 2014
6.	Pre-Requisite	TDC1231 Data Communications and Networking
7.	Name(s) of academic/teaching staff	Mohd Fikri Azli bin Abdullah Subarmaniam Kannan
8.	Semester and Year offered	Trimester 2, Year 3
9.	<p>Objective of the course in the programme :</p> <p>This course will first give an introduction into the basic concepts of real-time computing and then treat the two major issues real-time scheduling and real-time kernels. Real-time scheduling will concentrate on predictable scheduling algorithms and provide the scientific methodology required for the design of real-time systems. Real-time kernels will address the challenges and issues in the design and implementation of real-time operating systems.</p>	
10.	<p>Justification for including the course in the programme :</p> <p>The rapid growth of applications deploying real-time technologies has been matched by the evolutionary growth of the underlying technologies supporting the development of real-time systems. In this subject, we discuss some of the core technologies used in developing real-time systems. However, we restrict ourselves to software issues only and keep hardware discussions to the bare minimum. The software issues that we address are quite expansive in the sense that besides the operating system and program development issues, we discuss the networking and database issues</p>	

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11.	Course Learning Outcomes :							Domain	Level	
	LO1	Describe various real-time system classifications					Cognitive	1		
	LO2	Prepare computer hardware requirements which are used for real-time applications					Cognitive	3		
	LO3	Evaluate different types of real-time systems and task scheduling.					Cognitive	6		
	LO4	Explain the real-time system development paradigms					Cognitive	5		
	LO5	Relate real-time systems with reliability and safety issues.					Cognitive	6		
12.	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1	X							X	
	LO2	X								
	LO3							X		
	LO4	X						X		
	LO5	X							X	
13.	Assessment Methods and Types :									
	Method and Type		Description/Details					Percentage		
	Final Exam		Written examination					60		
	Test		Written examination					30		
	Quiz		Written examination					10		
14.	Mapping of assessment components to learning outcomes (LOs)									
	Assessment Components	%	LO1	LO2	LO3	LO4	LO5			
	Final Exam	60	60	60	60	85.71	85.71			
	Test	30	30	30	30					
	Quiz	10	10	10	10	14.29	14.29			
15.	Details of Course									

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	Topics	Mode of Delivery	
		Lecture	Tutorial
	1. Introduction Definition of Real Time System. Classification of Real Time System (Clock –based, Event – based, interactive systems). Time constraint	4	2
	2. Types of Real Time System Control System, Embedded Systems, Concurrent System, Multitasking System	4	3
	3. Computer Hardware Requirements for Real Time Applications General purpose computer, single chip microcomputer and microcontrollers, specialised processors (parallel processors, digital signal processor), process related interface, data transfer techniques, communication.	4	2
	4. Design Of Real Time Systems Specification Document, Hardware Design, Software Design, Single Program Approach, Foreground / Background system, Multitasking approach, mutual exclusion, Petri nets.	8	3
	5. Real Time System Development Methodologies Yourdon methodologies, Ward and Mellor method, MASCOT PAISLEY.	4	2
	6. Reliability Issues Reliability, Redundancy, Fault Detection, Fault Tolerance.	4	2
	Total	28	14
16.	Total Student Learning Time (SLT)	Face to Face / Guided Learning	Independent Learning
	Lecture	28	28
	Tutorials	14	14
	Quiz	2 Times	2
	Midterm Test	2 Times	10

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Final Exam	2	18
Sub Total	48	72
Total SLT	120	
Credit Value	3	
Reading Materials :		
Textbooks		
Alan Burns & Andy Wellings, "Real Time systems and programming languages", 4nd Edition, Addison Wesley, 2009.		
Reference Material (including 'Statutes' for Law)		
Laplante, P.A., "Real-Time Systems Design and Analysis: An Engineer's Handbook", 2nd Edition, A John Wiley & Sons, INC., Publication, 1997. ISBN: 0780334000.		
Burns, A, "Real Time System and their Programming languages", Pearson Education, 2001. ISBN: 0201729881		

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		<p>Appendix (to be compiled when submitting the complete syllabus for the programme) :</p> <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 : 																																										
		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="width: 15%;">Subject</th> <th rowspan="2" style="width: 25%;">Learning Outcomes (please state the learning Outcomes)</th> <th colspan="3" style="width: 55%;">Bloom's Taxonomy Domain</th> </tr> <tr> <th style="width: 20%;">Affective</th> <th style="width: 15%;">Cognitive</th> <th style="width: 20%;">Psychomot</th> </tr> </thead> <tbody> <tr> <td rowspan="4">ABC1234</td> <td>Learning Outcome 1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 4</td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="4">DEF5678</td> <td>Learning Outcome 1</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 2</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Learning Outcome 4</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Subject	Learning Outcomes (please state the learning Outcomes)	Bloom's Taxonomy Domain			Affective	Cognitive	Psychomot	ABC1234	Learning Outcome 1				Learning Outcome 2				Learning Outcome 3				Learning Outcome 4				DEF5678	Learning Outcome 1				Learning Outcome 2				Learning Outcome 3				Learning Outcome 4			
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