# MODULE DESCRIPTION FORM

# نموذج وصف المادة الدراسية

| Module Information<br>معلومات المادة الدراسية | | | | | |
|---|---|---|---|---|---|
| **Module Title** | **Computer Networks** | | | **Module Delivery** | |
| **Module Type** | **Core** | | | ☒ **Theory**<br>☒ **Lecture**<br>☒ **Lab**<br>☐ **Tutorial**<br>☒ **Practical**<br>☐ **Seminar** | |
| **Module Code** | **IT2101** | | | | |
| **ECTS Credits** | **6** | | | | |
| **SWL (hr/sem)** | **150** | | | | |
| **Module Level** | 2 | | **Semester of Delivery** | 3 | |
| **Administering Department** | Information Technology | | **College** | College of Scince | |
| **Module Leader's** | Karrar Saidq Mohsin | | **e-mail** | karar.sadeq@uowa.edu.iq | |
| **Acad. Title** | Asst. Lecturer | | **Module Leader's Qualification** | MS.c | |
| **Module Tutor** | Karrar Saidq Mohsin | | **e-mail** | | |
| **Peer Reviewer Name** | | | **e-mail** | | |
| **Scientific Committee Approval Date** | | | **Version Number** | 1.0 | |

| Relation with other Modules<br>العلاقة مع المواد الدراسية الأخرى | | | |
|---|---|---|---|
| **Prerequisite module** | IT121 | **Semester** | 1 |
| **Co-requisites module** | None | **Semester** | |

| Module Aims, Learning Outcomes and Indicative Contents<br>أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية | |
|---|---|
| **Module Aims**<br>أهداف المادة الدراسية | The "Computer Networks" module aims to provide IT undergraduate students with a solid foundation in computer networks. The module starts with an introduction to networks and progressively delves into the application and transport layers. Through a combination of theoretical knowledge and practical applications, the module aims to enable students to comprehend the principles, protocols, and functionalities of computer networks. By the end of the module, students should be capable of analyzing network requirements, designing appropriate solutions, implementing network services, and diagnosing common issues at the application and transport layers. Furthermore, the module aims to foster critical thinking, problem-solving skills, and an understanding of best practices for securing computer networks. Ultimately, the module seeks to prepare students for professional roles in network administration, network engineering, and related fields by equipping them with the necessary knowledge and skills in computer networks. |
| **Module Learning Outcomes**<br><br>مخرجات التعلم للمادة الدراسية | Understand the fundamental concepts and principles of computer networks.<br>Analyze and explain the functionalities and protocols of the application and transport layers.<br>Evaluate network requirements and design appropriate solutions for different scenarios.<br>Implement and configure network services and protocols at the application and transport layers.<br>Diagnose and troubleshoot common network issues at the application and transport layers.<br>Apply best practices for securing computer networks at the application and transport layers. |
| **Indicative Contents**<br>المحتويات الإرشادية | Introduction to Networks<br><br>Overview of computer networks and their importance in modern IT infrastructure.<br>Network topologies, protocols, and standards.<br>Network architectures: client-server, peer-to-peer, hybrid.<br>Network components: routers, switches, hubs, and cables.<br>Application Layer<br><br>Overview of the application layer and its role in network communication.<br>Common application layer protocols: HTTP, FTP, DNS, SMTP.<br>Application layer services: email, web browsing, file transfer.<br>Socket programming and network application development.<br>Transport Layer<br><br>Overview of the transport layer and its role in reliable data delivery.<br>Transport layer protocols: TCP and UDP.<br>Flow control, congestion control, and error detection techniques.<br>Quality of Service (QoS) considerations at the transport layer. |

| Learning and Teaching Strategies<br>استراتيجيات التعلم والتعليم | |
|---|---|
| **Strategies** | Lectures: In-class lectures will be delivered to introduce and explain key concepts, theories, and principles related to computer networks. Lectures will include real-world examples and case studies to enhance understanding.<br><br>Practical Sessions: Practical sessions will provide hands-on experience in configuring and managing computer networks. Students will have the opportunity to work with networking tools, simulate network scenarios, and troubleshoot network issues.<br><br>Group Discussions: Group discussions will encourage students to critically analyze and discuss networking concepts, protocols, and design principles. This will foster collaborative learning and the exchange of ideas among peers.<br><br>Case Studies and Projects: Students will be assigned case studies and projects that require them to apply their knowledge and skills to real-world network scenarios. This will help them develop problem-solving abilities and reinforce their understanding of network concepts.<br><br>Independent Study: Students will be expected to engage in independent study to further explore and deepen their understanding of the module content. This may involve reading recommended textbooks, researching additional resources, and completing assigned exercises.<br><br>Assessments: Assessments will include individual and group assignments, practical exercises, quizzes, and examinations. These assessments will evaluate students' understanding of concepts, ability to apply knowledge, and skills in network analysis and troubleshooting. |

| Student Workload (SWL)<br>الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا | | | |
|---|---|---|---|
| **Structured SWL (h/sem)**<br>الحمل الدراسي المنتظم للطالب خلال الفصل | 65 | **Structured SWL (h/w)**<br>الحمل الدراسي المنتظم للطالب أسبوعيا | 5 |
| **Unstructured SWL (h/sem)**<br>الحمل الدراسي غير المنتظم للطالب خلال الفصل | 85 | **Unstructured SWL (h/w)**<br>الحمل الدراسي غير المنتظم للطالب أسبوعيا | 6 |
| **Total SWL (h/sem)**<br>الحمل الدراسي الكلي للطالب خلال الفصل | 150 | | |

## Module Evaluation

تقييم المادة الدراسية

| | | Time/Number | Weight (Marks) | Week Due | Relevant Learning Outcome |
|---|---|---|---|---|---|
| Formative assessment | Quizzes | 2 | 10% (10) | 5, 10 | |
| | Assignments | 2 | 10% (10) | 2, 12 | |
| | Projects / Lab. | 1 | 10% (10) | Continuous | |
| | Report | 1 | 10% (10) | 13 | |
| Summative assessment | Midterm Exam | 2hr | 10% (10) | 7 | |
| | Final Exam | 3hr | 50% (50) | 16 | |
| Total assessment | | | 100% (100 Marks) | | |

## Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

| | Material Covered |
|---|---|
| Week 1 | Introduction to Networks |
| Week 2 | Network Core: Packet and Circuit Switching |
| Week 3 | Delay, Loss, Throughput in Networks |
| Week 4 | Protocol Layers and Service Model |
| Week 5 | Principles of Network Applications |
| Week 6 | Web and HTTP FTP |
| Week 7 | Electronic Mail: SMTP, POP3, IMAP |
| Week 8 | DNS and P2P |
| Week 9 | Transport Layer: Services |
| Week 10 | Multiplexing and Demultiplexing |
| Week 11 | Reliable Data Transfer RDT |
| Week 12 | Connectionless Transport Protocol: UDP |
| Week 13 | Connection-oriented transport: TCP |
| Week 14 | TCP Congestion Control |
| Week 15 | Flow Control |
| Week 16 | **Preparatory week before the final Exam** |

| Delivery Plan (Weekly Lab. Syllabus)<br>المنهاج الاسبوعي للمختبر | |
|---|---|
| | **Material Covered** |
| **Week 1** | Introduction to Network Components and Configurations |
| **Week 2** | Analyzing Network Topologies |
| **Week 3** | Configuring and Testing Network Protocols |
| **Week 4** | Socket Programming |
| **Week 5** | HTTP and FTP |
| **Week 6** | Flow Control and Congestion Control |
| **Week 7** | Quality of Service (QoS) Configuration |
| **Week 8** | Network Security and Firewalls |
| **Week 9** | Virtual Private Networks (VPNs) |
| **Week 10** | Network Monitoring and Troubleshooting |
| **Week 11** | SMTP, IMAP and POP3 |
| **Week 12** | Network Address Translation (NAT) |
| **Week 13** | DNS Configuration and Domain Setup |
| **Week 14** | Network Virtualization |
| **Week 15** | Network Performance Testing and Optimization |

| Learning and Teaching Resources<br>مصادر التعلم والتدريس | | |
|---|---|---|
| | **Text** | **Available in the Library?** |
| **Required Texts** | James F. Kurose and KeithW. Ross. Computer Networking: A Top-Down Approach, Eighth edition, 2020. | Yes |
| **Recommended Texts** | • L. L. Peterson and B. S. Davie. Computer Networks, A Systems Approach. Morgan Kaufman, Fourth edition, 2006.<br>• A. S. Tanenbaum. Computer networks. Prentice-Hall, Fifth edition, 2010 | No |
| **Websites** | Jim Kurose Homepage (umass.edu) | |

| Grading Scheme<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | **A** - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | **B** - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | **C** - Good | جيد | 70 - 79 | Sound work with notable errors |
| | **D** - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | **E** - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | **FX** – Fail | راسب (قيد المعالجة) | (45-49) | More work required but credit awarded |
| | **F** – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.