Preface

For optimal utilization of computational resources, sufficient care has been taken during the development of software systems. To maintain the consistence pace with the advancement in Hardware (HW) technologies, necessary advancements in the software development approach and methodology is solicited. But, it has been seen that there remains many scopes for further advancements in the field of software development lifecycle models and process. Current research in software development life cycle models emphasizes the use of different best industrial practices in software development. This thesis presents a new software development life cycle model- named BRIDGE projected by us to address the modern software crisis. The BRIDGE life cycle model enforces an engineering approach for development of good, efficient, quality software systems within time and budget with the primary focus on modern technologies and methodologies i.e. object-oriented methodologies, component based software development methodologies and, incremental and iterative development process modeling and alike.

Chapter 1 of this thesis provided a gentle introduction to history of Software Engineering (SE) with its chronological evolution and current trends.

Chapter 2 discussed the different phases of software development with a brief introduction to different well known software development life cycle models individually with their merits, limitations.

Chapter 3 briefly introduced the various research methodologies in Software Engineering and the research methodology used in this work.

Chapter 4 discussed about the emergence of Component Based Software Development (CBSD) approaches as a remedy to economic crisis to software development and as a mechanism to manage system complexity and maintenance effort.

Chapter 5 explored the different features that any suitable software development life cycle model should bear on it. These features will be used to validate the characteristics of the BRIDGE life cycle model in the subsequent chapters.
Chapter 6 discussed our primary research work i.e. the BRIDGE software development process life cycle model in details with the exploration of its different features. The BRIDGE process model is designed based on the traditional software development paradigm incorporating the modern trends and technologies for software development those are of most concern to the industry.

Chapter 7 outlined the Agile software development philosophy with its need and importance. The Agile manifestos are also discussed briefly. Further, we discuss how the agile philosophies can also be achieved with the BRIDGE process model.

In Chapter 8, initially we have identified the different reasons contributing to software project failure. Thereafter, we proposed some of the remedial to the identified reasons for software project failure following the BRIDGE Process Model.

In Chapter 9 of this thesis, we performed a comparative analysis of the BRIDGE process model in contrast to some of the well known software development lifecycle models. Next, we conclude the chapter by recommending this model to be the most suitable model for modern software development and, hence recommend this model to be used by the practitioners in software development projects to alleviate the present software development challenges i.e. software crisis.

In Chapter 10, we have briefly discussed a CASE tool named SRS Builder 1.0 developed following the BRIDGE process model by ourselves that is used to specify the system and customer requirements in the form of SRS document following IEEE specification.

At the end of this thesis, in Chapter 11, we have summarized the entire work highlighting the achievements. Thereafter, we have concluded the work by proposing some of the directions for future work those were identified whilst conducting this work.