



**STANLEY**  
**COLLEGE OF ENGINEERING & TECHNOLOGY FOR WOMEN**  
( Approved by AICTE , New Delhi | Affiliated to Osmania University ,Hyderabad)  
Address : Chapel Road, Abids ,Hyderabad

SE-517

## DESIGN AND ANALYSIS OF SYSTEMS

### UNIT-I

**Software architecting** - Introduction to architecture, The architecting process, Describing architectures, Cases of important architectures,

### UNIT-II

Basics of component technology, Distributed component architectures, Programming and modal logic -Syntax and semantics of propositional logic and predicate logic, Program verification by means of Hoare logic, Program verification by means of Model Checking using Computation Tree Logic,

### UNIT-III

Requirement analysis, design and verification - Process algebraic system design: Process algebra, interactions, behavior, axioms, derivations, hiding and internal actions, data-process interaction, Linear processes. Cones and foci. Confluence, mCRL toolset, Modal logic and model checking,

### UNIT-IV

The design of a small embedded system, Software testing Algorithms for model checking - Basic and advanced algorithms for model checking,  
**Optimization techniques** : partial-order reduction for reducing the state space, symbolic model checking by using Binary Decision Diagrams,

### UNIT-V

**Automated reasoning** - Resolution as a proof rule to prove propositions, and algorithms for satisfiability of propositions based on resolution, Binary Decision Diagrams as efficient representation of Boolean expressions, Unification; resolution on predicates, Reasoning modulo equations, term rewriting.

## Suggested Reading:

1. Rob Nederpelt, "*Theorem Provers*", November 2005
2. Rob Nederpelt, "*Basics of Type Theory*", Chapter 1 to 7, draft version, 23th November 2005, 130 pages.
3. Len Bass, Paul Clements and Risk Kazman, "*Software Architecture in Practice*", Addison-Wesley, 2<sup>nd</sup> edition, 2003
4. Eberhardt Rechtin and Mark Maier, "*The Art of Systems Architecting*", CRC Press(London), 2007.
5. M.R.A. Huth, M.D. Ryan, "*Logic in Computer Science: Modelling and reasoning about systems*", Cambridge University Press, 2001.