The University of Jordan
School of Engineering
Electrical Engineering Department
2nd Semester – A.Y. 2020/2021

Course:	**Telephone Communication Systems – 0953523 (3 Cr. – Elective Course)**
Instructor:	Dr. Raed Al-Zubi
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	Office Hours: Will be posted soon
Course website:	http://elearning.ju.edu.jo/
Catalog description:	Introduction. Telephone circuits. Round trip attenuation and delay time effects. Echo canceling. Signaling systems. Private Automatic Branch Exchanges (PABX). Transmission planning. PCM, A-law, Mu-law companding. PCM hierarchy. TDM transmission systems and their hierarchy. Traffic Theory: Erlang B and C formulas, traffic and resources calculations. Digital exchanges. Switching techniques. Network synchronization, control and hierarchy. Synchronization. System controllers and CPU. Common channel control and distributed control. Data Networks and ISDN and packet switching. Open systems interconnection and ISDN networks. Data and control interface to other systems. Signaling systems.
Prerequisites by course:	EE 0953422 Communications (II) (pre-requisite)
Prerequisites by topic:	Students are assumed to have a background in the following topics: • Digital baseband communications. • Probability and random variables.
Textbook:	**Telecommunications Crash Course by Steven Shepard, McGraw-Hill Education, 3rd Edition, 2014.**
References:	1. Modern Telecommunications: Basic Principles and Practices by Martin J N Sibley, CRC Press, 1st Edition, 2018.
	2. Telecom Systems, PSTN, PBX, Datacom, IP Telephony, IPTV, Wireless and Billing by Mr. Lawrence Harte and Avi Ofrane, DiscoverNet, 1st Edition, 2006.
	3. The Essential Guide to Telecommunications by Annabel Z. Dodd, Prentice Hall, 6th Edition, 2019.
	4. Telecosmos: The Next Great Telecom Revolution by John Edwards , Wiley-Interscience, 1st Edition, 2007.

5.	Data and Computer Communications by William Stallings, Pearson, 10th edition, 2013.	
6.	VoIP and Unified Communications: Internet Telephony and the Future Voice Network by William A. Flanagan, Wiley, 1st Edition, 2012.	
7.	Understood SIP and IP Telephony in 3 days: For the beginner by Nicholas Leonard, Independently published, 1st Edition, 2017.	

Schedule: 16 Weeks, 42 lectures (50 minutes each) plus exams.

Course goals: The overall objective is to introduce the student to the basics of telephony systems and analyze telecommunication traffic using queuing theory tools.

Course learning outcomes (CLO) and relation to ABET student outcomes (SO):

Upon successful completion of this course, a student will:	[SO]
1. Understand the fundamental and some advanced transmission techniques used in telecommunication systems.	[1]
2. Be able to use queuing theory to analyze and evaluate the performance of telecommunication networks.	[1]
3. Realize the ongoing and expected services and technologies in the field of telecommunications.	[1, 7]

Course topics:	Hrs
1. Introduction: regulations, standards, network classification, PSTN, OSI, TCP/IP models.	5
2. Key underlying technologies of telecommunication networks.	4
3. Multiplexing. PCM. Telephone Hierarchy: Plesiochronous Digital Hierarchy (PDH) and Synchronous Digital Hierarchy / Synchronous Optical Networks (SDH/SONET).	5
4. Circuit and Packet Switching. Voice-over-IP (VoIP).	4
5. Signaling in PSTN.	4
6. Speech coding and compression.	4
7. Assessing network quality.	4
8. Traffic analysis using queueing theory.	8
9. On-the-menu telecom services.	4

Ground rules: Attendance is required and highly encouraged. To that end, attendance will be taken every lecture. Eating and drinking are not allowed during class, and cell phones must be set to silent mode. All exams (including the final exam) should be considered cumulative. Exams are closed book. No scratch paper is allowed. You will be held responsible for all reading material assigned, even if it is not explicitly covered in lecture notes.

Assessment & grading policy:

	Assignments	0%	Quizzes	0%
	First Exam	30%	Projects	0%
	Midterm Exam	30%	Lab Reports	0%
	Final Exam	40%	Presentation	0%
			Total	**100%**

Last Revised: March 2021