المقررات الدراسية / كلية الهندسة / جامعة الموصل

المستوى الثالث للعام الدراسي 2020-2021

قسم الهندسة / الحاسوب

المستوى الدراسي الثالث (الفصل الثاني)								
اسم المتطلب	نوع المتطلب (اجباري – اختياري)	اسم المقـــــرر		عدد الساعات النظرية	عدد الساعات العملية	عدد الوحدات	الممهد ان وجد	رمز المقرر	الملاحظات
		باللغة العربية	باللغة الإنكليزية						
متطلبات القسم	اجباري	شبكات الحاسوب II	Computer Network II	2	2	3	شبكات الحاسوب I و تراسل بيانات	CONE351	
	اجباري	معالجة الاشارة الرقمية	Digital Signal Processing	3	-	3	الاشارات والأنظمة	DSPR352	
	اجباري	معمارية الحاسوب II	Computer Architecture II	3	-	3	معمارية حاسوب I	COAR353	
	اجباري	أنظمة تشغيل II	Operating System II	2	2	3	أنظمة تشغيل I	OPSY 354	
	اجباري	الانظمة المطمورة	Embedded System	2	2	3	-	EMSY358	
	اختياري	دوائر التكامل واسع النطاق	VLSI Circuits	2	-	2	-	VLSI356	يختار الطالب مقرر واحد فقط ، عدد الوحدات المطلوبة=2 وحدة
		معالجة الصور	Image Processing				-	IMPR355	
	اختياري	امثليه	Optimization	2	-	2	-	OPTI357	يختار الطالب مقرر واحد فقط ، عدد الوحدات المطلوبة=2 وحدة
		قواعد البيانات	Database System				-	DASY359	
	مجموع ساعات ووحدات الفصل الدراسي الثاني			16	6	19			

ملاحظة: التدريب الصيفي (Summer Training) من متطلبات االتخرج المطلوبة بعد اكمال الطالب المستوى الثالث للفترة من 1 تموز الى 31 تموز او من 1 اب الى 31 اب

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Computer Network II
(CONE351)

Lab	Tutorial	Theory
2		2

Course Objectives:

This is an under graduate level course on computer networking. The course involves both a reading/lecture/discussion and a term project. We will read and discuss topics on various aspects of computer networking: Internet design principles, LAN/MAN/WAN, congestion/flow control, network topology, routing, TCP/IP, Performance analysis and Network applications.

Course Details:

Article	Week
1- Wired LANs: all Ethernet Networks Types	1
2- Connecting LANs, Backbone Networks, and Virtual LANs	1
3- Wireless LAN & Bluetooth	1
4- Network Layer and IPv4 and IPv6 Addresses & Headers	2
5- Network Layer Protocols: Address Mapping, Error Reporting. and Multicasting	2
6- Network Layer: Unicast & Multicast Routing protocols	2
7- Transport Layer Protocols: User Datagram Protocol (UDP) and Transmission Control Protocol (TCP)	2
8- Congestion Control and Quality of Service	1
9- Application Layer Standard Client-Server Protocols (DHCP, DNS,FTP,TFTP,HTTP,TELNET, SMTP, POP, IMAP, SNMP)	2
10- Network security fundamentals	1

Text Books

Tanenbaum A.S. , "Computer Network",5th, Edition, Prentice-Hall Publishing,2014
Stallings W. , "Data & Computer Communications", 8th Edition , Prentice-Hall Publishing,2012 .
Forouzan B.,"Data, Communications and Networking", '5th Edition McGraw-Hill Publishing,2013

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Digital signal processing I (DSP532)

Lab	Tutorial	Theory
	1	2

Course Objectives:

This course provides the basic knowledge necessary to understand the digital filters. then this course content all basic principle about digital signals and system, types of filter and how design filter

Course Details:

S	Article	Week
1	The introduction of Z -transform	1
2	The relationship between Z transform and Laplace transform	1
3	The ROC (Reign of Convergence) and Transfer function	1
4	Review of digital filter design	1
5	Explain the principle of design filter	1
6	Types of filters	1
7	Filter design prosedure	1
8	Types of realization system (digital system)	1
9	The IIR filter design	1
10	Numerical Methods. - Biliner Transformation Method . - Impulse-Invariant Method	1
11	Butterworth Filter	2
12	Chebychev filter	2
13	The FIR filter design	1

Text Books

1. Fundamental of Digital Signal Processing By L.C. Ludeman
2. Digital Signal Processing With Computer Application By P.A. Lynn

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Computer Architecture II (COAR353)

Lab	Tutorial	Theory
	1	2

Course Objectives:

This course provides the basic knowledge necessary to understand the principle of microprogrammed control. Also, highlights on the central processing unit and the RISC & CISC Characteristics. Finally, gives the understanding of pipeline concepts and design.

Course Details:

S	Article	Week
1	Microprogrammed Control: Introduction	1
2	Microprogrammed Control: Mapping and sequencer	1
3	Microprogrammed Control: Micro-instructions	1
4	Microprogrammed Control: Micro-instructions programming	1
5	Microprogrammed Control: Design of decoding ALU control information	1
6	Microprogrammed Control: Design of microprogram sequencer	1
7	Microprogrammed Control: Condition and branching implementation	1
8	Central Processing Unit: General registers organization	1
9	Central Processing Unit: Stack organization	1
10	Central Processing Unit: Instruction format and addressing mode	1
11	Central Processing Unit: Flags (processor status word)	1
12	RISC & CISC characteristics	1
13	Pipelining concepts and design	1
14	Pipelining concepts and design	1
15	Pipelined processor	1

Text Books

1. M. Morris Mano "Computer System Architecture"
2. V.P Heuring and H.F Jordan "Computer System and Architecture"

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Operating System II
(OPSY354)

Lab	Theory
2	2

Course Objectives:

The operating system provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run. In this course we will explore the core principles of operating systems design and implementation, including file systems and storage; memory management techniques; virtualization and distributed systems.

Course Details:

Article	Week
1. Overview of Process Management	1
2. Main Memory	2
3. Virtual Memory	2
4. Mass-Storage Structure	1
5. I/O Systems	2
6. File-System Interface	1
7. File-System Implementation	2
8. File-System Internals	1
9. Virtual Machines	1
10. Distributed Systems	2

1. Operating Systems Concepts, 10th Edition Silberschatz, Abraham, Galvin, Peter B., and Gagne, Greg JohnWiley&Sons.,Inc. ISBN: 9781119320913.
2. An Introduction to GCC: For the GNU Compilers GCC and G++, Brian J. Gough, Richard M. Stallman, Network Theory Ltd, ISBN : 978-0954161798

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Embedded Systems (EMSY358)

Lab	Tutorial	Theory
2		2

Course Objectives:

Introduce the fundamentals of embedded system design and implementation, including specifications and modeling of embedded systems, hardware/software partition and co-design: validation and implementation, peripherals and interfacing :memory : development methodologies and tools.

Course Details:

Article	Week
1- Micro-controller Micro-controller vs. Microprocessor, families	1
2- ATmega2560 Micro-controller Architecture	1
3- Addressing modes, instruction set	1
4- ATmega2560 6-timer/Counter modes	1
5- ATmega2560 Serial Communication modes of operation	1
6- ATmega2560 Interrupts	1
7- Micro-controller Networking protocol, Advanced Buses	1
8- Micro-controller power management	1
9- Micro-controller features and applications	1
10- AVR,ARM, Arduino	2
11- Co-Design	2
12- USB, embedded multiprocessors	2

Text Books

1- The ATmega640/1280/2560/V Microcontroller Data sheet.
2- Embedded system Design: Embedded systems Foundations of Cyber-Physical Systems, Peter Marwedel, Spriner Nov. 16, 2010.

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VLSI circuit (VLSI356)

Lab	Tutorial	Theory
		2

Course Objectives:

gives the students the ability to understand the basic concepts and methodologies of VLSI design, especially CMOS circuits.

Course Details:

Article	Week
Introduction to VLSI Systems	1 Week
MOS Transistors and MOS Inverters	1 Week
Standard Cell Library Design and Characterization	1 Week
Digital CMOS Logic Design	4 Weeks
Semiconductor Memories	2 Weeks
BiCMOS Circuits	1 Week
Logic Synthesis	1 Week
Physical Design—Floor planning, Placement, and Routing	1 Week
IC Packaging	1 Week
VLSI Testing	1 Week
VLSI Process Technology	1 Week

Text Books

1) VLSI DESIGN **by:** DEBAPRASAD DAS, 2nd ed, 2015.
2) CMOS VLSI Design, A Circuits and Systems Perspective, **by:** Neil H. E. Weste, David Money Harris, 4th ed, 2011.

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Image processing (IMPR355)

Lab Tutorial Theory

2

Course Objectives:	
Cover the basic theory and algorithms that are widely used in digital image processing. Expose students to current technologies and issues that are specific to image processing systems.	
Course Details:	
Article	**Week**
Introduction & Fundamentals of Image	1
Introduction to image analysis, preprocessing, ROI, Image Algebra.	2
Spatial Filters, Image quantization methods.	3
Edge detection	4
Operators, Masks.	5
Noise in images	6
Noise removal	7
System model.	8
Image restoration	9
Image Compression	10,11
Discrete Transform, FFT, Cosine transforms	12,13
Wavelet Transform and examples	14
JPEG @ JPEG 2000	15
Text Books	
1- Rafael C.Gonzalez and Richard E.Woods,"Digital Image Processing, 3nd edition", Prentice Hall, 2008. 2-Linda Shapiro, “Computer Vision”, The University of Washington, 2000; ***3-*** Digital Image Processing and Analysis,2018 by Taylor & Francis Group, LLC	

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optimization
(opt1357)

Lab	Tutorial	Theory
	1	2

Course Objectives:

This course provides the basic knowledge necessary to understand the optimization method and a review of some types of optimization method and curve fitting.

Course Details:

S	Article	Week
1	Introduction of optimization	1
2	Classical optimization techniques	5
3	Multivartiation with no constraint	1
4	Linear programming (LP):Simplex method	4
5	Curve fitting using least square method	1
6	Nonlinear programing :1D minimization	1
7	Linear programming (LP):Simplex method	1

Text Books

1-Engineering optimization –theory and practice By Singiresu S.Rao

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Data Structures
(DAST203)

Lab	**Theory**
2	**2**

Course Objectives:

Review algorithms for solving problems that use data structures such as arrays linked lists, stacks, queues, graphs and trees, and those that are used for list manipulation, graph manipulation (e.g., depth-first search), and tree traversals. Moreover, implementing algorithms in C++ using good programming style for data structures.

Course Details:

Article	**Week**
Introduction and review	1
information hiding, Encapsulation, Design and implementation of list ADTS using arrays and linked lists	1
Recursion in Programming and Problem Solving Recursive valued functions: Factorial, Classical problems: Ackermann's function, 8-Queens problem, Towers of Hanoi, detecting palindromes Relation to mathematical induction	2
Stacks Stack ADT, implementation using arrays, linked lists, and list ADTS, Applications: Checking balanced braces, recognizing strings, depth-first searches on graphs	2
Queues Queue ADT, implementation using arrays, linked lists, and list ADTS, Applications: breadth-first searches, recognizing palindromes	2
Trees introduction, Terminology, Traversals, Applications: Binary Trees, Tree ,Huffman's algorithm	2
introduction to Graph theory	1
Hashing Techniques	1
Speed memory Trade off	1

Text Books

1- M.A. Weiss, Data structure and algorithm analysis in C++ Addison Wesley, 2006.
2- Michael T. Goodrich, Roberto Tamassia, David M. Mount , Data structure and algorithm in C++,2011