

VL5005 NETWORKS ON CHIP

DETAILED SYLLABUS

OBJECTIVES:

The students should be made to:

- Understand the concept of network - on - chip
- Learn router architecture designs
- Study fault tolerance network - on - chip

UNIT I INTRODUCTION TO NOC

Introduction to NoC – OSI layer rules in NoC - Interconnection Networks in Network-on-Chip
Network Topologies - Switching Techniques - Routing Strategies - Flow Control Protocol
Quality-of-Service Support

UNIT II ARCHITECTURE DESIGN

Switching Techniques and Packet Format - Asynchronous FIFO Design -GALS Style of
Communication - Wormhole Router Architecture Design - VC Router Architecture Design –
Adaptive Router Architecture Design.

UNIT III ROUTING ALGORITHM

Packet routing-Qos, congestion control and flow control – router design – network link design
– Efficient and Deadlock-Free Tree-Based Multicast Routing Methods - Path-Based Multicast
Routing for 2D and 3D Mesh Networks- Fault-Tolerant Routing Algorithms - Reliable and
Adaptive Routing Algorithms

UNIT IV TEST AND FAULT TOLERANCE OF NOC

Design-Security in Networks-on-Chips-Formal Verification of Communications in Networks-on
Chips Test and Fault Tolerance for Networks-on-Chip Infrastructures-Monitoring Services for
Networks-on Chips.

UNIT V THREE-DIMENSIONAL INTEGRATION OF NETWORK-ON-CHIP

Three-Dimensional Networks-on-Chips Architectures. – A Novel Dimensionally-Decomposed
Router for On-Chip Communication in 3D Architectures - Resource Allocation for QoS On-
Chip Communication – Networks-on-Chip Protocols-On-Chip Processor Traffic Modeling for
Networks-on Chip

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Architectures Holistic Design Exploration”, Springer.
2. Fayezegebal, Haythamelmiligi, HqhahedWatheq E1-Kharashi “Networks-on-Chips theory
and practice CRC press.
3. Konstantinos Tatas and Kostas Siozios "Designing 2D and 3D Network-on-Chip
Architectures” 2013

4. Palesi, Maurizio, Daneshtalab, Masoud "Routing Algorithms in Networks-on-Chip" 2014
5. SantanuKundu, SantanuChattopadhyay "Network-on-Chip: The Next Generation of System on-Chip Integration",2014 CRC Press