اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
بروتوكولات شبكات الحاسوب	Computer Networks Protocols	2	2	4	6

أهداف المادة: تهدف المادة الى تعريف الطالب بالبروتوكولات المستخدمة في شبكات الحاسوب و طريقة عملها.

Weeks	Syllabus
1st, 2nd	Introduction to the OSI Reference Mode, and the TCP/IP Reference Model. Protocol Hierarchies in these models.
3rd, 4th, 5th, 6th 7th, 8th	Application Layer Protocols • WWW (HTTP, HTTPs, FTP) • Electronic Mail (SMTP, POP) • DHCP, DNS, SNMP, SSH, Telnet, BGP, RIP
9th, 10th, 11th, 12th	Transport Layer Protocols • Congestion Control , Flow Control • End to End Protocols (UDP, TCP, RPC)
13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd 23rd, 24th	Network Layer Protocols • Routing Algorithms • Flooding • Shortest path routing • Distance Vector routing • Link Sate routing • Hierarchical routing • Broadcast and multicast routings • Routing in the Internet • Path Vector routing • OSPF routing • EIGRP routing • IPv4 , IPv6, IPsec, • ICMP , IGMP
25th, 26th, 27th, 28th	Data Link Layers Error control and flow control algorithms • ARP, L2TP, PPP • MAC (Ethernet, DSL, ISDN, FDDI). • STP • CSMA/CD • Check Sum algorithms • CRC
29th, 30th	Physical Layer Protocols Protocols • The Bluetooth Protocol Stack • OTN, SONET/SDH

اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
نظرية المعلومات والترميز	Information Theory & Coding	2	2	4	6

اهداف المادة: تهدف المادة الى تعريف الطالب بنظريات المعلومات وانواع الترميز والخوارزميات المستخدمة في الترميز

Weeks	Syllabus
1st	Review of related probability and statistics related topics.
2nd	Definition of random variable, definition of Alphabet, definition of joint probability.
3rd	Conditional probabilities and Bayes rule .Independence of two random variables .Venn's diagram.
4th	Model of information transmission system. Common sense definition of information .Logarithmic measure of information. Self-information.
5th	Definition of information for noisy channel .Posteriori probabilities. Average mutual information for noisy channel.
6th	Shannon representation diagram of information source. Parameters of discrete channel.
7th	Average information (entropy) of a discrete and continuous source, maximum source entropy. Source efficiency.
8th	Entropy for continuous uniform distribution source. Entropy for continuous Gaussian distribution source.
9th	Entropy for continuous Triangular distribution source. Entropy for continuous Exponential distribution source.
10th	Transition probability matrix of channel, discrete noiseless and noisy channel models, uniform channel. Ternary symmetric channel.
11th	Information transmission over symmetric channel, noiseless channel, binary symmetric channel, ternary symmetric channel.
12th	Memory and memory less information channels .Binary Erasure channel (BEC).
13th,14th	Capacity of discrete channel, channel capacity for noiseless channel. Channel efficiency and redundancy. Channel capacity for symmetric channels.
15th	Channel capacity for nonsymmetrical channels .binary nonsymmetrical channel.
16th	Mutual information of continuous channel. Capacity of continuous channels. Efficiency and redundancy of continuous channel.
17th ,18th	Sampling of continuous source .Sampling Theorem. Nyquist theorem for transmission over band limited continuous channel. Shannon-Hartly channel capacity theorem.
19th	Cascaded information channels .Parallel information channels.
20th	Source encoding; fixed and variable length codes. Prefix property .Average length of source code. Source code efficiency and redundancy.

21st	Fano coding method.
22nd	Shannon – Fano coding method.
23rd	Huffman Coding. Hamming distance.
24th	Channel Coding in Digital Communication Systems. Forward Error Correction (FEC)
25th	Block codes. Cyclic Redundancy Check (CRC)
26th	Repetition Codes, Single Parity Check Codes.
27th	Why do we need to compress? . Data compression basics. Lossless Compression. Run-Length Encoding (RLE)
28th	Principles of example of Coding Methods used in file and image compression .ZIP .JPEG
29th, 30th	Speech coding and compression techniques overview (LPC block diagram). Delta modulation. Vocoder Principle. Performance measuring.

اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
أنظمة الاتصالات المتنقلة	Mobile communications	2	2	4	6

أهداف المادة : تهدف المادة الى دراسة الطالب الاتصالات الخلوية المتنقلة بجميع أنظمة الاجيال ودراسة الهيكلية الداخلية للخلايا والتغطية لعملية الاتصال.

Weeks	Syllabus
1st, 2nd,3rd	**Introduction to Wireless Communication System:** Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication, Second generation (2G) systems. Evolved Second-Generation Systems (2.5G). Third-Generation (3G) Systems. Fourth-Generation (4G) Systems. Fifth-Generation (5G) Systems
4th,5th,6th ,7th	**The Cellular Concept-System Design Fundamentals:** Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Co-channel and adjacent interference, Handoff Strategies, Umbrella Cell Concept
8th, 9th, 10th,11th	**Traffic Engineering:** Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization
12th,13th,14th,15th	**Large scale path loss:** Free Space Propagation loss equation, Path-loss of NLOS and LOS systems, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design,
16th,17th,18th	**Small scale multipath propagation**: Impulse model for multipath channel, Delay spread, Feher's delay spread, upper bound Small scale, Multipath Measurement parameters of multipath channels, Types of small scale Fading, Rayleigh and Rician distribution
19th,20th	**Modulation Techniques for Mobile Radio:** Review for basic digital modulation techniques, QPSK,MSK,GMSK,
21th, 22th	**Multiple Access Techniques:** Frequency Division Multiple Access (FDMA). Time Division Multiple Access (TDMA). Spread Spectrum Multiple Access. Space Division Multiple Access (SDMA)
23th,24th,25th,26th,27th ,28th	**Wireless Systems:** GSM system architecture, Radio interface, Protocols, Localization and calling, Handover, Authentication and security in GSM, GSM speech coding, Concept of spread spectrum, Architecture of IS-95 CDMA system, Air interface, CDMA forward channels, CDMA reverse channels, Power control in CDMA, cellular technology, GPRS system architecture
29th,30th	**Recent trends:** Wi-Fi, WiMAX, ZigBee Networks, Software Defined Radio, UWB Radio, Wireless Ad-hoc Network and Mobile Portability, Security issues and challenges in a Wireless network.

اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
امنية الحاسوب وشبكاتها	Security of computer & Networks	2	2	4	6

أهداف المادة:تهدف المادة الى:

تهدف المادة الى بيان الوسائل والطرق التي يجب اتباعها لحماية الحاسوب من الدخول اليها من غير المخولين والعبث فيها كذلك حماية البيانات وقواعد البيانات من المتطفلين كذلك حماية شبكة الحاسوب وخصوصا الشبكات الخاصة من هجمات المتطفلين من خلال تفعيل واستثمار بروتوكولات حماية الشبكات.

Weeks	Syllabus
1st, 2nd, 3rd	Introduction ,Symmetric Ciphers model: plaintext, encryption algorithm, secret key, cipher text, decryption algorithm, A Model of conventional encryption. Cryptography, Cryptanalysis, block and stream cipher
4th	Caeser Cipher The affine Cipher
5th, 6th	Mono alphabetic substitution ciphers Shift ciphers
7th	Hill cipher
8th	Playfair cipher
9th	Polyalphabetic ciphers Vigenere cipher
10th	The Transposition cipher
11th	Affine cipher
12th	One time pad
13th, 14th , 15th	Cryptanalysis of a Symmetric key
16th	Euclid's Algorithm
17th, 18th , 19th	SYMMETRIC-KEY ALGORITHMS -DES—The Data Encryption Standard, hers -16 round Feistel system
20st , 21nd	PUBLIC-KEY ALGORITHMS, -RSA, - Other Public-Key Algorithms,
22nd ,2 3rd, 24th ,25th	AUTHENTICATION PROTOCOLS, -Authentication Based on a Shared Secret Key, -Establishing a Shared Key: The Diffie -Hellman Key Exchange, -Authentication Using a Key Distribution Center, -Authentication Using Kerberos, - Authentication Using Public-Key Cryptography,
26th, 27th	OSI security Architecture , a model for network security,EMAIL SECURITY -PGP—Pretty Good Privacy, S/MIME
28th , 29th ,30th	Protocols of computer networks PROTECTION SERVICES: • OS protection service: protected objects and methods of OS protection, security of OS, memory and addressing protection, fence protection • Database protection service: • Network protection service: IP and E-Commerce protection, VPN and next generation networks protection

اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
ادارة المشاريع	Project management	2	2	4	6

أهداف المادة: تهدف مادة إدارة المشاريع الى:
إكساب الطالب من الاختصاصات الهندسية المعرفة حول مفاهيم إدارة المشاريع وتطبيقات بحوث العمليات في مجال الادارة

Weeks	Syllabus
1st,2nd	Project management
3rd,4th	Economics and management for the engineers
5th, 6th	Layout of factories and workshops
7th	Productivity
8th, 9th	Networks
10th, 11th	Critical path method(CPM)
12th , 13th ,14th,15th	Pet technique (Time and cost)
16th	The resource allocation problems
17th, 18th	Linear programming (graphical method, simplex method)
19th, 20th,21th	Inventory models(Economic order quantity)(EOQ)
22 th	The break-even point
23 th ,24 th	The cost of inventory
25 th,26 th, 27 th	Maintenance policy and concepts
28 th, 29 th	Quality control
30 th	Employer management

اسم المادة		عدد الساعات الاسبوعية			
باللغة العربية	باللغة الانكليزية	ن	ع	م	عدد الوحدات
حوسبة الوسائط المتعدده	Multimedia Computing	2	2	4	6

أهداف المادة: توضيح مفهوم الوسائط المتعددة مع شرح تطبيقاتها ومكوناتها.

Weeks	Syllabus
1st	Introduction to Multimedia.
2nd	Hyper Text and Hyper Media.
3rd	Components of Multimedia.
4th	Multimedia Research Topics and Projects.
5th	Multimedia applications.
6th	Multimedia on the web.
7th	Multimedia Data Basics
8th	Graphics and Image Data Representation (1)
9th	Graphics and Image Data Representation (2)
10th	Image digitization.
11th	Spatial resolution and quantization.
12th	Type of image
13th	Image file formats
14th	Arithmetic operation on image
15th	Logical operation on image
16th	Image histogram
17th	Histogram modification and Histogram equalization.
18th	Image compression techniques (1)
19 th	Image compression techniques (2)
20th	Sound and Audio Basics
21th	Digitization of sound
22 th	Nyquist theorem

23 th	Synthetic sound
24 th	Quantization and transmission of Audio
25 th	Compression of audio
26 th	Video Basics
27 th	Video color models
28 th	Type of video signals
29 th	Video compression
30 th	Multimedia over networks