Faculty of Applied Science/==Information Technology Department==

IT Master Degree acceptance ==qualification exam topics== are as follows:

Course 1: **Data Communication and Networking** (suggested weight is 30% of questions)

- **Network Fundamentals**: OSI model, TCP/IP model, network topologies, and protocols.
- **Routing and Switching**: Routing algorithms, dynamic routing protocols, VLANs, and switching concepts.
- **Network Security**: Firewalls, VPNs, intrusion detection systems, and cryptographic techniques.
- **Wireless Networks**: Wireless communication principles, Wi-Fi, Bluetooth, and mobile networks.
- **Network Management**: SNMP, network monitoring tools, and performance analysis.
- **Network Troubleshooting**: Diagnosing and resolving network issues, using tools like ping, traceroute, and Wireshark.
- **Network Design and Implementation**: Designing scalable and efficient network architectures.

Course 2: **AI** (suggested weight is 20% of questions)

- **Introduction to AI**: History and development of AI, key milestones, and current trends.
- **Search Algorithms**: Uninformed and informed search strategies, heuristic functions, and search optimization.
- **Knowledge Representation**: Propositional logic, first-order logic, semantic networks, and frames.

Course 3: **IoT** (suggested weight is 20% of questions)

- **Introduction to IoT**: Overview of IoT, history, and key concepts.
- **IoT Architecture**: Components of IoT systems, including sensors, actuators, communication protocols, and cloud services.
- **Networking Protocols**: IoT-specific protocols such as MQTT, CoAP, Zigbee, and LoRaWAN.
- **Embedded Systems**: Basics of embedded systems, microcontrollers, and real-time operating systems.
- **IoT Applications**: Real-world applications of IoT in various industries such as healthcare, agriculture, smart cities, and industrial automation.

Course 4: **DBMS** (suggested weight is 30% of questions)

- **Database Fundamentals**: Basic concepts, data models, schemas, and instances.
- **Relational Model**: Concepts of tables, attributes, tuples, keys, and relationships.
- **SQL (Structured Query Language)**: DDL, DML, DCL commands, and advanced query writing.
- **Normalization**: Normal forms, normalization techniques, and decomposition.
- **Database Design**: ER (Entity-Relationship) model, ER diagrams, and database design principles.
- **Transaction Management**: ACID properties, transaction states, concurrency control, and recovery techniques.
- **Indexing and Hashing**: Types of indexes, index structures, and hashing methods.
- **Stored Procedures and Triggers**: Writing and using stored procedures and triggers for database operations.

Course 1: Data Communication and Networking (30%)

Primary Textbooks
1. "Computer Networking: A Top-Down Approach" by James F. Kurose and Keith W. Ross
2. "Computer Networks" by Andrew S. Tanenbaum and David J. Wetherall
3. "Network Security Essentials: Applications and Standards" by William Stallings

Online Resources
- Cisco Networking Academy (netacad.com)
- Professor Messer's Network+ Course (professormesser.com)

Course 2: Artificial Intelligence (20%)

Primary Textbooks
1. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig
2. "Introduction to Artificial Intelligence" by Wolfgang Ertel

Online Resources
- Harvard AI lectures (https://cs50.harvard.edu/x/2024/)
- Stanford AI Course Materials (cs221.stanford.edu)

Course 3: Internet of Things (20%)

Primary Textbooks
1. "Internet of Things: A Hands-on Approach" by Arshdeep Bahga and Vijay Madisetti
2. "Building the Internet of Things" by Maciej Kranz
3. Foundations of Modern Networking SDN, NFV, QoE, IoT, and Cloud. By William Stalling
4. IoT Fundamentals: Networking technologies, protocols, and use cases for the internet of things. David Hanes et. al

Online Resources
- AWS IoT Documentation (https://docs.aws.amazon.com/iot/)
- Microsoft Azure IoT Documentation (https://learn.microsoft.com/en-us/azure/iot/)

Course 4: Database Management Systems (30%)

Primary Textbooks
1. "Database System Concepts" by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan
2. "Database Management Systems" by Raghu Ramakrishnan and Johannes Gehrke
3. "Fundamentals of Database Systems" by Ramez Elmasri and Shamkant B. Navathe

Online Resources
- W3Schools SQL Tutorial (https://www.w3schools.com/sql/)
- PostgreSQL Documentation (https://www.postgresql.org/docs/)
- Oracle Database Documentation (https://docs.oracle.com/en/database/)