İTÜ
DERS KATALOG FORMU
(COURSE CATALOGUE FORM)

Dersin Adı	Course Name
Bilgisayar Haberleşmesi ve Ağ Temelleri	Principles of Computer Communications and Networking

				Ders Uygulaması, Saat/Hafta (Course Implementation, Hours/Week)		
Kodu (Code)	Yarıyılı (Semester)	Kredisi (Local Credits)	AKTS Kredisi (ECTS Credits)	Ders (Theoretical)	Uygulama (Tutorial)	Laboratuar (Laboratory)
BLG337E	5	3	5	3	0	0

Bölüm / Program (Department/Program)	Bilgisayar Mühendisliği, Computer Engineering			
Dersin Türü (Course Type)	Seçmeli Elective	Dersin Dili (Course Language)		İngilizce English
Dersin Önkoşulları (Course Prerequisites)	-			

Dersin mesleki bileşene katkısı, % (Course Category by Content, %)	Temel Bilim (Basic Sciences)	Temel Mühendislik (Engineering Science)	Mühendislik Tasarım (Engineering Design)	İnsan ve Toplum Bilim (General Education)
	25	25	50	-

Dersin İçeriği (Course Description)	Bilgisayar haberleşmesine giriş. Temel haberleşme kavramları. Shannon diyagramı, kaynak-kanal-varış düğümleri kullanılarak haberleşme tanımı). Veri haberleşmesi ve entropi kavramı. Uluslararası Standartlar Organizayonu Açık Sistem Arabağlaşım (ISO-OSI) başvuru modelinin incelenmesi. Bilgisayar ağlarında katmansal yapı. fiziksel katman ve veri bağı katmanında, tasarımıyla ilgili önemli noktaların ve protokollerin incelenmesi.
	Introduction to computer communications and basic communications concepts. Shannon diagram, communication principle using source-channel-destination nodes. Data communications and entropy. Introduction to International Standards Organization Open SystemInterconnection (ISO-OSI) reference model, design issues and protocolsin the physical layer, data link layer and network layer, architectures and control algorithms, standards in network access protocols and models of network interconnection.

Dersin Amacı (Course Objectives)	1.Bilgisayar haberleşmesnin temel kavramlarını öğretmek. 2. Bilgisayar ağ sistemini Shannon diyagramı ile analiz etmek ve tartışmak. 3. Bilgisayar haberleşmesinin katmansal yapısını detaylı inceletmek. 4. Bilgisayar haberleşmesinde fiziksel katmanı kablolu ve kablosuz teknolojilerde öğretmek. 5. Veri bağı katmanını, klasik ve güncel yapıları da katarak öğretmek.
	1. To teach basics of computer communication concepts. 2. To analyze and discuss principles of computer networking using Shannon diagram. 3.To analyze the layered architecture of computer networks. 3. To teach the principles of physical layer with wired and wireless technologies. 4. To teach the principles of data link layer.

Dersin Öğrenme Çıktıları (Course Learning Outcomes)	1. Bilgisayar haberleşmesinin temel kuramlarını öğrenmek. 2. Bilgisayar ağlarında katmansal yapıyı öğrenmek. 3. Fiziksel ve veri bağı katman protokollerini öğrenmek. 4.Güncel kablolu ve kablosuz teknolojileri öğrenmek.
	1.Learn the principles of computer communications 2. Understand the basics of layered architecture of computer networks 3. Learn the physical and data link layers in computer networks. 4. Learn the current wired and wireless technologies.

Ders Kitabı (Textbook)	'Computer networking, a top-down approach featuring the Internet', James F.Kurose, Keith W.Ross, Pearson-Addison Wesley, 6th edition, 2012.		
Diğer Kaynaklar (Other References)	-'Data and Computer Communications', William Stallings, Pearson-Prentice hall, 9th edition, 2010. -'Tcp/Ip Protocol Suite', Behrouz A. Forouzan, McGraw Hill, 4th edition, 2010. - 'Computer Networks and Internets', Douglas E. Comer, Pearson Education, 5th edition, 2008. -'Computer Networks', Andrew Tanenbaum, Pearson, 5th edition,2010.		
Ödevler ve Projeler (Homework & Projects	Öğrencilerin dört ödev hazırlaması beklenir. Students are expected to prepare four homeworks		
Laboratuar Uygulamaları (Laboratory Work)	- -		
Bilgisayar Kullanımı (Computer Use)	Öğrencilerin ödevlerde, kendilerine verilen algoritmaları C programa dili kullanarak kodlamaları beklenmektedir (bölümün bilgisayar laboratuarı kullanılabilir). Students are expected to prepare their course projects by using the C programmıng language (the computer lab.s of the department could be used).		
Diğer Uygulamalar (Other Activities)	- -		
Başarı Değerlendirme Sistemi (Assessment Criteria)	Faaliyetler (Activities)	Adedi (Quantity)	Değerlendirmedeki Katkısı, % (Effects on Grading, %)
	Yıl İçi Sınavları (Midterm Exams)	2	2X20=40
	Kısa Sınavlar (Quizzes)		
	Ödevler (Homework)	4	4X5=20
	Projeler (Projects)		
	Dönem Ödevi/Projesi (Term Paper/Project)		
	Laboratuar Uygulaması (Laboratory Work)		
	Diğer Uygulamalar (Other Activities)		
	Final Sınavı (Final Exam)	1	40

DERS PLANI

Hafta	Konular	Dersin Çıktıları
1	Giriş, bilgisayar haberleşmesi kavramı, tarihçe ve günümüze kadar olan ilerlemeler	1
2	Shannon diyagramı, kanal prensibi, verinin gösterilmesi ve iletimi, entropi.	1
3	Bilgisayar haberleşmesinde katmansal yapı, iletim teknolojieri, fiziksel katman.	2
4	Kablolu ağlarda fiziksel katman yapıları ve topolojiler, modulasyon ve multiplexing	2
5	Fiziksel katmanda spekral analiz, kablosuz topolojilerde fiziksel katman.	2
6	Uygulama	2
7	Veri bağı katmanı, çerçeve yapısı, hata bulma ve giderme algoritmaları,yerel ağlar.	1
8	Kablolu ve kablosuz ağlarda anahtarlama, kapsayan ağaç kavramı. Sanal yerel ağlar.	1-2
9	Hatta çoklu erişimin kontrolu, temel MAC protokolleri.	1
10	Kayan pencere protokolleri. tıkanıklık ve akış yönetimi.	1
11	Kablosuz yerel ağlar, hücresel ağlara giriş. Hücre kapasitesi ve yönetimi.	3
12	Uygulama	2
13	2G ,3G,4G teknolojileri ve güncel kablolu/kablosuz bilgisayar haberleşmesi	3
14	Bilgisayar ağ standartlaşması. Kablolu ve kablosuz standartlar	3

COURSE PLAN

Weeks	Topics	Course Outcomes
1	Introduction. Basics of communications, the evolution of communication concepts	1
2	Shannon diagram, channel basics, Representation of data and Information, entropy.	1
3	Layered architecture in computer networks, physical layer principles.	2
4	Physical layer concepts in wired networks, modulation and multiplexing	2
5	Spectral analysis in physical layer. Electromagnetic spectrum, fading and interference.	2
6	Problem solving and review.	2
7	Data link layer principles,framing, error detection and correction. LANs.	1
8	Bridging in wired and wireless topologies, spanning tree bridges, switches, virtual LANs.	1-2
9	Medium Acces Control (MAC) taxonomy and protocols.	1
10	Sliding window protocols, congestion and flow controls	1
11	Wireless LAN,cellular networks, cell capacity planning	3
12	Problem solving and review.	2
13	2g,3G and 4G technologies, current wired and wireless computer communications	3
14	Network standardization	3

Relationship between the Course and Computer Engineering Curriculum

(1: "Little", 2: "Partial", 3: "Full", Leave blank if your answer is "None")

		Computer Engineering Department Program Outcomes and Performance Criteria		Level of Contribution		
				1	2	3
a		an ability to apply knowledge of mathematics, science, and engineering to the field of computer engineering				
	a1	Acquiring knowledge of mathematics, science and engineering				
		PC.a1	answers questions on mathematics	x		
		PC.a2	answers questions on science and engineering			x

	a2	**Applying knowledge of mathematics**			
		PC.a3	applies mathematical principles to obtain analytical or numerical solutions to computer engineering problems			x
		PC.a4	chooses appropriate mathematical methods/approaches for a given problem			x
	a3	**Applying knowledge of science and engineering fundamentals**			
		PC.a5	applies science and engineering principles to model and solve computer engineering problems			x
b	**an ability to design and conduct experiments, as well as to analyze and interpret data**				
	b1	**Designing experiments**			
		PC.b1	selects variables, appropriate equipment, test apparatus, model, etc			x
		PC.b2	chooses the effective measure(s) by which the outcome or the alternative will be evaluated			x
	b2	**Conducting experiments**			
		PC.b3	uses appropriate measurement techniques to collect data			x
		PC.b4	documents collection procedures so that the experiment may be repeated			x
	b3	**Analyzing data**			
		PC.b5	selects and uses appropriate tools (i.e., statistical and graphical) to analyze data			x
	b4	**Interpreting data**			
		PC.b6	interprets results with respect to the original hypothesis			x
c	**an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability**				
	c1	**Identifying stated needs and determining functional requirements and limitations**			
		PC.c1	describes scope of the problem and specifies the requirements based on the desired needs			x
		PC.c2	selects appropriate methods satisfying the constraints and the requirements			x
	c2	**Developing a design**			
		PC.c3	applies appropriate design methods			x
		PC.c4	designs a software system, component or process			x
		PC.c5	designs a hardware system, component or process		x	
		PC.c6	presents the complete design with appropriate tools		x	
	c3	**Implementing the design**			
		PC.c7	develops a solution/prototype based on the design		x	
	c4	**Testing and validating the developed solution**			
		PC.c8	describes test cases and strategies		x	
		PC.c9	debugs the developed solution and corrects detected errors		x	
d	**an ability to observe and examine an existing structure or system in a criticizing attitude and finally correct or enhance it**				
		PC.d1	observes an existing hardware/software system to analyze its functionality			x
		PC.d2	analyzes outputs given certain well-chosen inputs that cover different possible cases			x
		PC.d3	finds and corrects defects of a system			x
		PC.d4	enhances a system according to the requirements			x
e	**an ability to function on multi-disciplinary teams**				
		PC.e1	participates effectively as a team member in a long-term group/multi-disciplinary project team	x		
		PC.e2	takes and fulfills responsibilities in the team	x		
		PC.e3	participates in the development of ideas	x		
		PC.e4	incorporates feedback from others into revisions/improvements	x		
f	**an ability to identify, formulate, and solve engineering problems**				
		PC.f1	identifies a computer engineering problem			x
		PC.f2	formally describes constituents of a computer engineering problem			x
		PC.f3	develops a solution for a computer engineering problem			x
g	**an understanding of professional and ethical responsibility**				

		PC.g1	is aware of the code of ethics that guide the professional practice of engineering	x		
		PC.g2	identifies and defines ethical issues concerning a decision	x		
		PC.g3	evaluates and judges a situation in practice, using facts and a professional code of ethics		x	
h	**an ability to communicate effectively**					
	h1	**Written communication of information, concepts, and ideas effectively**				
		PC.h1	writes a document using an appropriate format and grammar and uses discipline-specific conventions including citations	x		
	h2	**Orally communicating information, concepts, and ideas effectively**				
		PC.h2	plans, prepares, and delivers a well-organized, logical oral presentation; explains when questioned	x		
	h3	**Graphically communicating information, concepts, and ideas**				
		PC.h3	uses professional graphics on written and oral presentations	x		
i	**the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context**					
		PC.i1	lists several types of impacts an engineering solution might have			x
		PC.i2	defines key terms associated with understanding of a societal context including society, culture, and global society			x
		PC.i3	recognizes the engineering aspects of a global problem			x
j	**a recognition of the need for, and an ability to engage in life-long learning**					
	j1	**Demonstrating an awareness of what needs to be learned**				
		PC.j1	determines what needs to be learned in an actual project		x	
	j2	**Ability to engage in life-long learning**				
		PC.j2	applies the learning plan to an actual research project and/or independent learning opportunity		x	
		PC.j3	attends seminars and training activities		x	
k	**a knowledge of contemporary issues**					
		PC.k1	identifies engineering problems with potential environmental impact issues			x
		PC.k2	lists and describes major socio-economic issues			x
		PC.k3	lists and describes major political issues at national or international levels			x
l	**an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice**					
		PC.l1	uses engineering techniques, skills, and tools to monitor performance of an engineering system and/or create an engineering design		x	
		PC.l2	uses engineering techniques, skills, and tools to acquire information needed for decision-making		x	
		PC.l3	selects appropriate techniques and tools for a specific engineering task		x	
m	**an ability to adapt to changing conditions**					
		PC.m1	adapts to new tools and approaches		x	
		PC.m2	practices different team roles in a working group	x		
		PC.m3	is aware of emerging fields and adapts to them		x	

**Düzenleyen (Prepared by)**	_**Tarih (Date)**_	_**İmza (Signature)**_
	12.05.2014	