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|  | **ECTS Course Description Form** |

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| **PART I ( Senate Approval)** |
| **Offering School** | Engineering |
| **Offering Department** | Computer Engineering |
| **Program(s) Offered to** | Computer Engineering |  |
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| **Course Code**  | CS 363 |
| **Course Name** | Systems Programming |
| **Language of Instruction** | English |
| **Type of Course** | Compulsory  |
| **Level of Course** | Undergrad |
| **Hours per Week** | **Lecture: 3** | **Laboratory:** | **Recitation:**  | **Practical:**  | **Studio:**  | **Other:**  |
| **ECTS Credit** | **6** |
| **Grading Mode** | Letter grade |
| **Pre-requisites** | CS102 |
| **Co-requisites** | **-** |
| **Registration Restriction** | - |
| **Educational Objective** | This course introduces the students the basics of programming under Unix and C programming. The students are exposed to topics such as Unix bash shell, Unix filesystem, C structure and basic C library routines.  |
| **Course Description** | This course spans the following topics: introduction to Unix OS, C programming, programming under Unix OS. |
| **Learning Outcomes** | **LO1:** Be able to use Unix commands, |
| **LO2:** Be able to write simple Unix bash shell scripts |
| **LO3**: Be able to explain the Unix file system and create/delete/search directories and files. |
| **LO4:** Be able to write C programs |
| **LO5**: Be able to compile, link, run and debug C programs under Unix |
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| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** |  |
| **PO1** | **Ability** to communicate effectively and write and present a report in Turkish and English. |  |  | 2 |  |  |  |
| **PO2** | **Ability** to work individually, and in intra- disciplinary and multi-disciplinary teams. |  | 1 |  | 2 | 1 |  |
| **PO3** | **Recognition** of the need for life-long learning and **ability** to access information, follow developments in science and technology, and continually reinvent oneself. |  |  |  |  |  |  |
| **PO4** | **Knowledge** of project management, risk management, innovation and change management, entrepreneurship, and sustainable development. |  |  |  |  |  |  |
| **PO5** | **Awareness** of sectors and **ability** to prepare a business plan. |  |  |  |  |  |  |
| **PO6** | **Understanding** of professional and ethical responsibility and **demonstrating** ethical behaviour. |  |  |  |  |  |  |
| **Faculty Specific Outcomes** | **PO7** | **Ability** to define complex engineering problems, develop models and implement solutions for these problems |  | 2 |  | 2 |  |  |
| **PO8** | **Ability** to conduct lab experiments by using computers and the ability of collecting, analysing and interpreting data.  |  |  |  | 1 |  |  |
| **PO9** | **Ability** to apply the knowledge of mathematics, science and engineering principles to solve problems in computer engineering. |  |  |  | 1 |  |  |
| **PO10** | An **understanding** of current contemporary issues and impact of engineering solutions in legal and ethical levels |  |  |  |  |  |  |
| **PO11** | **Ability** to understand and apply discrete mathematics concepts. |  |  |  |  |  |  |
| **PO12** | **Ability** to use modern engineering techniques, tools and information technologies and develop software equipment and software. | 1 | 2 | 1 | 2 | 1 |  |
| **PO13** | **Ability** to analyse, design and manage the hardware/software computer system requirements with limited resources and conditions by modern engineering principles. | 1 | 1 | 1 | 2 | 1 |  |

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| **PART III (Department Board Approval)** |  |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | **Subjects** | **Week** |  | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** |  |
| **S1** | 1 | Unix basics and filesystem | 1 |  |  |  |  |  |
| **S2** | 2 | bash shell | 1 | 1 |  |  |  |  |
| **S3** | 3 | Unix file management | 1 | 1 | 1 |  |  |  |
| **S4** | 4 | Unix utility programs | 1 | 1 | 1 |  |  |  |
| **S5** | 5 | C language syntax, data types, variables |  |  |  | 1 |  |  |
| **S6** | 6 | C control structures |  |  |  | 1 |  |  |
| **S7** | 7 | C functions |  |  |  | 1 |  |  |
| **S8** | 8 | Arrays, Strings |  |  |  | 1 |  |  |
| **S9** | 9 | Structures in C |  |  |  | 1 |  |  |
| **S10** | 10 | C pointers and memory management |  |  |  | 1 |  |  |
| **S11** | 11 | Bit manipulation, file management and system calls in C |  |  |  | 1 | 1 |  |
| **S12** | 12 - 13 | Compiling and linking C programs, using gdb debugger |  |  |  |  | 1 |  |
| **S13** | 14 | Building makefile |  |  |  |  | 1 |  |

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| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | 70% | Midterm is 30% and final is 40% of the final mark. | A make-up exam is provided in case of a legitimate reason with a proof. |
| **A2** | **Quiz** | 20% | Two quizzes, each is worth 10% of the final mark | No make-up |
| **A3** | **Homework** | 10% | Two assignments are submitted, each worth 5%. | No make-up |
| **A4** | **Project** |  | - | - |
| **A5** | **Report** |  | - | - |
| **A6** | **Presentation** |  | - | - |
| **A7** | **Attendance/ Interaction** |  | - | - |
| **A8** | **Class/Lab./****Field Work** |  | - | - |
| **A9** | **Other** |  | - | - |
| **TOTAL** | **100%** |  |  |
| **Evidence of Achievement of Learning Outcomes** | Students will demonstrate learning outcomes through midterm exam, quizzes, homework assignments, and the final exam. Every topic is tested with at least one exam, quiz or homework question. In order to pass, a student needs to accumulate at least 50 % of the total mark. |
| **Method for Determining Letter Grade** | The total mark is converted to a letter grade using the table below.

|  |  |  |  |  |  |  |  |  |  |  |  |
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| **Total points** | 100-95 | 94-90 | 89-85 | 84-80 | 79-75 | 74-70 | 69-65 | 64-60 | 59-55 | 54-50 | <50 |
| **Letter Grade** | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | F |

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| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| ***Time applied by instructor*** |
| **1** | **Lecture** | Lectures are presented using the white board, and a computer connected to the projector. Whenever necessary, sample questions and programs are given to clarify the theoretical concepts.  | 3 \* 14 = 42 |
| **2** | **Interactive Lecture** |  |  |
| **3** | **Recitation** |  |  |
| **4** | **Laboratory** |  |  |
| **5** | **Practical** |  |  |
| **6** | **Field Work** |  |  |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  |  |
| **8** | **Homework** | The students get the solution to homework questions after submission. | 6 \* 4 = 24 |
| **9** | **Pre-class Learning of Course Material**  |  | 5\*14 = 70 |
| **10** | **Review of Course Material** | It is expected that the students work for at least 6 hours before the midterm exam, and 10 hours before the final exam. | 6+10 = 16 |
| **11** | **Studio** |  |  |
| **12** | **Office Hour** | Two hours per week is allocated for students’ questions. In addition, students can arrange for a meeting at any time. | 2 \* 14 = 28 |
|  | **TOTAL** |  | 180 |

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| **IV. PART** |
| **Instructor** | **Name** | Halil Nejat Özmen |
| **E-mail** | halil.ozmen@gmail.com |
| **Phone Number** | 0535 946 8082 |
| **Office Number** |  |
| **Office Hours** | 2 hours per week |
| **Course Materials** | **Mandatory** | -- |
| **Recommended** | * "The C Programming Language", 2nd ed., Brian W. Kernighan and Dennis M. Ritchie

At least one of the following documents:* "Learning the bash Shell", 3rd Ed., Cameron Newham
* "Bash Guide for Beginners", Machtelt Garrels
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| **Other** | **Scholastic Honesty** | Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Any for of scholastic dishonesty is a serious academic violation and will result in a disciplinary action. |
| **Students with Disabilities** | Reasonable accommodations will be made for students with verifiable disabilities. |
| **Safety Issues** | - |
| **Flexibility** | The level of detail can be made more in-depth or can be reduced depending on the students interests and time availability. |