Course Description for 2019/2020 Plan

Number	Name	Hours	Theoretical	Practical	Prerequisite
110101152	Discrete mathematics	3	3	0	-

Course Description

Propositional Logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rule of Inference, Introduction to Proofs; Sets, Set Operations, Functions, Sequences and Summations; Mathematical Induction; Algorithms, The Growth of Functions, and Complexity of Algorithms; The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations; Discrete Probability, Probability Theory; Recurrence Relations, Solving Linear Recurrence Relations, Generating Functions, Inclusion -Exclusion; Relations and their Properties, Representing relations, Closures of Relations, and Equivalence; Relations, Partial Order, Hasse Diagrams, and Topological Sort; Graphs and Graph Models, Graph Terminology and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Planar Graphs, Graph Coloring; Introduction to Trees, Applications of Trees, Spanning Trees.

Number	Name	Hours	Theoretical	Practical	Prerequisite
110101408	Numerical Methods	3	3	0	111001110 110101241

Course Description

Numerical Linear Algebra, Numerical Algorithms for the Solutions of Linear Systems, Linear Least Squares Problems (Best Approximate Solution for an Inconsistent Linear System) and Eigen value Problems. Number Representation and Errors, Locating Roots of Equations, Efficiency and Accuracy of the Algorithm in the Presence of Rounding Errors. Matrix Factorizations; Nonlinear Systems In particular Newton's Method, Unconstrained Optimization. Interpolation and Numerical Differentiation, Numerical Integration, Systems of Linear Equations, Approximation by Spline Functions, Monte Carlo Methods and Simulation, Ordinary Differential Equations, Smoothing of Data and the Method of Least Squares. Convergence of the iterative algorithms, and Converge to the Actual Solution and the rate of convergence.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011100	Introduction to Programming	3	3	0	-

Course Description

Introduce to the student the programming concepts using the C++ language. The course covers the fundamental concepts for analyzing problem statements, designing computer solutions, as well as an introduction into the syntax and semantics of the C++ language. It also focuses on Data types, variables, constant, Operators and expressions, Control flows, Functions, Arrays, and classes.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011101	Introduction to Programming Lab	1	0	2	With 1910011100

Course Description

The course provides students with basic understanding of C++ programming language. It shows students the ideal way to create programs by c++ language. It introduces the history of computer programming languages, and in more details covers the C++ programming languages by study the syntaxes and rules of C++ languages.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011110	Object Oriented 1	3	3	0	1910011101

Course Description

This course provides students with a comprehensive study of the Java Programming Language. The course stresses the object paradigm including classes, inheritance, virtual functions, and templates in the development of Java programs. Lab exercises reinforce the lectures.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011111	Object Oriented 1 lab	1	0	3	With 1910011110

Course Description

The objectives of the course are to have students identify and practice the object-oriented programming concepts and techniques, practice the use of Java classes and class libraries, modify existing Java classes, develop Java classes for simple applications, and practice the concepts of Object-Oriented Analysis and Design (OOA/OOD) and design patterns and frameworks by developing a Java based project.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011212	Object Oriented 2	3	3	0	1910011110

Course Description

This course teaches the fundamental ideas behind the object-oriented approach to programming; through the widely-used Java programming language. Concentrating on aspects of Java that best demonstrate object-oriented principles and good practice, students will gain a solid basis for further study of the Java language, and of object-oriented software development.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011213	Object Oriented 2 Lab	1	0	3	With 1910011212

Course Description

This course presents a conceptual and practical introduction to imperative and object oriented programming, exemplified by Java. As well as providing a grounding in the use of Java, the course will cover general principles of programming in imperative and object oriented frameworks. The course should enable you to develop programs that support experimentation, simulation and exploration in other parts of the Informatics curriculum (e.g. the capacity to implement, test and observe a particular algorithm).

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011214	Visual Programming	3	3	0	1910011110

Course Description

Introduction to the principles of programming for Windows in Visual Basic. Event driven programming. Control structures. Data types and structures. Properties, events, and methods of forms controlling. Modular programming.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011215	Visual Programming Lab	1	0	2	With 1910011214

Course Description

Visual programming environment, Hands on practicing using one of the visual programming languages such as VB.Net. Developing programs using object oriented programming, building user interface forms, connecting to Database.

Number	Name	Hours	Theoretical	Practical	Prerequisite
151002310	Programming of internet applications	3	3	0	151001212 or 151001110

Course Description

Quick review of the Internet and Internet programming concepts, Web Servers and Web Application Servers, Design Methodologies with concentration on Object- Oriented concepts, Client-Side Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications, Programming Common Gateway Interfaces, Programming the User Interface for the web applications.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011240	Theory of Computation	3	3	0	110101152

Course Description

Language theory includes: regular expressions, regular languages, finite automata (deterministic and non-deterministic), Context-Free Languages, Pushdown automata, and language grammars, simple introduction to Turing machines.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011250	Data structures	3	3	0	1910011111

Course Description

Present fundamental techniques in the design and analysis of data structures using Java Programming Language. Fundamental data structures include: lists, stacks, queues, trees, priority queues, hashing, graphs, and search trees. Introduces algorithm design and analysis techniques such as recursion and formal methods for analyzing the time and space requirements of programs.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011123	Digital logic design	3	3	0	110101152

Course Description

A modern introduction to logic design and the basic building blocks used in digital systems, methods for designing digital circuits, implementation of systems computer systems, control systems and other applications which demand digital hardware. Topics include: Numbering systems, conversion methods, binary and complement arithmetic, Boolean algebra, circuit minimization techniques, Combinational circuits: Adders, Decoders, Encoders, Code Converters, Sequential Circuits: flip-flops, counters, registers, synchronous sequential circuits.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011330	Multimedia Programming	3	3	0	1910011214

Course Description

Various elements of multimedia developmental environment: hardware and software such as: text, sound, images, animation, video, multimedia authoring techniques, multimedia approaches on Web including digitizing of audio and video multiple types of audio, images, video and animation, broadcasting techniques. Planning and producing multimedia projects, testing and deliver, compression algorithms and digital audio conversion.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011351	Algorithms	3	3	0	1910011250

Course Description:

The design and analysis of computer algorithms, growth of functions, recurrences, sorting, divide-and-conquer, binary search tree, red black tree, dynamic programming, greedy algorithms, graph searching and graph algorithms, flow networks, bipartite matching, NP-completeness.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011460	Artificial Intelligence	3	3	0	1910011250

Course Description

Rapidly-developing fields of artificial intelligence (AI): general knowledge representation techniques and problem solving strategies, classical and heuristic search techniques, rule-based systems, production system, stochastic system, prepositional and first order logic, fact representation in logic and logic programming (Prolog). Natural language processing, machine learning, expert systems, reasoning, neural network.

Number	Name	Hours	Theoretical	Practical	Prerequisite
110408240	Computer Organization	3	3	0	111001123 or110408220

Course Description

Understand how computer systems get into action, computer components, computer arithmetic's, processor structure and function, instruction sets, internal memory, I/Os and external memory.

Number	Name	Hours	Theoretical	Practical	Prerequisite
110408343	Computer Architecture	3	3	0	110408240

Course Description

Understand the behavior of computer systems in various applications, computer evaluation and performance, computer unit operation, micro-programmed control, reduced instruction set computers, instruction-level parallelism and superscalar processors, and parallel processing.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011320	Computer Networks	3	3	0	110408240

Course Description

Principles, design, implementation, and performance of computer networks, Internet protocols and routing, local area networks, wireless communications and networking, performance analysis, congestion control, TCP, network address translation, multimedia over IP, switching and routing, mobile IP, peer-to-peer networking, network security.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011422	Network Security	3	3	0	1910011320

Course Description

Theory and practice of computer security, focusing in particular on the security aspects of the web and Internet. Cryptographic tools used to provide security, such as shared key encryption (DES, 3DES, RC-4/5/6, etc.); public key encryption, key -Hellmann, RSA, DSS, etc.). Utilizing these exchange, and digital signature (Diffie concepts in the internet protocols and applications such as SSL/TLS, IPSEC, Kerberos, PGP, S/MIME, SET, and others (including wireless). System security issues, such as viruses, intrusion, and firewalls, will also be covered.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011431	Operating Systems	3	3	0	110408240

Course Description

Concepts and principles of operating systems, structure and services, processor scheduling, thread, virtual machine, processing synchronization, deadlocks, concurrent processes, memory management, virtual memory, input/output, secondary storage management, and file systems.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011423	Parallel and Distributed Computing	3	3	0	1910011320

Course Description

Basic architectural, programming, and algorithmic concepts in the design and implementation of parallel and distributed applications. The specific topics include, but not limited to, multithreaded programming, message passing interface, Shared memory programming, GPU, and cloud computing.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011421	Wireless networking	3	3	0	1910011320

Course Description

The design and implementation of wireless networks and mobile systems, the science and technology behind wireless networks, comprehensive view of the electromagnetic spectrum, mobile computing concepts and applications, the concepts of frequency and wavelength, radio propagation and attenuation, telecommunications via wireless, technology offerings, frequency allocations, and types of wireless technologies and their appropriate application, Wireless LAN technology, TCP/IP suite and sub netting, and IEEE 802.11 wireless LAN standard.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011373	Simulation	3	3	0	1910011250

Course Description

System modeling and simulation, Discrete and Continuous Markov Chains, Queuing Theory, Discrete Event Simulation, Large Sample Estimation, Output Statistics, Test of Randomness, Monté Carlo Simulation, sequence of assignments using some simulation tools such as ARENA..

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011341	Operation research	3	3	0	110101408

Course description

The Linear programming models, Simplex & revised simplex algorithms, Duality and sensitivity analysis in LP, Transportation and assignment problems, Decision Trees, Integer programming models, and the applications of the operations research.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011416	Programming languages Design	3	3	0	151002310

Course Description

Fundamental concepts and general principles underlying current programming languages and models, control and data abstractions, language processing and static and dynamic binding, indeterminacy and delayed evaluation, and languages and models for parallel and distributed processing. A variety of computational paradigms such as: functional programming, logic programming, object-oriented programming and data flow programming.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011474	Computer Graphics	3	3	0	1910011250

Course Description

Hardware and software principles of interactive raster graphics. Introduction to the basic concepts, 2-D and 3-D modeling and transformations, viewing transformations, projections, rendering techniques, graphical software packages and graphics systems. Students will use a standard computer graphics API to reinforce concepts and study fundamental computer graphics algorithms.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011322	Mobile Application development	3	3	0	1910011212

Course Description

This course covers software mobile application development, its architecture and lifecycle, as well as its inherent design considerations. Students will learn about mobile resources, activities, views, layouts, and intents in addition to interacting with the location based services, messaging services, multimedia interfaces, sensors available on the mobile device, and application distribution.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011490	Graduation Project (1)	1	1	0	Finish 80 hours

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011491	Graduation Project (2)	2	0	4	1910011490

Course Description

There are no formal lectures for this course but the student holds discussion at least 3 hours a week with the supervisor. The student will be given assigned a practical project where he/she is expected to analyses, design and implement it and finally to write a report of very high quality.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011492	Special Topics in computer science	3	3	0	-

Course Description

Covers topics of interest in computer science at the senior undergraduate level. Content varies from semester to semester. Prerequisites: Consent of instructor.

Number	Name	Hours	Theoretical	Practical	Prerequisite
1910011480	Practical Training	3	0	0	Finish 90 hours