# DEPARTMENT OF CIVIL ENGINEERING
# COURSE SYLLABUS

| **Course Details** | | | | |
|---|---|---|---|---|
| **Code** | | | **Academic Year** | **Semester** |
| INF101 | | | 3 | Fall |
| **Title** | **T** | **A** | **L** | **ECTS** |
| Introduction to Computer Science and Programming | 2 | 0 | 2 | 6 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Language** | German | | | | | |
| **Level** | **Undergraduate** | **X** | **Graduate** | | **Postgraduate** | |
| **Department / Program** | Civil Engineering | | | | | |
| **Forms of Teaching and Learning** | Formal | | | | | |
| **Course Type** | **Compulsory** | | **Elective** | **X** | | |
| **Objectives** | After successfully completing this module, students are able to describe elementary concepts and methods of computer science. You have knowledge of imperative programming and basic knowledge of basic data structures. They are able to algorithmically convert problems into programs and use the programming languages C and C ++. | | | | | |
| **Content** | Introduction to Computer Science<br>-data representation in computers<br>-coding theory<br><br>Introduction to Programming<br>-algorithm, specification, program<br>-data types, variables, operators<br>-logical expressions, flow control, loops<br>-functions, areas of validity<br>-pointers<br>-enumerations, structures, fields<br>-microprocessor programming with Arduino (optional for interested students)<br><br>Students deal with these concepts by independently solving, programming and handing in predetermined, relevant programming tasks. | | | | | |
| **Prerequisites** | None | | | | | |
| **Coordinator** | | | | | | |
| **Lecturer(s)** | | | | | | |
| **Assistant(s)** | | | | | | |
| **Work Placement** | None | | | | | |

| **Recommended or Required Reading** | |
|---|---|
| **Books / Lecture Notes** | -Hartmut Ernst, Jochen Schmidt, Gerd Beneken. Grundkurs Informatik. Springer Viewek, 2016 |
| **Other Sources** | -Helmut Erlenkötter. C: Programmieren von Anfang an. RowohltTaschenbuchVerlag, 1999. |

| **Additional Course Material** |
|---|

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|---|---|---|
| **Documents** | - | |
| **Assignments** | - | |
| **Exams** | - | |
| **Course Composition** | | |
| **Mathematics und Basic Sciences** | 20 | % |
| **Engineering** | 20 | % |
| **Engineering Design** | | % |
| **Social Sciences** | | % |
| **Educational Sciences** | | % |
| **Natural Sciences** | | % |
| **Health Sciences** | | % |
| **Expert Knowledge** | 60 | % |

**Assessment**

| Activity | Count | Percentage (%) |
|---|---|---|
| **Midterm Exam** | 1 | 40 |
| **Quiz** | | |
| **Assignments** | 6 | 10 |
| **Attendance** | | |
| **Recitations** | | |
| **Projects** | | |
| **Final Exam** | 1 | 50 |
| | **Total** | **100** |

**ECTS Points and Work Load**

| Activity | Count | Duration | Work Load (Hours) |
|---|---|---|---|
| **Lectures** | 14 | 2 | 28 |
| **Self-Study** | 1 | 60 | 60 |
| **Assignments** | 6 | 9 | 54 |
| **Presentation / Seminar Preparation** | | | |
| **Midterm Exam** | 1 | 3 | 3 |
| **Recitations** | | | |
| **Laboratory** | | | |
| **Projects** | | | |
| **Final Exam** | 1 | 10 | 10 |
| | | **Total Work Load** | **155** |
| | | **ECTS Points** (Total Work Load / Hour) | **6** |

**Learning Outcomes**

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| | |
|---|---|
| **1** | Know how different types of data are displayed in computers |
| **2** | Knowledge of number arithmetic in computers |
| **3** | Knowledge of fault-tolerant, compressing and encrypting coding methods |
| **4** | Independent development of algorithms in pseudo code and implementation in the programming language C |
| **Weekly Content** | |
| **1** | Introduction to computer science, history, data display in computers |
| **2** | Number systems and binary arithmetic |
| **3** | Programming in C (basic terms: algorithm, flowchart) |
| **4** | Programming in C (datatypes, variables) |
| **5** | Programming in C (mathematical and logical operators) |
| **6** | Programming in C (if statements, flow control) |
| **7** | Programming in C (gotoloop construction) |
| **8** | Programming in C (loops) |
| **9** | Midterm exams |
| **10** | Coding and encryption |
| **11** | Programming in C (arrays and structures) |
| **12** | Programming in C (functions and scope of variables) |
| **13** | Programming in C (recursive functions) |
| **14** | Programming in C (functions, call-by-value, call-by-reference) |
| **15** | Programming in C (pointer) |

**Contribution of Learning Outcomes to Program Objectives (1-5)**

| | P1 | P2 | P3 | P4 | P5 | P6 | P7 |
|---|---|---|---|---|---|---|---|
| **1** | 5 | 5 | 5 | | | 3 | 1 |
| **2** | 5 | 5 | 5 | | | 3 | 1 |
| **3** | 5 | 5 | 5 | | | 3 | 1 |
| **4** | 5 | 5 | 5 | | | 3 | 1 |

| | |
|---|---|
| **Contribution Level** | 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High |
| | |
| **Compiled by:** | |
| **Date of Compilation:** | 12.03.2020 |