Capstone Project Ontology : Ontology Requirements Specification (Phase I)

Submitted to: Dr. Fahad Maqbool

SubmittedBy:

Daima Iftikhar	*BSCS51F21R013*
Hadia Latif	BSCS51F21R020
Haseeb Bilal	BSSC51F21R014

Semantic web

1. Purpose

The main purpose of this ontology is to provide a structured semantic representation of all elements involved in academic capstone projects. It captures key concepts such as phases, documentation, tools, supervision, evaluation, and technical components, aiming to facilitate project planning, monitoring, and automated reasoning within university environments.

2. Scope

The ontology covers university-level capstone projects, particularly in software and AI-related domains. It models the lifecycle phases, participant roles, documentation artifacts, tools, evaluation methods, risks, and outcomes of such projects. The ontology offers medium granularity, making it adaptable for various departments.

3. Implementation Language

The ontology will be implemented in **OWL (Web Ontology Language)** to support semantic inference and reasoning.

4. Intended End-Users

- University Students
- Academic Supervisors / Advisors
- Evaluation Committees
- Industry Mentors
- Curriculum Designers / Departments

5. Intended Uses

- Guiding students through capstone phases
- Serving as a knowledge base for evaluation and feedback
- Supporting project planning, monitoring, and documentation
- Enhancing communication between all stakeholders
- Automating report generation and assessment processes

6. Ontology Requirements

a. Non-Functional Requirements

- The ontology must be modular and extensible across departments
- It should use standard ontology languages and support reuse
- It must be interoperable with common academic/project platforms
- It should be understandable by both technical and non-technical users

b. Functional Requirements: Groups of Competency Questions

Capstone Project Lifecycle

- What are the main phases of a capstone project?
- What activities are carried out in each phase?
- What documents are produced in each phase?
- What is the timeline or duration of each phase?

Stakeholders & Roles

- Who are the participants in a capstone project?
- What roles can a student play in the project?
- What is the role of the supervisor/advisor?
- Are industry mentors involved in the project?

Project Management

- What tools are used for collaboration?
- How are tasks assigned in a team?
- What milestones must be met in a project?
- What resources are allocated to the project?

Technical Aspects

- What programming languages are used in the project?
- What development methodology is followed?
- What type of database or storage is used?
- Are APIs or cloud services integrated?
- What security or privacy measures are applied?

Deliverables

- What are the required deliverables for a capstone project?
- When is each deliverable due?
- What is included in the final report?
- Is a user manual or demo required?

Evaluation

- What are the criteria used for project evaluation?
- Who performs the evaluation?
- How is innovation or originality measured?
- Is peer or industry feedback considered?

Risks & Challenges

- What are the common risks in capstone projects?

- How can team coordination issues be managed?
- Are there any legal or ethical concerns (e.g., plagiarism)?
- What happens if timelines are not met?

Future Scope

- Can the project be turned into a product or startup?
- Can the results be published?
- Is the project scalable for future improvements?
- Is there potential for industry adoption?

7. Pre-Glossary of Terms

a. Terms from Competency Questions

Term	Frequency	Notes
Capstone Project	High	Core domain concept
Phase	High	Lifecycle stages
Document	High	Includes multiple types
Student	High	Participant role
Supervisor	Medium	Academic role
Evaluation	Medium	Includes criteria & process
Timeline	Medium	Includes start, end, milestones
Tool	Medium	Collaboration or development
Resource	Medium	Budget, equipment, time
Risk	Low	Coordination, plagiarism, etc.
Industry Partner	Low	External contributor
Report	Medium	Specific deliverable
Activity	Medium	Actions within each phase
Milestone	Medium	Checkpoints in timeline
Team	Medium	Student grouping

b. Terms from Answers (Grouped by Class)

Term Group	Terms	Frequency
Document	Proposal, Literature Review, Design Document, Final Report, User Manual	High
Tool	GitHub, Trello, Notion	Medium
Programming Language	Python, Java, C++	Medium
Framework	React, TensorFlow	Medium
Database	MongoDB, MySQL, Firebase	Medium

Methodology	Agile, Waterfall	Medium
Deliverable	Poster, Presentation, Prototype	High
Evaluation Criteria	Innovation, Functionality, Timeliness, Viva	Medium
Outcome	Startup, Journal Publication	Low
Risk	Plagiarism, Coordination Issues	Low

c. Objects

Object	Notes
CapstoneProject	Main ontology focus
ProjectPhase	Subdivisions of the lifecycle
Student	Participant class
ProjectTeam	Grouping of students
Supervisor	Guides the student/team
IndustryMentor	External mentor or contributor
EvaluationPanel	Reviewers and assessors
Deliverable	Outcomes of each phase
Document	Produced per phase
Tool	Software platform or utility
ProgrammingLanguage	Languages used in development
Framework	Libraries and frameworks used
Database	Technologies for data storage
Methodology	Development approach
Timeline	Duration and milestones
Risk	Potential threats or problems
Activity	Tasks within each phase
Milestone	Important progress checkpoints
Enhancement	Future work or scalability aspect