Pakistan Air Force – Karachi Institute of Economics & Technology
College of Computing & Information Sciences (CoCIS)
I&IA
Spring 18

Instructor	**Hira Beenish**
Room No	10
Office Location	Upper Faculty Room
Email	hira@pafkie.edu.pk
Telephone	Contact #02136628381, Ext: 155
Teaching Assistants (TA)	Yusra
TA(s) Office Hours	
Course URL (if any)	

COURSE BASICS		
Course ID(s)	All IDs	
Credit Hours	3	
Lecture(s)	# of sessions / week: 02	Duration: 75 minutes / session
Lab(s)	# of sessions / week: 02	Duration: 75 minutes / session
Pre-Requisites	DCN	

COURSE DISTRIBUTION	
Theoretical Studies	60.00%
Practical Studies	40.00%

COURSE DESCRIPTION

As the name suggests the focus of this course should be about the current Internet architecture and the protocols behind it. I.e TCP/IP. This course is more geared towards the study of the upper layer protocols of OSI model. Although a review of the layer 2 and layer 1 technologies could be given but the emphasis will be on the study of protocols RIPv1,RIPv2, IGRP, EIGRP, OSPF, Inter VLAN Routing, etc.

GRADING BREAKUP AND POLICY

	Frequency	Score (for single stuff)	Total
Mid Term Exam	01	20	20
Quizzes (Best three)	5-6	05	10
Assignments (Best five)	05	05	05
Lab Test	01	10	10
Final Test	01	40	40
Project	01	15	15
		Total	100

Session No.	Chap. No.	Topics to be covered	Date	Time in	Time out	Sig
1	R-1	**Basic Concepts: Internetworking, Routers, and Addressess**				
		Data link Addresses				
		Frame				
		Repeators and Bridges				
		Routing Protocols				
		Packet				
		Network Addresses				
2	R-2	**TCP/IP Review**				
		The IP Packet Header				
		IP Addresses				
		The First Octet Rule				
		.Address Masks				
		Subnets and Subnet Masks				
		Classful Protocols				
		Designing Subnets				
3		Breaking The Octet Boundary				
		Troubleshooting Subnet Mask				
		ARP				
		Proxy ARP				
		Reverse ARP				
		ICMP				
		The Host to Host Layer				
		TCP				
		UDP				
4	R-3	**Static Routing**				
		The Routing Table				
		Configuring Static Routing Case Studies				
		Simple Static Routing				
		Summary Routes				
		Alternating Routes				
		Floating Static Routes				
5		Load Sharing				
		Recursive Table Lookups				
		Troubleshooting Static Routes				
		Tracing a Failed Route				
		A Protocol Conflict				
		Configuration Exercises				
		Troubleshooting Exercises				
6	R-4	**Dynamic Routing Protocols**				
		Routing Protocol Basic				
		Path Determination				
		Metrics				
		Hop Count				
		Bandwidth				
		Load				
		Delay				
7		Reliability				
		Cost				
		Convergence				
		Load Balancing				
		Distance Vector Routing Protocols				
		Periodic Updates				
		Neighbors				
		Broadcast Updates				

8		Full Routing Table Updates				
		Routing By Rumor				
		Route Invalidation Timers				
		Split Horizon				
		Couting To Infinity				
		Triggered Updates				
		Holddown Timers				
		Asynchronous Updates				
		Interior and Exterior Gateway Protocols				
		Interior Gateway Protocols				
9	R-5	**Routing Information Protocol(RIP)**				
		Operation of RIP				
		RIP Timers and Stability Features				
		RIP Message Format				
		Request Message Types				
		Classful Routing				
		Directly Connected Subnets				
		Summarization at Boundray Routers				
10		Configuring RIP Case Studies:				
		A Basic RIP Configuration				
		Passive Interfaces				
		Configuring Unicast Updates				
		Discontigous Subnets				
		Manipulating RIP Metrics				
		Troubleshooting RIP				
		Configuration Exercises				
		Troubleshooting Exercises				
11	R-6	**Interior Gateway Routing Protocols**				
		Operation Of IGRP				
		IGRP Timers and Stability Features				
		IGRP Metrics				
		Configuring IGRP Case Studies				
		A Basic IGRP Configuration				
12		Unequal Cost Load Balancing				
		Setting Maximum Paths				
		Multiple IGRP Proceses				
		Troubleshooting IGRP				
		Unequal Cost Load Balancing				
		A segmented Network				
		Configuration Exercises				
		Troubleshooting Exercises				
13	R-7	**Routing Information Protocol Version 2(RIP2)**				
		Operation of RIPv2				
		Compatability with RIPv1				
		Classless Route lookups				
		Classless Routing protocols				
		Variable Length subnet Masking				
		Authentication				
		Configuring RIPv2				
		A Basic RIPv2 Configuration				
		Compatability with RIPv1				
		Using VLSM				
14		Discontigous Subnets and Classless Routing				
		Authentication				
		Troubleshooting RIPv2				
		Misconfigured VLSM				
		Configuration Exercises				
		Troubleshooting Exercises				
15	**R-9**	**Open Shortest Path First**				
		Operation of OSPF				

		Neighbours and Adgencies				
		The Hello Protocol				
		Network Types				
16		**Designated Routers and Backup Dsignated Router**				
		OSPF Interfaces				
		OSPF Neighbours				
		Flooding				
		Areas				
		Router Types				
		Partitioned Areas				
		Virtual Links				
17		**The Link State Database**				
		LSA Type				
		Stub Areas				
		OSPF LSA Format				
		The LSA Header				
		The Router LSA				
		The Network LSA				
18		The Network and ASBR Summary LSA				
		The Autonomous System External LSA				
		The NSSA External				
		The Options Field				
		Configuring OSPF case study				
		The Basic OSPF Configuration				
		Settng Routers IDs with Loopback Interfaces				
		Domain Name Service Lockups				
		Troubleshooting OSPF				
19	R-11	**Router Redistribution**				
		Principles of Redistribution				
		Metrics				
		Administrative Distances				
		Redistribution from Classless to Classful Protocols				
		Configuring Redistribution case studies				
20		Redistributing IGRP and RIP				
		Redistributing EIGRP and OSPF				
		Redistribution and Route Summarization				
		Redistributing IS-IS and RIP				
		Redistributing Static Routes				
21	SW1	**LAN Design**				
		Describe how a hierarchical network supports the voice, video and data needs of a small and medium-sized business.				
		Match the appropriate Cisco switch to each layer in the hierarchical network design model.				
22	SW2	**Configure a Switch**				
		Summarize the operation of Ethernet as defined for 100/1000 Mbps LANs in the IEEE 802.3 standard				
		Explain the functions that enable a switch to forward Ethernet frames in a LAN. Explain the functions that enable a switch to forward Ethernet frames in a LAN.				
		Configure a switch for operation in a network designed to support voice, video, and data transmissions.				
		Configure basic security on a switch that will operate in a network designed to support voice, video, and data transmissions.				
23	SW3	**VLANs**				
		Explain the role of VLANs in a converged network.				
		Explain the role of trunking VLANs in a converged network.				
		Configure VLANs on the switches in a converged network topology.				
24		Troubleshoot the common software or hardware misconfigurations associated with VLANs on switches in a converged network topology.				

25	SW4	**Implemented VTP**					
		Explain the role of VTP in a converged switched network					
		Describe the operation of VTP: VTP domains, VTP Modes, VTP Advertisements, and VTP Pruning.					
		Configure VTP on the switches in a converged network.					
26		DHCP					
		Access Control List					
		Network Address Translation					
27		**GSS**					
28		**Mid Term Exam**					
29		**Project Presentation**					
30		**Project Presentation**					

Text and reference books

Code	Title	Auther	Publisher
R	**Routing TCP/IP**	**Jeff Doyle**	**Cisco**
	Internetworking With TCP/IP	**Douglas Comer**	
	Computer Networks	**Andrew S. Tanenbaum**	
	TCP/IP illustreted	**Richard Stevans**	
SW	**CCNP switching study guide**	**Tode lammle**	**BPB Publication**
BF	**Data Communication & Networking**	**Behrouz A. Forouzan**	**Mc Graw-Hill**