**ITU**

**DERS KATALOG FORMU**

**(Course Catalogue Form)**

| **Dersin Adı:**  Bilimsel ve Mühendislik Hesaplamaya Giriş | **Course Name:**  Introduction to Scientific and Engineering Computation |
| --- | --- |

| **Kodu (Course Code)** | **Yarıyıl (Semester)** | **Kredisi (Local Credits)** | **AKTS Kredisi (ECTS Credits)** | **Ders Uygulaması, Saat/Hafta** | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Ders (Theoretical)** | **Uygulama (Tutorial/Recitation)** | **Laboratuvar (Laboratory)** |
| BLG102E | 2 | 4 | 8 | 3 | 2 | - |

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

| **Dersin Türü**  **(Course Type)** | Temel Mühendislik  (Basic Engineering) | **Dersin Dili (Course Language)** | İngilizce  English |
| --- | --- | --- | --- |
| **Ders Zorunluluğu (Course Compulsion)** | | Zorunlu (Compulsory) | |

| **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) |
| 20% | 40% | 40% | 0% |

| **Dersin İçeriği (Course Description)** | Problem modelleme, algoritmalar. Seçme ve yineleme yapıları. Türemiş veri yapıları, diziler. Soyutlama. Temel giriş-çıkış işlemleri. Temel sayısal yöntemler. |
| --- | --- |
| Problem modelling, algorithms. Selection and repetition constructs. Derived data types, arrays. Abstraction. Basic input/output operations. Basic numerical methods. |
| **Dersin Amacı (Course Objective)** | 1. Öğrencileri komuta dayalı programlama yaklaşımıyla bilgisayar programlamaya başlatma. 2. Öğrencilere mühendislik uygulamalarında genelde ihtiyaç duyulan temel programlama tekniklerini ve sayısal yöntemleri öğretme |
| 1. To introduce students computer programming using the imperative programming paradigm 2. To teach students the fundamental programming techniques and numerical methods commonly required in engineering applications |
| **Dersin Öğrenme Çıktıları (Course Learning Outcomes)** | 1. Bir algoritma geliştirerek bilgisayar programı yardımıyla bir problemi çözmek için modellemek. 2. Küçük ve orta ölçekli bilgisayar programlarını tasarlayabilmek, gerçekleyebilmek ve sınayabilmek. 3. C programlama dili için geliştirme araçlarıyla tanışıklık edinmek. 4. Temel programlama tekniklerine hakim olmak. 5. Temel sayısal problemleri ve çözümleriyle tanışıklık edinmek. |
| 1. Ability to model a problem for solving it with the help of a computer program and developing an algorithm. 2. Ability to design, implement and test small to medium scale computer programs. 3. Acquaintance with the development tools of the C programming language. 4. Mastering commonly used programming techniques. 5. Acquaintance with commonly used numerical problems and their solutions. |

| **Ders Kitabı (Textbook)** | Cay S. Horstmann, C++ For Everyone, 2nd edition, Wiley, 2011, ISBN: 978-0-470-92713-7. |
| --- | --- |
| **Diğer Kaynaklar (Other References)** | Brian W. Kenighan and Dennis M. Ritchie, The C Programming Language, 2nd edition, Prentice Hall, 1988, ISBN: 978-0131103627. |

| **Ödevler ve Projeler (Homeworks & Projects)** | - |
| --- | --- |
| - |
| **Laboratuvar Uygulamaları (Laboratory Work)** | - |
| - |
| **Bilgisayar Kullanımı (Computer Use)** | Linux ortamında C dili ile algoritma geliştirme |
| Algorithm development using C programming language on a Linux environment |
| **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)** | - | - |
| **Ödevler (Homework)** | 4 | 20% |
| **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. Program geliştirme aşamaları. Algoritmalar. | 1, 2 |
| **2** | Veri tipleri. İfadeler. Değişkenler. | 3,4 |
| **3** | Karar yapıları | 3,4 |
| **4** | Yineleme yapıları | 3,4 |
| **5** | Fonksiyonlar | 2-5 |
| **6** | Fonksiyonların Kapsamı | 2-5 |
| **7** | Diziler | 3,4 |
| **8** | Diziler ve Fonksiyonlar. | 2-5 |
| **9** | İşaretçiler | 3,4 |
| **10** | İşaretçiler ve Karakter katarları | 3,4,5 |
| **11** | Dosya işlemleri | 1-5 |
| **12** | Biçimlendirilmiş giriş-çıkış | 1-5 |
| **13** | Bit işlemleri. Önişleme | 2,3,4 |
| **14** | Sınıflar | 1-5 |

| **Week** | **Topic** | **Course Outcome** |
| --- | --- | --- |
| **1** | Introduction. Program development phases. Algorithms | 1, 2 |
| **2** | Data types. Expressions. Variables | 3,4 |
| **3** | Selection structures | 3,4 |
| **4** | Repetition structures | 3,4 |
| **5** | Functions | 2-5 |
| **6** | Functions and scope | 2-5 |
| **7** | Arrays | 3,4 |
| **8** | Arrays and functions | 2-5 |
| **9** | Pointers | 3,4 |
| **10** | Pointers and character strings | 3,4,5 |
| **11** | File operations | 1-5 |
| **12** | Formatted input/output | 1-5 |
| **13** | Bitwise operations. Preprocessing | 2,3,4 |
| **14** | Classes | 1-5 |

**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 |  |  |  |
| 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 |  |  |  |
| 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 |  |  |  |
| 6 | an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions |  |  |  |
| 7 | an ability to acquire and apply new knowledge as needed, using appropriate learning strategies |  |  |  |

**HAZIRLANMA BİLGİSİ**

**Edition Information**

| **Prepared by** | **Date** | **Signature** |
| --- | --- | --- |
| **Dr. Ayşe Tosun** | **19.11.2020** |  |
| **Approved by** | **Date** | **Signature** |
| **Dr.Tolga Ovatman** | **20.11.2020** |  |