CMR Institute of Technology, Bangalore		
Department(s): Computer Science & Engineering		
Semester: 08	Section(s): A&B	
Software Architecture	10IS81	Lectures/week: 04
Course Instructor(s): Poonam Tijare		
Course duration: 01 Feb 2018 – 25 May 2018		

Course Objectives

➢ Develop an understanding of what the emerging field of software architecture means to the field of software development.

➢ Understand the need of architecture and perform the analyses necessary to formulate effective software architectures.

➢ Analyze Software Engineering problems in terms of architectural thinking.

Prerequisites

➢ Software Development model

➢ Costing and estimation: line of code, function point, COCOMO model.

➢ Documentation.

LESSON PLAN

Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids	% of Syllabus Covered
1-8	TB1 (Chp 1, 2)	**UNIT 1: Introduction:** The Architecture Business Cycle Introduction about Software architecture, Flow of the subject Where do architectures come from? ,Software processes and the architecture business cycle, What makes a "good" architecture? What software architecture is and what it is not; Other points of view; Architectural patterns, reference models and reference architectures; Importance of software architecture Architectural structures and views.	Chalk and Talk Video Lectures for some topics	15

Links to some useful online lectures:

➢ https://www.youtube.com/watch?v=gcs8_l3fkVo&list=PLhwVAYxlh5dusp7Y8-K-V0azc_KsCohEg
➢ https://www.youtube.com/watch?v=R6GKgJb9eLs&index=2&list=PLhwVAYxlh5dusp7Y8-K-V0azc_KsCohEg

9-16	TB3 (Chp-2, 3)	**UNIT 2: Architectural Styles and Case Studies :** Architectural styles; Pipes and filters; Data abstraction and object-oriented organization; Event-based, implicit invocation; Layered systems; Repositories; Interpreters; Process control; Other familiar architectures; Heterogeneous architectures, Case Studies: Keyword in Context; Instrumentation software, Mobile robotics, Cruise control, Three vignettes in mixed style. Revision of first 2 units	Chalk and Talk Video Lectures for some topics	15

Links to some useful online lectures:

- https://www.youtube.com/watch?v=mb6bwnEaZ3U
- https://www.youtube.com/watch?v=y4w8rkUHO5g

17-21	TB2 (Chp 3.1-3.4)	**UNIT 7: Some Design Patterns :** Structural decomposition: Whole – Part, Organization of work Master – Slave; Access Control: Proxy. Revision of Master Slave	Chalk and Talk	10
22-30	TB1 (Chp- 7, 9)	**UNIT 8: Designing and Documenting Software Architecture:** Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating a skeletal system Uses of architectural documentation; Views; Choosing the relevant views; Documenting a view; Documentation across views. Revision	Chalk and Talk Video Lectures for some topics	20

Links to some useful online lectures:

- https://www.youtube.com/watch?v=K8uaXXX7Noo

31-36	TB1 (Chp - 4, 5)	**UNIT 3: Quality :** Functionality and architecture; Architecture and quality attributes; System quality attributes; Quality attribute scenarios in practice; Other system quality attributes; Business qualities; Architecture qualities. Achieving Quality: Introducing tactics; Availability tactics; Modifiability tactics; Performance tactics; Security tactics; Testability tactics; Usability tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles.	Chalk and Talk	10

Links to some useful online lectures:

- https://www.youtube.com/watch?v=v8-piIk8Ols

37-42	TB2 (Chp 2:2.1, 2.2)	**Unit 4: Architectural Patterns – 1 :** Introduction; From mud to structure, Pipes and Filters, Blackboard Revision of Pipes and Filters	Chalk and Talk	10

Links to some useful online lectures:

- https://www.youtube.com/watch?v=GVaW0Ka3dEo
- https://www.youtube.com/watch?v=qzwWvvuyiiw

43-48	TB2 (Chp 2:2.3, 2.4)	**UNIT 5: Architectural Patterns – 2 :** Distributed Systems: Broker; Interactive Systems, Model View Controller, Presentation-Abstraction-Control. Revision	Chalk and Talk	10

Links to some useful online lectures:

➢ https://www.youtube.com/watch?v=X6xF82hRgbY
➢ https://www.youtube.com/watch?v=e9S90R-Y24Q

49-52	TB2 (Chp 3:3.1-3.4)	**UNIT 6: Architectural Patterns – 3 :** Adaptable Systems: Microkernel**,** Reflection, Revision of Model View Controller, Revision of Reflection	Chalk and Talk	10

Links to some useful online lectures:

➢ https://www.youtube.com/watch?v=T_mpNPkUEws
➢ https://www.youtube.com/watch?v=wvnCtqs5fdk&t=340s

Text Books	
1.	Len Bass, Paul Clements, Rick Kazman: Software Architecture in Practice (Chapters 1, 2, 4, 5, 7, 9), 2nd Edition, Pearson Education, 2003.
2.	Frank Buschmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal: Pattern-Oriented Software Architecture, A System of Patterns Volume 1, John Wiley and Sons, 2007. (Chapters 2, 3.1 to 3.4)
3.	Mary Shaw and David Garlan: Software Architecture- Perspectives on an Emerging Discipline, (Chapters 1.1, 2, 3), PHI, 2007.

Reference Books	
1.	E. Gamma, R. Helm, R. Johnson, J. Vlissides: Design Patterns- Elements of Reusable Object-Oriented Software, Pearson Education,1995.

Syllabus for Internal Assessment Tests (IAT) [*]

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19– 37
IAT-3	Class # 38– 52

* : See calendar of events for the schedules of IATs.

Course Outcomes
By the end of this course, students will be able to
1. Describe software architectures and architecture business cycle
2.   Describe quality attributes and the associated design strategies for their accomplishment.
3. Explain the following Architectural styles/patterns Layers, their application to chosen case

	studies and discuss their suitability: Layered, pipe and filter, blackboard, Broker, MVC, PAC
4.	Describe what design patterns are and explain the following Design Patterns, their application to selected case study : Whole-Part, Master-Slave and Proxy
5.	Describe the process of designing architectures and documenting them.

COGNITIVE LEVELS	
Cognitive level	**REVISED BLOOMS TAXONOMY KEYWORDS**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

PROGRAM OUTCOMES (PO), PROGRAM SPECIFIC OUTCOMES (PSO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering

		solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:**	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:**	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:**	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1		Design, implement and maintain business applications in a variety of languages using libraries and frameworks.
PSO2		Develop and simulate wired and wireless network protocols for various network applications using modern tools.
PSO3		Apply the knowledge of software and design of hardware to develop embedded systems for real world applications.
PSO4		Apply knowledge of web programming and design to develop web based applications using database and other technologies

CORRELATION LEVELS	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	Describe software architectures and architecture business cycle	1,2	1	-	1	1	1	1	1	1	2	2	2	2	2	0	2	2
CO2	Describe quality attributes and the associated design strategies	3	1	2	1	1	1	1	1	1	1	1	1	1	1	0	2	2

CO	Description		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	for their accomplishment.																
CO3	Explain the following Architectural styles/patterns Layers, their application to chosen case studies and discuss their suitability: Layered, pipe and filter, blackboard, Broker, MVC, PAC	**2,4,5, 6**	2	1	2	-	2	2	2	1	1	2	2	2	1	1	2	1
CO4	Describe what design patterns are and explain the following Design Patterns, their application to selected case study : Whole-Part, Master-Slave and Proxy	**6,7**	2	1	-	2	1	1	-	1	1	2	1	1	1	1	1	0
CO5	Describe the process of designing architectures and documenting them.	**8**	-	2	2	1	1	1	1	1	2	2	1	1	0	0	1	1

Note : From time to time, assignments will be posted on

https://sites.google.com/cmrit.ac.in/software-architecture1-is81/home

CMR Institute of Technology, Bangalore		
Department(s): Computer Science & Engineering		
Semester: 08	Section(s): A&B	Lectures/week: 04
Subject: System Modelling & Simulation		Code: 10CS82
Course Instructor(s): Swathi.Y		
Course duration: 01 Jan 2018 – 25 May 2018		
Course Site: https://sites.google.com/a/cmrit.ac.in/swathi-4950		

Course Objectives

➢ Define the basics of simulation modeling and replicating the practical situations in organizations

➢ Develop simulation model using heuristic methods.

➢ Generate random numbers and random variates using different techniques.

➢ Analysis of Simulation models using input analyzer, and output analyzer

➢ Explain Verification and Validation of simulation model.

➢ Probability distributions and random variables

➢ Object Oriented Modeling Concepts

➢ Operation research

Lesson Plan				
			Portions coverage	
Lecture #	**Book & Sections**	**Topics**	Teaching Aids	% of Syllabus Covered
1-8	TB1: - 1.1, 2.1- 2.5	**UNIT – 1 INTRODUCTION :** When simulation is the appropriate tool and when it is not appropriate, Advantages and disadvantages of Simulation, Areas of application, Systems and system Environment , Components of a system-Discrete and continuous systems, Model of a system, Types of Models, Discrete-Event System Simulation, Steps in a Simulation Study, The basics of SpreadSheet-Simulation, Simulation Example: Simulation of queuing systems in a spreadsheet	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures:				
➢ http://nptel.ac.in/courses/112107214/2 ➢ https://www.youtube.com/watch?v=QppldN-t4pQ				
9-16	TB1 3.1 - 3.2 4.4- 4.5	**UNIT-2 -General Principles, Simulation Software :** Concepts in Discrete-Event Simulation, The Event-Scheduling / Time-Advance Algorithm, World Views Manual simulation Using Event Scheduling ,List processing ,Basic properties, Operations-Using Arrays, Dynamic Allocation ,Linked Lists-Simulation in Java - Simulation in GPSS	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures:				
➢ https://www.youtube.com/watch?v=UUQ-kDbhw_M ➢ https://www.youtube.com/watch?v=maH8ormsIeU				
17-21	TB1 5.1 - 5.6	**UNIT 3- Statistical Models in Simulation:**Review of terminology, concepts, Useful statistical models, Discrete Distributions ,Continuous Distributions, Poisson Process, Empirical distributions.	Chalk and Talk	10
Links to some useful online lectures:				
➢ https://www.youtube.com/watch?v=IDc48fCRwuw ➢ https://www.youtube.com/watch?v=Nj_HjNRE6-U				
22-30	TB1 7.1- 7.4 8.1 -8.3	**UNIT 5- Random-Number Generation, Random-Variate Generation** Properties of random numbers, Generation of pseudo-random numbers ,Techniques for generating random	Chalk and Talk Video	20

		numbers ,Tests for Random Numbers, Random- Variate Generation ,Inverse transform technique ,Acceptance-Rejection technique, Special properties	Lectures for some topics	

Links to some useful online lectures:

31-36	TB1 9.1 - 9.7	**UNIT 6 -Input Modeling:** Data Collection ,Identifying the distribution with data, Parameter Estimation, Goodness of Fit Tests, Fitting a non-stationary Poisson process ,Selecting input models without data , Multi-variate and Time-Series input models	Chalk and Talk	10

Links to some useful online lectures:

37-42	TB1 11.1-11.5	**UNIT 7 –Estimation Of Absolute performance[Output Analysis For A Single Model :** Types of simulations with Respect to Output analysis , Stochastic Nature of Output Data, Measures of Performance and their Estimation ,Output Analysis for Terminating Simulations, Output analysis for steady-State Simulations. Problems	Chalk and Talk	10

Links to some useful online lectures:

43-48	TB1 10.1 - 10.3 & 12.4	**UNIT - 8 -Verification, Calibration, and Validation; Optimization of simulation Models :** Model Building, Verification, Validation, Verification of simulation models, Calibration, Validation of models , Optimization, Optimization via Simulation	Chalk and Talk	10

Links to some useful online lectures:

49-52	TB1 6.1- 6.7	**UNIT 4 - Queuing Models:** Characteristics of queuing Systems, Queuing notation , Long-run measures of performance of queuing Systems, Steady-state behavior of M/G/1 queue, Networks of queues ,Rough-cut modeling: An illustration	Chalk and Talk	10

Links to some useful online lectures:

Text Books

1.	Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation. (Listed topics only from Chapters-1 to 12), 5th Edition, Pearson Education ©2013
	Reference Books
2.	Averill M. Law: Simulation Modeling and Analysis , 4th Edition, Tata McGraw-Hill, 2007.ISBN : 9780070667334
3.	Lawrence M. Leemis, Stephen K. Park: Discrete – Event Simulation: A First Course,Pearson Education, 2006.ISBN: 978-0131429178

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19–37
IAT-3	Class # 38–52

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1. Describe the role of important elements of discrete event simulation and modeling paradigm.   2. Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.   3. Interpret the model and apply the results to resolve critical issues in a real world environment.   4. Apply random number variates to develop simulation models   5. Analyze output data produced by a model and test validity of the model   6. Explain the concepts of verification and validation

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	Describe the role of important elements of discrete event simulation and modeling paradigm.	1	2	2	1	1	-	1	-	-	-	-	-	1	1	-	1	-
CO2	Conceptualize real world situations related to systems development decisions, originating from source requirements and goals.	1,2	2	3	-	1	-	1	2	1	2	-	-	2	1	-	1	-
CO3	Interpret the model and apply the results to resolve critical issues in a real world	2,3,4	2	3	2	2	2	2	1	-	1	-	-	1	1	-	1	-

CO	Description	Level																
	environment.																	
CO4	Apply random numbers and variates to develop simulation models	5,6	1	2	1	-	2	1	-	-	-	-	-	1	1	-	1	-
CO5	Analyze output data produced by a model and test validity of the model	7	2	2	-	-	2	-	-	-	-	-	-	2	1	-	1	-
CO6	Explain the concepts of verification and validation	8	-	-	-	-	1	-	-	-	-	-	-	-	1		1	

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering

	solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PSO1	Design, implement and maintain business applications in a variety of languages using libraries and frameworks.
PSO2	Develop and simulate wired and wireless network protocols for various network applications using modern tools.
PSO3	Apply the knowledge of software and design of hardware to develop embedded systems for real world applications.
PSO4	Apply knowledge of web programming and design to develop web based applications using database and other technologies

Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore			
Department(s): Computer Science & Engineering			
Semester: 08	Section(s): C	Lectures/week: 04	
Subject: Information and network security		Code: 10CS835	
Course Instructor(s): D.Gopika			
Course duration: 01 Feb 2018 – 25 May 2018			
Course Site: https://sites.google.com/a/cmrit.ac.in/information-and-network-security/			

Course Objectives

➢ Understand network security and its importance for any modern organization for plan,
   improvement & documentation

➢ Implement Network Security features in different domains & platforms

1. Basics Concepts of Networking (OSI, TCP/IP), Basic understanding of Encoding, Encryption concepts
2. Knowledge of typical IT infrastructure and its usage. Operational skills would be preferable.

			Portions coverage	
Lesson Plan				
Lecture #	**Book & Sections**	**Topics**	Teaching Aids	% of Syllabus Covered
1-8	TB1: chapter 5	**UNIT-1** Planning for Security Introduction; Information Security Policy,Standards, and Practices; The Information Security Blue Print; Contingency plan and a model for contingency plan	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: ➢				
9-16	TB1: Chapter 7	**UNIT-2 -** Security Technology-1 Introduction; Physical design; Firewalls; Protecting Remote Connections	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=aUPoA3MSajU				
17-21	TB2 Chapter 1	**UNIT 4-** Introduction; A short History of Cryptography; Principles of Cryptography; Cryptography Tools; Attacks on Cryptosystems	Chalk and Talk	10
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=CHi2RclGvIM&t=14s				
22-30	TB2 Chapter 4	**UNIT 5** Introduction to Network Security, Authentication Applications Attacks,services, and Mechanisms; Security Attacks; Security Services; A model for Internetwork Security; Internet Standards and RFCs Kerberos, X.509 Directory Authentication Service.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: ➢ https://www.youtube.com/watch?v=S0XSAqZVuMM				

31-36	TB2 Chapter 7	**UNIT 6** Electronic Mail Security,Pretty Good Privacy (PGP); S/MIME	Chalk and Talk	10

Links to some useful online lectures:

➤   https://www.youtube.com/watch?v=2BSSD8tcvJo

37-42	TB2 Chapter 5	**UNIT 8 –** Web Security,Web security requirements; Secure Socket layer (SSL) and Transport layer Security (TLS); Secure Electronic Transaction (SET)	Chalk and Talk	10

Links to some useful online lectures:

➤   https://www.youtube.com/watch?v=dYQMzyfFrTE

43-48	TB1 Chapter 7	**UNIT - 3** Introduction; Intrusion Detection Systems (IDS); Honey Pots, Honey Nets, and Padded cell systems; Scanning and Analysis Tools	Chalk and Talk	10

Links to some useful online lectures:

➤   https://www.youtube.com/watch?v=DgqID9k83oQ

49-52	TB2 Chapter 8	**UNIT 7** IP Security IP Security Overview; IP Security Architecture; Authentication Header; Encapsulating Security Payload; Combining Security Associations;Key Management.	Chalk and Talk	10

Links to some useful online lectures:

➤   https://www.youtube.com/watch?v=pZIlaWhfhpQ

Text Books	
1.	Michael E. Whitman and Herbert J. Mattord: Principles of Information Securit(Chapters 5, 6, 7, 8; Exclude the topics not mentioned in the syllabus)
2.	William Stallings: Network Security Essentials: Applications and Standards(Chapters: 1, 4, 5, 6, 7, 8
Reference Books	
4.	Behrouz A. Forouzan: Cryptography and Network Security

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus

IAT-1	Class # 01 – 20
IAT-2	Class # 21– 35
IAT-3	Class # 36– 52

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
1.Understand network security and its importance for any modern organization for plan, improvement & documentation
2.Conceptualize technologies used in design of Virtual Private Network & firewall systems, architecture and implementation with their security issues
3. Examine behavior of Intrusion Detection Systems, honey pots and padded cells.
4. Analyze cryptography techniques, signatures and their mathematical model for implementation
5. Analyze security issues, services goals, vulnerabilities and protocols in existing algorithms
6. Implement Newtwork Security features in different domains & platforms

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	1.Understand network security and its importance for any modern organization for plan, improvement & documentation	1	1	0	1	0	1	0	2	1	1	0	0	0	1	0	0	-
CO2	2.Conceptualize technologies used in design of Virtual Private Network & firewall systems, architechture and implementation with their security issues	1,2	1	1	3	0	2	2	1	1	0	0	1	1	1	0	1	-

CO	Description	Cognitive Level																	
CO3	3. Examine behavior of Intrusion Detection Systems, honey pots and padded cells.	2,3,4	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	-
CO4	4. Analyze cryptography techniques, signatures and their mathematical model for implementation	5,6	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	-
CO5	5. Analyze security issues, services goals, vulnerabilities and protocols in existing algorithms	7	1	1	0	0	0	0	0	0	0	0	0	1	0	0	-	
CO6	6. Implement Newtwork Security features in different domains & platforms	8	1	1	0	0	0	0	0	0	0	0	0	0	1	0	-	

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

Program Outcomes (PO), Program Specific Outcomes (PSO)	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate

	consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
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PSO1	Design, implement and maintain business applications in a variety of languages using libraries and frameworks.
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Table 03: Correlation Levels

Correlation Levels	
0	No Correlation
1	Slight/Low
2	Moderate/ Medium
3	Substantial/ High

CMR Institute of Technology, Bangalore			
Department(s): Computer Science & Engineering			
Semester: 08	**Section(s): A,B & C**		**Lectures/week: 04**
Subject: SOFTWARE TESTING		**Code: 10CS842**	
Course Instructor(s): SUDHAKAR K N & SREEDEVI N			
Course duration: 05 Jan 2018 – 25 May 2018			
Course Site: https://sites.google.com/a/cmrit.ac.in/			

Course Objectives

- ➢ **Understand the basics of testing, test cases and examples.**
- ➢ **Compare and pick out the right type of software testing process for any given real world problem**
- ➢ **Understand different Testing Methods.**
- ➢ **Understand Testing Models and different Integration Testing.**

Prerequisites

- ➢ **Software Engineering.**
- ➢ **Algorithms and programming.**
- ➢ **Databases and web programming.**

Lesson Plan				
			Portions coverage	
Lecture #	**Book & Sections**	**Topics**	Teaching Aids	% of Syllabus Covered
1-6	TB1: CH 1 & CH2	**UNIT 1** **A Perspective on Testing, Examples:** Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Levels of testing. Examples: Generalized pseudo code , The triangle problem, The Next Date function, The commission problem, The SATM(Simple Automatic Teller Machine) problem, The currency converter, Saturn windshield wiper.	Chalk and Talk Video Lectures for some topics	11.5%
Links to some useful online lectures:				
➢ www.nptel.ac.in/**courses**				
7-13	TB1: CH 5,6 & CH 7	**UNIT-2** **Boundary Value Testing, Equivalence Class Testing, Decision Table-Based Testing:** Boundary value analysis, Robustness testing, Worst-case testing, Special value testing, Examples, Random testing, Equivalence classes, Equivalence test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations. Decision tables, Test cases for the triangle problem, NextDate function, and the commission problem, Guidelines and observations.	Chalk and Talk Video Lectures for some topics	25%
Links to some useful online lectures:				
➢ www.nptel.ac.in/courses				
➢ *https://**www.udemy.com/software-testing**-course*				
14-20	TB1:CH 9 &	**UNIT 3**	Chalk and	38.5%

	CH 10	**Path Testing, Data Flow Testing:** DD paths, Test coverage metrics, Basis path testing, guidelines and observations. Definition-Use testing, Slice-based testing, Guidelines and observations.	Talk	
Links to some useful online lectures:				
➢ *https://fullexams.com/exam/video-lectures-software-testing*				
➢ www.downloadmela.com/video-lectures/				
21-28	TB1:CH 14 & CH 15	**UNIT 5- System Testing ,Integration testing:** Threads, Basic concepts for requirements specification, Finding threads, Structural strategies and functional strategies for thread testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions) testing example. Context of interaction ,A taxonomy of interactions, Interaction, composition, and determinism, Client/Server Testing,	Chalk and Talk Video Lectures for some topics	50%
Links to some useful online lectures:				
➢ *https://fullexams.com/exam/video-lectures-software-testing*				
➢ www.downloadmela.com/video-lectures/				
29-35	TB2: CH 2,3,4	**UNIT 6 -Process Framework:** Validation and verification, Degrees of freedom, Varieties of software. Basic principles: Sensitivity, redundancy, restriction, partition, visibility, Feedback. The quality process, Planning and monitoring, Quality goals, Dependability properties, Analysis, Testing, Improving the process, Organizational factors.	Chalk and Talk	63.5%
Links to some useful online lectures:				
➢ www.nptel.ac.in/courses				
36-42	TB2: CH 2,3,4	**UNIT 7 –Fault-Based Testing, Test Execution:** Overview, Assumptions in fault based testing, Mutation analysis, Fault-based adequacy criteria, Variations on mutation analysis. Test Execution: Overview, from test case specifications to test cases, Scaffolding, Generic versus specific scaffolding, Test oracles, Self-checks as oracles, Capture and replay.	Chalk and Talk	77%
Links to some useful online lectures:				
https://fullexams.com/exam/video-lectures-software-testing				
www.downloadmela.com/video-lectures/				
42-47	TB2: CH 16,17,20,24	**UNIT – 8 Planning and Monitoring the Process, Documenting Analysis and Test:** Quality and process, Test and analysis strategies and plans, Risk planning, Monitoring the process, Improving the process, The quality team, Organizing documents, Test strategy document, Analysis and test plan, Test design specifications documents, Test and analysis reports.	Chalk and Talk	88.5%
Links to some useful online lectures:				
➢ www.nptel.ac.in/courses				
48-52	TB1:CH 12 & CH 13	**UNIT 4 –Levels of Testing and Integration Testing:** Traditional view of testing levels, Alternative life-cycle models, The SATM system, Separating integration and system testing. A closer look at the SATM system, Decomposition-based, call graph-based, Path-based integrations	Chalk and Talk	100%
Links to some useful online lectures:				
➢ www.nptel.ac.in/courses				

Text Books	
1.	Paul C. Jorgensen: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2008. (Listed topics only from Chapters 1, 2, 5, 6, 7, 9, 10, 12, 13,14, 15)
2.	Software Testing and Analysis – Process, Principles and Techniques, Wiley India, 2008. (Listed topics only from Chapters 2, 3, 4, 16, 17, 20, 24)
Reference Books	

1.	Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008.
2.	Srinivasan Desikan, Gopalaswamy Ramesh: Software Testing Principles and Practices,2nd Edition, Pearson Education, 2007.
3.	Brian Marrick: The Craft of Software Testing, Pearson Education, 1995.

Syllabus for Internal Assessment Tests (IAT[*])

IAT #	Syllabus
IAT-1	Class # 01 – 18
IAT-2	Class # 19–37
IAT-3	Class # 38–52

*See calendar of events for IAT schedule.

Course Outcomes
By the end of this course, students will be able to
7. Compare and pick out the right type of software testing process for any given real world problem
8. Understand the software testing process .
9. Automate the testing process by using several testing tools.
10. Establish a quality environment as specified in standards for developing quality software.
11. Understand Fault Based Testing and illustrate how it will migrate from test specification to test.
12. Have an ability to validate and verify test cases and better planning for quality product

**Based on table 01, 02, 03 in appendix, following are the Course outcomes.

	Course Outcomes	Modules covered	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	Understand the software testing process.	1	2	2	1	2	2	1	1	1	1	2	1	1	1	1	1	1
CO2	Compare and pick out the right type of software testing process for any given real world problem.	1,2	2	3	3	2	3	1	2	1	2	2	1	2	2	1	2	1
CO3	Automate the testing process by using several testing tools.	2,3,4	3	3	3	2	3	2	1	1	2	2	1	2	1	1	1	2
CO4	Establish a quality environment as specified in standards for developing quality software.	5,6	2	3	2	2	2	1	1	1	2	2	1	2	1	1	1	2
CO5	Study Fault Based Testing and understand how it will migrate from test specification to test.	7	2	3	2	2	2	2	2	1	2	2	1	2	1	1	1	2
CO6	Have an ability to validate and verify test cases and better planning for quality product.	8	2	3	2	2	2	2	2	1	2	2	1	2	1	1	1	2

Note: Assignments, study material, Question bank and other course related content would be posted on site mentioned above.

Appendix

Table 01: Cognitive Levels

Cognitive Levels	
Cognitive level	**Revised Blooms Taxonomy Keywords**
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.

L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

Table 02: Program Outcomes (PO) and Program Specific Outcomes (PSO)

	Program Outcomes (PO), Program Specific Outcomes (PSO)
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
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