

Sem	Part	Course	Course Title	Credits	Marks			Hrs/week	Exam Duration
					CAM	TEE	Total		
V	III	Core	Quantum Computing	4	25	75	100	4	Theory TEE : 3Hrs, Practicals TEE :3Hrs
	III	Core	Web Design and Markup Language	4	25	75	100	5	
	III	Core	Software Engineering	4	25	75	100	5	
	III	Core	.NET Programming	5	25	75	100	5	
	III	Core	.NET Programming and Web Design Lab	2	40	60	100	4	
	III	Elective	Elective - I	5	25	75	100	4	
	IV	Skilled Based Subject	Aptitude*	2	25	75	100	3	
VI	III	Core	Cyber Security	4	25	75	100	4	
	III	Core	Mobile Application Development	5	25	75	100	4	
	III	Core	Mobile Application Development Lab	2	40	60	100	4	
	III	Elective	Elective - II	5	25	75	100	4	
	III	Core	Project and Viva Voce	7	25	75	100	12	
	IV	Skilled Based Subject	Soft Skills *	2	25	75	100	2	
<b>Total</b>				<b>51</b>	<b>1120</b>	<b>2880</b>	<b>4000</b>	<b>60</b>	

\* Both CAM and TEE marks will be evaluated internally.

Basic Tamil/Advanced Tamil - 100 Marks CA only.

### Elective List

#### Elective I

- 1 Enterprise Resource Planning
- 2 Data Mining
- 3 Artificial Intelligence and Expert Systems
- 4 Computer Graphics
- 5 Integrating SOA and Web Services
- 6 Cloud Computing
- 7 Microprocessor and Assembly Language Programming

#### Elective II

- 1 Client/Server Technology
- 2 Parallel Computing
- 3 Mobile Communications
- 4 Network Security
- 5 Bioinformatics
- 6 Information Security
- 7 Scripting Languages
- 8 Air and Sea Navigation

*G. R. Damodaran*

#### Project & Viva Voce Split up

CA	
Review I	10
Review II	15
TEE	
Viva	50
Documentation	25

BII-02  
2018-19

**Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE**  
**Department of Computer Science**  
**BCA**  
**Effective from the academic year: 2018 – 2019**  
**FIFTH SEMESTER**

**Core: QUANTUM COMPUTING**

**Objective of the subject:** The objective of this course is to provide an introduction to quantum computation. Mathematical models of quantum computation, their relationships to each other, and to physical systems. Prerequisite knowledge on Discrete Structures, Computer Architecture and Linear Algebra is needed.

**UNIT I: FUNDAMENTALS OF QUANTUMNESS (10 hrs)**

Evolution of Quantum Computing-Global perspectives – History – Future directions – Quantum bits – Multiple Qubits– Quantum Computation – Single Qubit Gates – Multiple Qubit Gates – Measurements in Bases other than Computational Basis - Quantum Circuits – Qubit Copying Circuits – Examples: Bell states, quantum teleportation – Cost effectiveness compared to Digital Electronics – longevity of the technology.

**UNIT II: COMPUTATIONAL SCIENCES (10 hrs)**

Models for Computation – Turing Machine – Analysis of Computational Problems – Quantifying Computational Resources – Computational Complexity - Perspectives of Computer Science – level of perfection compared to Digital Electronics – Rapidity – Storage Capacity – life of the data – security of the data - features

**UNIT III: QUANTUM COMPUTATION (10 hrs)**

Quantum Algorithms - Single Qubit Operations - Controlled Operations –Measurements - Universal Quantum Gates - Two Level Unitary Gates - Single Qubit and CNOT Gate – proneness to hacking

**UNIT IV: QUANTUM ALGORITHMS (10 hrs)**

Probabilistic versus Quantum Algorithms – Phase Kick-Back – The Deutsch Algorithm – The Deutsch-Jozsa Algorithm – Simon's Algorithm.

**UNIT V: CASE STUDY (10 hrs)**

Quantum Qubit Simulator- CAD for Quantum Computer Simulator –QUACK (Quantum Computer Simulator for MATLAB) -Open Source Tool for Quantum Computing

**REFERENCEBOOKS:**

1. Michael A. Nielsen and Issac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press, 2012
2. P. Kaye, R. Laflamme, and M. Mosca, An introduction to Quantum Computing, Oxford University Press, 2007.
3. V. Sahni, Quantum Computing, Tata McGraw-Hill Publishing Company, 2007.
4. Eleanor Rieffel and Wolf Gang Polak, Quantum Computing: A Gentle Introduction, MIT Press, 2011.
5. Mermin N.D, Quantum Computer Science: An Introduction, Cambridge University Press 2007

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