**Week 1-2: Project Initiation & Research Preparation**

Define project objectives, requirements, clients’ needs and risks  
Review existing system architecture & previous research

Identify hardware & software technical approach  
Assign team roles

**Week 3-4: System Architecture Design**

Design one-to-three communication protocol  
Select appropriate signal synchronization & scheduling strategy  
Define data format & error handling methods

**Week 5-6: Hardware & Software Development**

Update master beacon software to handle multiple slave beacons  
Develop slave beacon communication logic for coordinated response  
Ensure underwater signal propagation stability

**Week 7-8: Simulation Testing**

Test one-to-three communication in a simulation environment  
Evaluate signal interference & impact of multiple simultaneous responses  
Optimize data synchronization & error correction methods

**Week 9-10: Real-World Testing**

Conduct testing in a controlled water tank/lab environment  
Measure latency, bit error rate, and data loss  
Adjust communication strategy based on feedback

**Week 11: Data Analysis & Documentation**

Analyze experimental results & identify optimization points  
Draft technical report & paper  
Prepare presentation materials

**Week 12: Final Optimization & Submission**

Final testing & code refinement  
Complete report & presentation slides  
Submit final deliverables

**Milestones for Multi-Beacon Ranging System for Underwater Robotics**

1. **Milestone 1: Project Initialization & Research Completion** (End of Week 2)

Clearly defined project objectives and scope

Team roles assigned

Understanding of previous research and existing one-to-one communication system

1. **Milestone 2: System Architecture Finalization** (End of Week 4)

One-to-three communication protocol designed

Signal synchronization & scheduling strategy selected

Data format and error handling methods defined

1. **Milestone 3: Software & Hardware Implementation** (End of Week 6)

Master beacon software updated to support multiple slave beacons

Slave beacon communication logic implemented

Initial validation of underwater signal stability

1. **Milestone 4: Successful Simulation Testing** (End of Week 8)

One-to-three communication tested in a simulated environment

Evaluated interference, latency, and data synchronization

Optimization of error correction methods

1. **Milestone 5: Real-World Testing & Data Collection** (End of Week 10)

System tested in a controlled water tank/lab environment

Performance metrics collected (latency, bit error rate, data loss)

Adjustments made based on real-world feedback

1. **Milestone 6: Documentation & Presentation Preparation** (End of Week 11)

Experimental results analyzed and documented

Technical report and draft paper completed

Presentation slides prepared

1. **Milestone 7: Final Optimization & Submission** (End of Week 12)

Final system refinements and optimizations completed

Technical report and presentation finalized

Project deliverables submitted