NCEAC.FORM.001-D

COURSE DESCRIPTION FORM

INSTITUTION **National University of Computer and Emerging Sciences-FAST**

PROGRAM (S) TO BE **Computer Science, Software Engineering**

EVALUATED

A. Course Description

(Fill out the following table for each course in your computer science curriculum. A filled out form should not be more than 2-3 pages.)

Course Code	CL3001
Course Title	Computer Network Lab
Credit Hours	01
Prerequisites by Course(s) and Topics	CS2001-Data Structures
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Mid:25 Lab Activity:25 Final: 50
Course Coordinator	Dr. Sufian Hameed
URL (if any)	
Current Catalog Description	This course will significantly benefits security officers, auditors, security professionals, site administrators, and anyone who is concerned about the integrity of their network infrastructure.
Textbook (or **Laboratory Manual** for Laboratory Courses)	Lab Manuals
Reference Material	Cisco Labs

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Course Goals	The goal is to enable the students to model their problem in the domain of object oriented programming.in this course this is done by using C++ as the programming language.

A. Course Learning Outcomes (CLOs)

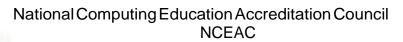| CLO	Course Learning Outcome (CLO)	Domain	Taxonomy Level	PLO	Tools
01	Applying networking, networking media, network topologies and protocol data units	Cognitive	3	1,6,10	LA, M, F
02	Demonstrate and explain switches, their configuration and their usage in VLANs..	Cognitive	3	2,3,4,5	LA,M, F
03	Explain routers, subnetting and their configuration, static routing and dynamic routing	Cognitive	2	3,5	LA, A, F

Tool:, Lab Activities = LA, Assignment=A , M = Midterm, F=Final

B. Course Learning Outcomes (CLOs)

1. Applying networking, networking media, network topologies and protocol data units.
2. Demonstrate and explain switches, their configuration and their usage in VLANs.
3. Explain routers, subnetting and their configuration, static routing and dynamic routing.
4. Implementation of the network scenario using different layers of protocol for better understanding of the course.

C. Program Learning Outcomes

PLO		Program Learning Outcome (PLO) Statement
1	Computing Knowledge	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.

2	**Problem Analysis**	Identify, formulate, research literature, and analysis complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences
3	**Design/Develop Solutions**	Design solutions for complex computing problems and design application, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
4	**Investigation & Experiment action**	Conduct investigation of complex computing problems using research based knowledge and research based methods
5	**Modern Tool Usage**	Create, select, and apply appropriate techniques, resources and modern computing tools, including prediction and modelling for complex computing problems.
6	**Society Responsibility**	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of complex computing problems
7	**Environment & Sustainability**	Understand and evaluate sustainability and impact of professional computing work in the solution of complex computing problems
8	**Ethics**	Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice.
9	**Individual and Team Work**	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
10	**Communication**	Communicate effectively on complex computing activities with the computing community and with society at large.
11	**Project Management & Finance**	Demonstrate knowledge and understanding of management principles and economic decision making and apply these to one's own work as a member or a team.
12	**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

		C. Relation between CLOs and PLOs											
		(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)											
		PLOs											
		1	2	3	4	5	6	7	8	9	10	11	12
	1	✔					✔				✔		
	2		✔	✔	✔	✔							
	3			✔		✔							
	4												
	5												
	6												
	7												
	8												
	9												
	10												
	11												
	12												

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)

Week	Topics Covered	CLO
1	Introduction & History of Networks, Topologies and OSI Model, Network	1
2	Introduction to Cisco Packet Tracer, network devices & IP Classful addressing (class A to E), identification of different class addresses, network address, and host address and default subnet mask and light introduction of custom subnet mask.	1
3	Introduction to WireShark. Telnet & SSH protocol implementation. Hands on WireShark analysis of above protocol.	1
4	Introduction of Application Layer Protocols. Intro about DNS, DHCP & its exercise on Packet Tracer. WireShark analysis of above protocols.	1

5	TCP-One Way Communication TCP-Two Way Communication Further Socket Programming Examples: UDP-One Way Communication UDP-Two Way Communication File transfer using TCP Broadcasting}	2,3
6	Theory Mid-I Week	
7	Introduction of HTTP & HTTPS. Its implementation on Packet Tracer. Network traffic analysis of HTTP/S protocol, Header, Cookie. Hands on WireShark analysis	2,3
8	Lab Mid Term	
9	To understand and implementation of: Simple Mail Transfer Protocol (SMTP), File Transfer Protocol (FTP).	1,2
10	Introduction to NS3. Implementation of flow control & congestion control in NS3	1,2
11	Theory Mid-II Week	
12	Intro to Subnetting, CIDR, VLSM. Introduction and Implementation of Subnetting	2,3
13	Introduction to Static Vs Dynamic Routing Implementation of Dynamic Routing Algorithm: RIP v2 and OSPF	2,3

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	14	Introduction to Wireless Routing & it exercise on Packet Tracer. NAT introduction & implementation.	2,3,4
	15	Introduction to Vlans and Intervlans routing.	2,3,4
	16	Introduction to Wireless Routing & it exercise on Packet Tracer. Introduction to ACL & its implementation	2,3,4
		Lab Final Exam	
Laboratory Projects/Experiments Done in the Course	Project will focus on the application of network fundamentals and practices to develop efficient networking solutions and applications.		
Programming Assignments Done in the Course	Semester Assignments will target Network Application which uses cloud components to implement various domains.		

Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	10%	30%	60%	-
Oral and Written Communications				

Instructor Name: Muhammad Nadeem Ghouri

Instructor Signature: Muhammad Nadeem

Date: 23rd Jan-2023