الخطة الدراسية

قسم هندسة تقنيات الحاسوب / كلية الهندسة التقنية / جامعة الكفيل / العام الدراسي 2020 – 2021

المرحلة الدراسية:	الثالثة
التخصص:	شبكات إتصالات الحاسوب
اسم المادة الدراسية باللغة العربية:	محاكيات شبكات الحاسوب
اسم المادة الدراسية باللغة الإنجليزية:	Networks Simulation
اهداف المادة:	تهدف المادة إلى تعريف الطالب بإستخدام برامج المحاكاة التي تستخدم في بناء هيكلية الشبكة وحساب القياسات والخصائص الرئيسية للشبكة بإستخدام برنامج Packet Tracer and NS-2.
وصف المادة:	تعريف الطالب إستخدام برامج المحاكيات مثل CISCO Packet Tracer
عدد الساعات النظرية:	1
عدد الساعات العملية:	2
عدد الوحدات:	4
اسم التدريسي باللغة العربية:	محمد جعفر فاضل البيرماني
اسم التدريسي باللغة الإنجليزية:	Mohamad Jaafar Fadhel Albermani
اللقب العلمي:	أستاذ مساعد دكتور
عنوان البريد الالكتروني الجامعي:	mohamad.albermani@alkafeel.edu.iq
رقم الهاتف الجوال (WhatsApp):	07721014395

المنهج المقرر / الجزء النظري:

Week	Syllabus
1 2 3 4 5 6 7	**Introduction to Networks Simulation** • Introduction • Simulator vs Emulator • Why Simulation? • Benefits and limitations of simulations • Simulation techniques as an engineering tool for analyzing, planning, dimensioning, monitoring, and building real operating networks. • Event driven vs Time driven simulation techniques • The use of measurement data and configuration data from real networks in simulation.
8 9 10 11	**Networking Basics** • Networking terminology • Common physical and logical topologies. • Networking architectures and protocols, network connections, and the Open Systems Interconnection (OSI) model. • Network Elements (HUBs, SWITCHs (L2, L3), ROUTERs, etc..)
12 13 14	**Network Implementation with simulation** • Understanding IP addressing, assigning IP addresses, mapping logical host names to IP addresses, routing, and accessing the Internet. • Why IPv6 is necessary and how multicasting works. • Implementing Routing techniques (static and dynamic).
15 16	**Network Management** • Remote management. • Network monitoring tools, and elements to optimize the performance of the network (Solar winds, PRTG, etc..).
17 18 19	**Troubleshooting** • Systematic methodology for troubleshooting. • Tools to troubleshoot network connectivity problems, and commands to gather network information and troubleshoot IP configuration problems. • Troubleshooting name resolution, switching and routing problems.
20 21 22 23 24 25 26 27 28	**Modeling Networks** • Introduction to system models. • **Event Probability** - events, axioms of probability, conditional probability, independence, and Bayes theorem. • **Discrete Probability Models** - random variables, expected values, cumulative distribution, Bernoulli trials; binomial, Poisson and geometric distributions. • **Continuous Probability Models** - density function; uniform, exponential and normal distributions; central limit theorem, confidence bounds. • **Basic Queueing Models** - arrival processes, Little's Law, classification, M/G/1, M/D/1 and M/M/1, occupancy and delay, closed-loop model. • **Introduction to Discrete-Event Simulation** - random numbers, event-oriented time advance, state machines, object-oriented java applications.

	• **Statistical Estimation** - point estimation and confidence intervals. • **Computer and Network Performance Models** - modeling and analysis of systems used to illustrate the various topics.
29	**Verification and Validation of Simulation Models** • Model Building, Verification, and Validation • Verification of Simulation Models • Calibration and Validation of Models
30	

المنهج المقرر / الجزء العملي:

Week	Syllabus
1	**Identify the Packet Tracer program**
2	**Peer to Peer Network(only two PCs)**
3	**Peer to Peer Network (use hub)**
4	**Peer to Peer Network (use switch)**
5	**Wireless Local Area Network (use the Access Point)**
6	**Router (without route) part 1**
7	**Router (without route) part 2**
8	**Router (with route) part 1**
9	**Router (with route) part 2**
10	**DHCP server**
11	**wireless router**
12	**DNS server**
13	**IP Subnetting part 1**
14	**IP Subnetting part 2**
15	**HTTP protocol**

المصادر:

المراجع الرئيسية:

[1] Behrouz ,A. Forouzan “Data communications and networking” 4th edition.

[2] Theoddore. S. Rappaport ,”wireless communications “ 2nd edition.

[3] Vijay Garg ,”wireless communications and networking “.

المراجع المساعدة:

[1] Teerawat Issariyakul , and Ekram Hossain “introduction to network simulator NS2”,2nd edition.

[2] Gassan A. Abed ,”introduction to network simulation using NS-2”.