Kathmandu University
Dept. of Computer Science and Engineering
Dhulikhel, Nepal
Year 2020/2021

LEVEL:	**Undergraduate**
YEAR:	**IV**
SEMESTER:	**II**
COURSE CODE:	**COMP 486**
COURSE NAME:	**Software Dependability (3-Cr.)**

COURSE DESCRIPTION:

In software engineering, dependability is the ability to provide services that can defensibly be trusted within a time-period. This may also encompass mechanisms designed to increase and maintain the dependability of a system or software. This course deals with software dependability which is a measure of a system's different properties such as availability, reliability, fault tolerance, rejuvenation, survivability, safety and security.

CONTENTS:

1. **Software Dependability [4 hrs]**
   - 1.1 Introduction to Software Dependability
   - 1.2 Dimensions of Software Dependability
2. **Markov Chain Modeling [4 hrs]**
   - 2.1 Introduction to Markov Chain Modeling
   - 2.2 Types of Markov Chain Modeling
   - 2.3 Advantages of Markov Modeling
   - 2.4 Disadvantages of Markov Modeling
   - 2.5 When Not to Use Markov Modeling
3. **Software Reliability [8 hrs]**
   - 3.1 Introduction to Software Reliability
   - 3.2 Significance of Reliability in Software System
   - 3.3 Reliability Metrics
   - 3.4 Mathematical Model of Software Reliability
4. **Software Availability [4 hrs]**
   - 4.1 Introduction to Software Availability
   - 4.2 Significance of Availability in Software System
   - 4.3 Availability Metrics
   - 4.4 Mathematical Model of Availability
5. **Software Safety [6 hrs]**
   - 5.1 Safety-critical Systems

5.2 Safety Requirements
5.3 Safety Engineering Processes
5.4 Safety Cases

6. **Software Fault Tolerance [8 hrs]**
   6.1 Introduction to Software Fault Tolerance
   6.2 System Survivability
   6.3 Measuring System Survivability
   6.4 Fault Minimization
   6.5 Fault Tolerance
   6.6 Fault Tolerance Architecture
7. **Software Rejuvenation [5 hrs]**
   7.1 Introduction to Software Rejuvenation
   7.2 Software Aging
   7.3 Software Rejuvenation
   7.4 Analytical Model for Software Rejuvenation
   7.5 Software Rejuvenation in Transaction-Based Software Systems
   7.6 Software Rejuvenation Agent in IBM X-Series Cluster Servers
   7.7 Approaches and Methods of Software Rejuvenation
   7.8 Granularity of Rejuvenation
8. **Software Security [6 hrs]**
   8.1 Security and Dependability
   8.2 Security and Organizations
   8.3 Security Requirements
   8.4 Secure Systems Design
   8.5 Security Testing and Assurance

RESOURCE:

Software Engineering: Ian Sommerville, 10th Edition- PEARSON Publication