

# Bangladesh University of Business and Technology (BUBT) Faculty of Engineering& Applied Sciences (FEAS) Department of Computer Science and Engineering (CSE)

## LAB COURSE OUTLINE

1	Program	B.Sc. Engg.	in CSE										
2	<b>Course Code</b>	CSE 320											
3	<b>Course Title</b>		Computer Networks Lab										
4	Course Type	Core Course											
5	Academic Session	Spring 2021											
6	Credit Hour	1.50											
7	Intake	39											
8	Section	1											
9	Campus	Permanent C	Campus										
10	Course	Name: Mr	r. Shamim A	hmed	Des	signatio	n: Assi	stant P	rofess	or			
	Teacher	_	tion: Comp , Systems an		orking,	Distrib		mputin	g Syst	em and		ain.	
11	Class Schedule	110011110							<u>caa.ee</u>	*	1100111	110101	.,,,,,
		Cla	ass Day			Class Ho	arme.			Clas	s Room		
			nursday				05.40 Pl	M			6 (B-2)		
		11	luisuay		02.30	<u> </u>	JJ.40 F	IVI		410	5 ( <b>B</b> -2)		
12			ourse is bas				-				~		
	Objectives	course prov	vides a prac	tical a	pproac	h to va	rious t	ypes o	f Ethe	ernet/I	nternet n	etwork	ing
		design, con	figure and	manage	netwo	ork usii	ng proto	ocols.	Also,	studen	nts will a	ble to	get
		some hands	-on experie	nce in n	etwork	contro	l securi	ty.					
13			iter Network					•	· 6 <sup>th</sup> E	dition.	by James	s F.	
	Text Book	-	and Keith I		Top 2	5II <b></b> P	p10001,	,, 0 01		<i></i>		,	
14	Reference		ommunicati		Netwo	rking 3	ard or 1th	1 Editio	n by	Rehro	uz A For	011 <b>7</b> 2n	
	Book		Lab Manua		TICIWO	ıkıng, .	014	Lanne	n, oy	DCIIIO	uz A Por	ouzan.	
15						11 1 1.1							
15	Course Outcomes		eting this cou					f lower	od n	otrrio els	r orobito	oturo	and
	(COs)		onstrate d				•						
	(003)	-	oduction to r	-		_		_		oubles	shooting	topics	anu
			<b>lyze</b> perfo							and a	oourity	protoc	01c
			figuration of								•	-	
			U		*				`		III, SW	1F, D	NS,
			and FTP) and practice packet /file transmission between nodes.										
		CO3: <b>Design</b> and build a wireless LAN, LAN, VLAN and implement a network security											
	Mapping of	policy using access control lists.											
	COs toPOs			1	T			1		1			
	200 101 00	CO	PO1 PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
		CO1				V							
		CO2			1								
		CO3		<b>√</b>									

	GO N	PO N	Bloom's	D.1. M		1 / 1 / 1 / 1		
	CO No.	PO No.	Domain / Level	Delivery M	letho	ds / Activities	Assessment Tools	
	CO1	PO5	Cognitive / Understanding			ask, Assignment.	Lab Performance	
	CO2	PO4	Cognitive / Applying / Guided Response			sk, Assignment.	Lab Performance, Lab Final	
	CO3	PO3	Psychomotor / Response	Lectures, La	ab Ta	sk, Assignment.	Lab Performance, Lab Final	
16	Teaching Strategy	followed. It time. Mult codes pract	n topics will be covered from the textbook. For the rest of the topics, reference booksome class notes will be uploaded on the web. White board will be used for multimedia projector and a PC will be used for the convenience of the students to uploaded. Students must participate in classroom discussions for case studies, and project developments.					
17	Assessm ent and	Class A	ttendance		:	10%		
	Marks	Assignr	nent		:	20%		
	Distribu tion:	Lab Per	formance		:	30%		
	<b>02022</b>	Lab Fin	al		:	40%		
18	Weekly So							
	Week 1	Lab Lab1	Course Introduction		Top	ics		CO
			<ul> <li>Class Overvio</li> <li>Course Object</li> <li>Structure of the structure of the st</li></ul>	ctives the Labs on the Lab S procedures		ions er Networking		
	Week2	Lab2	<ul> <li>To make stud guided media pair cables ar</li> <li>To understand and cross over</li> </ul>	<ul> <li>Networks Cabling (Theoretical and Practical)</li> <li>To make students aware about various tyling guided media like coaxial cable, optical for pair cables and its categories.</li> <li>To understand the working difference beto and cross over cable.</li> <li>Making connections with Cat5</li> </ul>			er cable, twisted	CO1
	Week3	Lab3	Simple LAN Connection:  Setting up a Simple LAN Connection ber Setting up LAN and Sharing Centre. File Sharing				een 2 PCs.	
	Week4	Lab4	Introduction to Building a Lag	AN with Houlations in	UBs	r 5.3 & Simple and Switches. CO Packet Tra	5 PC's network.	CO1
	Week5	Lab5	<ul><li>Computer Network</li><li>Configuring a</li><li>Configuring a</li></ul>	a HTTP Se	rver.			CO2

Week14	Lab13	Lab Final	
		<ul> <li>Mikrotik RB1100AHx4 Dude Edition Router Configuration.</li> <li>Router Security Configuration and Analysis.</li> <li>Lab Performance Evaluation</li> </ul>	
Week13	Lab12	Lab Performance Evaluation CISCO Dude Edition Router Configuration:	CO2
		<ul> <li>Configuring WEP, WPA, and WPA2 on a Wireless Router.</li> <li>Wireless connection using packet tracer.</li> <li>Configuring a Wireless AP- Access Point.</li> </ul>	
Week12	Lab11	<ul> <li>Wireless Router Configuration:</li> <li>Configuring a Wireless Router.</li> <li>Configuring WED WDA and WDA2 on a Wireless Pouter</li> </ul>	CO2
W 142	T 144	Introduction to STP.  Lab Performance Evaluation  Window Denter Confirmation	602
		Configuring VLANs and VTP by using more than Two Switches.  Introduction to STP.	
Week11	Lab10	VLAN-Virtual Local Area Network:	CO3
		Configuring VLANs and VTP.  Lab Performance Evaluation	
		Commands.  • Introduction to VLANs, Trunks, and VTP.	
Week10	Lab9	<ul> <li>VLAN-Virtual Local Area Network:</li> <li>Study of the Basic Switch and Router Configuration</li> </ul>	CO <sub>3</sub>
		Configuring and using ACL in different networks.  Lab Performance Evaluation	
		Study the basic of standard an extended ACL	
Week9	Lab8	Lab Performance Evaluation Access Control List	CO3
		Configuring RIP and OSPF.	
		• To configure the routers for performing IP routing and subnetting like cidr, vlsm etc.	
		Configuring and Troubleshooting a Router Network.	
Week8	Lab7	Router Configuration: • Performing an Initial Router Configuration.	CO2
Week7		Mid-Term Week	000
		<ul> <li>Configuring and Troubleshooting a Switched Network.</li> <li>Connecting a Switch.</li> <li>Lab Performance Evaluation</li> </ul>	
		<ul><li>commands.</li><li>Performing an Initial Switch Configuration.</li></ul>	
Week6	Lab6	<ul> <li>Switch Configuration:</li> <li>Study of basic network command and Network configuration</li> </ul>	CO2
		Lab Performance Evaluation	
		<ul><li>Configuring a DNS Server.</li><li>Configuring a FTP Server.</li></ul>	
		Configuring a SMPT Server.	

19	Overall CO	Assessi	ment methods	of COs	are given below	:					
	Assessment		sessment Are		-	urse Outco	mes (	CO		Asses	sment
	Criteria				CO1	CO2		CO3		Area Mark	
		Atten	dance								
		Lab A	Assignment								
		Lab F	Performance		5	15		10		3	0
		Lab F	Final			20		20		4	0
		Total Mark			5	35		30		7	0
20	Lab	Lab	Criteria	COs	Excellent(5)	Good(4)	Satis	sfactory(3)	Unsat	isfactory	Mark
	Performan	#							(0-2)		S
	ce				Student	Student	Stud	ent	Stude	nt was	(30)
	Assessment Details				demonstrates	arrives on		ness or		from lab	
	Details				an accurate	time to lab,		reparedness	or did		
					understanding of the lab	but may be unprepared.	make	es it ossible to	partici There	was no	
					objectives	Answers to	fully	participate.	attem		
					and concepts.	questions	If ab		make		
					The student can correctly	are basic and	-	cipate, ent has		gements ke up the	
					answer	superficial	diffic	culty	lab.	<sub>F</sub>	
					questions and	suggesting that		aining key			
					if appropriate, can explain	concepts	lab c	oncepts.			
					concepts to	are not					
					the course	fully					
					teacher.	grasped.					
		L2	Networks	CO1	"	,,		"		,,	3
			Cabling								
		L4	Building a	CO1	>>	,,		,,		,,	2
		L4	LAN with	COI							3
			HUBs and								
			Switches, Network								
			Simulations								
			in CISCO								
			Packet Tracer.								
		L5	Configuring	CO2	"	"		"		"	3
			a HTTP,								
			DHCP, SMTP,								
			DNS and								
		L6	FTP Server								
			Switch Configurati	CO2	>>	,,		"		,,	3
			on								
		L7	Router, RIP,	CO2	>>	,,		,,		,,	3
		L/	and OSPF	CO2							3
			Configurati								
		TO	On Study the	CO3	>>	,,		,,		,,	3
		L8	Study the basic of	CO3							3
			standard an								
			extended								

		ACL and Configur and using ACL in different networks  L9 VLAN-Virtual Local A Network  L10 Configur	S. CO3	22 22	"	"	3
		VLANs VTP using n	and CO3 by nore Two				3
		L11 Wireless Router Access Point Configur on	and	"	"	"	3
		Router Security Configur on Analysis	and ati and	,,	,,	,,	3
21	Lab Final Assessment Details	Computer Network Servers Configurations, Switch and Router Configuration, Static and Dynamic routing implementation	Excellent(5)  If the whole problem is successfully implemented	Good(4)  If the half of the problem is successfully implemented	Satisfactory(3)  If a small part of the problem is successfully implemented	Unsatisfactory (0-2)  Students were either absent or know nothing how to implement the problem	Marks (40) 15
		Access Control List, VLAN, VTP	If the whole problem is successfully implemented	If the half of the problem is successfully implemented	If a small part of the problem is successfully implemented	Students were either absent or know nothing how to implement the problem	15
		Course Viva	The student can correctly answer questions and if appropriate, can explain concepts to the course teacher.	The student can moderately answer questions and if not fully appropriate, can explain concepts to the course teacher.	The student can answer a small portion of the questions	Students were either absent or cannot correctly answer questions	10

#### 22 Grading The following chart will be followed for grading. This has been customized from the guideline **Policy** provided by the School of Engineering and Computer Science. A+Α A-B+ В B-C+C D F $\geq 80$ 75-<80 70-<75 65-<70 60-<65 55-<60 50-<55 45-<50 40-<45 <40 There will be at least two assignments. Average marks of the assignments will be counted. 23 **Additional Assignments** No late homework will be accepted. Course Any kind of copy/manipulation in assignment will carry zero mark. **Policies** Two or more copied assignments will carry zero mark in all assignments. Zero tolerance will be shown in this regard. Solutions to assignment problems will be provided through web and on hand. There will be at least six lab performance evaluations. These will be taken as per the weekly Lab Performance schedule. During evaluation, following instructions will be strictly maintained: 1. Every student is expected to be regular in Lab classes. 2. Do NOT copy lines of code from anybody else. 3. Do NOT ask to see another student's code. 4. Do NOT pass code or program to other members of the class 5. If the instructor is at all uncomfortable about the originality of student's work, no mark will be given. There will be no make-up evaluation of lab performance (except, at the discretion of the instructor, in the case of documented medical or family emergencies). Students are expected to attend all classes and examinations. A student MUST have **Special Instructions** at least 70% class attendance to sit for the final exam. Students will not be allowed to enter into the classroom after 20 minutes of the starting time. 3. For plagiarism, the grade will automatically become zero for that exam/assignment. 4. All mobile phones MUST be turned to silent mode during class and exam period. 5. There is zero tolerance for cheating in exam. The only penalty for cheating is expulsion for several semesters as decided by the Disciplinary Committee of the university. 6. Undergraduate students may not stay in the laboratory without School staff supervision. 7. No food or drink is to be consumed in the laboratory. 8. Students are not permitted to carry any music generating device (eg ipod, mp3 players, pda's) in the laboratory. 9. Students must inform the supervisor of any illness, injury, medication or circumstance which may impair performance. 10. Punctuality to practical classes is important. 11. Report all injuries, accidents, spills and breakages immediately to laboratory staff. 12. Familiarize yourself with the evacuation procedures and the location of: Fire extinguishers, fire blankets, eye wash stations, safety showers, water taps Academic Calendar Summer 2020: <a href="http://www.bubt.edu.bd/academics/academic-calendar.">http://www.bubt.edu.bd/academics/academic-calendar.</a> 24 **Additional** Academic Policies: http://www.bubt.edu.bd/academics/academic-rules-a-regulations. Information b. Grading & Evaluation: <a href="http://www.bubt.edu.bd/academics/academic-rules-a-regulations">http://www.bubt.edu.bd/academics/academic-rules-a-regulations</a>. d. Proctorial Rules: http://www.bubt.edu.bd/administrator/proctors-office. Bloom's Taxonomy for Teaching-Learning Bloom's Taxonomy is a set of three hierarchical models used to classify educational learning objectives into levels of complexity and specificity. The three lists cover the learning objectives in Cognitive, Affective and Psychomotor domains. 25 The Cognitive domain list has been the primary focus of most education and is frequently used to structure curriculum

learning objectives, assessments and activities. The three domains and respective levels are illustrated below.

Cognitive [C] (Knowledge-based)	Affective [A] (Emotion-based)	Psychomotor [P] (Action-based)		
1. Remembering	1. Receiving	1. Perception		
2. Understanding	2. Responding	2. Set		
3. Applying	3. Valuing	3. Guided Response		
4. Analyzing	4. Organizing	4. Mechanism		
5. Evaluating	5. Characterizing	5. Complex Overt Response		
6. Creating		6. Adaptation		
-		7. Origination		

#### Descriptions of Cognitive Domain (AndersonandKrathwohl'sTaxonomy2001):

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The **cognitive domain** involves the development of our mental skills and the acquisition of knowledge.

I	Level	Category		Keywords
	C1	Remembering	Recognizing or recalling knowledge from memory. Remembering is when memory is used to produce or retrieve definitions, facts, or lists, or to recite previously learned information.	Define, describe, draw, find, identify, label, list, match, name, quote, recall, recite, tell, write
	C2	Understanding	Constructing meaning from different types of functions be they written or graphic messages or activities like interpreting, exemplifying, classifying, summarizing, inferring, comparing, or explaining.	Classify, compare, exemplify, conclude, demonstrate, discuss, explain, identify, illustrate, interpret paraphrase, predict, report
	C3	Applying	Carrying out or using a procedure through executing, or implementing. Applying relates to or refers to situations where learned material is used through products like models, presentations, interviews or simulations.	Apply,change,choose,compute,dramatize,implement,interview,prepare, produce, role play, select, show, transfer, use
,	C4	Analyzing	Breaking materials or concepts into parts, determining how the parts relate to one another or how they interrelate, or how the parts relate to an overall structure or purpose. Mental actions included in this function are differentiating, organizing, and attributing, as well as being able to distinguish between the components or parts. When one is analyzing, he/she can illustrate this mental function by creating spreadsheets, surveys, charts, or diagrams, or graphic representations.	Analyze, characterize, classify, compa re, contrast, debate, deconstruct, dedu ce, differentiate, discriminate, distinguish, examine, organize, outline, relate, research, separate, structure
1	C5	Evaluating	Making judgments based on criteria and standards through checking and critiquing. Critiques, recommendations, and reports are some of the products that can be created to demonstrate the processes of evaluation.	Appraise, argue, assess, choose, conclude, critique, decide, evaluate, judge, justify, predict, prioritize, prove, rank, rate, select, Monitor
	C6	Creating	Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure through generating, planning, or producing. Creating requires users to put parts together in a new way, or synthesize parts into something new and different creating a new form or product. This process is the most difficult mental function.	Construct, design, develop, generate, hypothesize ,invent, plan, produce, compose, create, make, perform, plan, produce

### Descriptions of Affective Domain (Krathwohl, Bloom, Masia, 1973)

The affective domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes.

	Level	Category	Meaning	Keywords
	A1	Receiving	Awareness, willingness to hear, selected attention.	acknowledge, asks, attentive, courteous, dutiful, follows, gives, listens, understands

A2	Responding	Active participation on the part of the learners. Attend and react to a particular phenomenon. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation).	answers, assists, aids, complies, conforms, discusses, greets, helps, labels, performs, presents, tells
A3	Valuing	The worth or value a person attaches to a particular object, phenomenon, or behavior. This ranges from simple acceptance to the more complex state of commitment. Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner's overt behavior and are often identifiable.	appreciates, cherish, treasure, demonstrates, initiates, invites, joins, justifies, proposes, respect, shares
A4	Organizing	Organizes values into priorities by contrasting different values, resolving conflicts between them, and creating an unique value system. The emphasis is on comparing, relating, and synthesizing values.	compares, relates, synthesizes
A5	Characterizing	Has a value system that controls their behavior. The behavior is pervasive, consistent, predictable, and most important characteristic of the learner. Instructional objectives are concerned with the student's general patterns of adjustment (personal, social, emotional).	acts, discriminates, displays, influences, modifies, performs, qualifies, questions, revises, serves, solves, verifies

#### **Descriptions of Psychomotor Domain (Simpson, 1972)**

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**The psychomotor domain** includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.

L	Level Categor	y Meaning	Keywords
P	Percepti	On The ability to use sensory cues to guide motor activity.  This ranges from sensory stimulation, through cue selection, to translation.	chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects.
P	Set Set	Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that predetermine a person's response to different situations (sometimes called mindsets).	begins, displays, explains, moves, proceeds, reacts, shows, states, volunteers.
P	Guided Respons	The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing.	copies, traces, follows, react, reproduce, responds
P	4 Mechan	This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency.	assembles, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
P	Comple overt Respons	complex movement patterns. Proficiency is indicated by	assembles, builds, calibrates, constructs, dismantles, displays, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches.
P	6 Adaptat	Skills are well developed and the individual can modify movement patterns to fit special requirements.	adapts, alters, changes, rearranges, reorganizes, revises, varies.
P	7 Original	Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills.	arranges, builds, combines, composes, constructs, creates, designs, initiate, makes, originates.

Graduate Attributes (Program Outcomes) for B.Sc. in Engineering Program based on Washington Accord

Program Outcomes (POs) are narrower statements that describe what students are expected to know and be able to do by the Time of graduation. These relate to the knowledge skills and attitudes that students acquire while progressing through the program. The students of the B.Sc. in CSE program are expected to achieve the following graduate attributes or program outcomes at the time of graduation.

**PO1–Engineering knowledge (Cognitive):** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

**PO2–Problem analysis (Cognitive):** Identify, formulate, research the literature and analyze complex engineering problems and reach substantiated conclusions using first principles of mathematics, the natural sciences and the engineering sciences.

**PO3–Design/development of solutions (Cognitive, Affective):** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety as well as cultural, societal and environmental concerns.

**PO4–Investigation** (**Cognitive**, **Psychomotor**): Conduct investigations of complex problems, considering design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

**PO5–Modern tool usage (Psychomotor, Cognitive):** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6**—The engineer and society (Affective): Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

**PO7–Environment and sustainability** (**Affective, Cognitive**): Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

**PO8**—**Ethics** (**Affective**): Apply ethical principles and commit to professional ethics, responsibilities and the norms of the engineering practice.

**PO9–Individual work and teamwork (Psychomotor, Affective):** Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.

**PO10–Communication (Psychomotor, Affective)**: Communicate effectively about complex engineering activities with the engineering community and with society at large. Be able to comprehend and write effective reports, design documentation, make effective presentations and give and receive clear instructions.

**PO11–Project management and finance (Cognitive, Psychomotor):** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work as a member or a leader of a team to manage projects in multidisciplinary environments.

**PO12–Life-long learning (Affective, Psychomotor):** Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

#### 30 Social & Moral Capital

Our promises are based on the three cardinal principles:

(a) What we do believe (b) What we do practice, and (c) What we will promote

However, students are advised to undertake the following commitments for moral development.

- **1.** To be punctual and attentive in class
- **2.** To maintain inclusive learning environment
- **3.** To ensure mutual respect
- **4.** To be cooperative in group learning.
- **5.** To be innovative and Creative
- **6.** To follow dress code and wearing ID card
- 7. To be always proactive

- **8.** Try to follow and review day to day
- **9.** To avoid conspiracy
- 10. To prioritize honesty & faith
- **11.** To be motivated for asking question and encourage feedback
- **12.** To develop attitude for speaking in English
- **13.** Do not ignore to carry out any assignments or commitments
- 14. To be clean and decent in all levels.

- **15.** To be sincere for class preparation
- **16.** Do not forget to switch-off the cell phone in class
- **17.** Do not forget to carry course pack and learning stuffs in class
- **18.** To maintain loyalty and trust to the university
- **19.** Must avoid unfair means and plagiarism in exam, reports and assignments
- **20.** Must maintain eco-friendly environment in the campus.

Prepared by:	Checked by:	Approved by:

Mr. Shamim Ahmed

Assistant Professor

CSE, BUBT