Green University of Bangladesh

Department of Science in Computer science and Engineering

Course Outline

1 General Information

Fall 2024 CSE 312

Faculty	Faculty of Science and Engineering (FSE)
Department	Department of Science in Computer science and Engineering (CSE)
Programme	Bachelor of Science in Computer science and Engineering
Semester	**Fall 2024**
Course Title	*Computer Networking Lab*
Course Code	CSE 312
Course Credit	1.5 units
Contact Hours	2.5 /week
Course Status	Core Course
Prerequisite Course	N/A

2 Course Instructors

Section	Name	Office	Email
221 D17	Md. Ehsan Shahmi Chowdhury	A-510	ehsan@cse.green.edu.bd
221 D22	Sharifur Rahman	A-608	sharifur@cse.green.edu.bd
221 D3	Sharifur Rahman	A-608	sharifur@cse.green.edu.bd
222 D2	Rusmita Halim Chaity	A-510	chaity@cse.green.edu.bd
222 D4	Rusmita Halim Chaity	A 510	chaity@cse.green.edu.bd
221 D2	Tanpia Tasnim	F-135	tanpia@cse.green.edu.bd
221 E1	Tanpia Tasnim	F-135	tanpia@cse.green.edu.bd
221 D7	Muhaimen Khan	A-608	muhaimen@cse.green.edu.bd
222 D5	Muhaimen Khan	A-608	muhaimen@cse.green.edu.bd
221 D11	Md. Mamunur Rahman	A-510	rahman@cse.green.edu.bd
221 D14	Md. Mamunur Rahman	A-510	rahman@cse.green.edu.bd
221 D19	Md. Mamunur Rahman	A-510	rahman@cse.green.edu.bd
222 D3	Maisha Muntaha	A-608	maisha@cse.green.edu.bd
221_D16	Maisha Muntaha	A-608	maisha@cse.green.edu.bd
221 D9	Fatema Akter	A-510	$fatema_akter@cse.green.edu.bd$
221 D12	Fatema Akter	A-510	$fatema_akter@cse.green.edu.bd$
221 D4	Mahjabin Rahman Oishe	A-608	oishe@cse.green.edu.bd
221 D8	Mahjabin Rahman Oishe	A-608	oishe@cse.green.edu.bd
221 D5	Md. Saiful Islam Bhuiyan	A-608	$saiful_islam@cse.green.edu.bd$
221 D21	Md. Saiful Islam Bhuiyan	A-608	$saiful_islam@cse.green.edu.bd$
221 D15	Md. Sabbir Hosen Mamun	A5103	mamun@cse.green.edu.bd

3 Laboratory and Counseling Hours

	Laboratory	Counseling

Section	Room	Weekday	Time	Weekday	Time
221 D17	A-503	Tuesday	11:00 AM - 1:30 PM	Tuesday	9:45 AM - 11:00 AM
221 D22	K-109	Wednesday	2:00 PM - 4:30 PM	Wednesday	8:30 AM - 9:45 AM
221 D3	L-106	Wednesday	11:00 AM - 1:30 PM	Wednesday	9:45 AM - 11:00 AM
222 D2	K 107	Wednesday	11:00 AM- 01:30 PM	Thursday	8:30-11:00 AM
222 D4	K 107	Thursday	2:00-4:30 PM	Thursday	8:30-11:00 AM
221 D2	K110	Wednesday	8:30 AM - 11:00 AM	Monday	11:00 AM - 12:30 PM
221 E1	J103	Friday	10:30 AM - 1:00 PM	Friday	9:00 AM - 10:00 AM
221 D7	L-106	Monday	02:00 PM-04:30PM	Tuesday	11:00 AM-12:15 PM
222 D5	L-104	Friday	10:00 AM-1:00 PM	Wednesday	12:15 PM - 01:00 PM
221 D11	L-104	Thursday	8:30 AM - 11:00 AM	Wednesday	11:00 AM - 01:30 PM
221 D14	J-103	Saturday	8:30 AM - 11:00 AM	Wednesday	11:00 AM - 01:30 PM
221 D19	K-110	Tuesday	11:00 AM- 01:30 PM	Wednesday	11:00 AM - 01:30 PM
222 D3	K-106	Wednesday	2.00 PM-4.30 PM	Tuesday	9:45 AM - 11:00 AM
221_D16	K-109	Saturday	8.30 Am- 11.00 AM	Tuesday	9:45 AM - 11:00 AM
221 D9	L 104	Thursday	11:00 AM - 1:30 PM	Tuesday	9:45 AM - 11:00 AM
221 D12	J 108	Friday	8:30 AM - 11:00 AM	Tuesday	9:45 AM - 11:00 AM
221 D4	K 102	Wednesday	11:00 AM - 1:30 PM	Tuesday	11:00AM - 12:15PM
221 D8	K 109	Monday	2:00 PM - 4:30 PM	Monday	11:00 AM - 12:15 PM
221 D5	K 102	Monday	8:30 AM - 11:00 AM	Monday	11:00 AM - 12:15 PM
221 D21	K-110	Thursday	8:30 AM - 11:00 AM	Monday	11:00 AM - 12:15 PM
221 D15	J108	Saturday	8:30 AM - 11:00 AM	Saturday	11:00 AM - 12:15 PM

4 Course Rationale

This course describes some of the important concepts related to Computer Networks, e.g. the network edge and core, routers, the ISO and TCP/IP reference models for computer communication and networking protocols. The course depicts the communication processes, protocols, standards and "behind-the-scenes" that makes this network communication possible. Students learn what happens to the data in the computer before it is prepared for transmission, how protocols work to transmit the data and how it is received at other computers. Error control and recovery methods for lost or corrupted data are also investigated. A a layered model for computer communications is thoroughly examined. Students would also write networking programs in python and test a local area network or on the Internet.

5 Course Description

Open System Interconnection (OSI) model, frame transmission methods, Routing Protocols, Routing command, Transmission Control Protocol, Internet Protocol (TCP/IT), Ethernet, IEEE 802 networking technology, Simple Mail Transfer Protocols configuration, File Transfer Protocols configuration, Implementation of HTTP GET, PUT, POST, Socket Programming Using GUI between a client and a server, Flow Control, cumulative ACK, slow start and congestion avoidance (TCP Tahoe) Fast Retransmission (TCP Reno). RIP, EIGRP, OSPF and BGP Routing Protocols.

6 Teaching Methods

Lecture, Laboratory experiments, Home works, and Project developments.

7 Course Outcomes

CO	CO Description	PO	Domain (LoBT)	Weight	WK	WP	EA	Assessment Methods

CO1	Design networking topologies and client-server applications using various networking algorithms and protocols to apply the knowledge of mathematics and engineering fundamentals for solving networking related complex engineering problems.	PO3	Cognitive (C5)	55%	WK5	WP1	Please refer to Section 8.
CO2	Demonstrate the performances of various communication protocols, using different network simulation tools to implement appropriate engineering practice while solving the networking related complex engineering problems.	PO5	Psychomotor (P4)	30%	WK6	WP3, WP4	
CO3	Perform the identification of appropriate protocols and tools to address the network-related problems, which provide reliable and high performing services to the users relevant to professional engineering practice.	PO10	Psychomotor (P6)	15%		EA2	

Legend:

CO: *Course Outcome* **PO**: *Program Outcome* (Appendix: A)
WK: *Knowledge Profile* (Appendix: B) **WP**: *Complex Problem Solving* (Appendix: C)
EA: *Complex Engineering Activities* (Appendix: D) **LoBT**: *Level of Bloom's Taxonomy* (Appendix: E)

8 Assessment Methods of COs

Assessment Method	CO1	CO2	CO3	Total
Continuous Lab Performance	15%	10%		25%
Lab Report	10%		5%	15%
Project Presentation & Viva	10%	10%	10%	30%
Lab Final (Hands on Test)	20%	10%		30%
Total	55%	30%	15%	100%

9 Lab Activity Outline

Class	Experiment Title	COs	Reference	Activities
1	Basic Ping and Traceroute Commands	1	Lab Manual, Experiment 1	Lab Experiment

2	Implementation of HTTP GET, POST	2	Lab Manual, Experiment 2	Lab Experiment
3	Configuration of SMTP Server	2	Lab Manual, Experiment 3	Lab Experiment
4	Implementation of DNS Server	2	Lab Manual, Experiment 4	Lab Experiment
5	Implementation of one-way and two-way socket programming	2-3	Lab Manual, Experiment 5-6	Lab Experiment
6	Socket Programming - threading	2-3	Lab Manual, Experiment 7	Lab Experiment
7	Practical Implementation of TCP/IP Flow Control	2-3	Lab Manual, Experiment 8	Lab Experiment
8-9	Practical Implementation of TCP Congestion Control	2-3	Lab Manual, Experiment 9	Lab Experiment
10	Implementation of Distance Vector Routing and Link State Protocol	2-3	Lab Manual, Experiment 10	Lab Experiment
11	Configuration of NAT	2	Lab Manual, Experiment 11	Lab Experiment
12	Configuration of OSPF	2-3	Lab Manual, Experiment 12	Lab Experiment
13	Project Presentation	1,2,3	Presentation, Viva	
14	**Final Examination**	1, 2, 3		

10 Text and Reference Materials

T Textbook:

- *Kurose, J. F., & Ross, K. W.*, **Computer Networking: A Top-Down Approach**, 8th Edition, Boston, USA: Addison Wesley, 2021.

R References:

- *Forouzan, B. A.* , **Data communication and Networking**, 4th Edition, Science Engineering & Math Publications, 2013.
- *Tanenbaum, A. S., & Wetherall, D. J.*, **Computer Networks**, 5th Edition, Pearson, 2011.

11 Grading Policy

Marks Obtained	Letter Grade	Numerical Evaluation	Definition
80% and above	A+	4.00	Excellent
75% <80%	A	3.75	Excellent
70% <75%	A-	3.50	Very Good
65% <70%	B+	3.25	Good
60% <65%	B	3.00	Good
55% <60%	B-	2.75	Good
50% <55%	C+	2.50	Average
45% <50%	C	2.25	Average
40% <45%	D	2.00	Below Average
below 40%	F	0.00	Failing

12 Additional Course Policies

1. **Equipment and Aids**: Bring your own materials such as a calculator, notebook, and pen to participate effectively in classroom activities. You are NOT allowed to borrow from others inside the classroom which may potentially create distractions for your classmates.
2. **Assignments**: There will be a number of assignments for formative assessment purposes. The average of the assignment marks will be used for computing the final grade. Late submission of homework will carry a zero mark.

3. **Class Tests**: There will be at least three Class Tests taken during the semester and the best two will be counted for final grading. A class test can be taken with/without prior announcement.

4. **Examinations**: The midterm and final examinations will be a closed book, closed notes. Mobile phones are strictly prohibited in the exam hall. Please bring your own watch (non-smart) and synchronize at the beginning of the examination.

5. **Test Policy**: In case of missing a test without prior notice to the respected faculty member, a zero mark will be given. No makeup tests will be taken as the best two test scores will be considered for grading out of three tests.

6. **Mobile Devices Policy**: Empirical evidence of using multitasking devices such as laptops and smartphones in the classroom hinders the learning experience. Thus, the use of multitasking devices is strictly discouraged. Switch off your laptop/mobile devices during class activities.

13 Additional Information

Please click or scan:

Academic Calendar Fall , 2024 :

Academic Information and Policies:

Proctorial Rules:

Grading and Performance Evaluation:

Maisha Muntaha
Course Coordinator, CSE 312
August 28, 2024

Dr. Muhammad Aminur Rahaman
Chairman, Department of CSE
August 28, 2024

Appendix A : Program Outcomes

POs	Category	Program Outcomes
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, 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	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	Investigations	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	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	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	Understand the impact of 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, responsibilities and the norms of the engineering practice.
PO9	Individual work and teamwork	Function effectively as an individual and as a member or leader of diverse teams as well as in multidisciplinary settings.
PO10	Communication	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	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	Recognize the need for and have the preparation and ability to engage in independent, life-long learning in the broadest context of technological change.

Appendix B : Knowledge Profile

Knowledge Profile	Attribute
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline
WK2	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
WK5	Knowledge that supports engineering design in a practice area
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline
WK7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability

WK8	Engagement with selected knowledge in the research literature of the discipline

Appendix C : Range of Complex Engineering Problem Solving

Attribute	Identity	Complex Engineering Problem Description
Depth of knowledge required	WP1	Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach
Range of conflicting requirements	WP2	Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	WP3	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
Familiarity of issues	WP4	Involve infrequently encountered issues
Extent of applicable codes	WP5	Are outside problems encompassed by standards and codes of practice for professional engineering
Extent of stakeholder involvement and conflicting requirements	WP6	Involve diverse groups of stakeholders with widely varying needs
Interdependence	WP7	Are high-level problems including many component parts or sub-problems

Note: Complex Engineering Problems have identity P1 and some or all of P2 to P7.

Appendix D : Range of Complex Engineering Activities

Attribute	Identity	Activity Description
Range of resources	EA1	Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies)
Level of interaction	EA2	Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	EA3	Involve creative use of engineering principles and researchbased knowledge in novel ways
Consequences for society and the environment	EA4	Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	EA5	Can extend beyond previous experiences by applying principles-based approaches

Note: Complex activities means (engineering) activities or projects that have some or all of the above activities.

Appendix E : Domain and Level of Bloom's Taxonomy

Cognitive Domain		Psychomotor Domain		Affective Domain	
C1	Remembering	P1	Perception	A1	Receive
C2	Understanding	P2	Set	A2	Respond
C3	Applying	P3	Guided Response	A3	Value
C4	Analyzing	P4	Mechanism	A4	Organize
C5	Evaluating	P5	Complex Overt Response	A5	Internalize
C6	Creating/ Designing	P6	Adaption		
		P7	Origination		