



جمهورية العراق وزارة التعليم العالي والبحث العلمي الجامعة التكنولوجية قسم علوم الحاسبات

فرع البرمجيات المناهج الدراسية للعام الدراسي 2009-2010

الجامعة التكنولوجية
قسم علوم الحاسبات

الصفحة الرئيسية | الدراسات العليا | البرامج | نظم المعلومات | الذكاء الاصطناعي | امنية البيانات

نشأة القسم والاهداف

تأسس قسم علوم الحاسبات في الجامعة التكنولوجية عام ١٩٨٢ استجابة للتطورات العلمية والتكنولوجية الحاصلة في العراق، ولتهيئة الملاكات المتخصصة في هذا المجال الحيوي.

يمنح القسم شهادات البكالوريوس (BSc)، الماجستير (MSc) والدكتوراه (PhD) في اختصاصات علوم الحاسبات. وخلال سنوات عمله تطور القسم باتجاه التخصص العلمي، فحالياً يمنح القسم شهادة البكالوريوس في اربعة اختصاصات وهي اختصاص البرمجيات (Softwares)، نظم المعلومات (Information Systems)، الذكاء الاصطناعي (Artificial Intelligent)، وامنية البيانات (Information Security).

يعتبر القسم احد الركائز العلمية التخصصية التي تقدم استشارات تنفيذ المشاريع في اختصاصات الاضافة الى الدورات التطبيقية والمتقدمة بالتعاون مع مركز التعليم المستمر في الجامعة.

آخر تحديث للصفحة في 23/01/2008

المكتبة الالكترونية
اطرواح دكتوراه،
اطرواح ماجستير،
بحوث منشورة
الدخول الى المكتبة

محتويات الموقع

- المدرسة البحثية
- المختبرات
- مركز الانترنت
- المناهج الدراسية
- معرض الصور
- الارتباطات الخارجية

Microsoft Internet Explorer



First Year Syllabus

منهج المرحلة الأولى

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
4	-	2	3	Structured Programming	البرمجة المهيكلية (لغة C++)	.1
2	1	-	2	Mathematics	الرياضيات	.2
2	-		2	Fundamental of Programming Technique	اساسيات تقنيات البرمجة	.3
2	1	-	2	Discrete Structures	الهياكل المتقطعة	.4
2	-	-	2	Computer Organization and Information Technology	تركيب الحاسبة وتكنولوجيا المعلومات	.5
3	-	2	2	Logic Design	التصميم المنطقي	.6
Pass	-	-	2	Democracy	الديمقراطية	.7
Pass		-	-	English	اللغة الانكليزية	.8
15	2	4	15			Total

Total No. of Unit for One Semester: (15)Units
Total No. of Unit for Year: (30) Units

مجموعة الوحدات للفصل الدراسي الواحد: (15) وحدة
مجموعة الوحدات لسنة دراسية: (30) وحدة

1- Structured Programming (with C++ Programming Language):

- ▶ Introduction,
- ▶ Procedural Programming Principles,
- ▶ Algorithm ,
- ▶ Algorithm properties ,
Examples,
- ▶ Flowcharts,
Flowchart Figure,
Examples
- ▶ C++ Language Basics (Character set, Identifiers, Getting Started with C++, Variables Declaration, Variables, Constants, Arithmetic Operations,
- ▶ The “math.h” Library, Unary Minus, Increment and /decrement Operators, Operational Assignment Operators, Relational Operators, Logical Operators, Bitwise Operator),
- ▶ Selection Statements (Selection Statements, The Single If Statement Structure, The Single If Statement Structure (Blocks), The If/else Statement Structure, Nested If and If/else Statements, The Switch Selection Statement (Selector),



- ▶ Conditional Statement), Iteration Statements (Selection Statements, While Repetition Structure, Do/While Statement, For Statement, More about For Statement, Nested Loops, Break and Continue Control Statements),
- ▶ Functions (Function, Passing Parameters (Passing by Value, Passing by Reference)), Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements), Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements)),
- ▶ String (Read / Write / Process Array Elements, Member Function of String, stdlib Library),
- ▶
- ▶ Structures (The Three Ways for Declare the Structure, Array of Structures).

References:

Mastering c++ by sorhan sami & oqeli saleh 2002

2- Mathematics:

Functions, Transcendental Function, Sequence and Series, Differentiation and Applications, Integration and Applications, Multiple Integrals, Polar Plane, Complex Numbers, Matrices, Vector Analysis.

References:

Thomas calculus , 1989

3- Discrete Structures

Set theory -sets & subsets - how to specify sets -, sequences -Operations on sets-, Algebra of sets & its proves, sets of numbers- Finite sets, Mathematical induction & recursion, Matrices, Logic and propositions- Equivalency, Tautology& Contradiction, Relations- Computer representation of relations & Digraph, Manipulation of relations, Properties of relations, Composition of relations (Functions-types of functions, Graphs-definition-graphs & multigraphs- subgraph – degree of graph), Walk –length of walk- trail- path- cycle- the bridges of konnissberg, Traversable multigraphs- Euler theorem- special graph- bipartite graph matrices & graph, Labeled graphs – trees- rooted tree- ordered rooted tree- polish notation, Spanning tree- directed graph- matrix of digraph, Minimal path, Finite state machines, Language & pattern recognition machines, Optimistic approach to construct FSM, Finite automata, Finite automata (Contd).

References:

1. Discrete mathematics by Seymour Lipschutz
2. Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby 2004
- 3.

4- Fundamental of Programming Technique

- ▶ Programming Language
- ▶ Features of High level Language
- ▶ Main Component of HLL



- ▶ 1- Variable & Constant (representation of Integer, real (fixed & floating point), characters.
- ▶ 2- Basic Arithmetic & logic Operation
- ▶ 3- I/O interface
- ▶ 4- Control Structure (Sequences, Conditional, Loops)
- ▶ 5- Basic data Structure (String, Array, Pointers and Internal Representation of Scalar & Vector Data
- ▶ 6- Functions or subroutines and their calling Mechanism
 - ▶ - Notion of an Algorithm and Flowchart
 - ▶ - Problem Solving using top –Down design
 - ▶ - Steps of developing an algorithm
 - ▶
 - ▶ - Developing algorithmic solution from a mathematical specification of the problem.
 - ▶ - Introduction of Recursion.

Reference

- 1- Concurrent programming: fundamental techniques for real time and parallel software design, Tom Axford, 1989.
- 2- Concepts Techniques and Models of Computer Programming, by peter ,&Seif Haride, 2002.
- 3- Java Programming for beginner, Joseph Russell, 2004.

5- Computer Organization and Information Technology

- ▶ Computer definition & history of computer. Importance and advantages of computers.
- ▶ Applications with computer systems. Computer system classification (hardware, software).
- ▶ Hardware: The structure of computer system
 - Input units (تفصيل على كل وحدات الإدخال إلى عام 2009) Output units (تفصيل على كل وحدات الإخراج إلى عام 2009) Central Processing Units (CPU) ,CPU definition. CPU components (ALU, Rs, CU).
CPU operations. Full example of CPU operation.
 - Main memory
Primary storage ,Magnetic core storage. Semiconductor memory. Full examples of memory. Instructions format with memory. Secondary storage.
Types of main memory (RAM, ROM, ...).
 - Computer classification (analog, digital, hybrid).
- ▶ Software:
 - ▶ Types of software (System SW, Application SW)
 - ▶ Programming language & types of them (high level, mid level).
 - ▶ Translation programs Compiler. Interpreters. Assemblers. Linkers. Debugging.
 - ▶ Managing organization data & information
 - ▶ Introduction (data & information).
 - ▶ Data hierarchy (record, field). Files & Database. Database types
 - ▶ Database representation.
 - ▶ Telecommunications & networks (network type, transition media, cable & wireless)



- ▶ Signals (analog, digital). Telecommunication system components.
- ▶ Internet & Intranet.

Reference

1. "Introduction to information technology", Turban&Rainer&Potter, 2001.
2. "Introduction to information systems", James.OBrien, 1997.
3. Computer System Architecture M. Morris Mano 1993
4. Murdocca .M .J ., Heuring .V .P ., "Principle Of Computer Architecture", Prentice-Hall, Inc .
5. Hutchinson .S .E ., Sawyer .S .C ., with Contribution by Coulthard .G .J ., ” Computers, Communications , and Information”, Revised Edition, Mc-Graw

6- Logic Design:

Number System and Codes, Logic Gates, Boolean Algebra, Minimization Methods (K-Map, Q-M), Combination Logic Circuits, Adders, Subtractors, Comparators, Code Converters, Multiplexers, Sequential Logic Circuits, Flip-Flops, S-R FF, D FF, J-K FF, T FF, Registers, Counters, State Diagram and FSA, ROM and RAM.

References:

Digital fundamentals by Floyd, 2003

7- ديمقراطية

مفهوم الديمقراطية، خصائص الديمقراطية ، وسائل تطبيق الديمقراطية، صور الديمقراطية/الديمقراطية المباشرة/ شبه المباشرة/ النيابية، مفهوم الانتخاب ، هيئة الناخبين ، تنظيم عملية الانتخاب ، نظم الانتخابات ، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم ، النظام البرلماني في بريطانيا ، المؤسسات الدستورية في بريطانيا.

المصادر:

1- محاضرات في الديمقراطية د. فيصل شطناوي

8- English



Second Year Syllabus

منهج المرحلة الثانية

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Object Oriented Programming	البرمجة الشيئية	1
3	-	2	2	Data Structures and Algorithms	هياكل البيانات والخوارزميات	2
2	1	-	2	Numerical Analysis	التحليل العددي	3
3	-	2	2	System Analysis and Databases Design	تحليل نظم و تصميم قواعد البيانات	4
3	-	2	2	Micro-Processors and Assembly Programming	المعالجات الميكروية و البرمجة بلغة التجميع	5
2	1	-	2	Advanced Mathematics	الرياضيات المتقدمة	6
2	-	-	2	Computation Theory	النظرية الاحتمالية	7
Pass	-	-	2	Human rights	حقوق الانسان	8
18	2	8	16	Total		

Total No. of Unit for One Semester: **(18)Units**
Total No. of Unit for Year: **(36) Units**

مجموعة الوحدات للفصل الدراسي الواحد: (18) وحدة
مجموعة الوحدات لسنة دراسية: (36) وحدة

1. Numeric Analysis:

Binary Fraction and Shifting, Scientific Notation Machine Number and Computer Accuracy, Computer Floating Point Numbers, Error Analysis (Absolute band Relative Errors, Truncation, Round-Off and Chopping Errors), The Solution of non-Linear Equations $F(x)=0$, The Solution of Linear Systems $Ax=B$, Interpolation and Polynomial Approximation, Numerical Differentiation, Numeric Integration, Solution of Differential Equations (Euler 'S Method, Runge-Kutta Methods), Eigen Values and Vector.

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.
- 2- Numerical Methods Using Matlab, Prentice Hall.

2. Micro-Processors and Assembly Programming:

CPU Architecture, Register Transfer, Memory, Peripheral Control Chips, Data Transfer, Fetch and Execute Cycles, Address and Data and Control Buses, Brief Introduction to Machine Code, Instruction Sets (Form, Orthogonality, Number of Addresses), and Decoding. Assembly Language Programming: Addressing Modes of the 808, Data Registers, Flags, The Status Register, and Implementing Control Structures in Assembly Language, Structured Assembly Language Programming using Procedures, Arithmetic and Logic Instructions Stack (Concepts



and Applications), String Processing, Tools for Preparing and Debugging and Translating Programs. MS-DOS Operating System Structure: MS-DOS and BIOS Disk and Keyboard System Architecture. Advanced Features of Processors: Segments and Segment Registers, Interrupts and Interrupt Service Routines, I/O Port Addressing, Instruction Pipelining, Cache Memory.

References:

- 1- Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
- 2- Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

3. Data Structures and Algorithms:

- 3- Introduction to Data Structures, Memory representation for 1D and 2D arrays, Linear list, Linear list types, Stack: (Stack Operations, Applications of stack), Queue: (Queue Operations, Applications of queue), Circular Queue: (CQueue Operations, Applications of CQueue), Linked List, Linked-Stack, Linked-Queue, Linked-CQueue, Recursion, Graph, Trees: (Types of Tree, Binary tree, Binary tree scan, Represent Regulars expression using trees, convert tree to binary tree, Binary Search Tree), Sorting: (Sorting Algorithms, Types of Sorting algorithms, Bubble Sort, Insertion Sort, Quick Sort), Searching: (Searching Algorithm, Sequential Search, Binary Search).

4. Computation Theory:

Regular Expression, Finite Automata, DFA and NFA, Equivalence of NFA and DFA, Equivalence of NFA and DFA with E-moves, Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar, Chomsky Normal Form, Greibach Normal Form, Tree, The empty string in context free grammar ambiguity, Regular grammar, Left linear grammar, Right linear grammar, Kleen theorem, Two way finite automata with output (mealy machine, moor machine), The equivalence of mealy and moor machine, Push down automata, Top down –bottom up derivation, Turing machine.

References:

1. H.R.Lewis and G.H Papadimitiou, "Elements Of The Theory Of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel, "The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.

5. Object Oriented Programming (with C++ Programming Language):

An Introduction: (The Evolution of OOP, Encapsulation and Data Hiding, Inheritance and Reuse, Polymorphism, Short History, C++ Program Development Process (PDP)), Classes: (Introduction, Declaration of classes, Class Constructors and Destructors, Overloading Constructors, Class Templates, Case Study1(Guessing Password Game)), Inheritance: (Introduction, Declaration of Inheritance, An Example – Single Inheritance, Inheritance based on access-specifier (Inheritance with Public access-specifier, Inheritance with Private access-specifier), Parent Constructors and Destructors), Polymorphism: (Introduction, Pointer to Classes, Static and Dynamic Binding, Types of Polymorphism (Polymorphism of Variables, Polymorphism of Functions, Polymorphism of Objects), Virtual Functions, Override Function, Constructor and Virtual Destructor, Abstract Base Class (ABC) and Pure Virtual Function),



Operator Overloading: (Introduction, Operators that can't be overloaded, Operator Functions, Operator Overloading with the Member Operator Functions, Operator Overloading with the Non- member Operator Functions (Friend Function), The Flexibility of Friend Operator Functions, Overload the Output Operator), Selected Advance OOP Topics: (Custom Header Files, Selected Problems: Program's Self-Protection, Simple Virus and its Anti-Virus)).

References:

4. "Mastering C++", Prof. Oqeili Saleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
5. "Object Oriented Programming Language with C++", Bjarne Stroustrup, Addison-Wesley Publication, 2003.

6. Advance Mathematics:

Formation of Partial Differential Equations, First Order Linear and non-Linear Equations, Boundary Value Problems, Formation of the Wave Equation, Equation for the One Dimensional and Two Dimensional Heats Flow, Laplace Transform: (Laplace transformation and inverse, Properties of Laplace transform), Fourier series: (Periodic functions, Odd and even functions, Half range Fourier sine and cosine series), Fourier Transformation (Definition, Sine Cosine Transformation, Finite Fourier Sine and Cosine Transformation, Convolution, Inverses), Bessel's Equations: (Beta and Gamma function, Series Solutions of Bessel Equation).

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesly, 1999.

7. System Analysis and Databases Design:

Introduction (DBMS), Data abstraction, Data models, Data independence, Database management & administrator, Entity relation model, Mapping constraints, Entity relation diagram, Representation of strong & weak entity, Generalization & aggregation, Design of an E-R database scheme, Mapping cardinalities, Data model-relational model, Example SQL and AQL, Hierarchical model, Example DL/1 and IQL, Network model, Data and file organization, Sequential & index file, Hash index & inverted files.

8. حرية انسان:

مفهوم حقوق الانسان، مفهوم الديمقراطية، خصائص وفئات حقوق الانسان، خصائص الديمقراطية، موقف الحضارات القديمة من حقوق الانسان/حضارة وادي الرافدين، وسائل تطبيق الديمقراطية، الحضارة الرومانية، الحضارة الاغريقية، صور الديمقراطية/الديمقراطية المباشرة، موقف الشرائع السماوية من حقوق الانسان، الديمقراطية النيابية، الديانة المسيحية والديانة الاسلامية، المصادر القانونية لحقوق الانسان في بريطانيا، المدرسة الطبيعية ونظمية العقد الاجتماعي، الديمقراطية شبه المباشرة، اعلان حقوق الانسان والمواطن الفرنسي، الحكومة وانواعها، منظمة الامم المتحدة وحقوق الانسان، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون، الاعلان العالمي لحقوق الانسان، تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم، الموثيق والاتفاقيات/الاتفاقية الاوربية والاتفاقية الامريكية، النظام البرلماني واركانه، الميثاق الافريقي لحقوق، الانسان ومشروع الميثاق العربي، النظام البرلماني في بريطانيا، المنظمات غير الحكومية، المؤسسات الدستورية في بريطانيا.

المصادر:

1. محاضرات في الديمقراطية د. فيصل شطناوي.
2. محاضرات في الحرية والديمقراطية د. ولاء مهدي الجبوري.



Third Year Syllabus

منهج المرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Computer Graphics	رسوم الحاسبة	1
3	-	2	2	Compilers	المتجمات	2
3	-	2	2	Advanced Databases	قواعد البيانات متقدمة	3
2	-	-	2	Computer Architecture	معمارية الحاسبة	4
3	-	2	2	Artificial Intelligent	الذكاء الاصطناعي	5
3	-	2	2	Software Engineering	هندسة البرمجيات (أختياري)	6
3	-	2	2	Internet and Intranet	انترنت وانترانت (أختياري)	7
2	1	-	2	Operation Research	بحوث عمليات	8
22	1	12	16	Total		

Total No. of Unit for One Semester: (22)Units
Total No. of Unit for Year: (44) Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة
مجموعة الوحدات لسنة دراسية: (44) وحدة

1. Operation Research:

Operating Research and the Art of Problem solving 0, Linear Programming, Formulation and Graphical Solution, Algebraic Solution, Duality and Sensitivity Analyses. Transportation Model .Networking Analyses .Decision Theory and Games, Inventory Model, Queuing Theory, Simulation.

References:

1. Operation Research: An Introduction, Hamdy A. Taha.

2. Computer Graphics:

Introduction: Display Devices (e.g. Raster, Vector). Elementary Graphics Figures: Line and Circle Drawing Algorithms. Sorting Pictures and 2D Transformations: Writing and Reading Graphics Data Files, Pictures Translation, Pictures Rotation, Pictures Scaling. Clipping and Windowing: Point and Line Clipping, Clipping Algorithms, Polygon Clipping. Curves: Polynomial Curves, Spline Curves. Elementary 3D Graphics: Introduction, Coordinates System, Transformations, Orthogonal Projection, Multiple Views, Hidden Lines and Surfaces, Shading and Coloring. Animation Techniques.

References:

- 1- J. D. Foley, Avan Dametal, "Introduction to Computer Graphic", Addison-Wesley, 1993.
- 2- D. Hearn and M.P. Baker, "Computer Graphics ", 2nd. Ed., Prentice-Hall, 1994



3. Computer Architecture:

Introduction to computer architecture and CPU architecture, Instruction set and format, Addressing modes, Program control (interrupt and subroutine call), Microprogramming Design of CPU Control Unit and Micro programmed vs., hardwired Control, RISC and CISC, I/O organization and Peripheral Control Strategies, Input / output interfaces, Asynchronous data transfer, Programmed I/O, Memory Management, types and hierarchy, Main memory and memory address map, Direct Memory Access, Input / output processor (IOP) and Channels, Associative Memory and Content-Addressable Memories, Cache memory, Parallel processing, Pipeline (general consideration), Arithmetic pipeline, Instruction pipeline, Difficulties in Instruction pipeline, And theme solutions, Vector processing, And array processors, Interprocessor communication, Cache coherence.

References:

- 1- M.M Mano "Computer System Architecture " third Edition, Prentice Hall, 1993.
- 2- David A. Patterson And John L. Hennessy, "Computer Organization And Design " Morgan Kaufmann, 1998.

4. Compilers:

Programming Language, Introduction to Compiler, Type of Errors, One Pass Compiler, Syntax Definition, Context Free Grammar, Parsing Tree & leftmost and rightmost derivations, Transition Graph, Lexical analysis, Syntax of Analysis, Problems of Compiler, First and Follow, Top down Parsing, Predictive Parsing Method, Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser, Look Ahead LR, Semantic Analysis, Intermediate Code Generation, Code Optimization, Examples of Code Optimization, Code Generation, Build Simple Compiler.

References:

1. Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ulman.

5. Artificial Intelligent:

Introduction to Programming in Logic, Prolog Language Structure, Prolog Language Components, Facts, Simple Rules, Built in Functions in Prolog Language, Recursion in Prolog (Tail Recursion), Non Tail Recursion, Fail Structure, List Processing, String Processing, Database Structure and Properties, Files in Prolog and Applications with Database, Introduction to Artificial Intelligence, Knowledge Representation, Logical Representation, Graphical Representation, Problem State Space Characteristics, Problem Solving, Search Technique (Blind), Heuristic Search, The 8_Puzzle Problem, Control Strategy (Structure), Forward Chaining for Problem Solving, Backward Chaining for Problem Solving, Hybrid Method (Rule Cycle).

References:

1. Elian Rich, Artificial Intelligence, Prentice Hall 1991.

6. Software Engineering (Optional):

Introduction to Software Engineering, Computer System Engineering, Types of S/W E, Role of S/W E in system design, S/W system, General phases of S/W E, S/W E Tools, Characteristic of S/w E, S/W Process, S/W Process Models, Classical Model, Prototype Model, Spiral Model, Incremental Model, Iterative Model, RAD Model, Half-year Break, Requirement analysis and principles, Requirement analysis and Definition, Function Oriented Approach, Data Oriented



Approach, System Modeling, Object Oriented Approach, Normalization, Jackson Method, Finite State Machine, Requirement Document, CORE Approach, Data Flow Diagram, Testing Technology, State Transmission diagram, Decision Tree, Decision Table.

References:

1. Software Engineering by Roger Press Man
2. Introduction to Software Engineering by Sommer Ville

7. Databases:

Introduction (DBMS), Data abstraction, Data models, Data independence, Database management & administrator, Entity relation model, Mapping constraints, Entity relation diagram, Representation of strong & weak entity, Generalization & aggregation, Design of an E-R database scheme, Mapping cardinalities, Data model-relational model, Example SQL, AQL, Hierarchical model, Example DL/1, IQL, Structure of distributed Databases, Trade-off in Distributing the databases, Design of distributed databases, Transparency and Autonomy, Distributed Query Processing, Recovery in distributed databases.

References:

1. Database System Concepts (Henry F. Korth).
2. An Introduction Database System C.J.Date.

8. Internet and Intranet (Optional):

Data Communication & Computer Network (Introduction, Transmission Media, Network Topologies, Network Layers and Protocols). Internet Hardware & Software (Introduction, Internet Protocol Address, IP Datagram, Naming with DNS, Client / Server Interaction, Example of Client / Server Interaction, Internet Service Provider, Internet Browsers, World Wide Web page, Internet and Intranet, Internet services, Navigation, E-mail Technique). Internet Search Engine (Introduction, Search engine working, Types of search engine, Search engine frame work-I-crawler, Search engine frame work-II- indexer, Search engine frame work-III- indexer, Search engine frame work-VI-Ranker).

References:

1. Douglas E. Comer. Computer Networks and Internet. Department of Computer Science, Purdue University. Second edition. 1999.
2. Andrew S. Tanenbaum. Computer Networks. Vrije University, Amsterdam, The Netherlands. Third edition. 1996
3. Vrieze, P.. Improve Search Engine Technology. M. sc. Thesis. 7 March 2002.

Elective Subjects for Third Year

المواضيع الاختيارية للمرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Software Engineering	هندسة البرمجيات	1
3	-	2	2	Internet and Intranet	انترنت وانترانيت	2
3	-	-	3	Advanced IT	تكنولوجيا المعلومات المتقدم	3
2	-	2	2	Mathematics Applied in Computer	تطبيقات رياضية في الحواسيب	4

Forth Year Syllabus

منهج المرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
2	-	-	2	Computer and Data Security	امنية الحاسبات والبيانات	1
3	-	2	2	Advanced Windows Programming	برمجة نوافذ متقدمة	2
3	-	2	2	Communication and Computer Networks	الاتصالات وشبكات الحاسبة	3
3	-	2	2	Operating Systems	نظم التشغيل	4
3	-	2	2	Intelligence Applications	تطبيقات ذكية	5
3	-	2	2	Web programming	برمجة المواقع (أختياري)	6
3	-	2	2	Image Processing	معالجة الصور (أختياري)	7
3	-	4	1	Project	المشروع	8
23	-	16	15	Total		

Total No. of Unit for One Semester: (23)Units

مجموعة الوحدات للفصل الدراسي الواحد: (23) وحدة

Total No. of Unit for Year: (46) Units

مجموعة الوحدات لسنة دراسية: (46) وحدة

1. Computer and Data Security:

Introduction of Data security, Basic terminology of Data security, Mathematical Background, Basic definition of arithmetic modular with examples, How Compute the Greater common deviser (GCD) using different methods, Explain the methods to compute the Inv, Explain the methods to find Euler notation and compute inv using Euler notation, Introduction of types of cipher systems, Types traditional of ciphers systems, Introduction of transposition cipher systems, Implementation of simple transposition method with examples for encipher and decipher methods, Columner method and fixed pired method, Implementation of simple substitution methods with examples for encipher and decipher methods, Types of substitution cipher systems types, Monoalphabetic substitution cipher systems (keywords method), Homophonic substitution cipher systems(Beal cipher, Higher order homophnics), polyaphabetic substitution cipher systems(Vigener cipher, Beaufort cipher ,Running ker cipher), polygram substitution cipher systems(playfair cipher, hill cipher ,product cipher), Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm), Trapdoor knapsack algorithm, With example for encipher and decipher process, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), Introduction of DES algorithm, X-box process in DES algorithm with example, Encryption process in DES algorithm with example, Decryption process in DES algorithm with example, Introduction of Stream ciphers, One time Pad system (vernam system),



The requirements of steam cipher, The Basic Five Randomness tests (i.e. frequency test , serial test), Poker test , run test, auto correlation test.

2. **Advance Windows Programming:**

Introduction, The Main Difference between DOS and Windows version, Windows Concept and Technology, The Windows' window, Visual Interface Component, Windows Class, Messages, Windows Resources, Windows Function, The Coordinate System, The Element of Windows Application Program, The WM-PAINT and WM-DESTROY messages, Creating Menus, Message Box, Dialog Box, Scroll Bars, Adding Icons, Cursors, and Bitmap.

References:

1. "Windows NT4 Programming from the ground up".
2. "Windows 98 Programming from the ground up".
3. "Principle of Windows programming in Borland C++".

3. **Communication and Computer Networks:**

Data Communication, Physical Topology, Basic Network Technology, LAN Devices, Collision and Collision Domains in Shared Layer Environments, Network Devices, Network Layer Addressing, Network Layer Field & Datagram, IP address Class, Subnet NW, Private Addresses, Transmission of Digital Data Interfaces and Modems, Transmission Media, Unguided Media, Satellite Communication, Error Detection and Correction, Data Link Control, Multiplexing, De Multiplexing, Data Link Protocols, ARP, FTP, TELNET, DNS, UDP, TCP, NFS and RPC, SMTP, TFTP, HTTP, WAIS, Gopher, SNMP, WWW, Browser Architecture, Methods for Assigning IP Address, Advance ARP, DHCP, Dynamic Addressing, Routable and non Routable Protocols, RIP Features.

References:

- 1- "Computer Networks", 3rd Edition, A. Tannenbaum, Prentice-Hall, 1996.
- 2- "Data Communications, Computer Networks and OSI", 4th Edition, F. Halsall, Addison-Wesley, 1995.
- 3- "Computer Communications and Networks", J. R. Freer, USL Press, 1996.

4. **Operating System:**

Introduction to Operating Systems, User view and system view of OS, OS for mainframe, Desktop computer systems, OS for multiprocessor and distributed systems, OS for clustered, real-time and handheld computer systems, Introduction to computer system structure, Hardware Protection, Operating system structure, System components1, System components2, Operating system services, System calls and System Programs, System Design, System implementation, Half-year Break, Introduction to Processes, Process Concepts, Process Control Block, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess Communication, Introduction to CPU Scheduling, CPU Scheduling concepts, Scheduling Criteria, Scheduling Algorithms, First Come First Served and Shortest Job First, Priority Scheduling algorithm and Round Robin Algorithm, Introduction to Deadlocks and handling.

References:

1. "Operating System Concepts" by Silberschatz, Galvin and Gagne, 2003.



Elective Subjects for Forth Year

المواضيع الاختيارية للمرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	3D Graphics and Vision	الرسوم ثلاثية الابعاد والرؤية	1
3	-	2	2	Web programming	برمجة المواقع	2
3	-	2	2	Image Processing	معالجة الصور	3
2	-	-	2	Modeling and Simulation	النمذجة والمحاكاة	4
2	-	-	2	Data Compression	ضغط البيانات	5



جمهورية العراق وزارة التعليم العالي والبحث العلمي الجامعة التكنولوجية قسم علوم الحاسبات

فرع نظم المعلومات المناهج الدراسية للعام الدراسي 2009-2010

الجامعة التكنولوجية
قسم علوم الحاسبات

الصفحة الرئيسية | الدراسات العليا | البرامج | نظم المعلومات | الذكاء الاصطناعي | أمنية البيانات

نشأة القسم والاهداف

تأسس قسم علوم الحاسبات في الجامعة التكنولوجية عام ١٩٨٣ استجابةً للنظرات العلمية والتكنولوجية الحاصلة في العراق، ولتهيئة الملاكات المتخصصة في هذا المجال الحيوي.

يمنح القسم شهادات البكالوريوس (BSc)، الماجستير (MSc) والدكتوراه (PhD) في اختصاصات علوم الحاسبات. وخلال سنوات عمله تطور القسم باتجاه التخصص العلمي، فحالياً يمنح القسم شهادة البكالوريوس في أربعة اختصاصات وهي اختصاص البرمجيات (Softwares)، نظم المعلومات (Information Systems)، الذكاء الاصطناعي (Artificial Intelligent)، وأمنية البيانات (Information Security).

يعتبر القسم احد الركائز العلمية التخصصية التي تقدم استشارات تنفيذ المشاريع في اختصاصات بالإضافة الى الدورات التطبيقية والمقدمة بالتعاون مع مركز التعليم المستمر في الجامعة.

آخر تحديث للصفحة في
23/01/2008

المكتبة الالكترونية
اطرايح كتورا،
اطرايح ماجستير،
بحوث منشورة
الدخول الى المكتبة

محتويات الموقع

- المدرسة الحتية
- المختبرات
- مركز الانترنت
- المناهج الدراسية
- معرض الصور
- الارتباطات الخارجية

Microsoft Internet Explorer



First Year Syllabus

منهج المرحلة الأولى

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
4	-	2	3	Structured Programming	البرمجة المهيكلة (C++)	1
2	1	-	2	Mathematics	الرياضيات	2
2	1	-	2	Discrete Structures	الهياكل المنقطعة	4
3	-	2	2	Logic Design	التصميم المنطقي	3
2	-	-	2	Principles of Information Technology	مبادئ تكنولوجيا المعلومات	5
2	-	-	2	Principles of Information Systems	مبادئ نظم المعلومات	6
Pass	-	-	2	Democracy	الديمقراطية	7
Pass	-	-	2	English Language	لغة انكليزية	8
15	2	4	17	Total		

Total No. of Unit for One Semester: (15)Units

مجموعة الوحدات للفصل الدراسي الواحد: (15) وحدة

Total No. of Unit for Year: (30) Units

مجموعة الوحدات لسنة دراسية: (30) وحدة

Structured Programming

Introduction, Procedural Programming Principles, Algorithm , Algorithm proper, Examples, Flowcharts, Flowchart Figure, Examples C++ Language Basics (Character set, Identifiers, Getting Started with C++, Variables Declaration, Variables, Constants, Arithmetic Operations, The “math.h” Library, Unary Minus, Increment and /decrement Operators, Operational Assignment Operators, Relational Operators, Logical Operators, Bitwise Operator), Selection Statements (Selection Statements, The Single If Statement Structure, The Single If Statement Structure (Blocks), The If/else Statement Structure, Nested If and If/else Statements, The Switch Selection Statement (Selector), Conditional Statement), Iteration Statements (Selection Statements, While Repetition Structure, Do/While Statement, For Statement, More about For Statement, Nested Loops, Break and Continue Control Statements), Functions (Function, Passing Parameters (Passing by Value, Passing by Reference)), Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements), Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements)), String (Read / Write / Process Array Elements, Member Function of String, stdlib Library), Structures (The Three Ways for Declare the Structure, Array of Structures).

References



2010 - 2009

- Mastering c++ by sorhan sami & oqeli saleh 2002

Mathematics

Functions, Transcendental Functions, Sequence and Series, Differentiation and Applications, Integration and Applications, Multiple Integrals, Polar Plane, Complex Number, Matrices, Vector Analysis.

References:

- Thomas calculus ,1989

Discrete Structure

Set theory (sets & subsets, how to specify set, sequences , Operations on sets-, Algebra of sets & its proves, sets of numbers- Finite sets), Mathematical induction & recursion, Matrices, Logic and propositions- Equivalency, Tautology& Contradiction, Relations Computer representation of relations & Digraph, Manipulation of relations, Properties of relations, Composition of relations (Functions-types of functions, Graphs-definition-graphs & multigraphs- subgraph – degree of graph), Walk –length of walk- trail- path- cycle- the bridges of konnissberg, Traversable multigraphs- Euler theorem- special graph- bipartite graph matrices & graph, Labeled graphs –trees-rooted tree- ordered rooted tree- polish notation, Spanning tree- directed graph- matrix of digraph, Minimal path, Finite state machines, Language & pattern recognition machines, Optimistic approach to construct FSM, Finite automata, Finite automata (Contd).

References:

- Discrete mathematics by Seymour Lipschutz
- Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby

Principles of Information Technology

Introduction to information technology, Introduction to computer architecture computer hardware(Computer hardware: central processing unit and its components, Memory and its components), Computer software: (Application software, Programming languages types, Input technologies, Output technologies) Managing organizational data and information: introduction, Traditional file environment problems), Data base: the modern approach centralized database, distributed database, Data base management system, its components, Telecommunications and networks: introduction, Telecommunications system and its processes, Communications media and channels, Networks: introduction, Local area networks, wide area network, Network communications software, applications Internet, intranets: introduction: the evolution of the Internet, The operation of the internet: services provided by the Internet, Intranets: introduction, what the difference the internet and intranet, security.

References:

- "Introduction to information technology", Turban&Rainer&Potter, 2001.
- "Introduction to information systems", James.OBrien, 1997.

Principles of Information Systems

Information systems overview, Information system hardware, Information system software, Database management, Telecommunication, Electronic commerce and the internet, Organizational information system, Emerging Information System, Information System Development, Information system processes, Information system development approaches, Information system management, Managing Information system as an organizational resources, Making business case for a system, Organizing the information system function

Reference

Jessup L., Valcich J., "Information Systems Foundations", Que E&T, 1999

ديمقراطية

شبه /الديمقراطية المباشرة/ مفهوم الديمقراطية، خصائص الديمقراطية ، وسائل تطبيق الديمقراطية، صور الديمقراطية النيابية، مفهوم الانتخاب ، هيئة الناخبين ، تنظيم عملية الانتخاب ، نظم الانتخابات. /المباشرة
المصادر:

- حقوق الانسان والطفل والديمقراطية، د. ماهر صالح الجبوري ، د. رعد ناجي الجدة ، د. رياض عزيز هادي، 2009
- محاضرات في الديمقراطية د. فيصل شطناوي

Second Year Syllabus

منهج المرحلة الثانية

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Object Oriented Programming	البرمجة الشيئية	1
3	-	2	2	Data Structures and Algorithms	هياكل البيانات والخوارزميات	2
2	1	-	2	Numerical Analysis	التحليل العددي	3
3	-	2	2	System Analysis and Databases Design	تحليل نظم و تصميم قواعد البيانات	4
3	-	2	2	Micro-Processors and Assembly Programming	المعالجات الميكروية و البرمجة بلغة التجميع	5
2	1	-	2	Advanced Mathematics	الرياضيات المتقدمة	6
2	-	-	2	Computational Theory	النظرية الاحتمالية	7
pass	-	-	2	Human rights	حقوق الانسان	8
18	2	8	16	Total		

Total No. of Unit for One Semester: (18)Units

مجموعة الوحدات للفصل الدراسي الواحد: (18) وحدة



Total No. of Unit for Year: **(36)** Units

مجموعة الوحدات لسنة دراسية: (36) وحدة

1. **Numeric Analysis:**

Binary Fraction and Shifting, Scientific Notation Machine Number and Computer Accuracy, Computer Floating Point Numbers, Error Analysis (Absolute and Relative Errors, Truncation, Round-Off and Chopping Errors), The Solution of non-Linear Equations $F(x)=0$, The Solution of Linear Systems $Ax=B$, Interpolation and Polynomial Approximation, Numerical Differentiation, Numeric Integration, Solution of Differential Equations (Euler 'S Method, Runge-Kutta Methods), Eigen Values and Vector.

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.
- 2- Numerical Methods Using Matlab, Prentice Hall.

2. **Micro-Processors and Assembly Programming language:**

CPU Architecture, Register Transfer, Memory, Peripheral Control Chips, Data Transfer, Fetch and Execute Cycles, Address and Data and Control Busses, Brief Introduction to Machine Code, Instruction Sets (Form, Orthogonality, Number of Addresses), and Decoding. Assembly Language Programming: Addressing Modes of the 808, Data Registers, Flags, The Status Register, and Implementing Control Structures in Assembly Language, Structured Assembly Language Programming using Procedures, Arithmetic and Logic Instructions Stack (Concepts and Applications), String Processing, Tools for Preparing and Debugging and Translating Programs. MS-DOS Operating System Structure: MS-DOS and BIOS Disk and Keyboard System Architecture. Advanced Features of Processors: Segments and Segment Registers, Interrupts and Interrupt Service Routines, I/O Port Addressing, Instruction Pipelining, Cache Memory.

References:

- 1- Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
- 2- Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

3. **Data Structures and Algorithms:**

- 3- Introduction to Data Structures, Memory representation for 1D and 2D arrays, Linear list, Linear list types, Stack: (Stack Operations, Applications of stack), Queue: (Queue Operations, Applications of queue), Circular Queue: (CQueue Operations, Applications of CQueue), Linked List, Linked-Stack, Linked-Queue, Linked-CQueue, Recursion, Graph, Trees: (Types of Tree, Binary tree, Binary tree scan, Represent Regulars expression using trees, convert tree to binary tree, Binary Search Tree), Sorting: (Sorting Algorithms, Types of Sorting algorithms, Bubble Sort, Insertion Sort, Quick Sort), Searching: (Searching Algorithm, Sequential Search, Binary Search).



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4. Computational Theory:

Regular Expression, Finite Automata, DFA and NFA, Equivalence of NFA and DFA, Equivalence of NFA and DFA with E-moves, Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar, Chomsky Normal Form, Greibach Normal Form, Tree, The empty string in context free grammar ambiguity, Regular grammar, Left linear grammar, Right linear grammar, Kleen theorem, Two way finite automata with output (mealy machine, moor machine), The equivalence of mealy and moor machine, Push down automata, Top down –bottom up derivation, Turing machine.

References:

1. H.R.Lewis and G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.

5. Object Oriented Programming (with C++ Programming Language):

An Introduction: (The Evolution of OOP, Encapsulation and Data Hiding, Inheritance and Reuse, Polymorphism, Short History, C++ Program Development Process (PDP)), Classes: (Introduction, Declaration of classes, Class Constructors and Destructors, Overloading Constructors, Class Templates, Case Study1(Guessing Password Game)), Inheritance: (Introduction, Declaration of Inheritance, An Example – Single Inheritance, Inheritance based on access-specifier (Inheritance with Public access-specifier, Inheritance with Private access-specifier), Parent Constructors and Destructors), Polymorphism: (Introduction, Pointer to Classes, Static and Dynamic Binding, Types of Polymorphism (Polymorphism of Variables, Polymorphism of Functions, Polymorphism of Objects), Virtual Functions, Override Function, Constructor and Virtual Destructor, Abstract Base Class (ABC) and Pure Virtual Function), Operator Overloading: (Introduction, Operators that can't be overloaded, Operator Functions, Operator Overloading with the Member Operator Functions, Operator Overloading with the Non- member Operator Functions (Friend Function), The Flexibility of Friend Operator Functions, Overload the Output Operator), Selected Advance OOP Topics: (Custom Header Files, Selected Problems: Program's Self-Protection, Simple Virus and its Anti-Virus)).

References:

1. "Mastering C++", Prof. Oqeili Saleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
2. "Object Oriented Programming Language with C++", Bjarne Stroustrup, Addison-Wesley Publication, 2003.

6. Advanced Mathematics:

Formation of Partial Differential Equations, First Order Linear and non-Linear Equations, Boundary Value Problems, Formation of the Wave Equation, Equation for the One Dimensional and Two Dimensional Heats Flow, Laplace Transform: (Laplace transformation and inverse, Properties of Laplace transform), Fourier series: (Periodic functions, Odd and even functions, Half range Fourier sine and cosine series), Fourier Transformation (Definition, Sine Cosine Transformation, Finite Fourier Sine and Cosine Transformation, Convolution, Inverses), Bessel's Equations: (Beta and Gamma function, Series Solutions of Bessel Equation).

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.

7. System Analysis and Databases Design

Introduction (DBMS), Data abstraction, Data models, Data independence, Database management & administrator, Entity relation model, Mapping constraints, Entity relation diagram, Representation of strong & weak entity, Generalization & aggregation, Design of an E-R database scheme, Mapping cardinalities, Data model-relational model, Example SQL and AQL, Hierarchical model, Example DL/1 and IQL, Network model, Data and file organization, Sequential & index file, Hash index & inverted files.

7. حرية انسان:

مفهوم حقوق الانسان، مفهوم الديمقراطية، خصائص وفئات حقوق الانسان، خصائص الديمقراطية، موقف الحضارات القديمة من حقوق الانسان/حضارة وادي الرافدين، وسائل تطبيق الديمقراطية، الحضارة الرومانية، الحضارة الاغريقية، صور الديمقراطية/الديمقراطية المباشرة، موقف الشرائع السماوية من حقوق الانسان، الديمقراطية النيابية، الديانة المسيحية والديانة الاسلامية، المصادر القانونية لحقوق الانسان في بريطانيا، المدرسة الطبيعية ونظية العقد الاجتماعي، الديمقراطية شبه المباشرة، اعلان حقوق الانسان والمواطن الفرنسي، الحكومة وانواعها، منظمة الامم المتحدة وحقوق الانسان، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون، الاعلان العالمي لحقوق الانسان، تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم، المواثيق والاتفاقيات/الاتفاقية الاوربية والاتفاقية الامريكية، النظام البرلماني واركانه، الميثاق الافريقي لحقوق الانسان ومشروع الميثاق العربي، النظام البرلماني في بريطانيا، المنظمات غير الحكومية، المؤسسات الدستورية في بريطانيا.

المصادر:

1. محاضرات في الديمقراطية د. فيصل شطناوي.
2. محاضرات في الحرية والديمقراطية د. ولاء مهدي الجبوري.



Third Year Syllabus

منهج المرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
2	1	-	2	Operation Research	بحوث العمليات	1
3	-	2	2	Computer Graphics	رسوم الحاسبة	2
2	-	-	2	Computer Architecture	معمارية الحاسبة	3
3	-	2	2	Compilers	مترجمات	4
3	-	2	2	Artificial Intelligent	ذكاء اصطناعي	5
3	-	2	2	Software Engineering	هندسة البرمجيات (اختياري)	6
3	-	2	2	Distributed Databases	قواعد البيانات الموزعة (اختياري)	7
3	-	-	3	Advanced IT	تكنولوجيا معلومات متقدمة	8
22	1	10	17	Total		

Total No. of Unit for One Semester: **(22)**Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة

Total No. of Unit for Year: **(44)** Units

مجموعة الوحدات لسنة دراسية: (44) وحدة

1. Operation Research:

Operating Research and the Art of Problem solving 0, Linear Programming, Formulation and Graphical Solution, Algebraic Solution, Duality and Sensitivity Analyses. Transportation Model .Networking Analyses .Decision Theory and Games, Inventory Model, Queuing Theory, Simulation.

References:

1. Operation Research: An Introduction, Hamdy A. Taha.

2. Computer Graphics:

Introduction: Display Devices (e.g. Raster, Vector). Elementary Graphics Figures: Line and Circle Drawing Algorithms. Sorting Pictures and 2D Transformations: Writing and Reading Graphics Data Files, Pictures Translation, Pictures Rotation, Pictures Scaling. Clipping and Windowing: Point and Line Clipping, Clipping Algorithms, Polygon Clipping. Curves: Polynomial Curves, Spline Curves. Elementary 3D Graphics: Introduction, Coordinates System, Transformations, Orthogonal Projection, Multiple Views, Hidden Lines and Surfaces, Shading and Coloring. Animation Techniques.

References:

- 1- J. D. Foley, Avan Dametal, "Introduction to Computer Graphic", Addison-Wesley, 1993.
- 2- D. Hearn and M.P. Baker, "Computer Graphics ", 2nd. Ed., Prentice-Hall, 1994



3. Computer Architecture:

Introduction to computer architecture and CPU architecture, Instruction set and format, Addressing modes, Program control (interrupt and subroutine call), Microprogramming Design of CPU Control Unit and Micro programmed vs., hardwired Control, RISC and CISC, I/O organization and Peripheral Control Strategies, Input / output interfaces, Asynchronous data transfer, Programmed I/O, Memory Management, types and hierarchy, Main memory and memory address map, Direct Memory Access, Input / output processor (IOP) and Channels, Associative Memory and Content-Addressable Memories, Cache memory, Parallel processing, Pipeline (general consideration), Arithmetic pipeline, Instruction pipeline, Difficulties in Instruction pipeline, And theme solutions, Vector processing, And array processors, Interprocessor communication, Cache coherence.

References:

- 1- M.M Mano "Computer System Architecture " third Edition, Prentice Hall, 1993.
- 2- David A. patterson And John L.Hennessy, "Computer Organization And Design " Morgan Kaufmann, 1998.

4-Compilers:

Programming Language, Introduction to Compiler, Type of Errors, One Pass Compiler, Syntax Definition, Context Free Grammar, Parsing Tree & leftmost and rightmost derivations, Transition Graph, Lexical analysis, Syntax of Analysis, Problems of Compiler, First and Follow, Top down Parsing, Predictive Parsing Method, Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser, Look Ahead LR, Semantic Analysis, Intermediate Code Generation, Code Optimization, Examples of Code Optimization, Code Generation, Build Simple Compiler.

References:

1. Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ulman.

5- Artificial Intelligent:

Introduction to Programming in Logic, Prolog Language Structure, Prolog Language Components, Facts, Simple Rules, Built in Functions in Prolog Language, Recursion in Prolog (Tail Recursion), Non Tail Recursion, Fail Structure, List Processing, String Processing, Database Structure and Properties, Files in Prolog and Applications with Database, Introduction to Artificial Intelligence, Knowledge Representation, Logical Representation, Graphical Representation, Problem State Space Characteristics, Problem Solving, Search Technique(Blind), Heuristic Search, The 8_Puzzle Problem, Control Strategy(Structure), Forward Chaining for Problem Solving, Backward Chaining for Problem Solving, Hybrid Method (Rule Cycle).

References:

1. Elian Rich, Artificial Intelligence, Prentice Hall 1991.



6- Software Engineering (Optional):

Introduction to Software Engineering, Computer System Engineering, Types of S/W E, Role of S/W E in system design, S/W system, General phases of S/W E, S/W E Tools, Characteristic of S/w E, S/W Process, S/W Process Models, Classical Model, Prototype Model, Spiral Model, Incremental Model, Iterative Model, RAD Model, Half-year Break, Requirement analysis and principles, Requirement analysis and Definition, Function Oriented Approach, Data Oriented Approach, System Modeling, Object Oriented Approach, Normalization, Jackson Method, Finite State Machine, Requirement Document, CORE Approach, Data Flow Diagram, Testing Technology, State Transmission diagram, Decision Tree, Decision Table.

References:

1. Software Engineering by Roger Press Man
2. Introduction to Software Engineering by Sommer Ville

7- Distributed Databases:

Structure of Distributed Database, Trade-offs in Distributed Database, Advantages of data distribution, Data sharing and distributed control, Reliability and Availability, speed up query processing, disadvantages of data distribution, software development cost, examples and exercises, Design of distributed database, Data Replication, Availability, Increased parallelism, Increased overhead on update, Data fragmentation, Horizontal fragmentation, vertical fragmentation, Mixed fragmentation, Examples and exercises, Transparency and Autonomy, Naming of data items, Fragmentation of data items, Location fragments and replicas, Examples, Recovery in Distributed systems, system structure, Robustness, commit protocols, concurrency controls, time stamping, Deadlock Handling, Examples and exercises, Database system concepts Henry K. Korta 1991, Database system using Oracle. 2E Shah, Distributed system concepts couloirs 2005.

8 - Advance Information Technology (Optional).

What is Information System, Element of Information System, Characteristics of Valuable Data, Types of Information system, Computer-Based information system (CBIS), Hardware Components, Hardware Components in Action, The motherboard, Memory Characteristics and Functions, Secondary Storage, Access Methods, Input and Output Devices, Special Purpose Input and Output Devices, Computer system Types, Ports and cables, An overview of software, Systems software, System Software Type, Operating Systems, User Interface, Application software, Off-the-Shelf Application Software, Personal Application Software, Programming Languages, Object Oriented Programming Language, The Hierarchy of Data, Data Entities Attributes and Keys, The Traditional Approach versus the Database Approach, Advantages of the Database Approach, Disadvantages of the Data Approach, Data Warehouses Data Marts and Data Mining, Communications Systems, Communications Systems, Telecommunication, Networks, Basic Communications Channel Characteristics , Channel Bandwidth and Information-Carrying Capacity, Types of Media, Network Topology, How the Internet Works, The Worlds Wide

Web, Web Browsers, Search Engines, JAVA, Push Technology, Cookie, Fraud, Security with Encryption and Firewalls, Unauthorized Sites.

Reference:

1. Principles of Information systems
By Ralph M. Stair, Gorge W. Reynolds, sixth edition, 2003.
2. Concepts of Information Technology (IT), ECDL Module 1, By Dr. M. Al-Kolaly, Version 4, 2005.

Elective Subjects for Third Year

المواضيع الاختيارية للمرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
2	-	-	2	decision making systems	نظم اتخاذ القرار	1
2	-	-	2	Modeling and Simulation	نمذجة ومحاكاة	2
3	-	2	2	Software Engineering	هندسة البرمجيات	3
3	-	2	2	Distributed Databases	قواعد بيانات موزعة	4





Forth Year Syllabus

منهج المرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Intelligence Systems	انظمة ذكية	1
3	-	2	2	Communication and Computer Networks	الاتصالات وشبكات الحاسبات	2
2	-	-	2	Management information system	نظم ادارة المعلومات	3
3	-	2	2	Operating System	نظم تشغيل	4
2	-	-	2	Computer and Data Security	امنية الحاسبات والبيانات	5
3	-	2	2	Image Processing	معالجة الصور (اختياري)	6
3	-	2	2	Web programming	برمجة المواقع (اختياري)	7
3	-	4	1	Project	مشروع	8
22	-	14	15	Total		

Total No. of Unit for One Semester: (22)Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة

Total No. of Unit for Year: (44) Units

مجموعة الوحدات لسنة دراسية: (44) وحدة

1- Intelligence Systems:

Expert Systems Using and Applications, Forward Chaining, Backward Chaining, Systems Based on Simple Search, Using Heuristics in Games, Search With Heuristics Embedded in Rules, Controlling the Reasoning Strategy, Systems Depend Under Uncertainty, Systems That Explain Their Actions, Using WHY Facility in Explanation Processor, Using HOW Facility in Explanation Processor, Natural Language Understanding, NLP Informal Method, NLP Formal Method, An Introduction to Adaptive Algorithms, An Introduction to Neural Network, Perceptron Neural Net, Back Propagation Neural Net, Hopfield Neural Net, Bidirectional Associative Memory Neural Net, Case Study in NN, An Introduction to Genetic Algorithms, GA in Travelling Sales Man Problem Solving, GA in the 8_Puzzle Problem Solving, GA in the Transitions Problem Solving, An Introduction to Genetic Programming.

References:

2. Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
3. 1.George F. Luger, Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.
4. 2. Laurene Fausett, Fundamantals of neural Networks: Architecture, Algorithms, and Applications, 1994.
5. David E. Goldberg, Genetic Algorithms in Search optimization, and Machine Learning, 1993.



2- Communication and Computer Networks:

Data Communication, Physical Topology, Basic Network Technology, LAN Devices, Collision and Collision Domains in Shared Layer Environments, Network Devices, Network Layer Addressing, Network Layer Field & Datagram, IP address Class, Subnet NW, Private Addresses, Transmission of Digital Data Interfaces and Modems, Transmission Media, Unguided Media, Satellite Communication, Error Detection and Correction, Data Link Control, Multiplexing, De Multiplexing, Data Link Protocols, ARP, FTP, TELNET, DNS, UDP, TCP, NFS and RPC, SMTP, TFTP, HTTP, WAIS, Gopher, SNMP, WWW, Browser Architecture, Methods for Assigning IP Address, Advance ARP, DHCP, Dynamic Addressing, Routable and non Routable Protocols, RIP Features.

References:

- 1- "Computer Networks", 3rd Edition, A. Tannenbaum, Prentice-Hall, 1996.
- 2- "Data Communications, Computer Networks and OSI", 4th Edition, F. Halsall, Addison-Wesley, 1995.
- 3- "Computer Communications and Networks", J. R. Freer, USL Press, 1996.

3- Management Information Systems:

Definition of MIS, MIS as an Evolving Concept, Subsystem of MIS, Operating Element of Information System, MIS Support for Decision Making, MIS Structure based on Management Activity, MIS Structure based on Organization Function, Synthesis of MIS Structure, Some Issues of MIS Structure, H/W _ S/W and Communication Technology for Information System, Storage and Retrieval of Data, Physical version Logical Models of Data.

4- Operating System:

Introduction to Operating Systems, User view and system view of OS, OS for mainframe, Desktop computer systems, OS for multiprocessor and distributed systems, OS for clustered, real-time and handheld computer systems, Introduction to computer system structure, Hardware Protection, Operating system structure, System components¹, System components², Operating system services, System calls and System Programs, System Design, System implementation, Half-year Break, Introduction to Processes, Process Concepts, Process Control Block, Process Scheduling, Operation on Processes, Cooperating Processes, Intercrosses Communication, Introduction to CPU Scheduling, CPU Scheduling concepts, Scheduling Criteria, Scheduling Algorithms, First Come First Served and Shortest Job First, Priority Scheduling algorithm and Round Robin Algorithm, Introduction to Deadlocks and handling.

References:

1. "Operating System Concepts" by Silberschatz, Galvin and Gagne, 2003.



5- Computer and Data Security:

Introduction of Data security, Basic terminology of Data security, Mathematical Background, Basic definition of arithmetic modular with examples, How Compute the Greater common deviser (GCD) using different methods, Explain the methods to compute the Inv, Explain the methods to find Euler notation and compute inv using Euler notation, Introduction of types of cipher systems, Types traditional of ciphers systems, Introduction of transposition cipher systems, Implementation of simple transposition method with examples for encipher and decipher methods, Columner method and fixed pired method, Implementation of simple substitution methods with examples for encipher and decipher methods, Types of substitution cipher systems types, Monoalphabetic substitution cipher systems (keywords method), Homophonic substitution cipher systems(Beal cipher, Higher order homophnics), polyaphabetic substitution cipher systems(Vigener cipher, Beaufort cipher ,Running ker cipher), polygram substitution cipher systems(playfair cipher, hill cipher ,product cipher), Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm), Trapdoor knapsack algorithm, With example for encipher and decipher process, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), Introduction of DES algorithm, X-box process in DES algorithm with example, Encryption process in DES algorithm with example, Decryption process in DES algorithm with example, Introduction of Stream ciphers, One time Pad system (vernarn system), The requirements of steam cipher, The Basic Five Randomness tests (i.e. frequency test , serial test), Poker test , run test, auto correlation test.

6- Image Processing (Optional):

Introduction to Image Processing, Compression between Computer Image and Computer Vision, Major topics for Computer Vision, Major topic for image processing, Image restoration, Image Enhancement, Image Compression, Image Representation, Digitization, Type of digital image, Binary Image, Gray Image, Color Image, HSL, Digital Image File Format, Spatial Domain, Frequency Domain, Region of interest image geometry (Crop, enlarge , shrinking , translate , rotate), Zoom algorithm, Zero order hold, First order hold, Convolution, Image Analysis: Image analysis steps, Preprocessing, Data reduction, Feature Analysis, Image algebra operation, Arithmetic operation, Logical operation, Spatial Filters, Mean Filters, Median Filters, Enhancement filters, Laplacian Filter, Difference Filter, Image Equalization, Gray level reduction, Spatial reduction, Edge line detection technique, Robert operator (Sobel operator, Prewitt operator, Krisch compass, Robinson compass mask, Laplacian operator, Frei chen mask), Segmentation, Region growing, Clustering methods, Boundaries detects, Combined approach, Histogram (Histogram features, Histogram Equalization, Histogram advantage, Image enhancement: Introduction, Gray scale modification, Histogram modification, Adaptive contrast enhancement, Color, Image sharpening (High pass filter, High frequency emphasis,



Homomorphism filter), Image smoothing (Mean and median filters, Low pass filter, Image Restoration), Image Compression: Discrete transformation, Fourier transform (Walsh Hadamard transform, Wavelet transform).

7-Web Programming:

Introduction to Web, Introduction to the Internet, The World Wide Web, The Internet and Web, The History and Growth of the Web, The Purpose of the Web, The Web Concepts, The Web Site Generations, Classifying the Web Sites, Programming Technologies, ASP Principles, Web Programming with ASP
Web based Applications.

References:

1. World Wide Web Consortium (W3C)
<http://www.w3c.org>
2. Tim Berners-Lee Web Page
<http://www.w3.org/People/Berners-Lee>
3. Weaving the Web ... "Book"
<http://www.w3.org/People/Berners-Lee/Weaving/Overview.html>
4. Web Site Engineering ... "Book"
http://www.geocities.com/website_engineering/chapter01.htm

8- Project.

Elective Subjects for Forth Year

المواضيع الاختيارية للمرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Neural Networks	شبكات عصبية	1
2	-	-	2	Management information system	نظم المعلومات الادارية	2
2	-	-	2	Distributed system	الانظمة الموزعة	3
3	-	2	2	Image Processing	معالجة الصور	4
3	-	2	2	Web programming	برمجة المواقع	5



جمهورية العراق وزارة التعليم العالي والبحث العلمي الجامعة التكنولوجية قسم علوم الحاسبات

فرع الذكاء الاصطناعي المناهج الدراسية للعام الدراسي 2009-2010

الجامعة التكنولوجية
قسم علوم الحاسبات

الصفحة الرئيسية | الدراسات العليا | البرمجيات | نظم المعلومات | الذكاء الاصطناعي | أمنية البيانات

نشأة القسم والاهداف

تأسس قسم علوم الحاسبات في الجامعة التكنولوجية عام ١٩٨٣ استجابة للتطورات العلمية والتكنولوجية الحاصلة في العراق، ولتهيئة الملاكات المتخصصة في هذا المجال الحيوي.

يمنح القسم شهادات البكالوريوس (BSc)، الماجستير (MSc) والدكتوراه (PhD) في اختصاصات علوم الحاسبات. وخلال سنوات عمله تطور القسم باتجاه التخصص العلمي، فحالياً يمنح القسم شهادة البكالوريوس في اربعة اختصاصات وهي اختصاص البرمجيات (Softwares)، نظم المعلومات (Information Systems)، الذكاء الاصطناعي (Artificial Intelligent)، وأمنية البيانات (Information Security).

يعتبر القسم احد الركائز العلمية التخصصية التي تقدم استشارات تنفيذ المشاريع في اختصاصه بالإضافة الى الدورات التطبيقية والمتقدمة بالتعاون مع مركز التعليم المستمر في الجامعة.

آخر تحديث للصفحة في 23/01/2008

المكتبة الالكترونية

اطراح كتوراه،
اطراح ماجستير،
بحوث منشورة

الدخول الى المكتبة

محتويات الموقع

- المدرسة العتية
- المختبرات
- مركز الانترنت
- المناهج الدراسية
- معرض الصور
- الارتباطات الخارجية

Microsoft Internet Explorer

First Year Syllabus

منهج المرحلة الاولى

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
4	-	2	3	Structured Programming	البرمجة المهيكلة	1
2	1	-	2	Mathematics	الرياضيات	2
2	1	-	2	Discrete Structures	الهياكل المتقطعة	3
3	-	2	2	Computer Organization and Logic Design	تركيب الحاسبة و التصميم المنطقي	4
3	-	2	2	Principles of Artificial Intelligence	مبادئ الذكاء الاصطناعي	5
2	1	-	2	Introduction to statistics theory	مقدمة الى نظرية الاحصاء	6
Pass	-	-	2	Democracy	الديمقراطية	7
Pass	-	-	-	English Language	اللغة الانكليزية	8
16	3	6	15	Total		

Total No. of Unit for One Semester: (16)Units

مجموعة الوحدات للفصل الدراسي الواحد: (16) وحدة

Total No. of Unit for Year: (32) Units

مجموعة الوحدات لسنة دراسية: (32) وحدة

1- Structured Programming (with C++ Programming Language):

Introduction, Procedural Programming Principles, Algorithm , Algorithm properties , Examples, Flowcharts, Flowchart Figure, Examples ,C++ Language Basics (Character set, Identifiers, Getting Started with C++, Variables Declaration, Variables, Constants, Arithmetic Operations, The “math.h” Library, Unary Minus, Increment and /decrement Operators, Operational Assignment Operators, Relational Operators, Logical Operators, Bitwise Operator), Selection Statements (Selection Statements, The Single If Statement Structure, The Single If Statement Structure (Blocks), The If/else Statement Structure, Nested If and If/else Statements, The Switch Selection Statement (Selector), Conditional Statement), Iteration Statements (Selection Statements, While Repetition Structure, Do/While Statement, For Statement, More about For Statement, Nested Loops, Break and Continue Control Statements), Functions (Function, Passing Parameters (Passing by Value, Passing by Reference)), Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements), Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements)), String (Read / Write / Process Array Elements, Member Function of String, stdlib Library), Structures (The Three Ways for Declare the Structure, Array of Structures).

References:

Mastering c++ by sorhan sami & oqeli saleh 2002



2- Mathematics:

Functions, Transcendental Functions, Sequence and Series, Differentiation and Applications, Integration and Applications, Multiple Integrals, Polar Plane, Complex Numbers, Matrices, Vector Analysis.

References:

Thomas calculus ,1989

3- Discrete Structures

Set theory -sets & subsets - how to specify sets -, sequences -Operations on sets-, Algebra of sets & its proves, sets of numbers- Finite sets, Mathematical induction & recursion, Matrices, Logic and propositions- Equivalency, Tautology& Contradiction, Relations- Computer representation of relations & Digraph, Manipulation of relations, Properties of relations, Composition of relations (Functions-types of functions, Graphs-definition-graphs & multigraphs- subgraph – degree of graph), Walk –length of walk- trail- path- cycle- the bridges of konnissberg, Traversable multigraphs- Euler theorem- special graph- bipartite graph matrices & graph, Labeled graphs – trees-rooted tree- ordered rooted tree- polish notation, Spanning tree- directed graph- matrix of digraph, Minimal path, Finite state machines, Language & pattern recognition machines, Optimistic approach to construct FSM, Finite automata, Finite automata (Contd).

References:

1. Discrete mathematics by Seymour Lipschutz
2. Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby 2004

4- Computer Organization and Logic Design:

Digital systems conversion, Digital system arithmetic, Complement scheme, Subtraction with complement, Logic gates, Addition digital system, The basic postulation, Prove the theorem, Simplification by map, Combinational circuits, Sequential circuits, Flip-flops, Multilevel logic implementation, Encoder and decoder, Multiplexer and de-multiplexer, Msl and vlsc, Computer definition, Computer generation, Computer architecture, CPU operation, Fetch cycle, Execution cycle, Memory representation, Memory types, Primary storage, Secondary storage, Computer classification, Language classification, Translators program, Operating systems, Networking, Internet.

References:

1. Computer System Architecture, M. Morris Mano, Third Edition, 1993.
2. Digital Fundamental, Floyd, Eight Edition, 2003.
3. Principle Of Computer Architecture, Murdocca. M. J., Heuring .V.P., Prentice-Hall, Inc.
4. Computer Communications and Information, Hutchinson .S.E., Sawyer .S.C. ,with Contribution by Coulthard G.J. .

5- Principles of Artificial Intelligence :

Propositional logic, Predicate Logic,First-Order- Predicate,Production rules, Problem Characteristics, Search Strategies (Problem state space



and search space ,Problem Solving ,Blind Search , Search Space Problems, Monkey &Banana , 8-puzzle , 2-jug) , Forward & Backward , Matching , Prolog (Terms, List, String)

References:

1. Artificial Intelligence structures and strategies for complex problem solving by "George F. Luger".
2. Elin Rich, "Artificial Intelligence", 1991.
3. Matt Carter , "Mind and Computers" "An Introduction to the Philosophy of Artificial Intelligence " , Edinbwgh University press , 2007.
4. Max Bramer, " Logic Programming with prolog ", Spring ,2005.
5. زينب الزرقاء وايمن عودة ، الذكاء الصناعي في لغة prolog شعاع للنشر والعلوم ، سورية ، حلب ، 2005.
6. الدكتور ف. سكر الذكاء الاصطناعي من خلال لغة prolog شعاع للنشر والعلوم ، سورية ، حلب ، 1998.

6- Introduction to statistic theory

Set theory, Binary operations on set , Permutation, Combination , Sample space, events, random variable , Addition theorem, multiplication theorem, Conditional probability , Bays theorem, Independent of events , Birnolli trails , Introduction to the theory of statistics ,Descriptive statistics, Measure of central tendency , Measure of dispersion , Binominal distribution , Exponential distribution , Normal (Gaussian) distribution , Correlation of Coefficient , The Chi-square test, the Goodness – of –Fit test, test of homogeneity, Regression , Regression analysis.

References:

1. Statistics: theories and applications, Joseph Inungo, 2006.
2. Probability and statistics, theory and applications, Gunnar Blom, 1989.

7- ديمقراطية

مفهوم الديمقراطية، خصائص الديمقراطية ، وسائل تطبيق الديمقراطية، صور الديمقراطية/الديمقراطية المباشرة/ شبه المباشرة/ النيابية، مفهوم الانتخاب ، هيئة الناخبين ، تنظيم عملية الانتخاب ، نظم الانتخابات.

المصادر:

- 1- محاضرات في الديمقراطية د. فيصل شطناوي
- 2- حقوق الانسان والنظ والديمقراطية، دز ماهر صالح الجبوري ، د. رعد ناجي الجدة ، د. رياض عزيز هادي،

2009

8- English Language

Second Year Syllabus

منهج المرحلة الثانية

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Object Oriented Programming	البرمجة الشيئية	1
3	-	2	2	Data Structures and Algorithms	هياكل البيانات والخوارزميات	2
2	1	-	2	Numerical Analysis	التحليل العددي	3
3	-	2	2	Artificial Intelligence Languages	لغات الذكاء الاصطناعي	4
3	-	2	2	Micro-Processors and Assembly Programming language	المعالجات الميكروية و البرمجة بلغة التجميع	5
2	1	-	2	Advanced Mathematics	الرياضيات المتقدمة	6
2	-	-	2	Computational Theory	النظرية الاحتمالية	7
Pass	-	-	2	Human rights	حقوق الانسان	8
18	2	8	16	Total		

Total No. of Unit for One Semester: **(18)Units**

مجموعة الوحدات للفصل الدراسي الواحد: (18) وحدة

Total No. of Unit for Year: **(36) Units**

مجموعة الوحدات لسنة دراسية: (36) وحدة

1. Numeric Analysis:

Binary Fraction and Shifting, Scientific Notation Machine Number and Computer Accuracy, Computer Floating Point Numbers, Error Analysis (Absolute band Relative Errors, Truncation, Round-Off and Chopping Errors), The Solution of non-Linear Equations $F(x)=0$, The Solution of Linear Systems $Ax=B$, Interpolation and Polynomial Approximation, Numerical Differentiation, Numeric Integration, Solution of Differential Equations (Euler 'S Method, Runge-Kutta Methods), Eigen Values and Vector.

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.
- 2- Numerical Methods Using Matlab, Prentice Hall.

2. Micro-Processors and Assembly Programming language:

CPU Architecture, Register Transfer, Memory, Peripheral Control Chips, Data Transfer, Fetch and Execute Cycles, Address and Data and Control Busses, Brief Introduction to Machine Code, Instruction Sets (Form, Orthogonality, Number of Addresses), and Decoding. Assembly Language Programming: Addressing Modes of the 808, Data Registers, Flags, The Status Register, and Implementing Control Structures in Assembly Language, Structured Assembly Language Programming using Procedures, Arithmetic and Logic Instructions Stack (Concepts and Applications), String Processing, Tools for Preparing and Debugging and Translating Programs. MS-DOS Operating System Structure: MS-DOS and BIOS Disk and



Keyboard System Architecture. Advanced Features of Processors: Segments and Segment Registers, Interrupts and Interrupt Service Routines, I/O Port Addressing, Instruction Pipelining, Cache Memory.

References:

- 1- Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
- 2- Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

3. Data Structures and Algorithms:

Introduction to Data Structures, Memory representation for 1D and 2D arrays, Linear list, Linear list types, Stack: (Stack Operations, Applications of stack), Queue: (Queue Operations, Applications of queue), Circular Queue: (CQueue Operations, Applications of CQueue), Linked List, Linked-Stack, Linked-Queue, Linked-CQueue, Recursion, Graph, Trees: (Types of Tree, Binary tree, Binary tree scan, Represent Regulars expression using trees, convert tree to binary tree, Binary Search Tree), Sorting: (Sorting Algorithms, Types of Sorting algorithms, Bubble Sort, Insertion Sort, Quick Sort), Searching: (Searching Algorithm, Sequential Search, Binary Search).

4. Computational Theory:

Regular Expression, Finite Automata, DFA and NFA, Equivalence of NFA and DFA, Equivalence of NFA and DFA with E-moves, Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar, Chomsky Normal Form, Greibach Normal Form, Tree, The empty string in context free grammar ambiguity, Regular grammar, Left linear grammar, Right linear grammar, Kleen theorem, Two way finite automata with output (mealy machine, moor machine), The equivalence of mealy and moor machine, Push down automata, Top down –bottom up derivation, Turing machine.

References:

1. H.R.Lewis and G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981.
2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.

5. Object Oriented Programming (with C++ Programming Language):

An Introduction: (The Evolution of OOP, Encapsulation and Data Hiding, Inheritance and Reuse, Polymorphism, Short History, C++ Program Development Process (PDP)), Classes: (Introduction, Declaration of classes, Class Constructors and Destructors, Overloading Constructors, Class Templates, Case Study1(Guessing Password Game)), Inheritance: (Introduction, Declaration of Inheritance, An Example – Single Inheritance, Inheritance based on access-specifier (Inheritance with Public



access-specifier, Inheritance with Private access-specifier), Parent Constructors and Destructors), Polymorphism: (Introduction, Pointer to Classes, Static and Dynamic Binding, Types of Polymorphism (Polymorphism of Variables, Polymorphism of Functions, Polymorphism of Objects), Virtual Functions, Override Function, Constructor and Virtual Destructor, Abstract Base Class (ABC) and Pure Virtual Function), Operator Overloading: (Introduction, Operators that can't be overloaded, Operator Functions, Operator Overloading with the Member Operator Functions, Operator Overloading with the Non- member Operator Functions (Friend Function), The Flexibility of Friend Operator Functions, Overload the Output Operator), Selected Advance OOP Topics: (Custom Header Files, Selected Problems: Program's Self-Protection, Simple Virus and its Anti-Virus)).

References:

3. "Mastering C++", Prof. Oqeili Saleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
4. "Object Oriented Programming Language with C++", Bjarne Stroustrup, Addison-Wesley Publication, 2003.

6. Advanced Mathematics:

Formation of Partial Differential Equations, First Order Linear and non-Linear Equations, Boundary Value Problems, Formation of the Wave Equation, Equation for the One Dimensional and Two Dimensional Heats Flow, Laplace Transform: (Laplace transformation and inverse, Properties of Laplace transform), Fourier series: (Periodic functions, Odd and even functions, Half range Fourier sine and cosine series), Fourier Transformation (Definition, Sine Cosine Transformation, Finite Fourier Sine and Cosine Transformation, Convolution, Inverses), Bessel's Equations: (Beta and Gamma function, Series Solutions of Bessel Equation).

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.
- 2-

7. Artificial Intelligence Language:

Introduction, State Space Search, Search Strategies, Knowledge Representation, Clause form, Resolution, Resolution by Refutation, Introduction to Natural language.

References:

- 1- Elin Rich, "Artificial Intelligence", 1989.
- 2- William A. Stubblefield & Luger E. George, "Artificial Intelligence and the Design of Expert Systems", 1998.
- 3- Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
- 4- Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.



8. حرية انسان:

مفهوم حقوق الانسان، مفهوم الديمقراطية، خصائص وفئات حقوق الانسان، خصائص الديمقراطية، موقف الحضارات القديمة من حقوق الانسان/حضارة وادي الرافدين، وسائل تطبيق الديمقراطية، الحضارة الرومانية، الحضارة الاغريقية، صور الديمقراطية/الديمقراطية المباشرة، موقف الشرائع السماوية من حقوق الانسان، الديمقراطية النيابية، الديانة المسيحية والديانة الاسلامية، المصادر القانونية لحقوق الانسان في بريطانيا، المدرسة الطبيعية ونظبية العقد الاجتماعي، الديمقراطية شبه المباشرة، اعلان حقوق الانسان والمواطن الفرنسي، الحكومة وانواعها، منظمة الامم المتحدة وحقوق الانسان، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون، الاعلان العالمي لحقوق الانسان، تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم، المواثيق والاتفاقيات/الاتفاقية الاوربية والاتفاقية الامريكية، النظام البرلماني واركانه، الميثاق الافريقي لحقوق الانسان ومشروع الميثاق العربي، النظام البرلماني في بريطانيا، المنظمات غير الحكومية، المؤسسات الدستورية في بريطانيا.

المصادر:

1. محاضرات في الديمقراطية د. فيصل شطناوي.
2. محاضرات في الحرية والديمقراطية د. ولاء مهدي الجبوري.

Third Year Syllabus

منهج المرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Computer Graphics	رسوم الحاسبة	.1
3	-	2	2	Compilers	المتجمات	.2
3	-	2	2	Databases	قواعد البيانات	.3
2	-	-	2	Computer Architecture	معمارية الحاسبة	.4
3	-	2	2	Natural Languages Processing	معالجة اللغات الطبيعية	.5
3	-	2	2	Expert Systems	النظم الخبيرة (أختياري)	.6
3	-	2	2	Neural Networks + Genetic Algorithms	الشبكات العصبية و الخوارزميات الجينية (أختياري)	.7
2	1	-	2	Operation Research	بحوث عمليات	.8
22	1	12	16	Total		

Total No. of Unit for One Semester: (22)Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة

Total No. of Unit for Year: (44) Units

مجموعة الوحدات لسنة دراسية: (44) وحدة

1. Operation Research:

Operating Research and the Art of Problem solving 0, Linear Programming, Formulation and Graphical Solution, Algebraic Solution, Duality and Sensitivity Analyses. Transportation Model .Networking Analyses .Decision Theory and Games, Inventory Model, Queuing Theory, Simulation.

References:

1. Operation Research: An Introduction, Hamdy A. Taha.

2. Computer Graphics:

Introduction: Display Devices (e.g. Raster, Vector). Elementary Graphics Figures: Line and Circle Drawing Algorithms. Sorting Pictures and 2D Transformations: Writing and Reading Graphics Data Files, Pictures Translation, Pictures Rotation, Pictures Scaling. Clipping and Windowing: Point and Line Clipping, Clipping Algorithms, Polygon Clipping. Curves: Polynomial Curves, Spline Curves. Elementary 3D Graphics: Introduction, Coordinates System, Transformations, Orthogonal Projection, Multiple Views, Hidden Lines and Surfaces, Shading and Coloring. Animation Techniques.

References:

- 1- J. D. Foley, Avan Dametal, "Introduction to Computer Graphic", Addison-Wesley, 1993.
- 2- D. Hearn and M.P. Baker, "Computer Graphics ", 2nd. Ed., Prentice-Hall, 1994.



3. Computer Architecture:

Introduction to computer architecture and CPU architecture, Instruction set and format, Addressing modes, Program control (interrupt and subroutine call), Microprogramming Design of CPU Control Unit and Micro programmed vs., hardwired Control, RISC and CISC, I/O organization and Peripheral Control Strategies, Input / output interfaces, Asynchronous data transfer, Programmed I/O, Memory Management, types and hierarchy, Main memory and memory address map, Direct Memory Access, Input / output processor (IOP) and Channels, Associative Memory and Content-Addressable Memories, Cache memory, Parallel processing, Pipeline (general consideration), Arithmetic pipeline, Instruction pipeline, Difficulties in Instruction pipeline, And theme solutions, Vector processing, And array processors, Interprocessor communication, Cache coherence.

References:

- 1- M.M Mano "Computer System Architecture "third Edition, Prentice Hall, 1993.
- 2- David A. patterson And John L.Hennessy,"Computer Organization And Design " Morgan Kaufmann, 1998.

4. Compilers:

Programming Language, Introduction to Compiler, Type of Errors, One Pass Compiler, Syntax Definition, Context Free Grammar, Parsing Tree & leftmost and rightmost derivations, Transition Graph, Lexical analysis, Syntax of Analysis, Problems of Compiler, First and Follow, Top down Parsing, Predictive Parsing Method, Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser, Look Ahead LR, Semantic Analysis, Intermediate Code Generation, Code Optimization, Examples of Code Optimization, Code Generation, Build Simple Compiler.

References:

1. Principles of Compiler Design, Alfred V. Aho, Jeffrey D. Ulman.

5. Natural Languages Processing (NLP):

Introduction to NLP: (Definition of NLP, NLP Goal, The advantage of NLP, Example of Intelligent Robot), Understanding: (What is Understanding?, What makes understanding hard?, The complexity of the target representation, Type of mapping, Level of interactive among components), Types of Languages & Grammars: (Type 0: Phrase Structure Grammar (PSG), Type 1: Context Sensitive Grammar (CSG), Type 2: Context Free Grammar (CFG), Type 3: Regular Grammar (RG), Written Text Processing (Formal Method), Lexical analysis, Syntax analysis: (Rules of Grammar, Parse Tree and Transition Network Parser), Semantic analysis, Syntax Analysis (Formal Method): Rules of English Grammar, Example of PROLOG program of English Grammar solved in: Append Mechanism.Syntax Analysis, Formal Method, Append Mechanism with Singular & Plural Consideration. Syntax Analysis (Formal Method): Difference Pair Idea, Semantic Analysis (Formal Method): A: Knowledge Representation (Rule-Base System, Semantic Net, Frame Representation, Conceptual



Graph, Semantic Analysis (Formal Method), B: Analyzing the semantic structure of a sentence: (object case, Agent case, Co-agent case, Beneficiary case, Location case, Time case, Instrument case, Source and destination cases ...), C: The Case Analysis Parser. Written Text Processing (Informal Method), Extracting meaning from keywords, Example of PROLOG program (DOCSYS) for a manual of a company. Machine Translation (MT): (Definition of MT and its usage, Computer-Aided Human Translation (CAHT), Language Similarities & Differences), Machine Translation Methods: (Direct Translation Method, Transfer Metaphor Model, The Interlingua Idea: Using Meaning), Translation Dictionary: (Types of dictionary, Dictionary structure), Spoken language Processing: (Speech definition, Problem areas in speech recognition system, Text-Dependent & text Independent SR, Continuous & Isolated SR), SR System model, From talk to text: Dual purpose speech (medical report), From talk to text: (Dual purpose speech (schedule appointment), Multiple pronunciations lexicons (Using Hidden Markov Model (HMM), Speech Recognition Grammar: Using XML Data Structure, Application on SR system: (Understanding speech without recognizing words)), Application on SR system, Speech Compression (Lossless compression, Lossy compression), Application on SR system: Distributed speech recognition system, The relationship between NL & SR, Compares between Written text processing & Speech processing, Natural Language Generation: Example and Program.

References:

1. "AI", By: Alian Rich, 1991.

6. Neural Networks & Genetic Algorithms (Optional):

Introduction, Artificial neuron concepts, NN Architecture, Supervised & Unsupervised, Activation Functions, learning Rules, Hebbian Learning rule, Basic Delta Rule, ANN taxonomy, Hopfield NN, Back Propagation NN, Continue with application, BAM, Adaline, Application, Kohonen NN, Application, (ART), Auto & Hetero Associative, GA concepts, GA Operators, GA Parameters, GA Fitness Function, Genetic Programming, GA Application.

References:

- 1- Fundamentals of Neural Networks: Architecture, Algorithms, and application. By Laurene Fausett
- 2- Neural Networks. By Phil Picton
- 3- Neural Networks. Fundamentals, Application, Examples. By Werner Kinnebrock
- 4- Neural network for identification, prediction and control. By D. T. Pham and X. Liu.
- 5- Genetic Algorithms. By Gross berg

7. Databases:

Introduction (DBMS), Data abstraction, Data models, Data independence, Database management & administrator, Entity relation model, Mapping constraints, Entity relation diagram, Representation of strong & weak entity, Generalization & aggregation, Design of an E-R database scheme, Mapping cardinalities, Data model-



relational model, Example SQL,AQL, Hierarchical model, Example DL/1,IQL, Structure of distributed Databases, Trad-off in Distributing the databases, Design of distributed databases, Transparency and Autonomy, Distributed Query Processing, Recovery in distributed databases.

References:

1. Database System Concepts (Henry F. Korth).
2. An Introduction Database System C.J.Date.

8. Expert Systems (Optional):

Expert Systems Using and Applications, Forward Chaining, Backward Chaining, Systems Based on Simple Search, Using Heuristics in Games, Search With Heuristics Embedded in Rules, Controlling the Reasoning Strategy, Systems Depend Under Uncertainty, Systems That Explain Their Actions, Using WHY Facility in Explanation Processor, Using HOW Facility in Explanation Processor, Natural Language Understanding, NLP Informal Method, NLP Formal Method, An Introduction to Adaptive Algorithms, An Introduction to Neural Network, Perceptron Neural Net, Back Propagation Neural Net, Hopfield Neural Net, Bidirectional Associative Memory Neural Net, Case Study in NN, An Introduction to Genetic Algorithms, GA in Travelling Sales Man Problem Solving, GA in the 8_Puzzle Problem Solving, GA in the Transitions Problem Solving, An Introduction to Genetic Programming.

References:

1. Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
2. 1.George F. Luger,Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.
3. 2. Laurene Fausett, Fundamentals of neural Networks: Architecture, Algorithms, and Applications, 1994.
4. David E. Goldberg, Genetic Algorithms in Search optimization, and Machine Learning, 1993.

Elective Subjects for Third Year

المواضيع الاختيارية للمرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Expert Systems	النظم الخبيرة	1
3	-	2	2	Neural Network and Genetic Algorithms	الشبكات العصبية والخوارزميات الجينية	2
3	-	2	2	Moulding and Simulation	النمذجة والمحاكاة	3
2	-	-	2	Predicted and Decision Making	التنبؤ واتخاذ القرار	4



Forth Year Syllabus

منهج المرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Advanced Artificial Intelligence	ذكاء اصطناعي متقدم	1
3	-	2	2	Communication and Computer Networks	الاتصالات وشبكات الحاسبة	2
2	-	-	2	Computer and Data Security	امنية الحاسبات والبيانات (أختياري)	3
3	-	2	2	Operating System	نظم التشغيل	4
3	-	-	2	Fuzzy Logic	المنطق المضبب	5
3	-	2	2	Web programming	برمجة مواقع الانترنت (أختياري)	6
3	-	2	2	Image Processing	معالجة الصور	7
3	-	4	1	Project	مشروع	8
23	-	14	15	Total		

Total No. of Unit for One Semester: (21)Units

مجموعة الوحدات للفصل الدراسي الواحد: (21) وحدة

Total No. of Unit for Year: (46) Units

مجموعة الوحدات لسنة دراسية: (46) وحدة

1- Advanced Artificial Intelligence:

Planning: (P-A-D Algorithm, Non-linear Constraint Planning, Means Ends Algorithm),
Symbolic Learning: (Framework, Candidates Elimination Algorithms, ID3 Algorithm),
Reinforcement Learning, Non- Monotonic Logic, Tabu Search, Simulated Annealing,
Introduction to Data Mining: (Association Rules Extraction, Apriori Algorithm),
Introduction to Swarm intelligent.

References:

5. Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
6. 1.George F. Luger,Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.
7. 2. Laurene Fausett, Fundamantals of neural Networks: Architecture, Algorithms, and Applications, 1994.
8. David E. Goldberg, Genetic Algorithms in Search optimization, and Machine Learning, 1993.

2- Computer Networks and Internet:

Data Communication, Physical Topology, Basic Network Technology, LAN Devices, Collision and Collision Domains in Shared Layer Environments, Network Devices, Network Layer Addressing, Network Layer Field & Datagram, IP address Class,



Subnet NW, Private Addresses, Transmission of Digital Data Interfaces and Modems, Transmission Media, Unguided Media, Satellite Communication, Error Detection and Correction, Data Link Control, Multiplexing, De Multiplexing, Data Link Protocols, ARP, FTP, TELNET, DNS, UDP, TCP, NFS and RPC, SMTP, TFTP, HTTP, WAIS, Gopher, SNMP, WWW, Browser Architecture, Methods for Assigning IP Address, Advance ARP, DHCP, Dynamic Addressing, Routable and non Routable Protocols, RIP Features.

References:

- 1- "Computer Networks", 3rd Edition, A. Tannenbaum, Prentice-Hall, 1996.
- 2- "Data Communications, Computer Networks and OSI", 4th Edition, F. Halsall, Addison-Wesley, 1995.
- 3- "Computer Communications and Networks", J. R. Freer, USL Press, 1996.

3- Fuzzy Logic:

Introduction: why we need fuzzy theory , advantages and applications, Fuzzy set: definition , comparison between the crisp set and fuzzy set, examples, Operations on fuzzy sets and comparison to the crisp operations with examples, Fuzzy logic and compatriot to logic rule with examples, Fuzzy number with example, Definition of fuzzification, fuzzification functions, and examples, Definition of de-fuzzification, de-fuzzification functions, examples, Rules, rule structures, rule firing, confides and rules Inference engine, Knowledge base, data base, Big picture of fuzzy logic system structure, Preprocessing and post-processing, Review of fuzzy logic system, Data, conclusions to be reached, purpose, Mapping out the reasoning process, Turbine controller, fuzzy stream, Fuzzy logic controller, Comparison between fuzzy system and fuzzy controller, Working one-line real time constraint, On-line real time data input and output and processing algorithms, Memory storage requirement and response time, Introduction to fuzzy hybrid systems, Feature detection , c-mean, Fuzzy c-mean with example, Introduction to NN, Fuzzy NN with example, Introduction to wavelet transform, wavenet, Fuzzy wavenet with example, Review of the hybrid systems, Application of hybrid systems.

References:

1. Fuzzy system hand book, Byearl Cox, 1999.
2. Fuzzy controllers by; Leonid Reznik, 1997.

4- Operating System:

Introduction to Operating Systems, User view and system view of OS, OS for mainframe, Desktop computer systems, OS for multiprocessor and distributed systems, OS for clustered, real-time and handheld computer systems, Introduction to computer system structure, Hardware Protection, Operating system structure, System components1, System components2, Operating system services, System calls and System Programs, System Design, System implementation, Half-year Break, Introduction to Processes, Process Concepts, Process Control Block, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess



Communication, Introduction to CPU Scheduling, CPU Scheduling concepts, Scheduling Criteria, Scheduling Algorithms, First Come First Served and Shortest Job First, Priority Scheduling algorithm and Round Robin Algorithm, Introduction to Deadlocks and handling.

References:

1. "Operating System Concepts" by Silberschatz, Galvin and Gagne, 2003.

5- Computer and Data Security:

Introduction of Data security, Basic terminology of Data security, Mathematical Background, Basic definition of arithmetic modular with examples, How Compute the Greater common deviser (GCD) using different methods, Explain the methods to compute the Inv, Explain the methods to find Euler notation and compute inv using Euler notation, Introduction of types of cipher systems, Types traditional of ciphers systems, Introduction of transposition cipher systems, Implementation of simple transposition method with examples for encipher and decipher methods, Columner method and fixed pired method, Implementation of simple substitution methods with examples for encipher and decipher methods, Types of substitution cipher systems types, Monoalphabetic substitution cipher systems (keywords method), Homophonic substitution cipher systems(Beal cipher, Higher order homophnics), polyaphabetic substitution cipher systems(Vigener cipher, Beaufort cipher ,Running ker cipher), polygram substitution cipher systems(playfair cipher, hill cipher ,product cipher), Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm), Trapdoor knapsack algorithm, With example for encipher and decipher process, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), Introduction of DES algorithm, X-box process in DES algorithm with example, Encryption process in DES algorithm with example, Decryption process in DES algorithm with example, Introduction of Stream ciphers, One time Pad system (vernarn system), The requirements of steam cipher, The Basic Five Randomness tests (i.e. frequency test , serial test), Poker test , run test, auto correlation test.

6- Image Processing:

Introduction to Image Processing, Comparession between Computer Image and Computer Vision, Major topics for Computer Vision, Major topic for image processing, Image restoration, Image Enhancement, Image Comprission, Image Representation, Digitization, Type of digital image, Binary Image, Gray Image, Color Image, HSL, Digital Image File Format, Spatial Domain, Frequency Domain, Region of interest image geometry (Crop, enlarge , shrinking , translate , rotate), Zoom algorithm, Zero order hold, First order hold, Convolution, Image Analysis: Image analysis steps, Preprocessing, Data reduction, Feature Analysis, Image algebra operation, Arithmetic operation, Logical operation, Spatial Filters, Mean Filters, Median Filters, Enhancement filters, Laplacian Filter, Difference Filter, Image Equalization, Gray level reduction, Spatial reduction, Edge line detection technique, Robert operator (Sobel operator, Prewitt operator, Krisch compass, Robinson compass



mask, Laplacian operator, Frei chen mask), Segmentation, Region growing, Clustering methods, Boundaries detects, Combined approach, Histogram (Histogram features, Histogram Equalization, Histogram advantage, Image enhancement: Introduction, Gray scale modification, Histogram modification, Adaptive contrast enhancement, Color, Image sharpening (High pass filter, High frequency emphasis, Homomorphic filter), Image smoothing (Mean and median filters, Low pass filter, Image Restoration), Image Compression: Discrete transformation, Fourier transform (Walsh Hadamard transform, Wavelet transform).

7-Web Programming:

Introduction to Web, Introduction to the Internet, The World Wide Web, The Internet and Web, The History and Growth of the Web, The Purpose of the Web, The Web Concepts, The Web Site Generations, Classifying the Web Sites, Programming Technologies, ASP Principles, Web Programming with ASP
Web based Applications.

References:

1. World Wide Web Consortium (W3C)
<http://www.w3c.org>
2. Tim Berners-Lee Web Page
<http://www.w3.org/People/Berners-Lee>
3. Weaving the Web ... "Book"
<http://www.w3.org/People/Berners-Lee/Weaving/Overview.html>
4. Web Site Engineering ... "Book"
http://www.geocities.com/website_engineering/chapter01.htm

8-project.

Elective Subjects for Forth Year

المواضيع الاختيارية للمرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Intelligent Databases	قواعد البيانات الذكية	1
3	-	2	2	Robotics	الروبوت	2
3	-	2	2	Web programming	برمجة مواقع الانترنت	3
2	-	-	2	Computer and Data Security	امنية الحاسبات والبيانات	4
3	-	2	2	Advanced Intelligent Systems	الانظمة الذكية المتقدمة	5



جمهورية العراق وزارة التعليم العالي والبحث العلمي الجامعة التكنولوجية قسم علوم الحاسبات

فرع أمنية البيانات المناهج الدراسية للعام الدراسي 2010-2009

الجامعة التكنولوجية
قسم علوم الحاسبات

الصفحة الرئيسية | الدراسات العليا | البرامجيات | نظم المعلومات | الذكاء الاصطناعي | أمنية البيانات

نشأة القسم والاهداف

تأسس قسم علوم الحاسبات في الجامعة التكنولوجية عام ١٩٨٣ استجابة للتطورات العلمية والتكنولوجية الحاصلة في العراق، ولتهيئة الملاكات المتخصصة في هذا المجال الحيوي.

يمنح القسم شهادات البكالوريوس (BSc)، الماجستير (MSc) والدكتوراه (PhD) في اختصاصات علوم الحاسبات. وخلال سنوات عمله تطور القسم باتجاه التخصص العلمي، فحالياً يمنح القسم شهادة البكالوريوس في اربعة اختصاصات وهي اختصاص البرامجيات (Softwares)، نظم المعلومات (Information Systems)، الذكاء الاصطناعي (Artificial Intelligent)، وأمنية البيانات (Information Security).

يعتبر القسم احد الركائز العلمية التخصصية التي تقدم استشارات تنفيذ المشاريع في اختصاصات بالإضافة الى الدورات التطبيقية والمتقدمة بالتعاون مع مركز التعليم المستمر في الجامعة.

آخر تحديث للصفحة في 23/01/2008

المكتبة الالكترونية

اطاريح دكتوراه،
اطاريح ماجستير،
بحوث منشورة

الدخول الى المكتبة

محتويات الموقع

- المدرسة العتبية
- المختبرات
- مركز الانترنت
- المناهج الدراسية
- معرض الصور
- الارتباطات الخارجية

Microsoft Internet Explorer



First Year Syllabus

منهج المرحلة الأولى

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
4	-	2	3	Structured Programming	البرمجة المهيكلية	.1
2	1	-	2	Mathematics	الرياضيات	.2
2	1	-	2	Discrete Structures	الهياكل المنقطعة	.3
3	-	2	2	Computer Organization and Logic Design	تركيب الحاسبة والتصميم المنطقي	.4
2	-	-	2	Principals of security	مبادئ الامنية	.5
2	1	-	2	Probability Theory	نظرية الاحتمالات	.6
Pass	-	-	2	Democracy	الديمقراطية	.7
Pass	-	-	2	English Language	لغة انكليزية	.8
15	3	4	19	Total		

Total No. of Unit for One Semester: (15)Units

مجموعة الوحدات للفصل الدراسي الواحد: (15) وحدة

Total No. of Unit for Year: (30) Units

مجموعة الوحدات لسنة دراسية: (30) وحدة

Structured Programming (with C++ Programming Language): update

Introduction, Procedural Programming Principles, Algorithm ,Algorithm properties ,Examples, Flowcharts, Flowchart Figure, Examples C++ Language Basics (Character set, Identifiers, Getting Started with C++, Variables Declaration, Variables, Constants, Arithmetic Operations, The “math.h” Library, Unary Minus, Increment and /decrement Operators, Operational Assignment Operators, Relational Operators, Logical Operators, Bitwise Operator), Selection Statements (Selection Statements, The Single If Statement Structure, The Single If Statement Structure (Blocks), The If/else Statement Structure, Nested If and If/else Statements, The Switch Selection Statement (Selector), Conditional Statement), Iteration Statements (Selection Statements, While Repetition Structure, Do/While Statement, For Statement, More about For Statement, Nested Loops, Break and Continue Control Statements), Functions (Function, Passing Parameters (Passing by Value, Passing by Reference)), Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements), Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements)), String (Read / Write / Process Array Elements, Member Function of String, stdlib Library), Structures (The Three Ways for Declare the Structure, Array of Structures).

References:

- 1- Mastring C++ , Amman-Jordan, AL-Shorok\2002.
- 2- Oqeili Salch, prof. Department of IT-AL-Balqa Applied University.



Mathematics:

Functions, Transcendental Functions, Sequence and Series, Differentiation and Applications, Integration and Applications, Multiple Integrals, Polar Plane, Complex Numbers, Matrices, Vector Analysis.

References:

1- Calculas , Thomas.

Discrete Structures

Set theory -sets & subsets - how to specify sets -, sequences -Operations on sets-, Algebra of sets & its proves, sets of numbers- Finite sets, Mathematical induction & recursion, Matrices, Logic and propositions- Equivalency, Tautology& Contradiction, Relations- Computer representation of relations & Digraph, Manipulation of relations, Properties of relations, Composition of relations (Functions-types of functions, Graphs-definition-graphs & multigraphs- sub graph – degree of graph), Walk –length of walk- trail- path- cycle- the bridges of Konigsberg, Traversable multigraphs- Euler theorem- special graph- bipartite graph matrices & graph, Labeled graphs – trees- rooted tree- ordered rooted tree- polish notation, Spanning tree- directed graph- matrix of digraph, Minimal path, Finite state machines, Language & pattern recognition machines, Optimistic approach to construct FSM, Finite automata, Finite automata (Contd).

References:

1. Discrete mathematics by Seymour Lipchitz
2. Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby

Computer Organization and Logic Design:

Digital systems conversion, Digital system arithmetic, Complement scheme, Subtraction with complement, Logic gates, Addition digital system, The basic postulation, Prove the theorem(Booleam Algebra), Simplification by K-map, Combinational logic circuits Using (NAND, NOR Gates), Half-Adder, Full-Adder, 4-Bit Parallel Adder, Sequential circuits, Flip-flops, Multilevel logic implementation, Encoder and decoder, Multiplexer and de-multiplexer, Msl and vlsc, Computer definition, Computer generation, Computer architecture, CPU operation, Fetch cycle, Execution cycle, Memory representation, Memory types, Primary storage, Secondary storage, Computer classification, Language classification, Translators program, Operating systems, Networking, Internet.

References:

1. Computer System Architecture, M. Morris Mano, Third Edition, 1993.
 2. Digital Fundamental, Floyd, Eight Edition, 2003.
 3. Principle Of Computer Architecture, Murdocca. M. J., Heuring .V.P., Prentice-Hall, Inc.
 4. Computer Communications and Information, Hutchinson .S.E., Sawyer .S.C. ,with Contribution by Coulthard G.J. .
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Principals of security

Number Theory:

What is number theory, Definition of : set, binary operation, group, Definition of : ring, field, Basic properties of divisibility, Fundamental theorem of arithmetic, Mersenn prime and Fermat number, Euclid's algorithm, Definition of: mod, congruent, Properties of congruent, Residue class of a modular, The properties of residue classes, Modular arithmetic, Linear congruence: Fermat's little theorem, Euler's theorem, How to find the multiplicative inverse, Applications for binary number, Applications for integer number, Linear congruent generation, Power and discrete exponential generator, Introduction to cryptography.

References:

1- Number Theory for Computing, By: Song Y. Yan.

6- Probability Theory:

set theory, equality of sets, subset , binary operations on set, Venn diagram, finite set and countable sets , cardinality, Cartesian product, Relations , inverse relation, functions, type of function, inverse function, equality of function, composite function , Permutation and combination, Permutation, combination, binomial theorem, Probability theory, Basic probability definition and rules, sample space, event, type of sample space, Probability, complement rule, addition theorem, books inequality, multiplication theorem , Conditional probability, the general multiplication rule, Independent of events, probability distributions , random variable, the probability density function , cumulative probability , the binomial distribution

References:

1- Probability and Statistics Theory and Applications, Gunnar Blom.

حقوق الانسان:

مفهوم حقوق الانسان، مفهوم الديمقراطية، خصائص وفئات حقوق الانسان، خصائص الديمقراطية، موقف الحضارات القديمة من حقوق الانسان/حضارة وادي الرافدين، وسائل تطبيق الديمقراطية، الحضارة الرومانية، الحضارة الاغريقية، صور الديمقراطية/الديمقراطية المباشرة، موقف الشرائع السماوية من حقوق الانسان، الديمقراطية النيابية، الديانة المسيحية والديانة الاسلامية، المصادر القانونية لحقوق الانسان في بريطانيا، المدرسة الطبيعية ونظمية العقد الاجتماعي، الديمقراطية شبه المباشرة، اعلان حقوق الانسان والمواطن الفرنسي، الحكومة وانواعها، منظمة الامم المتحدة وحقوق الانسان، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون، الاعلان العالمي لحقوق الانسان، تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم، المواثيق والاتفاقيات/الاتفاقية الاوربية والاتفاقية الامريكية، النظام البرلماني واركانه، الميثاق الافريقي لحقوق، الانسان ومشروع الميثاق العربي، النظام البرلماني في بريطانيا، المنظمات غير الحكومية، المؤسسات الدستورية في بريطانيا.

المصادر:

1. محاضرات في الديمقراطية د. فيصل شطناوي.
2. محاضرات في الحرية والديمقراطية د. ولاء مهدي الجبوري.

8- English language:



Second Year Syllabus

منهج المرحلة الثانية

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Object Oriented Programming	البرمجة الشيئية	.1
3	-	2	2	Data Structures and Algorithms	هياكل البيانات والخوارزميات	.2
2	1	-	2	Numerical Analysis	التحليل العددي	.3
3	-	-	3	Information Theory	نظرية معلومات	.4
3	-	2	2	Micro-Processors and Assembly Programming language	المعالجات الميكروية و البرمجة بلغة التجميع	.5
2	1	-	2	Advanced Mathematics	الرياضيات المتقدمة	.6
2	-	-	2	Computational Theory	النظرية الاحتمالية	.7
Pass	-	-	2	Human rights	حقوق الانسان	.8
18	2	6	17	Total		

Total No. of Unit for One Semester: (18)Units
Total No. of Unit for Year: (36) Units

مجموعة الوحدات للفصل الدراسي الواحد: (18) وحدة
مجموعة الوحدات لسنة دراسية: (36) وحدة

1. Numerical Analysis:

Binary Fraction and Shifting, Scientific Notation Machine Number and Computer Accuracy, Computer Floating Point Numbers, Error Analysis (Absolute band Relative Errors, Truncation, Round-Off and Chopping Errors), The Solution of non-Linear Equations $F(x)=0$, The Solution of Linear Systems $Ax=B$, Interpolation and Polynomial Approximation, Numerical Differentiation, Numeric Integration, Solution of Differential Equations (Euler 'S Method, Runge-Kutta Methods), Eigen Values and Vector.

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesley, 1999.
- 2- Numerical Methods Using Matlab, Prentice Hall.

2. Micro-Processors and Assembly Programming:

CPU Architecture, Register Transfer, Memory, Peripheral Control Chips, Data Transfer, Fetch and Execute Cycles, Address and Data and Control Busses, Brief Introduction to Machine Code, Instruction Sets (Form, Othogonality, Number of Addresses), and Decoding. Assembly Language Programming: Addressing Modes of the 808, Data



Registers, Flags, The Status Register, and Implementing Control Structures in Assembly Language, Structured Assembly Language Programming using Procedures, Arithmetic and Logic Instructions Stack (Concepts and Applications), String Processing, Tools for Preparing and Debugging and Translating Programs. MS-DOS Operating System Structure: MS-DOS and BIOS Disk and Keyboard System Architecture. Advanced Features of Processors: Segments and Segment Registers, Interrupts and Interrupt Service Routines, I/O Port Addressing, Instruction Pipelining, Cache Memory.

References:

- 1- Abel P., "IBM PC Assembly Language and Programming", 4th Edition, Prentice Hall, 1998..
- 2- Thorne M., "Computer Organization and Assembly Language Programming", 2nd Edition, Benjamin/Cummings, 1990.

3. Data Structures and Algorithms:

- 3- Introduction to Data Structures, Memory representation for 1D and 2D arrays, Linear list, Linear list types, Stack: (Stack Operations, Applications of stack), Queue: (Queue Operations, Applications of queue), Circular Queue: (CQueue Operations, Applications of CQueue), Linked List, Linked-Stack, Linked-Queue, Linked-CQueue, Recursion, Graph, Trees: (Types of Tree, Binary tree, Binary tree scan, Represent Regulars expression using trees, convert tree to binary tree, Binary Search Tree), Sorting: (Sorting Algorithms, Types of Sorting algorithms, Bubble Sort, Insertion Sort, Quick Sort), Searching: (Searching Algorithm, Sequential Search, Binary Search).

4. Computational Theory:

Regular Expression, Finite Automata, DFA and NFA, Equivalence of NFA and DFA, Equivalence of NFA and DFA with E-moves, Introduction to Crammers, Phrase Structure Grammar, Context sensitive Grammar, Context Free grammar, Chomsky Normal Form, Greibach Normal Form, Tree, The empty string in context free grammar ambiguity, Regular grammar, Left linear grammar, Right linear grammar, Kleen theorem, Two way finite automata with output (mealy machine, moor machine), The equivalence of mealy and moor machine, Push down automata, Top down –bottom up derivation, Turing machine.

References:

1. H.R.Lewis and G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981.
 2. R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network, 1994.
 3. M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.
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5. Object Oriented Programming (with C++ Programming Language):

An Introduction: (The Evolution of OOP, Encapsulation and Data Hiding, Inheritance and Reuse, Polymorphism, Short History, C++ Program Development Process (PDP)), Classes: (Introduction, Declaration of classes, Class Constructors and Destructors, Overloading Constructors, Class Templates, Case Study1(Guessing Password Game)), Inheritance: (Introduction, Declaration of Inheritance, An Example – Single Inheritance, Inheritance based on access-specifier (Inheritance with Public access-specifier, Inheritance with Private access-specifier), Parent Constructors and Destructors), Polymorphism: (Introduction, Pointer to Classes, Static and Dynamic Binding, Types of Polymorphism (Polymorphism of Variables, Polymorphism of Functions, Polymorphism of Objects), Virtual Functions, Override Function, Constructor and Virtual Destructor, Abstract Base Class (ABC) and Pure Virtual Function), Operator Overloading: (Introduction, Operators that can't be overloaded, Operator Functions, Operator Overloading with the Member Operator Functions, Operator Overloading with the Non-member Operator Functions (Friend Function), The Flexibility of Friend Operator Functions, Overload the Output Operator), Selected Advance OOP Topics: (Custom Header Files, Selected Problems: Program's Self-Protection, Simple Virus and its Anti-Virus)).

References:

3. "Mastering C++", Prof. Oqeili Saleh and others, Dar Al-Shorok, Amman-Jordan, 2004.
4. "Object Oriented Programming Language with C++", Bjarne Stroustrup, Addison-Wesley Publication, 2003.

6. Advanced Mathematics:

Formation of Partial Differential Equations, First Order Linear and non-Linear Equations, Boundary Value Problems, Formation of the Wave Equation, Equation for the One Dimensional and Two Dimensional Heats Flow, Laplace Transform: (Laplace transformation and inverse, Properties of Laplace transform), Fourier series: (Periodic functions, Odd and even functions, Half range Fourier sine and cosine series), Fourier Transformation (Definition, Sine Cosine Transformation, Finite Fourier Sine and Cosine Transformation, Convolution, Inverses), Bessel's Equations: (Beta and Gamma function, Series Solutions of Bessel Equation).

References:

- 1- Thomas, G. Calculus and Analytic Geometry, 5th Edition, Addison Wesly, 1999.

7. Information Theory.

The measure of information, self information, average information entropy, maximum entropy of a discrete source, binary source, ternary source, mutual information, normal noisy channel, noiseless channel, total channel, channel capacity, channel efficiency, channel redundancy, source efficiency, symmetric channel,



capacity of symmetric channel, binary symmetric channel capacity, cascade channel, coding, source coding, average length of coding, compact code, code efficiency and redundancy , source coding technique, fixed length coding, variable length coding, source coding for special source, Shannon-fano method, Huffman method, extension of code.

References:

1- Coding and Information Theory, Richard W. Hamming.

8. حرية انسان:

مفهوم حقوق الانسان، مفهوم الديمقراطية، خصائص وفئات حقوق الانسان، خصائص الديمقراطية، موقف الحضارات القديمة من حقوق الانسان/حضارة وادي الرافدين، وسائل تطبيق الديمقراطية، الحضارة الرومانية، الحضارة الاغريقية، صور الديمقراطية/الديمقراطية المباشرة، موقف الشرائع السماوية من حقوق الانسان، الديمقراطية النيابية، الديانة المسيحية والديانة الاسلامية، المصادر القانونية لحقوق الانسان في بريطانيا، المدرسة الطبيعية ونظمية العقد الاجتماعي، الديمقراطية شبه المباشرة، اعلان حقوق الانسان والمواطن الفرنسي، الحكومة وانواعها، منظمة الامم المتحدة وحقوق الانسان، تقسيم الحكومة من حيث مصدر السلطة واحترام القانون، الاعلان العالمي لحقوق الانسان، تقسيم الحكومة من حيث توزيع السلطة ومن حيث الشخص الاعلى في الحكم، المواثيق والاتفاقيات/الاتفاقية الاوربية والاتفاقية الامريكية، النظام البرلماني واركانه، الميثاق الافريقي لحقوق الانسان ومشروع الميثاق العربي، النظام البرلماني في بريطانيا، المنظمات غير الحكومية، المؤسسات الدستورية في بريطانيا.

المصادر:

3. محاضرات في الديمقراطية د. فيصل شطناوي.
4. محاضرات في الحرية والديمقراطية د. ولاء مهدي الجبوري.



Third Year Syllabus

منهج المرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Computer Graphics	رسوم الحاسبة	.1
3	-	2	2	Compilers	المتجمات (أختياري)	.2
3	-	2	2	Databases	قواعد البيانات (أختياري)	.3
2	-	-	2	Computer Architecture	معمارية الحاسبة	.4
3	-	2	2	Computer Networks	شبيكات الحاسبة	.5
3	-	2	2	Artificial Intelligence	الذكاء الاصطناعي	.6
3	-	2	2	Data Encryption	تشفير البيانات	.7
2	-	-	2	Information Hiding	اخفاء المعلومات	.8
22	-	12	16	Total		

Total No. of Unit for One Semester: (22)Units
Total No. of Unit for Year: (44) Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة
مجموعة الوحدات لسنة دراسية: (44) وحدة

1. Information Hiding:

Main Subdisciplines of Information Hiding, A Brief History of Information Hiding, Some Applications of Information Hiding, Frameworks for Secret Communication, Security of Steganography Systems, Information Hiding in Noisy Data, Information Hiding in Written Text, Examples of Invisible Communication, Least Significant Bit Substitution, Cover-Regions and Parity Bits, Palette-Based Images, Information Hiding in Binary Images, Steganography in the DCT Domain, Information Hiding and Data Compression, Statistical Steganography, Encoding Information in Formatted Text, Distortion of Digital Images.

References:

- 1- Information Hiding Techniques for Steganography and Digital Watermarking By Stefan Katzenbesser, Fabien Pericolos, 2000.

2. Computer Graphics:

Introduction: Display Devices (e.g. Raster, Vector). Elementary Graphics Figures: Line and Circle Drawing Algorithms. Sorting Pictures and 2D Transformations: Writing and Reading Graphics Data Files, Pictures Translation, Pictures Rotation, Pictures Scaling. Clipping and Windowing: Point and Line Clipping, Clipping Algorithms, Polygon Clipping. Curves: Polynomial Curves, Spline Curves. Elementary 3D Graphics:



Introduction, Coordinates System, Transformations, Orthogonal Projection, Multiple Views, Hidden Lines and Surfaces, Shading and Coloring. Animation Techniques.

References:

- 1- J. D. Foley, Avan Dametal, "Introduction to Computer Graphic", Addison-Wesley, 1993.
- 2- D. Hearn and M.P. Baker, "Computer Graphics ", 2nd. Ed., Prentice-Hall, 1994

3. Computer Architecture:

Introduction to computer architecture and CPU architecture, Instruction set and format, Addressing modes, Program control (interrupt and subroutine call), Microprogramming Design of CPU Control Unit and Micro programmed vs., ardwired Control, RISC and CISC, I/O organization and Peripheral Control Strategies, Input / output interfaces, Asynchronous data transfer, Programmed I/O, Memory Management, types and hierarchy, Main memory and memory address map, Direct Memory Access, Input / output processor (IOP) and Channels, Associative Memory and Content-Addressable Memories, Cache memory, Parallel processing, Pipeline (general consideration), Arithmetic pipeline, Instruction pipeline, Difficulties in Instruction pipeline, And theme solutions, Vector processing, And array processors, Interprocessor communication, Cache coherence.

References:

- 1- M.M Mano "Computer System Architecture " third Edition, Prentice Hall, 1993.
- 2- David A. patterson And John L.Hennessy, "Computer Organization And Design " Morgan Kaufmann, 1998.

4. Compilers:

Programming Language, Introduction to Compiler, Type of Errors, One Pass Compiler, Syntax Definition, Context Free Grammar, Parsing Tree & leftmost and rightmost derivations, Transition Graph, Lexical analysis, Syntax of Analysis, Problems of Compiler, First and Follow, Top down Parsing, Predictive Parsing Method, Bottom up Parsing, Operation Precedence Parser, Simple Left to Right Parser, Canonical LR Parser, Look Ahead LR, Semantic Analysis, Intermediate Code Generation, Code Optimization, Examples of Code Optimization, Code Generation, Build Simple Compiler.

References:

1. Principles of Compiler Design ,Alfred V. Aho, Jeffry D. Ulman.

5. Artificial Intelligence:

Introduction to Programming in Logic, Prolog Language Structure, Prolog Language Components, Facts, Simple Rules, Built in Functions in Prolog Language, Recursion in Prolog (Tail Recursion), Non Tail Recursion, Fail Structure, List Processing, String Processing, Database Structure and Properties, Files in Prolog and Applications with Database, Introduction to Artificial Intelligence, Knowledge Representation, Logical



Representation, Graphical Representation, Problem State Space Characteristics, Problem Solving, Search Technique(Blind), Heuristic Search, The 8_Puzzle Problem, Control Strategy(Structure), Forward Chaining for Problem Solving, Backward Chaining for Problem Solving, Hybrid Method (Rule Cycle).

References:

1. Elian Rich, Artificial Intelligence, Prentice Hall 1991.

6. Data Encryption:

Introduction of Data security, Basic terminology of Data security, Mathematical Background, Basic definition of arithmetic modular with examples, How Compute the Greater common deviser (GCD) using different methods, Explain the methods to compute the Inv, Explain the methods to find Euler notation and compute inv using Euler notation, Introduction of types of cipher systems, Types traditional of ciphers systems, Introduction of transposition cipher systems, Implementation of simple transposition method with examples for encipher and decipher methods, Columner method and fixed pired method, Implementation of simple substitution methods with examples for encipher and decipher methods, Types of substitution cipher systems types, Monoalphabetic substitution cipher systems (keywords method), Homophonic substitution cipher systems(Beal cipher, Higher order homophnics), polyaphabetic substitution cipher systems(Vigener cipher, Beaufort cipher ,Running ker cipher), polygram substitution cipher systems(playfair cipher, hill cipher ,product cipher), Introduction to public key systems (secrecy and authenticity), Knapsack ciphers), Merkel-Hellman knapsacks, simple knapsack algorithm), Trapdoor knapsack algorithm, With example for encipher and decipher process, RSA algorithm (encryption and decryption processes), Public-key digital signature algorithms (RSA), Introduction of DES algorithm, X-box process in DES algorithm with example, Encryption process in DES algorithm with example, Decryption process in DES algorithm with example, Introduction of Stream ciphers, One time Pad system (vernam system), The requirements of steam cipher, The Basic Five Randomness tests (i.e. frequency test , serial test), Poker test , run test, auto correlation test.

7. Databases:

Introduction (DBMS), Data abstraction, Data models, Data independence, Database management & administrator, Entity relation model, Mapping constraints, Entity relation diagram, Representation of strong & weak entity, Generalization & aggregation, Design of an E-R database scheme, Mapping cardinalities, Data model-relational model, Example SQL,AQL, Hierarchical model, Example DL/1,IQL, Structure of distributed Databases, Trad-off in Distributing the databases, Design of distributed databases, Transparency and Autonomy, Distributed Query Processing, Recovery in distributed databases.

References:

- 1- Database System Concepts(Henry F. Korth).
-



2- An Introduction Database System C.J.Date.

8. Computer Networks:

Data Communication, Physical Topology, Basic Network Technology, LAN Devices, Collision and Collision Domains in Shared Layer Environments, Network Devices, Network Layer Addressing, Network Layer Field & Datagram, IP address Class, Subnet NW, Private Addresses, Transmission of Digital Data Interfaces and Modems, Transmission Media, Unguided Media, Satellite Communication, Error Detection and Correction, Data Link Control, Multiplexing, De Multiplexing, Data Link Protocols, ARP, FTP, TELNET, DNS, UDP, TCP, NFS and RPC, SMTP, TFTP, HTTP, WAIS, Gopher, SNMP, WWW, Browser Architecture, Methods for Assigning IP Address, Advance ARP, DHCP, Dynamic Addressing, Routable and non Routable Protocols, RIP Features.

References:

- 1- "Computer Networks", 3rd Edition, A. Tannenbaum, Prentice-Hall, 1996.
- 2- "Data Communications, Computer Networks and OSI", 4th Edition, F. Halsall, Addison-Wesley, 1995.
- 3- "Computer Communications and Networks", J. R. Freer, USL Press, 1996.

Elective Subjects for Third Year

المواضيع الاختيارية للمرحلة الثالثة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
2	-	-	2	Intrusion Detection	تعقب المتطفلين	1
3	-	2	2	Neural Networks + Genetic Algorithms	الشبكات العصبية و الخوارزميات الجينية	2
3	-	2	2	Internet and Intranet	انترنت وانترانيت	3
3	-	2	2	Compilers	المتجمات	4
3	-	2	2	Databases	قواعد البيانات	5



Forth Year Syllabus

منهج المرحلة الرابعة

No. of Units	Tutorial	No. of Lab. hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	Intelligence Systems	أنظمة ذكية	.1
2	-	-	2	Networks Security	أمنية الشبكات	.2
3	-	-	2	Cryptanalysis	تحليل شفرة	.3
3	-	2	2	Operating System	نظم التشغيل	.4
2	-	-	2	Advanced Cryptography	تشفير متقدم	.5
3	-	2	2	Web Programming	برمجة مواقع	.6
3	-	2	2	Image Processing	معالجة الصور	.7
3	-	4	1	Project	المشروع	.8
22	-	12	15	Total		

Total No. of Unit for One Semester: (22)Units

مجموعة الوحدات للفصل الدراسي الواحد: (22) وحدة

Total No. of Unit for Year: (44) Units

مجموعة الوحدات لسنة دراسية: (44) وحدة

1- Intelligence Systems:

Expert Systems Using and Applications, Forward Chaining, Backward Chaining, Systems Based on Simple Search, Using Heuristics in Games, Search With Heuristics Embedded in Rules, Controlling the Reasoning Strategy, Systems Depend Under Uncertainty, Systems That Explain Their Actions, Using WHY Facility in Explanation Processor, Using HOW Facility in Explanation Processor, Natural Language Understanding, NLP Informal Method, NLP Formal Method, An Introduction to Adaptive Algorithms, An Introduction to Neural Network, Perceptron Neural Net, Back Propagation Neural Net, Hopfield Neural Net, Bidirectional Associative Memory Neural Net, Case Study in NN, An Introduction to Genetic Algorithms, GA in Travelling Sales Man Problem Solving, GA in the 8_Puzzle Problem Solving, GA in the Transitions Problem Solving, An Introduction to Genetic Programming.

References:

1. Daniel H. Marcellus, Expert Systems Programming in Turbo Prolog, Prentice Hall (New Jersey) 1992.
2. 1.George F. Luger,Artificial Intelligence (structures and strategies for complex problem solving), Pearson Education Asia (Singapore), 2002.
3. 2. Laurene Fauset, Fundamantals of neural Networks: Architecture, Algorithms, and Applications, 1994.



2- Networks Security:

Introduction to network security, Network security definition, computing systems, IOS-OSI Reference Model, TCP/IP Model, IP Address, ports, networks are system, too, security attacks, active and passive attacks, methods of defense, threats in Networks, Reasons for network security problems, Network security threats, wiretapping, impersonation, message confidentiality violations, message integrity violations, hacking, code integrity violations, denial of service, protocol flaws, spoofing, web site defacement, distributed denial of service, threats to active or mobile code, complex attacks, security involving programs, information access problems, service problems, Trojan horse applications, the Trojan horse applications work, Trojan and the port numbers, examples of Trojan horse application, Network Security Control, encryption, encryption methods, link encryption method, end –to-end encryption method, comparison of encryption methods, virtual private network, PKI and certificates, SSH encryption, SSL encryption, IP sec, signed code, key distribution, secure key distribution protocol , key server, secure cryptographic facility, port protection, Authentication, Traffic control, Data integrity, Network security solutions, Kerberos Authentication System, Firewalls, intrusion detection Systems, Secure E-Mail, Multilevel Security on Networks, Advance Network Security Topics.

References:

- 1- Security in Computing, 3rd Edition, By Charles P. Pfleeger, Shari Lawrence Pfleeger. Prentice Hall-2003.
- 2- Cryptography and Network Security, By William Stalling. Prentice Hall-1999.
- 3- Several Papers Published on the Web.

3- Cryptanalysis:

Definon of Cryptanalysis and Cryptanalyst, Cryptanalyst position is some, simple cryptosystems, Requirements of Cryptosystems, Type of Attacks on Cryptosystems, Shannon's Theory: Entropy, Cryptanalysis of the Classical cryptography "Methods"Steps in Cryptanalysis and old tools, Cryptanalysis of the Classical cryptography "Methods" transition cipher, Cryptanalysis of the Classical cryptography "Subsritution cipher", Cryptanalysis of the Classical cryptography" Affine Cipher", Cryptanalysis of the Classical cryptography" Vigenere Cipher" of the Classical cryptography" Beaufort Cipher" of the Classical cryptography Hill Cipher", Cryptanalysis of the Classical cryptography" Playfair Ciphers".

References:

- 1- Applied Cryptography, Bruce Schneier, 1996.
 - 2- Cipher Systems: The protection of communication, H.Beker, F.Piper, 1998.
 - 3- Cryptography & Data Security, D.E.R. Denning, Purdue University, 1983.
 - 4- A new Dimension in computer Data Security, C.H. Meyer, S.M. Matyas.
-



4- Operating System:

Introduction to Operating Systems, User view and system view of OS, OS for mainframe, Desktop computer systems, OS for multiprocessor and distributed systems, OS for clustered, real-time and handheld computer systems, Introduction to computer system structure, Hardware Protection, Operating system structure, System components¹, System components², Operating system services, System calls and System Programs, System Design, System implementation, Half-year Break, Introduction to Processes, Process Concepts, Process Control Block, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess Communication, Introduction to CPU Scheduling, CPU Scheduling concepts, Scheduling Criteria, Scheduling Algorithms, First Come First Served and Shortest Job First, Priority Scheduling algorithm and Round Robin Algorithm, Introduction to Deadlocks and handling.

References:

1. "Operating System Concepts" by Silberschatz, Galvin and Gagne, 2003.

5- Advanced cryptography:

Block Cipher Principles, The Data Encryption Standard, Differential and Linear Cryptanalysis, Groups, Rings, and Fields, Modular Arithmetic, The Euclidean Algorithm, Finite Fields of The Form $GF(p)$, Polynomial Arithmetic, Finite Fields Of the Form $GF(2^n)$, Evaluation Criteria For AES, The AES Cipher, Polynomials with Coefficients in $GF(28)$, Simplified AES, Multiple Encryption and Triple DES, Placement of Encryption Function, Key Distribution, Random Number Generation Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithms, Principles of Public-Key Cryptosystems, The RSA Algorithm, Proof of the RSA Algorithm, Key Management, Diffie-Hellman Key Exchange, Elliptic Curve Arithmetic.

References:

- 1- Cryptograph and Network Security Principles and Practices, Four Edition By William Statings, 2005.

6- Image Processing:

Introduction to Image Processing, Compression between Computer Image and Computer Vision, Major topics for Computer Vision, Major topic for image processing, Image restoration, Image Enhancement, Image Compression, Image Representation, Digitization, Type of digital image, Binary Image, Gray Image, Color Image, HSL, Digital Image File Format, Spatial Domain, Frequency Domain, Region of interest image geometry (Crop, enlarge, shrinking, translate, rotate), Zoom algorithm, Zero order hold, First order hold, Convolution, Image Analysis:



Image analysis steps, Preprocessing, Data reduction, Feature Analysis, Image algebra operation, Arithmetic operation, Logical operation, Spatial Filters, Mean Filters, Median Filters, Enhancement filters, Laplacian Filter, Difference Filter, Image Equalization, Gray level reduction, Spatial reduction, Edge line detection technique, Robert operator (Sobel operator, Prewitt operator, Krisch compass, Robinson compass mask, Laplacian operator, Frei chen mask), Segmentation, Region growing, Clustering methods, Boundaries detects, Combined approach, Histogram (Histogram features, Histogram Equalization, Histogram advantage, Image enhancement: Introduction, Gray scale modification, Histogram modification, Adaptive contrast enhancement, Color, Image sharpening (High pass filter, High frequency emphasis, Homomorphic filter), Image smoothing (Mean and median filters, Low pass filter, Image Restoration), Image Compression: Discrete transformation, Fourier transform (Walsh Hadamard transform, Wavelet transform).

References:

- 1- Computer Vision and Image Processing, Scotte Eumbaugh,PH.D.
- 2- Digital Image Processing, Second edition
Rafael C.Gonzalez University of Tennessee.
Richard E. Woods UedData interactive.
- 3- Image processing Algorithms.

7-Web Programming:

Introduction to Web, Introduction to the Internet, The World Wide Web, The Internet and Web, The History and Growth of the Web, The Purpose of the Web, The Web Concepts, The Web Site Generations, Classifying the Web Sites, Programming Technologies, ASP Principles, Web Programming with ASP
Web based Applications.

References:

1. World Wide Web Consortium (W3C)
<http://www.w3c.org>
2. Tim Berners-Lee Web Page
<http://www.w3.org/People/Berners-Lee>
3. Weaving the Web ... "Book"
<http://www.w3.org/People/Berners-Lee/Weaving/Overview.html>
4. Web Site Engineering ... "Book"
http://www.geocities.com/website_engineering/chapter01.htm

8- Project.



Elective Subjects for Forth Year

المواضيع الاختيارية للمرحلة الرابعة

No. of Units	Tutorial	No. of Lab. Hour	No. Of Theory hour	Subject	اسم المادة	ت
3	-	2	2	3D Graphics and Vision	الرسوم ثلاثية الابعاد والرؤية	1
2	-	-	2	Internet Architecture	معمارية الانترنت	2
3	-	2	2	Image Processing	معالجة الصور	3
2	-	-	2	Modeling and Simulation	النمذجة والمحاكاة	4
2	-	-	2	Data Compression	ضغط البيانات	5
3	-	2	2	Web Programming	برمجة المواقع	6