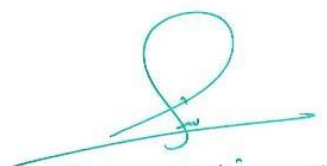


# MODULE DESCRIPTION FORM

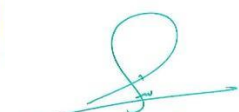
Module Information			
Module Title	Network Routing and switching		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Practical
Module Code	IT2201		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UG2	Semester of Delivery	2
Administering Department	Information Technology	College	College of Science
Module Leader	Ali Abdulhussein Ibrahim	e-mail	<a href="mailto:ali.abdulhussein19@uowa.edu.iq">ali.abdulhussein19@uowa.edu.iq</a>
Module Leader's Acad. Title	Asst. Lect	Module Leader's Qualification	M.Sc.
Module Tutor	Ali Abdulhussein Ibrahim	e-mail	<a href="mailto:ali.abdulhussein19@uowa.edu.iq">ali.abdulhussein19@uowa.edu.iq</a>
Peer Reviewer Name	Dr. Maky H.Abdulraheem	e-mail	<a href="mailto:maky.h@uowa.edu.iq">maky.h@uowa.edu.iq</a>
Scientific Committee Approval Date	2025-01-20	Version Number	1.0

Relation with other Modules			
Prerequisite module	Computer Network	Semester	1
Co-requisites module	-	Semester	-

  
 أ.م.د. شياد صبيح نونل  
 ٢٠٢٥/١/٢٤

Department Head Approval



  
 أ.م.د. شياد صبيح نونل  
 ٢٠٢٥/١/٢٤

Dean of the College Approval

## Module Aims, Learning Outcomes and Indicative Contents

<b>Module Aims</b>	<p>To introduce students to the fundamental concepts and principles of routing and switching in computer networks.</p> <p>To provide students with an in-depth understanding of network routing protocols and their role in efficient data transmission.</p> <p>To develop students' knowledge of network addressing and subnetting, enabling them to design and configure networks effectively.</p> <p>To familiarize students with switching concepts and technologies, including VLANs, spanning tree protocols, and virtualization.</p> <p>To equip students with the skills and techniques required to troubleshoot network connectivity and performance issues.</p>
<b>Module Learning Outcomes</b>	<p>Explain the basic principles and components of computer networks, including protocols, devices, and architectures.</p> <p>Understand the purpose and operation of routing protocols, such as RIP, OSPF, and BGP, and evaluate their suitability for different network environments.</p> <p>Design and implement IP addressing schemes and subnetting plans to efficiently allocate network resources.</p> <p>Configure and manage network switches, including VLANs, spanning tree protocols, and port security.</p> <p>Identify and resolve common network connectivity and performance issues using appropriate troubleshooting methodologies and tools.</p>
<b>Indicative Contents</b>	<p>Routing Protocols:</p> <p>Routing fundamentals and the role of routing protocols.</p> <p>Distance-vector routing protocols (e.g., RIP).</p> <p>Link-state routing protocols (e.g., OSPF).</p> <p>Border Gateway Protocol (BGP) for inter-domain routing.</p> <p>Network Addressing and Subnetting:</p> <p>IPv4 addressing and subnetting concepts.</p> <p>Address classes, subnet masks, and CIDR notation.</p> <p>Address allocation and hierarchical addressing.</p> <p>Switching Concepts and Technologies:</p> <p>Introduction to network switches and their role in local area networks (LANs).</p> <p>VLANs and their benefits in network segmentation.</p> <p>Spanning Tree Protocol (STP) and its variants.</p> <p>Virtual LAN Trunking Protocol (VTP) and its configuration.</p>

## Learning and Teaching Strategies

<b>Strategies</b>	<p>Lectures: In-class lectures will cover theoretical concepts, principles, and frameworks related to routing and switching. Lecturers will provide real-world examples and case studies to reinforce understanding.</p>
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	<p><b>Practical Exercises:</b> Hands-on lab sessions will allow students to apply their knowledge through network configuration and troubleshooting exercises. These practical sessions will utilize simulation software or physical network equipment.</p> <p><b>Group Discussions:</b> Group discussions and collaborative activities will encourage students to analyze and discuss complex networking scenarios, fostering critical thinking and problem-solving skills.</p> <p><b>Online Resources:</b> Access to online resources, including interactive tutorials, e-books, and video lectures, will supplement in-class learning and provide additional support for self-study.</p> <p><b>Assessments:</b> Formative and summative assessments, such as quizzes, practical exams, and project assignments, will evaluate students' understanding of the concepts, their practical skills, and their ability to analyze and solve networking problems.</p>
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Student Workload (SWL)			
Structured SWL (h/sem)	60	Structured SWL (h/w)	4
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	6
Total SWL (h/sem)	147 + 3 final = 150		

Module Evaluation					
		Time/ Number	Weight (Marks)	Weekly Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (8)	All Weeks	1,2,3,4,5
	Assignments	5	10% (5)	All Weeks	1,2,3,4,5
	Lab	5	10% (15)	All Weeks	1,2,3,4
	Home Work	5	10% (7%)	All Weeks	1,2,3,4,5
	Projects	1	5% (5)	All Weeks	1,2,3,4,5
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

	Material Covered
<b>Week 1</b>	Introduction to Network Layer
<b>Week 2</b>	what's inside a router
<b>Week 3</b>	IP: Internet Protocol
<b>Week 4</b>	IP Subnetting
<b>Week 5</b>	DHCP and NAT
<b>Week 6</b>	Routing Algorithms: Link State
<b>Week 7</b>	Distance Vector
<b>Week 8</b>	Routing in the Internet: OSPF
<b>Week 9</b>	BGP
<b>Week 10</b>	Link Layer Services: Error detection, Correction
<b>Week 11</b>	Multiple Access Protocols
<b>Week 12</b>	LANs: Addressing, ARP, Ethernet and Switches
<b>Week 13</b>	VLANs
<b>Week 14</b>	Link Virtualization MPLS
<b>Week 15</b>	Data Center Networking
<b>Week 16</b>	<b>Preparatory week before the final Exam</b>

### Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
<b>Week 1</b>	Routing Protocol Configuration and Verification
<b>Week 2</b>	Subnetting and IP Address Allocation
<b>Week 3</b>	Dynamic Routing Protocol Comparison: RIP vs. OSPF
<b>Week 4</b>	Static Routing Configuration and Troubleshooting
<b>Week 5</b>	Network Address Translation (NAT) Implementation
<b>Week 6</b>	Virtual LAN (VLAN) Design and Routing
<b>Week 7</b>	Subnet Design and Optimization for Efficient IP Addressing
<b>Week 8</b>	Routing Metrics and Path Selection Analysis

<b>Week 9</b>	Implementing VLSM (Variable Length Subnet Masking)
<b>Week 10</b>	IPv6 Routing Configuration and Transition Techniques
<b>Week 11</b>	Inter-VLAN Routing with Router-on-a-Stick Topology
<b>Week 12</b>	Redundancy and Load Balancing using Routing Protocols
<b>Week 13</b>	Routing Protocol Redistribution and Route Filtering
<b>Week 14</b>	Routing Loop Detection and Prevention Strategies
<b>Week 15</b>	Troubleshooting Routing and Subnetting Issues in a Complex Network

### Learning and Teaching Resources

	Text	Available in the Library?
<b>Required Texts</b>	James F. Kurose and Keith W. Ross. Computer Networking: A Top-Down Approach, Eighth edition, 2020.	Yes
<b>Recommended Texts</b>	<ul style="list-style-type: none"> <li>L. L. Peterson and B. S. Davie. Computer Networks, A Systems Approach. Morgan Kaufman, Fourth edition, 2006.</li> <li>A. S. Tanenbaum. Computer networks. Prentice-Hall, Fifth edition, 2010</li> </ul>	No
<b>Websites</b>	<a href="http://jim.kurose.org/">Jim Kurose Homepage (umass.edu)</a>	

### Grading Scheme

Group	Grade	Mark	Marks (%)	Definition
<b>Success Group (50 - 100)</b>	<b>A</b> - Excellent	Excellent	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	Very Good	80 - 89	Above average with some errors
	<b>C</b> - Good	Good	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	Fair / Average	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	Pass / Acceptable	50 - 59	Work meets minimum criteria
<b>Fail Group (0 – 49)</b>	<b>FX</b> – Fail	Fail (Pending)	(45-49)	More work required but credit awarded
	<b>F</b> – Fail	Fail	(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.