


CMR Institute of Technology, Bangalore			
Department(s): Information Science & Engineering			
Semester: 08	Section(s): A&B	Lectures/week: 04	
Subject: Adhoc Networks		Code: 10CS841	
Course Instructor(s): Divya Singh			
Course duration: 05 Feb 2018 – 26 May 2018			
Course Site: https://sites.google.com/a/cmrit.ac.in/ad-hoc-networks-10is841/			

Course Objectives

- To learn about the wireless Adhoc Network and its applications
- To learn about MAC, Routing, Transport Protocols
- To learn about the issues and goals in designing adhoc protocol
- To learn about the QOS provided by Adhoc nodes

Pre requisites

- Basic of Computer Networks
- Fundamentals of Wireless Communication Technology

Lesson Plan				
Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids	% of Syllabus Covered
1-3	TB1: - 5.1-5.5	Introduction: Ad hoc Networks: Introduction, Issues in Ad hoc wireless networks, Ad hoc wireless internet	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures: <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=LXSkpB35cjw 				
4- 11	TB1 6.1-6.6	MAC – 1: MAC Protocols for Ad hoc wireless Networks: Introduction, Issues in designing a MAC protocol for Ad hoc wireless Networks, Design goals of a MAC protocol for Ad hoc wireless Networks, Classification of MAC protocols, Contention based protocols with reservation mechanisms.	Chalk and Talk Video Lectures for some topics	15
Links to some useful online lectures:				

		<ul style="list-style-type: none"> • https://www.youtube.com/watch?v=IASr8e_8UK4 • 		
12-18	TB1 6.7-6.9	MAC – 2: Contention-based MAC protocols with Scheduling mechanism, MAC protocols that use directional antennas, Other MAC protocols.	Chalk and Talk	10
Links to some useful online lectures: <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=czw1PYhx9ts • 				
19-24	TB1 7.1-7.5	Routing – 1: Routing protocols for Ad hoc wireless Networks: Introduction, Issues in designing a routing protocol for Ad hoc wireless Networks, Classification of routing protocols, Table drive routing protocol, On-demand routing protocol.	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: <ul style="list-style-type: none"> • 				
25-28	TB1 7.6-7.10	Routing – 2: Hybrid routing protocol, Routing protocols with effective flooding mechanisms, Hierarchical routing protocols, Power aware routing protocols Transport Layer: Transport layer protocols for Ad hoc wireless Networks:	Chalk and Talk	10
Links to some useful online lectures: <ul style="list-style-type: none"> • 				
29-32	TB1 9.7-9.12	Security : Security: Security in wireless Ad hoc wireless Networks, Network security requirements, Issues & challenges in security provisioning, Network security attacks, Key management, Secure routing in Ad hoc wireless Networks	Chalk and Talk	10
Links to some useful online lectures: <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=xwXmYeQkF9Y • https://www.youtube.com/watch?v=3JblSrRT8XE&index=38&list=PLCB46B39EBE51B674 				
33-36	TB1 9.1-9.5	Introduction, Issues in designing a transport layer protocol for Ad hoc wireless Networks, Design goals of a transport layer protocol for Ad hoc wireless Networks, Classification of transport layer solutions, TCP over Ad hoc wireless Networks, Other transport layer protocols for Ad hoc wireless Networks	Chalk and Talk	10

Links to some useful online lectures:

- https://www.youtube.com/watch?v=wZLMLX_hWk0&list=PL-bZp8Qhr-SZG08n3IeXT8R5hafSg_jIv&index=1
- https://www.youtube.com/watch?v=GHso8jGh2Lg&index=2&list=PL-bZp8Qhr-SZG08n3IeXT8R5hafSg_jIv

37-40	TB1 10.1-10.5	QoS: Quality of service in Ad hoc wireless Networks: Introduction, Issues and challenges in providing QoS in Ad hoc wireless Networks, Classification of QoS solutions, MAC layer solutions, network layer solutions.	Chalk and Talk	10
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Links to some useful online lectures:

- <https://www.youtube.com/watch?v=Ejz4VueOZpo>

Text Books

1.	C.Siva Ram Murthy & B.S Manoj: Ad hoc Wireless Networks, 2nd Edition, Pearson Education, 2005.ISBN9788131759095
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Reference Books

1.	Ozan K. Tonguz and Gianguigi Ferrari: Ad hoc Wireless Networks John Wiley, 2007.ISBN 9788126523047
2.	Xiuzhen Cheng, Xiao Hung, Ding-Zhu Du: Ad hoc Wireless Networking Kluwer Academic Publishers, 2004.ISBN 978-1402077128
3.	C.K. Toh: Adhoc Mobile Wireless Networks- Protocols and Systems Pearson Education, 2002. ISBN 9788131715109

Syllabus for Internal Assessment Tests (IAT*)

IAT #	Syllabus
T1	Class # 1-24
T2	Class # 1-24
T3	Class # 1-24

*See calendar of events for IAT schedule.

Course Outcomes**By the end of this course, students will be able to**

1. Discuss the issues and concept of ad-hoc networks.
2. Explain basic and advanced MAC Protocols for adhoc networks
3. Discuss routing protocols in adhoc networks with associated design challenges.
4. Discuss the challenges in designing transport protocols for wireless Ad-hoc/sensor networks.
5. Discuss quality of service and security aspects of adhoc networks.

**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	Discuss the issues and concept of ad-hoc networks	1	3	0	2	0	0	0	1	0	0	0	0	0	0	3	0	0
CO2	Explain basic and advanced MAC Protocols for adhoc networks	2	3	0	1	0	0	0	1	0	0	0	0	0	0	3	0	0
CO3	Discuss routing protocols in adhoc networks with associated design challenges.world environment.	3,4	3	0	1	0	0	0	1	0	0	0	0	0	0	3	0	0
CO4	Discuss the challenges in designing transport protocols for wireless Ad-hoc/sensor networks.	5,6	3	0	1	0	0	0	1	0	0	0	0	0	0	3	0	1
CO5	Discuss quality of service and security aspects of adhoc networks.	7,8	3	0	1	0	0	0	1	0	0	0	0	0	1	3	1	1

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

Signature with date: | **Course Instructor**

Program Coordinator

Head-ISE

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	Implement and maintain enterprise solutions using latest technologies.
PSO2	Develop and simulate wired and wireless network protocols for various network applications using modern tools.
PSO3	Apply the knowledge of Information technology and software testing to maintain legacy systems.
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): Information Science & Engineering			
Semester: 06	Section(s): A&B	Lectures/week: 04	
Subject: Software Testing		Code: 15IS63	
Course Instructor(s): Sheetal R			
Course duration: 05 Feb 2018 – 26 May 2018			
Course Site:			

Course Objectives

- Differentiate the various testing techniques
- Analyze the problem and derive suitable test cases.
- Apply suitable technique for designing of flow graph
- Explain the need for planning and monitoring a process

Pre requisites

- Software Engineering
- Basic Programming knowledge

Lesson Plan				
Lecture #	Book & Sections	Topics	Portions coverage	
			Teaching Aids	% of Syllabus Covered
1-10	T.B1:Chapter1, T.B3:Chapter1, T.B1:Chapter2.	<p>Basics of Software Testing: Basic definitions, Software Quality , Requirements, Behaviour and Correctness, Correctness versus Reliability, Testing and Debugging, Test cases, Insights from a Venn diagram, Identifying test cases, Test-generation Strategies, Test Metrics, Error and fault taxonomies , Levels of testing, Testing and Verification, Static Testing.</p> <p>Problem Statements: Generalized pseudocode, the triangle problem, the NextDate function, the commission problem, the SATM (Simple Automatic Teller Machine) problem, the currency converter, Saturn windshield wiper</p>	Chalk and Talk Video Lectures for some topics	20
Links to some useful online lectures: <ul style="list-style-type: none"> ➤ https://www.coursera.org/learn/software-processes/lecture/XmIRH/software-testing-introduction ➤ https://www.youtube.com/watch?v=21wOCNHsSU4 				

11-20	T.B1: Chapter 5, 6 & 7, T.B2: Chapter 16	<p>Functional Testing: Boundary value analysis, Robustness testing, Worst-case testing, Robust Worst testing for triangle problem, Nextdate problem and commission problem, 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.</p> <p>Fault Based Testing: Overview, Assumptions in fault based testing, Mutation analysis, Fault-based adequacy criteria, Variations on mutation analysis.</p>	Chalk and Talk Video Lectures for some topics	20
<p>Links to some useful online lectures:</p> <ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=21wOCNHsSU4 ➤ https://www.youtube.com/watch?v=B8zNCnxdUGg 				
21-30	T.B3:Section 6.2.1, T.B3:Section 6.2.4, T.B1:Chapter 9 & 10, T.B2:Chapter 17	<p>Structural Testing: Overview, Statement testing, Branch testing, Condition testing , Path testing: DD paths, Test coverage metrics, Basis path testing, guidelines and observations, Data –Flow testing: Definition-Use testing, Slicebased testing, Guidelines and observations.</p> <p>Test Execution: Overview of test execution, from test case specification to test cases, Scaffolding, Generic versus specific scaffolding, Test oracles, Self-checks as oracles, Capture and replay.</p>	Chalk and Talk Video Lectures for some topics	20
<p>Links to some useful online lectures:</p> <ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=B7q_86Ui-As ➤ https://www.youtube.com/watch?v=_RABB5GHQ-w ➤ https://classroom.udacity.com/courses/cs258 ➤ https://www.youtube.com/watch?v=ZYAZAlcY1po 				
31-40	T.B2: Chapter 3 & 4, T.B2: Chapter 20, T2: Chapter 24.	<p>Process Framework :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.</p> <p>Planning and Monitoring the Process: Quality and process, Test and analysis strategies and plans, Risk planning, monitoring the process, Improving the process, the quality team</p> <p>Documenting Analysis and Test: Organizing documents, Test strategy document, Analysis and test plan, Test design specifications documents, Test and analysis reports.</p>	Chalk and Talk	20
41-50	T.B2: Chapter 21 & 22, T.B1 : Chapter 12 & 13	<p>Integration and Component-Based Software Testing: Overview, Integration testing strategies, Testing components and assemblies. System, Acceptance and Regression Testing: Overview, System testing, Acceptance</p>	Chalk and Talk	20

		testing, Usability, Regression testing, Regression test selection techniques, Test case prioritization and selective execution. Levels of Testing, 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		
<p>➤ https://www.youtube.com/watch?v=EfoqaZGI0yk</p>				

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)
2.	Mauro Pezze, Michal Young: Software Testing and Analysis – Process, Principles and Techniques, Wiley India, 2009. (Listed topics only from Chapters 3, 4, 16, 17, 20,21, 22,24)
3.	Aditya P Mathur: Foundations of Software Testing, Pearson Education, 2008.(Listed topics only from Section 1.2 , 1.3, 1.4 ,1.5, 1.8,1.12,6. 2.1,6. 2.4)
Reference Books	
1.	Software testing Principles and Practices – Gopaldaswamy Ramesh, Srinivasan Desikan, 2nd Edition, Pearson, 2007
2.	Software Testing – Ron Patton, 2nd edition, Pearson Education, 2004.
3.	The Craft of Software Testing – Brian Marrick, Pearson Education, 1995.
4.	Anirban Basu, Software Quality Assurance, Testing and Metrics, PHI, 2015.
5.	Naresh Chauhan, Software Testing, Oxford University press.

Syllabus for Internal Assessment Tests (IAT^{*})

IAT #	Syllabus
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IAT-1	Class # 01 – 18
IAT-2	Class # 19– 34
IAT-3	Class # 35– 50

*See calendar of events for IAT schedule.

Course Outcomes	
By the end of this course, students will be able to	
➤	Derive test cases for any given problem
➤	Compare the different testing techniques
➤	Classify the problem into suitable testing model
➤	Apply the appropriate technique for the design of flow graph.
➤	Create appropriate document for the software artefact.
➤	Explain the concepts of verification and validation

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

Course Outcomes		Modu les cover ed	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3	P S O 4
CO1	Derive test cases for any given problem	1	1	1	1	1	-	-	-	-	-	-	1	1	-	-	1	-
CO2	Compare the different testing techniques	2,3	1	2	-	1	1	-	-	-	1	-	-	2	-	-	2	-
CO3	Classify the problem into suitable testing model	2	1	3	2	2	1	-	-	-	1	-	-	2	1	-	1	-
CO4	Apply the appropriate technique for the design of flow graph.	3	1	2	2	1	2	-	-	-	-	1	-	2	1	-	1	-
CO5	Create appropriate document for the software artefact.	4	1	1	1	1	-	-	-	-	-	-	1	1	-	-	1	-
CO6	Explain the concepts of verification and validation	5	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-

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

Signature with date:	Course Instructor	Program Coordinator	Head-ISE
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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.
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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	Implement and maintain enterprise solutions using latest technologies.
PSO2	Develop and simulate wired and wireless network protocols for various network applications using modern tools.
PSO3	Apply the knowledge of Information technology and software testing to maintain legacy systems.
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): Information Science & Engineering			
Semester: 08	Section(s): A&B	Lectures/week: 04	
Subject: Information and network security		Code: 10CS835	
Course Instructor(s): Mr.Manoj Challa			
Course duration: 05 th Feb 2018 – 26 th May 2018			
Course Site: _https://sites.google.com/			

Course Objectives

- Understand network security and its importance for any modern organization for plan, improvement & documentation
- Implement Network Security features in different domains & platforms

Pre requisites

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.

Lesson Plan				
Lecture #	Book & Sections	Topics	Portions coverage	
			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:				
➤ https://www.youtube.com/watch?v=nwvygzSeP4U				
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:				

		<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=aUPoA3MSajU ➤ https://www.youtube.com/watch?v=0UXdEGAhPj4 ➤ https://www.youtube.com/watch?v=K_JomGpvjH4 		
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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=DgqID9k83oQ 				
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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=S0XSAqZVuMM ➤ https://www.youtube.com/watch?v=PPoTceJSR50 ➤ https://www.youtube.com/watch?v=dVj4Ivh7waM 				
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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=Chi2RclGvIM&t=14s ➤ https://www.youtube.com/watch?v=jcFGx6QQXTo ➤ https://www.youtube.com/watch?v=wlu9hc4KoEQ 				
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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=2BSSD8tcvJo 				
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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=dYQMzyfFrTE ➤ https://www.youtube.com/watch?v=PubIGaURxqg 				

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
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Links to some useful online lectures:

- <https://www.youtube.com/watch?v=O74QneB7mt8&t=64s>
- <https://www.youtube.com/watch?v=EaO4MY3Y1pY&t=31s>
- <https://www.youtube.com/watch?v=EaO4MY3Y1pY>
- <https://www.youtube.com/watch?v=IBuhc5qMkh4>

Text Books	
1.	Michael E. Whitman and Herbert J. Mattord: Principles of Information Security(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	
1.	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 Network 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, architecture and implementation with their security issues	1,2	1	1	3	0	2	2	1	1	0	0	1	1	1	0	1	-
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	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	0	1	0	-

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

Signature with date:	Course Instructor CSE	Program Coordinator	Head-
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Appendix

Table 01: Cognitive Levels

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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	Implement and maintain enterprise solutions using latest technologies.
PSO2	Develop and simulate wired and wireless network protocols for various network applications using modern tools.

PSO3	Apply the knowledge of Information technology and software testing to maintain legacy systems.
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): Information Science & Engineering			
Semester: 08	Section(s): A&B		
Software Architecture	10IS81		Lectures/week: 04
Course Instructor(s): Vidya.U			
Course duration: 05 Feb 2018 – 26 May 2018			

Course Objectives
<ul style="list-style-type: none"> ➤ 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
<ul style="list-style-type: none"> ➤ 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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=gcs8_l3fkVo&list=PLhwVAYxIh5dusp7Y8-K-V0azc_KsCohEg ➤ https://www.youtube.com/watch?v=R6GKgb9eLs&index=2&list=PLhwVAYxIh5dusp7Y8-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	Chalk and Talk Video	15

		architectures; Heterogeneous architectures, Case Studies: Keyword in Context; Instrumentation software, Mobile robotics, Cruise control, Three vignettes in mixed style. Revision of first 2 units	Lectures for some topics	
<p>Links to some useful online lectures:</p> <p>➤ https://www.youtube.com/watch?v=mb6bwnEaZ3U</p> <p>➤ https://www.youtube.com/watch?v=y4w8rkUHO5g</p>				
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
<p>Links to some useful online lectures:</p> <p>➤ https://www.youtube.com/watch?v=K8uaXXX7Noo</p>				
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
<p>Links to some useful online lectures:</p> <p>➤ https://www.youtube.com/watch?v=v8-pilk8OIs</p>				
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
<p>Links to some useful online lectures:</p> <p>➤ https://www.youtube.com/watch?v=GVaW0Ka3dEo</p> <p>➤ https://www.youtube.com/watch?v=qzwWvuyiw</p>				
43-48	TB2 (Chp 2:2.3,	UNIT 5: Architectural Patterns – 2 : Distributed Systems: Broker; Interactive Systems, Model View Controller,	Chalk and	10

	2.4)	Presentation-Abstraction-Control. Revision	Talk	
Links to some useful online lectures:				
<ul style="list-style-type: none"> ➤ 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:				
<ul style="list-style-type: none"> ➤ https://www.youtube.com/watch?v=T_mpNPkUEws ➤ https://www.youtube.com/watch?v=wwnCtqs5fdk&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	
2.	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 select 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.
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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.
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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	1	-	1	1
CO2	Describe quality attributes and the associated design strategies	3	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1

	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	2	1	2	-	
CO4	Describe what design patterns are and explain the following Design Patterns, their application to select case study : Whole-Part, Master-Slave and Proxy	6,7	2	1	-	2	1	1	-	1	1	2	1	1	2	1	-	2	
CO5	Describe the process of designing architectures and documenting them.	8	-	2	2	1	1	1	1	1	2	2	1	1	-	2	2	1	

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

<https://sites.google.com/cmrit.ac.in/software-architecture10is81/home>

