**Computer Engineering**

**Course Descriptions**

**Javad Alizadeh Shabkhoslati**

|  |  |
| --- | --- |
| **General** | **21** |
| **Basic** | **20** |
| **Major** | **59** |
| **Specialty** | **28** |
| **Optional** | **15** |
| **Total Credits** | **143** |

**Content Help**

|  |  |
| --- | --- |
| Course Name | نام درس (Course Name in Farsi) |
| Credit | Type | Prerequisite |
| Aim of course |

|  |  |
| --- | --- |
| **General Mathematics (1)** | **ریاضی عمومی (1)** |
| 3 | Theoretical |  |
| Basic concepts of calculus and geometry are thought to the students in this course which provide needed background for technical courses. |
| **General Mathematics (2)** | **ریاضی عمومی (2)** |
| 3 | Theoretical | General Mathematics (1) |
| Basic concepts of calculus and geometry are thought to the students in this course which provide needed background for technical courses, continuing "General Mathematics (1)" discussions. |
| **Physics (1)** | **فیزیک (1)** |
| 3 | Theoretical |  |
| This course teaches students fundamentals concepts of Mechanic and ThermodynamicsPhysics and is one of basic courses in engineering fields. |
| **Physics Laboratory** | **آزمایشگاه فیزیک (1)** |
| 1 | Practical |  |
| Testing Physics (1) subjects practically. |
| **Physics (2)** | **فیزیک (2)** |
| 3 | Theoretical | Physics (1) |
| Concepts of Electricity and Magnetic Physics which are basic for many electric and hardware courses and continuing "Physics (1)" discussions. Electric charge, Coulomb force, electric field and electric potential. Gauss’ law. Magnetic field, Ampere’s low. |
| **Physics Laboratory (2)** | **آزمایشگاه فیزیک (2)** |
| 1 | Practical | Physics (2) |
| Testing Physics (2) subjects practically. |
| **Fundamentals of Computer & Programming** | **مبانی کامپیوتر و برنامه سازی** |
| 4 | Theoretical |  |
| This course teaches students main concepts of programming and program making using a high level programming language such as Pascal. Techniques of developing and implementing algorithms in a high level language are thought in this course. |
| **Fundamentals of Information Technology** | **مبانی فناوری اطلاعات** |
| 3 | Theoretical |  |
| In this course, students become familiar with fundamentals and history of information technology. Furthermore, usage and effects of these technologies in society are discussed. |
| **Discrete Structures** | **ساختمانهای گسسته** |
| 3 | Theoretical | Fundamentals of Computer & Programming |
| An introduction to the foundations of discrete structures as they apply to computer science, focusing on providing a solid theoretical foundation for further work. Topics include sets, ordered structures, graph and trees, functions, proof techniques, number systems, logic, Boolean algebra, etc. |
| **Advanced Computer Programming** | **برنامه سازی پیشرفته** |
| 3 | Theoretical | Fundamentals of Computer & Programming |
| Students learn advanced concepts and techniques such as OO in programming using C++ language. |
| **Logic Circuits** | **مدارهای منطقی** |
| 3 | Theoretical | Discrete Structure |
| Students can gain a broad point of view to hardware aspects of computer engineering, by passing this course. |
| **Logic Circuits Laboratory** | **آزمایشگاه مدارهای منطقی** |
| 1 | Practical | Electric Circuits, Logic Circuits |
| Testing Logic Circuits Theory subjects practically. |
| **Data Structure** | **ساختمان داده ها** |
| 3 | Theoretical | Advanced Programming, Discrete Structure |
| A study of the development and use of Abstract Data Types for storing and retrieving data. Data structures considered include lists, strings, tables, stacks, trees, and graphs. Pointers, templates, and classes are used for implementing data structures. Other topics include searching and sorting algorithms and recursion. |
| **Differential Equations** | **معادلات دیفرانسیل** |
| 3 | Theoretical | General Mathematics (2) |
| In this course, first and second level linear differential equations and some non-linear differential equations are introduced, in addition to some numerical and analytical ways to solve them. |
| **Data Storage & Retrieval** | **ذخیره و بازیابی اطلاعات** |
| 3 | Theoretical | Advanced Programming, Data Structure |
| File systems working logic, how to store data in data storage devices such as H.D.D or tape or flash memory, how to recover stored data from these devices, different algorithms for accessing desired sector and block in a disk, and so on. |
| **Theory of Languages and Machines** | **زبانهای ماشین و برنامه سازی سیستم** |
| 3 | Theoretical | Data Structure |
| Some subjects of this course are finite automata, pushdown automata, Turing machine, Grammars and Languages, and so on. |
| **Technical Language** | **زبان تخصصی** |
| 2 | Theoretical | Advanced Programming, General English Language |
| The aim of this course is to teach students how to read the technical texts in their text books which written in English more efficiently. |
| **Electric Circuits** | **مدارهای الکتریکی** |
| 3 | Theoretical | Advanced Programming, General English Language |
| In this course student will learn how simple electric circuits that contain resistances, capacitors work. Also different laws will be introduced. |
| **Electric Circuits Laboratory (1)** | **آزمایشگاه مدارهای الکتریکی (1)** |
| 1 | Practical | Electric Circuits |
| Testing Electric Circuits subjects practically |
| **Statistics & Engineering Probabilities** | **آمار و احتمالات مهندسی** |
| 3 | Theoretical | General Mathematics (1) |
| By learning this course, students can use basic rules of probability theory for real modeling of information problems. |
| **Principles of Database Design** | **اصول طراحی پایگاه داده ها** |
| 3 | Theoretical | Data Storage & Retrieval |
| In this course, theoretical and practical concepts of relational databases are introduced, and concurrency, security, and completeness aspects of database systems are discussed. |
| **Scientific & Technical Presentation** | **شیوه ارائه مطالب علمی و فنی** |
| 2 | Theoretical |  |
| The aim of this course is to teach students how to read the technical texts in their text books which written in English more efficiently. |
| **Introduction to Algorithms** | **طراحی الگوریتمها** |
| 3 | Theoretical | Data Structure |
| Analysis of algorithms including time complexity and Big-O notation. Analysis of stacks, Queues, and trees, including B-trees. Heaps, hashing, and advanced sorting techniques. Disjoint Sets and graphs. Course emphasizes design and implementation. |
| **Computer Architecture** | **معماری کامپیوتر** |
| 3 | Theoretical | Logic Circuits |
| In this course, students learn how computers work and become familiar with their organization. Practical experiences to design, use and develop computer parts and joining them to microprocessors are also gained. |
| **Computer Architecture Lab** | **آزمایشگاه معماری کامپیوتر** |
| 1 | Practical | Computer Architecture |
| Testing Computer Architecture subjects practically. |
| **Design & Implementing Programming Languages** | **طراحی و پیاده سازی زبانهای برنامه سازی** |
| 3 | Theoretical | Data Structure |
| Basic concepts about program executions and programming languages internal architectures. |
| **Operating Systems** | **سیستم عامل** |
| 3 | Theoretical | Computer Architecture |
| This course is related to different Operating Systems, their parts and usages. |
| **Operating Systems Lab** | **آزمایشگاه سیستم عامل** |
| 1 | Theoretical | Operating Systems |
| Testing Operating Systems subjects practically. |
| **Principles of Database Design Laboratory** | **آزمایشگاه پایگاه داده** |
| 1 | Practical | Principles of Database Design |
| Testing principles of database design subjects practically. |
| **Software Engineering (1)** | **مهندسی نرم افزار (1)** |
| 3 | Theoretical | Data Storage & Retrieval |
| This course is related to ways and analysis techniques for developing and completing information systems. Students gain needed knowledge and experience to analyze and develop a computer software. |
| **Software Engineering (2)** | **مهندسی نرم افزار (2)** |
| 3 | Theoretical | Software Engineering (1) |
| Needed techniques for developing software systems are discussed in this lesson based on assessing characteristics, logical design, detailed design, and system test and maintenance. |
| **Theory of Languages and Machines** | **نظریه زبانها و ماشین ها** |
| 3 | Theoretical | Data Structure |
| Some subjects of this course are finite automata, pushdown automata, Turing machine, Grammars and Languages, and so on. |
| **Computer Lab** | **آزمایشگاه کامپیوتر** |
| 1 | Practical |  |
| Testing Computer subjects practically. |
| **Computer Networks** | **شبکه های کامپیوتری** |
| 3 | Theoretical | Operating Systems |
| Basics and Principles of Computer Networks and data transition systems are introduced in this course. Also practical principles of developing local networks are presented. |
| **Electronic Circuits** | **مدارهای الکترونیکی** |
| 3 | Theoretical | Electric Circuits |
| Students learn fundamentals of electrical quantities, circuit boards, labels, Laws Kirchoff, linear data analysis principles of electric circuits. Also how to measure and control voltage and current division, superposition, connecting resistors in series and parallel. |
| **Electronic Circuits Lab** | **آزمایشگاه مدارهای الکترونیکی** |
| 1 | Practical | Electronic Circuits |
| Testing Electronic Circuits subjects practically. |
| **Microprocessor (1)** | **ریز پردازنده (1)** |
| 3 | Theoretical | Computer Architecture |
| This course is related to topics regarding to microprocessors and basic concepts of designing and developing them. |
| **Microprocessor Lab (1)** | **آزمایشگاه ریز پردازنده (1)** |
| 1 | Practical | Microprocessor |
| Testing Microprocessor subjects practically. |
| **Artificial Intelligence** | **هوش مصنوعی** |
| 3 | Theoretical | Introduction to Algorithms |
| This course is related to Artificial Intelligence subjects in computer science such as Chess Game, Pattern Recognition, Speaking Understanding, and problem solving. |
| **Information Management Systems** | **سیستم های اطلاعات مدیریت** |
| 3 | Theoretical |  |
| In this course students will become familiar with how IMS and it principles, focuses on managing of information systems to provide efficiency and effectiveness of strategic decision making in companies. |
| **Engineering Mathematics** | **ریاضی مهندسی** |
| 3 | Theoretical | General Mathematics (2), Differential Equations |
| Discussing about advanced topics in mathematics that can be useful in engineering problems, such as complex numbers. |
| **Numerical Computations Methods** | **روشهای محاسبات عددی** |
| 3 | Theoretical | General Mathematics (2) |
| Students learn how to solve with simple solutions and find accepted and close results for complex mathematical problems. |
| **Object Oriented Design Principles** | **تحلیل و طراحی شی گرا** |
| 3 | Theoretical | Introduction to Algorithms |
| This course is related to advanced techniques for developing and designing object oriented programs and systems. |
| **Compiler Design Principles** | **اصول طراحی کامپایلر** |
| 3 | Theoretical | Theory of Languages and Machines, Data Structure |
| Compiler construction; lexical analysis, including regular languages and finite-state acceptors; syntactic analysis, including parsing techniques and grammars; code generation and optimization. |
| **Computer Simulation** | **شبیه سازی کامپیوتری** |
| 3 | Theoretical | Data Structure, Statistics & Engineering Probabilities |
| The course is about how the algorithms and equations used to model a system or a process. |
| **Internet Engineering** | **مهندسی اینترنت** |
| 3 | Theoretical |  |
| The main points of this course is about how internet is made to be like as we know and use it today. How it works and the different protocols that control the data over it. |
| **Advanced Topics in Software Engineering** | **مباحث پیشرفته در مهندسی نرم افزار** |
| 3 | Theoretical | Software Engineering (2) |
| This course continues Software Engineering (1) & (2) topics and gives more details about how to analyze, control and verify computer software in different ways. |
| **Internship** | **کارآموزی** |
| 2 | Practical |  |
| Students have to work in a company or manufacture in a field related to their interests or project for 240 hours and give a report about their work. |
| **Project** | **پروژه** |
| 3 | Theoretical | Software Engineering (1), Principles of Database Design, Operating System, Scientific & Technical Presentation |
| Developing a system using all or part of the materials that was gained through bachelor program based on personal interests. |

|  |  |
| --- | --- |
| **Physical Education (1)** | **تربیت بدنی (1)** |
| 1 | Practical |  |
| In this course students learn about human anatomy and its working processes during doing sports. |
| **Physical Education (2)** | **تربیت بدنی (2)** |
| 1 | Practical | Physical Education (1) |
| In this course students learn more technical information about human anatomy and should choose a specific field of sport to do and show their efficiency in that. |
| **General English Language** | **زبان خارجی** |
| 3 | Theoretical |  |
| In These Courses students will learn general and basic English requirements. |
| **Persian Literature** | **فارسی** |
| 3 | Theoretical |  |
| Teaches Persian literature to students and familiars them with Persian poets. |
| **Islamic Ethics (1)** | **اندیشه اسلامی (1)** |
| 2 | Theoretical |  |
| Teaches Islamic ethics to students. |
| **Islamic Ethics (2)** | **اندیشه اسلامی (2)** |
| 2 | Theoretical |  |
| Teaches the second part of Islamic ethics to students. |
| **Islamic Ethics & Training** | **اخلاق اسلامی (مبانی و مفاهیم)** |
| 2 | Theoretical |  |
| Becoming familiar with instructions in Islam. |
| **Nahj-Albalagha Exegesis** | **تفسیر موضوعی نهج البلاغه** |
| 2 | Theoretical |  |
| Becoming familiar with the Imam Ali`s book and the main principles of it. |
| **Islamic Revolution of Iran** | **انقلاب اسلامی ایران** |
| 2 | Theoretical |  |
| About Iran's Islamic revolutions, its roots, and why it was happened |
| **Culture and Civilization of Islam and Iran** | **فرهنگ و تمدن اسلام و ایران** |
| 2 | Theoretical |  |
| Introducing the rich history of Islam and its presence in Iran. |
| **Family Adjustment** | **جمعیت و تنظیم خانواده** |
| 1 | Theoretical |  |
| The aim of this course is discussing about correct sexual relations and related topics. |