



SYRIAN ARAB REPUBLIC

DAMASCUS UNIVERSITY

Faculty of Information Technology Engineering

Detailed List & Syllabuses of Courses

Taken by a graduate at

The Faculty of Information Technology Engineering,
Department of Software Engineering and Information
Systems

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The first page

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The First Year

Physics 1

Syllabus

- General mechanics laws
 - Motion equations
 - work and energy
- Physics of semi-conductors (preliminary of electrical and electronic circuits)
 - Crystal structure of solids
 - Quanta-mechanic for reasoning the fundamental characteristics of energy levels in solids and situations density function and the statistical laws which clarifies the structures of bodies.
 - The situation of equilibrium of semiconductors.
 - Pure semi-conductors.
 - Charge porters density in pure semiconductors.
 - Charge porters transmission via an electrical field.
 - Propagation current density.
 - The link (P-N).
 - Spatial charge.
 - The direct and indirect polarization of I inks.
 - Stable situation.
 - Mechanical resistance.
 - Zener effect.
 - One-side links.
 - Applications in links of (P-N).
 - The transistor (types, its characteristic curves, gain factor, practical example in its manipulations).

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Classroom activities 15%
- Assessments 15%
- Final exam 70%

English Language 1

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

General Algebra

Syllabus

- Set, binary relations, equivalence relations, order relations, partitions, totally ordered sets, superior element, greatest element, counting, binomial theorem, arrangements and permutations.
- Decomposition internal lows, Group, subgroup, homomorphism, symmetrical group.
- Ring, integral domain, principal ring, principal ideal, prime ideal, prime numbers, GCD, LCM, Euclidian division.
- Polynomial degree, roots, irreducible polynomial, division with increasing (decreasing) powers.

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Classroom activities 5%
- Assessments 10%
- Practical exam 15%
- Final exam 70%

Analysis 1

Syllabus

- Sequences
 - Increasing and decreasing sequences
 - Bounded sequences
 - Limit of a sequence
 - Convergence
 - Divergence
 - Monotony
 - Cauchy sequences.
- Series
 - Partial sum
 - Convergence of a series
 - Absolute convergence
 - Non negative series
 - Riemann series
 - Comparison of series
 - Alternative series.
- Real function's limit
- Functions continuity,
- Real function's zeros compact subsets and continuity
- Lipchitz condition
- Theorem of fixed point.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Classroom activities 5%
- Assessments 10%
- Practical exam 15%
- Final exam 70%

Computer Operating Principles

Syllabus

- Fundamental concepts, Informatics and computers.
- Information representation.
- Computer hardware components.
- Computer peripherals.
- Computer software components.
- Digital information transmission.
- Informatics network and interne.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 10%
- Final exam 70%

Socialist National Culture

Teaching hours

- Theoretical: 2 hours a week.
- Total hours a week: 2 hours a week.
- Total hours per semester: 28 hours per semester.

Evaluation

- Final exam 100%

Programming 1

Syllabus

- Introduction to algorithms
 - Pseudo-code
 - Flow Chart
- Basics programming statements (Read, Write, Assign, Condition, Loops).
- Basic predefined functions and operators.
- Variables and primitive types (Integer, Boolean, Char, Real, String).
- Arrays (One dimension and multidimensional arrays)
- Functions and Procedures
- Passing variables to functions (pass by value, pass by reference)
- Recursion

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Weekly labs 10%
- Weekly assignments 10%
- Assessments 10%
- Final exam 70%

Analysis 2

Syllabus

- Derivative of high order, Taylor series, finite development, local study of a function.
- Sequences, Series of functions, simple, uniform and normal convergence, power series.
- Piecewise continuity, primitives and integrals, integration by parts, integration by variable change, fractions partition and in integrals.
- Generalized integrals and parametric integrals, Euler's functions.

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Classroom activities 8%
- Assignment 2%
- Practical exam 20%
- Final exam 70%

Linear Algebra

Syllabus

- Fields, symmetrical group.
- Vector space, free system, generator system basis dimension.
- Linear map, kernel, image.
- Matrix, square matrix, invertible matrix, matrix of linear map.
- Linear map.
- Linear system.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Classroom activities 5%
- Assessments 10%
- Practical exam 15%
- Final exam 70%

Electrical & Electronic circuits

Syllabus

- Introduction: electrical circuits, and
- Concepts of current, energy and power.
- Resistances and CUM law.
- Continuous feeding resources (ideal, practical).
- Kirchhoff laws.
- Alternative feeding resources, and generalized OUM law.
- Laplace transformations, transmission functions and filters.
- Semi-conductors, P-N (Polarization-Modalaziation, type).
- Bi-polarized transistor (effects, forms, work types, modalaziation, calculating of work point).
- Fields effects transistor: types JFET and MOseft, forms, modalaziation.
- Transistor amplifications: calculating of amplifications mediums, famous forms of the amplifications and their characteristics.
- The amplificatory and its applications: Differentiated amplificatory, some linear and non-linear amplifier.
- Response to separate electronic elements.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Weekly reports 10%
- Assessments 10%
- Practical exam 10%
- Final exam 70%

English Language 2

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

Programming 2

Syllabus

- Pointers.
- Complex types (Enum, Records).
- Using Files.
- Programming Libraries: use and build a programming Library.
- Introduction to Object Oriented programming.

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Weekly labs 10%
- Weekly assignments 10%
- Assessments 10%
- Final exam 70%

The Second Year

Probabilities and Statistics

Syllabus

- Events and their probabilities (Conditional probability, random independency, probability spaces).
- Random Variables (Law of probability, probability density, random independency, mathematical expectation, law of large numbers, random vectors, some famous random variables, mutual random distributions, conditional random distributions and mathematical expectation).
- Genetic functions and their applications, genetic functions, distinguished functions for
- Famous random variables, law of large numbers and central limitation theorem.
- Attending lines (random systems, attending lines, single server attending Lines, multi-windows attending line).
- Fundamentals concepts in Statistics (general problem in decision making,
- Statistical decisions, decision problem precision, optimized procedures, loyalty and ordering of statistical procedures, sufficient statistics).
- Punctual estimation (Optimum probability in punctual estimations, solid estimations,
- Trust sets and intervals).
- Hypotheses tests, Niman-persol preliminary.
- Random numbers (Generating, regular distributed random numbers, linear method in measurement some other methods in generating regular distributed random numbers).
- Random tests (general methods in hypotheses tests, experimental tests).

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Classroom activities 10%
- Practical exam 20%
- Final exam 70%

Algorithms and Data Structures 1

Syllabus

- Basic concepts in algorithms.
- Iterative Algorithms.
- Divide-and-conquer Algorithms.
- Algorithmic Analysis and Efficiency
- Time and Space Complexity.
- Search and Sort Algorithms.
- Recursive Algorithms.
- Recursive Drawing and Fractals.
- Transforming recursive Algorithms to iterative Algorithms.
- Backtracking Algorithms.
- Dynamic Programming.
- Greedy Algorithms.
- Basic concepts in data structures.
- Abstract data typing.
- Linear Data Structures.
 - Vectors.
 - Linked lists.
 - Double Linked lists.
 - Circular Linked lists.
 - Queue
 - Stack
 - Set
 - Map
- Indexing Data.
 - Skip List
 - Hash Table.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 3 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Analysis 3

Syllabus

- Function of several variables derivability first order differential form
- Power series - exponential function - analytic functions holomorphic functions - Cauchy theorem.
- Laurent series, residues theorem and its applications.
- Fourier's series and its applications.

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Classroom activities 15%
- Assessments 15%
- Final exam 70%

Analysis 3

Syllabus

- Function of several variables derivability first order differential form
- Power series - exponential function - analytic functions holomorphic functions - Cauchy theorem.
- Laurent series, residues theorem and its applications.
- Fourier's series and its applications.

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Classroom activities 15%
- Assessments 15%
- Final exam 70%

Computer architecture 1

Syllabus

- The machine language instruction set.
- The microprocessor Design and Implementation.
- Memories Organization and Design.
- Interfacing processors and peripherals.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Logical Circuits

Syllabus

- Number systems and Information Representation:
- Binary and hexadecimal number system. Negative number representation. BCD codes. excess-1 codes. gray codes.
- Boolean Algebra: AND gate. Or gate. NOT gate. Truth tables. Boolean Algebra laws.
- Combinational circuit minimization: Karnaugh maps, Quine-McCluskey algorithm.
- Famous combinational circuits: decoders, multiplexers. Full Adder. PLA. ROM.
- Introduction to sequential logic: RS Flip flop. Jk flip flop. D flip flop. Registers. Counters.
- Synchronous sequential circuits Design: Finite state machines. Timing methodologies. examples.

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Weekly reports 15%
- Practical exam 15%
- Final exam 70%

Programming 3

- Object-Oriented Programming.
 - Class and Object
 - Controlling access to class members
 - Constructor and Destructor
 - Properties
 - Composition
 - Static members
 - Methods Overloading
 - Inheritance
 - Polymorphism
- Inner Classes
- Abstract Classes
- Interfaces
- Templates

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Weekly labs 10%
- Weekly assignments 10%
- Assessments 10%
- Final exam 70%

Algorithms and Data Structures 2

Syllabus

- Trees
 - Generalized Trees
 - Binary Trees
 - Binary Search Trees
 - Heaps (Heap Sort, Priority Queue)
- Balanced Trees
 - AVL Trees
 - B-Trees
- Graphs
 - Graph Basics: Directed\Undirected Graphs, Weight\Unweighted Graph
 - Graph Traversal: Depth First Search (DFS) and Breadth First Search (BFS)
 - Topological Sort
 - Shortest Path (Dijkstra Algorithm)
 - Minimum Spanning Tree
- Hash Tables

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 3 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Arabic Language

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

English Language 3

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

Digital communications and Information Theory

Syllabus

- Entropy and Information, Uncertainty, Entropy and its properties, Conditional Entropy, Information, Mutual Information and its properties, Data processing theorem, Relative Entropy, source coding theorem, Memory less sources, Instantaneous and uniquely decipherable codes, The Kraft-McMillan inequalities, Noiseless coding theorem for memory less sources, Constructing compact codes, Shannon-Fano Algorithms, Lempel-Ziv algorithm
- Communication Through noisy channels, the discrete memory less channel, the capacity of channel, the Noisy Coding Theorem, General Sources, the structure of natural languages, Differential Entropy and Gaussian Channel.
- Network Information theory, Multiple access channel, Broadcast channel
- Signals and linear systems, Analogue Pulse Modulation, Pulse Code Modulation PCM, Base - band Digital Transmission, Band- pass Digital Transmission, Modems, Data Networks protocols.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Numerical Analysis

Syllabus

- Numbers presentation, floating-point, rounding, errors, machine precision, propagation of errors and stability.
- Resolution of non linear equations: Secant method, Newton's method, iterative methods, Muller's method.
- Interpolation: polynomial interpolation, Newton divided differences, Hennitte interpolation, piecewise polynomial interpolation, spline functions, cubic lagrange interpolation.
- Numerical integration: trapezoidal rule, Simpson's rule, Gaussian quadrature, Gauss-Legendre quadrature, adaptive numerical integration.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Classroom activities 6%
- Practical exam 24%
- Final exam 70%

The Third Year

Operational Research

Syllabus

- Graph theorem convolutions (fundamental definitions, information-representation of data).
- Research algorithms inside a graph (wide search, deep search, applications).
- Minimum tree (properties of minimum weight tree, Kruskal algorithm, Prim algorithm).
- Research for the shortest paths (from a nodal points to other nodal points, dijkstra algorithm, Bellmann algorithm, general algorithm in searching for shortest paths. Linear programming- mathematical concepts and tools (linear programming signification, general form of linear program, example in formulating a linear program model methods in solving linear programs)
- Linear programming: Siplmex method (canonic formula of linear programs. specification a circuit primitive original simplex algorithm, table, form to original primitive simplex algorithm, matrix of basis changing and the canonic formula of inversion, modified simplex algorithm, complexity of simplex algorithm.
- Binary problem and the complementary of linear programming: (concept, explaining the binary problem for a linear program (variables and marginal costs),
- Introduction in problems complexity: (what is an efficient algorithm, NP classes, NP-Complete classes).

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Seminars 15 %
- Classroom activity 15%
- Final exam 70%

Programming Languages

Syllabus

- Java Programming Language.
- Java as structured programming language.
- Using Basic Programming Packets.
- Exception Handling.
- Multi –Threading.
- Using Collections.
- Building Graphical User Interfaces (GUI)
- Events and Listeners.
- ANSI-C Programming Language.
- C as structured programming language.
- Specific programming techniques in C.
- Programming Languages comparison (strength and weaknesses).

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 2.5%
- 2nd assignment 2.5%
- Project 15%
- Assessments 10%
- Final exam 70%

Computer Architecture 2

Syllabus

- Pipelining.
- Multiprocessing.
- Superscalar Architecture.
- Performance related issues.
- Analysis and Design a simple CPU.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Principles of Artificial intelligence

Syllabus

- Introduction to Artificial Intelligence.
- Intelligent Agents.
- Logical Agents.
- Forward and backward chaining.
- Inference.
- First Order Logic
- Inference in first-order logic.
- Introduction Knowledge-Based Systems.
- Introduction to Expert Systems.
- Prolog.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Practical part 30%
- Final exam 70%

Graphics and Computer Aided Design

Syllabus

- Standard definition of graphics.
- Devices definition of graphics.
- Bi-dimensional graphics.
 - Basic algorithm (ex Bresenham).
 - Standard graphical system and basic functions.
 - GUI.
 - Graphical file format (vector, raster).
- Three-dimensional graphics.
 - Geometrical Transformation.
 - Projection and clipping.
 - Modeling.
 - Solids and Boolean Operations between them.
 - Bezier and spline.
 - Coloring, Lighting and Shading.
 - Texturing.
 - Computer-aided design.
 - Ray Tracing.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- Practical part 30%
- Final exam 70%

Scientific Calculations Project

Teaching hours

- Theoretical: 1 hours a week.
- Practical: 3 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final interview 100%

Basics of Information Networks

Syllabus

- Historical preliminary of computer networks beginning.
- General definition of communication protocols.
- OS layers and service primitives
- Serial ports and the protocol RS232.
- Local networks:
 - Topology of local networks.
 - Ethernet protocol.
- Internet protocols: TCP/IP family:
 - Internet layers.
 - Internet addresses.
 - Encapsulation.
 - Demultiplexing.
 - Protocol IP (IPV4,IPV6).
 - Protocol X25.

Teaching hours

- Theoretical: 4 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- Practical part 30%
- Final exam 70%

Databases 1

Syllabus

- Introduction to databases.
- Entity-Relation model and Entity Relational Diagram (ERD)
- Relational model (Relational Algebra).
- SQL language.
- Integrity Constraints.
- Relational Database Design.
- Storage and File Structure.
- Concurrency Control.
- Recovery systems.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

English Language 4

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

Automata & Formal languages

Syllabus

- Basic Concepts in alphabets and languages.
- Finite Automaton Model.
- Deterministic Finite Automaton (DFA).
- Non Deterministic Finite Automaton (NFA).
- Non Deterministic Finite Automaton with ϵ -transitions (ϵ -NFA).
- Regular Expressions.
- Properties of Regular Languages
- Context-Free Grammars.
- Properties of Context Free Grammars.
- Pushdown Automaton.
- Turing Machines.
- Chomsky Hierarchy.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 3 hours a week.
- Total hours a week: 6 hours a week.
- Total hours per semester: 84 hours per semester.

Evaluation

- 1st assignment 2%
- Project 20%
- Seminars 8%
- Final exam 70%

Third year Project

Evaluation

- Final interview 100%

The Forth Year

Operating Systems 1

Syllabus

- Computer & OS History.
- Operating systems types and features.
- Computer Hardware.
- System Components.
- System Calls.
- Virtual Machines.
- System Design.
- Process Concept.
- User and Kernel Threads.
- Inter-process Communication.
- Process scheduling
- Critical-Selection Problem
- Synchronization Hardware.
- Semaphores & Monitors.
- Classical Synchronization Problems.
- Deadlock Problem & Solutions.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Software Engineering 1

Syllabus

- Software Engineering Principles.
- Software process models.
 - Plan-driven development.
 - Agile development.
- Requirement Engineering
 - RE phases.
 - RE management.
 - Change control.
- Analysis concepts and principles.
- Analysis Modeling
 - Use Case Diagram
 - Activity Diagram
 - Sequence Diagram
 - Collaboration Diagram
 - Class Diagram
 - State Diagram.
- Design concepts and principles.
 - Architectural Design.
 - Detailed Design.
 - Design Modelling.
- Software Implementation.
- Software Deployment.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Economy & Business Management

Syllabus

- Management and Organization
- Manager Roles (Planning, Organizing, Directing, Controlling)
- Planning and Strategic Planning
- Strategic Analysis Tools
- Leadership Style
- Human Resources Management
 - Organizational Charts & Job Description
 - HR Planning & Recruitment
 - HR Development
 - HR Evaluation
- Engineering Economics
- Terms and Conditions of Engineering Credibility and Engineering Syndicate
- Ethics of the profession

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Project 30%
- Final exam 70%

Intelligent Search Algorithms

Syllabus

- Introduction to Artificial Intelligence
- AI and Internal Representation
 - Representation in AI
 - Graph Representation
- Representation, Heuristic Concept, Brief History.
- Search in State Spaces
 - State-Space Graphs Searching
 - Explicit State Spaces Uninformed Search
 - Heuristic Search using Evaluation Functions
 - A General
- Graph Searching Algorithm (Algorithm A*).
- Searching Goal Trees
 - Goal Tree (And/Or Trees)
 - And/Or Uninformed Search Trees
 - And/Or Heuristic Search Trees
 - A General Tree Searching Algorithm (Algorithm OA*)
- Search in Game-Playing
 - Two-Agent Games
 - The Minimax Procedure
 - The Alpha-Beta Procedure
 - The Alpha-Beta Strategy Heuristics in Game Trees

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Assignment 20%
- Assessments 10%
- Final exam 70%

Compilers

Syllabus

- General Introduction.
- Lexical Analysis.
- Syntactic Analysis.
 - Context Free Grammars
 - Descendent Analyzers, LL Parsing
 - Ascendant Analyzers, LR Parsing
- Syntax-Directed Translation
 - Attribute Definitions
 - Evaluation of Attribute Definitions
- Semantic Analysis.
- Run-Time Organization
- Intermediary Code Generation.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 5%
- Mini project 20 %
- Assessments 5%
- Final exam 70%

Database 2

Syllabus

- Storages
 - Storage devices.
 - File management.
- Indexing
 - Linear indices.
 - Hash indices.
- Transaction management.
 - Transaction types.
 - Concurrency control (lock based protocols, time stamp based protocols).
- Query processing and optimization
 - Cost estimation.
 - Measures of query cost.
 - Expression evaluation.
 - Cost based optimization.
- Distributed databases
 - Processing complicating factors.
 - Database design.
- Object oriented databases
 - Object oriented data model.
 - Object oriented languages and persistent languages.
 - ODL and OML.
- Object relational databases.
 - Nested relations.
 - Complex types and object oriented (SQL-3).
 - Creation of complex values and object (SQL-3).
 - Comparison of object oriented and object relational databases.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Software Engineering 2

Syllabus

- Software testing principles.
- Software testing process
 - V model.
 - Testing phases.
 - Regression testing.
 - Debugging process.
- Software Testing: Conventional Methods.
 - White box testing.
 - Control graph methods.
 - Black box testing.
 - Equivalence partitioning.
- Software Testing: Object oriented and web-based Methods.
- Software Maintenance.
- Software Project Management Concepts.
- Software Planning and feasibility.
- Scheduling Management.
- Quality Management.
- Software Metrics.
- Risk Management.
- Configuration Management .
- Change Management.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Parallel Programming

Syllabus

- Parallel computers: types, architectural features, increasing computational process speed potential.
- Evaluating and debugging of parallel programs.
- Geometrical transformation of images.
- Mandelbrot set.
- Partitioning and divide-and-conquer strategies.
 - Sorting using bucket set.
 - Numerical integration.
 - Adding and sorting numbers.
 - Prime numbers generation.
 - Solving a system of linear equations.
- Synchronous and local computations.
- Synchronous iteration examples.
 - Solving a system of linear equations by iteration.
 - Program example: shortest path problem.
- Programming with shared memory.
- Specifying parallelism.
- Language construct for parallelism.
- Dependency analysis.
- Program example: UNIX P threads Java.
- Numerical algorithms.
- Matrix and Matrix vector multiplication.
- Relationships of matrices to linear equation and implementing matrix multiplication.
- Direct and recursive implementation.
- Iterative methods and faster convergence methods.
- Image processing.
- Mean and Median.
- Weighted masks, edge detection, edge detection masks.
- The Hough transforms.
- Transformation into the frequency domain.
- Discrete and fast Fourier Transform.

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Assessments 10%
- Final exam 70%

Multimedia and Hypermedia Systems

Syllabus

- History of Multimedia
- Hypermedia vs. Multimedia
- Image and Graphics representations
 - Vector and Raster images
 - Color images, grayscale and black\white images
 - Image Color systems (RGB, CMYK, YUV, HSV, YCbCr, L*a*b*)
 - Dithering and color lookup table
 - Image File formats (BMP, GIF, PNG, JPEG, TIFF)
- Basic concepts of sound
 - Analog to Digital Conversion (Sampling and Quantization)
 - Sound File formats (WAV, MP3)
 - Frequency Domain
- Basic concepts of videos
 - Video Standards
- Information Lossless compression
 - Run Length Encoding (RLE)
 - Huffman
 - Arithmetic coding
 - Lempel–Ziv–Welch (LZW)
- Information Lossy compression
 - Discrete Cosine Transformation (DCT)
 - JPEG algorithm
 - MPEG
- Introduction to Multimedia Networks

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Marketing

Syllabus

- Role Of Marketing in Organization Management
- Marketing Management
- Customer Behavior
- Customer Relationship Management
- Marketing Mix
- Pricing and Production Costs
- E-Marketing
- Corporate Social Responsibility
- Marketing and Competition
- Entrepreneurship
- Marketing Plan

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 1 hours a week.
- Total hours a week: 3 hours a week.
- Total hours per semester: 42 hours per semester.

Evaluation

- Classroom activities 5%
- 1st assignment 5%
- 2nd assignment 5%
- Assessments 10%
- Summarizing assignment 5%
- Final exam 70%

English Language 5

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

Compiler Project

Evaluation

- Final interview 100%

Fourth year Project

Evaluation

- Final interview 100%

The Fifth Year

Project Management

Syllabus

- Project Management Concepts
- Project Life Cycle & Knowledge Areas
- Project Scope
- Project Scheduling
- Project Cost Management
- Quality Assurance
- Resources Management
- Risk Management
- Project Communication Plan
- Procurement Plan
- Stakeholder Management Plan
- Project Integration
- Social Responsibility

Teaching hours

- Theoretical: 2 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 4 hours a week. Total hours per semester: 56 hours per semester.

Evaluation

- Classroom activities 5%
- 1st assignment 5%
- 2nd assignment 5%
- Assessments 10%
- Summarizing assignment 5%
- Final exam 70%

Information Systems Security

Syllabus

- Introduction to Information Systems Security.
- Encryption
 - Symmetric algorithms.
 - Asymmetric algorithms.
 - Message Authentication and Digital Signature.
 - User Authentication and Cryptographic Key Infrastructure.
- Database Systems Security.
- Networks Security.
- Web Security.
- Malicious Software, Intrusion Detection, and Firewalls
- Operation Systems Security.
- Information Security Management.
- Security Policies.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Software Engineering 3

Syllabus

- Design Patterns
 - Creational Design Patterns.
 - Structural Design Patterns.
 - Behavioral Design Patterns.
- Component-based Software Engineering.
 - CORBA Component Model.
- Aspect-oriented Software Engineering
- Meta Modelling.
- Model-driven Development.
 - Petri-Nets
 - Timed petri nets.
- Temporal logics.
- Model checking.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Advanced Database

Syllabus

- Advanced topics in Multimedia Databases
 - Matching of images.
 - Visual characterization.
 - Similarity measure.
 - Relevance feedback.
 - Clustering / Data mining.
- Advanced topics in Distributed Databases
 - Design of a distributed database.
 - Data replication.
 - Distributed transaction models.
 - Evaluation and optimization of distributed queries.
 - Multi-database systems and mediators (WWW context).
 - Data management in mobile environments.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Web applications

Syllabus

- Basic Concepts of the web.
- Hypermedia.
- Semantic Web.
- Linked Data.
- Digital Content.
- eCommerce.
- eGovernment.
- eLearning.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Information Retrieval Systems

Syllabus

- Basic concepts of Information Retrieval.
- Content Modeling.
- Basic Retrieval Models.
- Latent Semantic Indexing.
- Probabilistic Model.
- Logic Model.
- Web Search Engines.
- Multimedia Information Retrieval.
- Personalized Information Retrieval.
- Language Modeling Basics.
- Use of Knowledge Bases and Inference in IR.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Information Systems

Syllabus

- Information Systems versus Computerized Information Systems.
- Data Lifecycle.
- Data Quality.
- Data Analysis Tasks.
- Data-Intensive Applications
- Customer Relation Management.
- Enterprise Resource Planning.
- Supply Chain Management.
- Requirements Engineering.
- Workflow Systems.
- Case studies.

Teaching hours

- Theoretical: 3 hours a week.
- Practical: 2 hours a week.
- Total hours a week: 5 hours a week.
- Total hours per semester: 70 hours per semester.

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

Distributed Systems and Applications

Syllabus

- Introduction to distributed systems.
- Shared memory, migration, Network OS, Distributed OS, Middle ware.
- Naming in distributed systems, name spaces and naming services, transporting entities naming.
- Distributed systems architectures and model.
- Client/Server architectures
 - Group model.
 - Failures.
 - RPC.
 - RMI.
 - Synchronization.
- Overview of some distributed algorithms.
- Distributed transactions.,
- Distributed file systems.
- Introduction to distributed applications building.

Teaching hours

- 1st assignment 8%
- 2nd assignment 8%
- Classroom activities 4%
- Assessments 10%
- Final exam 70%

Evaluation

- 1st assignment 10%
- 2nd assignment 10%
- Projects 10%
- Final exam 70%

English Language 6

Teaching hours

- Theoretical: 4 hours a week.
- Total hours a week: 4 hours a week.
- Total hours per semester: 56 hours per semester.

Evaluation

- Final exam 100%

Graduation Project

Evaluation

- Final interview 100%

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