**Module 9: Requirements Quality**

1. **Quality Measures (IEEE-830)**
   * **Correctness**: All requirements must be met by the software; no extra "nice-to-haves"​(Module 9 - Requirements…).
   * **Completeness**: Describes all necessary functionality, performance, constraints, and interfaces​(Module 9 - Requirements…).
   * **Unambiguous**: Each requirement should only have one interpretation​(Module 9 - Requirements…).
   * **Consistency**: No conflicts among requirements​(Module 9 - Requirements…).
   * **Ranked**: Prioritize by importance and stability​(Module 9 - Requirements…).
   * **Verifiability**: Requirements must be testable​(Module 9 - Requirements…).
   * **Modifiability**: The structure must allow easy changes​(Module 9 - Requirements…).
   * **Traceability**: Clear origins and referable in future development​(Module 9 - Requirements…).
2. **Key Challenges and Solutions**
   * **Correctness**: Requires peer and customer reviews, traceability​(Module 9 - Requirements…).
   * **Completeness**: Joint reviews with users, prototyping to ensure all functional and non-functional requirements are captured​(Module 9 - Requirements…).
   * **Unambiguity**: Use multi-level reviews, prototypes, and measurable criteria​(Module 9 - Requirements…).
   * **Consistency**: Extensive manual reviews to prevent contradictions​(Module 9 - Requirements…).
   * **Ranked Requirements**: Prioritize based on scope, stability, and importance​(Module 9 - Requirements…).
   * **Verifiability**: Testing-aware wording and process-focused validation​(Module 9 - Requirements…).
   * **Modifiability**: Embrace change through tools and a change management process​(Module 9 - Requirements…).
   * **Traceability**: Use unique identifiers for all requirements and artifacts​(Module 9 - Requirements…).
3. **Requirements Validation**
   * **Validation**: Ensures the system meets the user’s needs. It’s more than just testing; it checks for completeness, ambiguity, and omissions​(Module 9 - Requirements…).
   * **Prototyping**: Helps with validating concepts but must be careful about shortcuts​(Module 9 - Requirements…).
   * **Requirements-Based Testing**: Validates use cases and ensures all scenarios are covered​(Module 9 - Requirements…).

**Module 10: Requirements Standards**

1. **General Standards**
   * **IEEE 29148**: Focused on requirements process, documents (SRS, StRS, SyRS), and traceability. An extended and detailed version of IEEE 830​(Module 10 - Requirement…).
   * **CMMI (Capability Maturity Model Integration)**: Emphasizes process maturity. Includes Requirements Development (RD) and Requirements Management (REQM), focusing on elicitation, validation, and traceability​(Module 10 - Requirement…).
   * **SWEBOK**: Software Engineering Body of Knowledge, covering all essential knowledge for software engineers, including requirements​(Module 10 - Requirement…).
   * **SEBOK**: Systems Engineering Body of Knowledge, guiding systems design and requirement decomposition​(Module 10 - Requirement…).
   * **BABOK**: Business Analyst Body of Knowledge, focusing on people, collaboration, and communication in requirements processes​(Module 10 - Requirement…).
2. **Industry-Specific Standards**
   * **MIL-STD-498**: Defense standard focused on comprehensive documentation like SRS, design descriptions, and interface descriptions​(Module 10 - Requirement…).
   * **DO-178C**: Avionics software standard with design assurance levels based on failure consequences. It requires extensive traceability and verification​(Module 10 - Requirement…).
   * **IEC 62304**: Medical device software standard focused on risk management, development, and requirements traceability​(Module 10 - Requirement…).
   * **EN 50128**: Railway system standard focused on safety integrity levels and full traceability​(Module 10 - Requirement…).
3. **Why Standards Matter**
   * Standards provide a **common approach** to requirements engineering, ensuring **rigor**, **traceability**, and **compliance**, particularly in industries with critical systems like defense, aerospace, medical devices, and transportation​(Module 10 - Requirement…).