**ITU**

**DERS KATALOG FORMU**

**(Course Catalogue Form)**

| **Dersin Adı:**  Bilgisayar Haberleşmesi Temelleri | **Course Name:**  Principles of Computer Communications |
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| **Kodu (Course Code)** | **Yarıyıl (Semester)** | **Kredisi (Local Credits)** | **AKTS Kredisi (ECTS Credits)** | **Ders Uygulaması, Saat/Hafta** | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Ders (Theoretical)** | **Uygulama (Tutorial/Recitation)** | **Laboratuvar (Laboratory)** |
| BLG337E | 5 | 3 | 5 | 3 | 0 | 0 |

| **Bölüm/Program**  **(Department/Program)** | Bilgisayar Mühendisliği / Computer Engineering |
| --- | --- |

| **Dersin Türü**  **(Course Type)** | Mühendislik Tasarım  Engineering Design | **Dersin Dili (Course Language)** | İngilizce  English |
| --- | --- | --- | --- |
| **Ders Zorunluluğu (Course Compulsion)** | | Seçmeli / Elective | |

| **Dersin Önkoşulları (Course Prerequisites)** | - | | | |
| --- | --- | --- | --- | --- |
| **Dersin Mesleki Bileşene Yüzde Katkısı**  **(Course Category by Content Percentage)** | Temel Bilim  (Basic Science) | Temel Mühendislik (Engineering Science) | Mühendislik Tasarım (Engineering Design) | İnsan ve Toplum Bilim (General Education) |
| 25% | 50% | 25% | - |

| **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 protocols in 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 Objective)** | 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. 4. To teach the principles of physical layer with wired and wireless technologies. 5. 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, 7th edition, 2017. |
| --- | --- |
| **Diğer Kaynaklar (Other References)** | Data Communications and Networking, Behrouz A. Forouzan, McGraw Hill, 5th edition, 2013.  Data and Computer Communications, William Stallings, Pearson-Prentice hall, 9th 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 (Homeworks & Projects)** | - |
| --- | --- |
| - |
| **Laboratuvar Uygulamaları (Laboratory Work)** | - |
| - |
| **Bilgisayar Kullanımı (Computer Use)** | Ödevlerin hazırlanmasında beklenir. |
| Students are expected to use computers during their homeworks |
| **Diğer Uygulamalar (Other Activities)** | - |
| - |

| **Başarı Değerlendirme Sistemi**  **(Assessment Criteria)** | **Faaliyetler (Activities)** | **Adedi (Quantity)** | **Değerlendirmedeki Yüzde Katkısı**  **(Effects on Grading by Percentage)** |
| --- | --- | --- | --- |
| **Yıl İçi Sınavları (Midterm Exams)** | 2 | 40% |
| **Kısa Sınavlar (Quizzes)** | 5 | 20% |
| **Ödevler (Homework)** | - | - |
| **Projeler (Projects)** | - | - |
| **Dönem Ödevi/Projesi (Term Paper/Project)** | - | - |
| **Laboratuvar Uygulaması (Laboratory Work)** | - | - |
| **Diğer Uygulamalar (Other Activities)** | - | - |
| **Final Sınavı (Final Exam)** | 1 | 40% |

**DERS PLANI**

**(Course Plan)**

| **Hafta** | **Konu** | **Dersin Çıktıları** |
| --- | --- | --- |
| **1** | Giriş, bilgisayar haberleşmesi kavramı, tarihçe ve günümüze kadar olan ilerlemeler | 1 |
| **2** | Shannon diyagramı, kanal prensibi, verinin gösterilmesi ve iletimi | 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. | 1-2 |
| **6** | Veri bağı katmanı, çerçeve yapısı | 2 |
| **7** | Veri Bağı katmanında 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. | 2-3 |
| **11** | Kablosuz yerel ağlar, hücresel ağlara giriş. | 3-4 |
| **12** | Hücre kapasitesi ve yönetimi. | 3-4 |
| **13** | 2G ,3G,4G teknolojileri ve güncel kablolu/kablosuz bilgisayar haberleşmesi | 3-4 |
| **14** | Bilgisayar ağ standartlaşması. Kablolu ve kablosuz standartlar | 2-3-4 |

| **Week** | **Topic** | **Course Outcome** |
| --- | --- | --- |
| **1** | Introduction. Basics of communications, the evolution of communication concepts | 1 |
| **2** | Shannon diagram, channel basics, Representation of data and Information. | 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. | 1-2 |
| **6** | Data link layer principles,framing | 2 |
| **7** | 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 | 2-3 |
| **11** | Wireless LAN,cellular networks, | 3-4 |
| **12** | cell capacity planning | 3-4 |
| **13** | 2G,3G and 4G technologies, current wired and wireless computer communications | 3-4 |
| **14** | Network standardization | 2-3-4 |

**DERSİN BİLGİSAYAR MÜHENDİSLİĞİ ÖĞRENCİ ÇIKTILARI İLE İLİŞKİSİ**

**Relationship between the Course and Student Outcomes**

**(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** |
| 1 | an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics |  | X |  |
| 2 | an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors |  |  | X |
| 3 | an ability to communicate effectively with a range of audiences | X |  |  |
| 4 | an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts |  |  | X |
| 5 | an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives |  | X |  |
| 6 | an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions |  |  | X |
| 7 | an ability to acquire and apply new knowledge as needed, using appropriate learning strategies |  |  | X |

**HAZIRLANMA BİLGİSİ**

**Edition Information**

| **Prepared by** | **Date** | **Signature** |
| --- | --- | --- |
| **Berk Canberk** | **27.11.2020** |  |
| **Approved by** | **Date** | **Signature** |
| **Dr.Tolga Ovatman** | **30.11.2020** |  |